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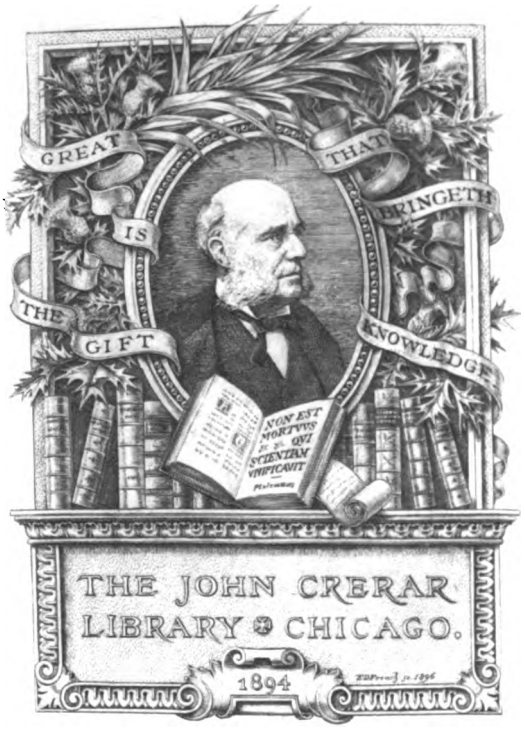

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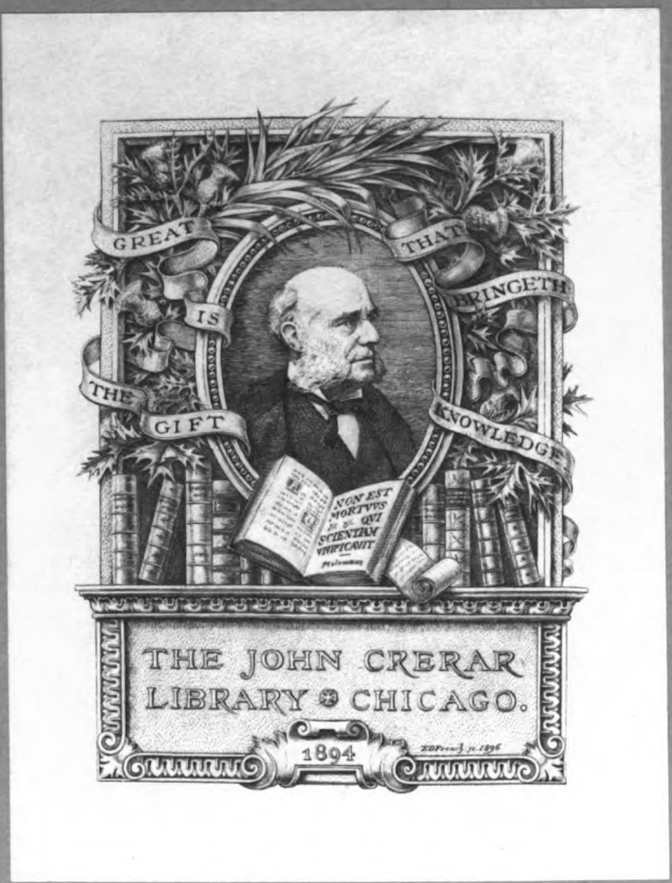

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Electric Railway Journal

Volume XLVIII

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Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each subject. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the State matters of any particular State. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or State to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or State affairs appear direct under the names of the city or State involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the more common keywords used in the index. This list has [illegible] convenience into sixteen [illegible] the general subject head[illegible] tal letters, do not appear [illegible] index. As an example, if [illegible] locate an article on [illegible] wagons he would obviou[illegible] under the general subject [illegible] the two keywords that app[illegible] tion, only "Service and to[illegible] apply to the article in qu[illegible] would therefore refer to t[illegible] "S" in the body of the inde[illegible]

In addition to the grou[illegible] ered by these headings t[illegible] ports from railway asso[illegible] nical societies are grouped [illegible] of the various organizatio[illegible] other associations are inde[illegible] ance with the subject disc[illegible] scriptions of machine tools [illegible] der the heading "Repair [illegible] and are not indexed alphabe[illegible] the wide choice in most ca[illegible] keyword.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND LEGAL

Accidents (including wrecks)
Accident claim department
Legislation
Legal
Public service and regulative commissions
Public service corporations
Safety-first movement

CARS

Car design
Cars (descriptive)
Cleaning of cars
Gasoline cars
Lubrication
Heating of cars
Lighting of cars
Storage battery cars
Tower cars
Ventilation of cars
Work and wrecking cars

CAR EQUIPMENT

Axles
Bearings
Brakes
Controllers and wiring
Couplers
Current-collecting devices
Doors, seats and windows
Fenders and wheel guards
Gears and pinions
Headlights
Motors
Trucks, car
Wheels

EMPLOYEES

Employees
Strikes and arbitrations

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Fares
Freight rates
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Transfers

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Appraisal of railway property
Financial
Franchises
Maps
Operating records and costs
Statistics
Traffic investigations

HEAVY ELECTRIC TRACTION

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High-tension d.c. railways
Interurban railways (general)
Locomotives
Low-tension d.c. railways
Single-phase railways

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Inspection of cars
Maintenance records and costs
Paints and painting
Repair shop equipment
Repair shop practice
Repair shops
Tests of equipment
Welding, Special methods

OPERATION

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Multiple-unit trains
Operating records and costs
Passenger handling records
Schedules and time tables
Signals
Stopping of cars
Train operating practice

POWER

Boilers and equipment
Cables
Energy consumption
Feeders
Overhead contact system
Poles
Power distribution
Power generation
Power stations and equipment
Purchased po[illegible]
Substations a[illegible]
Third-rail con[illegible]
Transmission
Turbo-generat[illegible]

RE[illegible]

Maintenance r[illegible]
Operating rec[illegible]
Passenger hal[illegible]
Record forms

STRU[illegible]

Bridges
Carhouses and [illegible]
Power stations [illegible]
Repair shops
Terminal stati[illegible]
Waiting statio[illegible]

TI[illegible]

Pavement
Rail joints and [illegible]
Rails
Special work
Ties
Track construc[illegible]
Track mainten[illegible]

TR[illegible]

Freight and ex[illegible]
Public, Relatio[illegible]
Publicity
Routing of car[illegible]
Traffic investig[illegible]
Traffic stimula[illegible]

VEHICLES [illegible]

Motor buses
Service and tow[illegible]

MISCEL[illegible]

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MANUFACTURERS AND THE ASSOCIATION

If one can judge from the enthusiasm of those who were in attendance at the committee meetings of the American Electric Railway Association in Atlantic City last week, the October convention will be a great success. A gratifying number of manufacturers have joined the association under the new membership plan. There are still many who have not joined, but the proper committees are enthusiastically busy in the work of building up the membership. While many manufacturers were disappointed at the disruption of their association as it had been in the past, it will be more and more apparent as time goes on that full membership for manufacturers in the parent association will mean much more to them than simple membership in the old Manufacturers' Association. In this connection, however, it should be remembered that a strong committee of manufacturers was appointed to consider the perpetuation of some sort of a manufacturers' association, and this committee, no doubt, will report in the fall. If it appears that there is work to be done, no doubt a manufacturers' association can be perpetuated or the manufacturers who join the parent association can apply for a charter similar to that enjoyed by the Engineering and other affiliated associations. At any rate there is a definite plan before us, and that plan calls for the united membership of all those manufacturing companies who have the welfare of the electric railway industry at heart.

ELASTIC LIMIT DEFINED

A feature of the convention of the American Society for Testing Materials this week was the plan for defining that decidedly indefinite property of ferrous metals, elastic limit. This came with a recommendation from the committee on steel to revise its several existing specifications covering carbon-steel and alloy-steel forgings by the elaboration of the present clause which refers to this point and which states merely that elastic limit shall be determined by an extensometer. Naturally, this wording leaves a wide opening for the influence of the personal equation of the observer; so much so, in fact, that the term "elastic limit" has become almost meaningless. The substitute clause, on the other hand, provides for use of an extensometer which reads to 0.0002 in. This must be attached to the specimen at the gage marks, and not to the shoulders of the specimen nor to any part of the testing machine. The machine must then be operated so as to increase the load on the specimen at a uniform rate, and the observer is to note "the load at which the rate of elongation shows a sudden increase." This load is the elastic limit of the tested material. The elaboration furnishes at least the improvement of increased definiteness, but unfortunately, with the practical disappearance of wrought iron, the cases where the change in the rate of elongation is really sudden are rare, so that, after all, the personal element of observation is still the dominating feature in the determination of this important quality of wrought steel.

CITY PARALLEL TO "EXCLUSIVE FRANCHISE"

The city of San Francisco and the United Railroads are again entering upon legal procedure over franchise matters, this time with a fair prospect of carrying the case to the Supreme Court. Last year, in the legal battle over the Market Street loop, apparent victory rested alternately with each side, but there was never a clear and final decision on the matter. Perhaps the most regrettable feature of this case was that all the trouble and agitation of public opinion could have been avoided, and the dispute settled out of court, if the disputants could have gotten together and frankly discussed the problem. President Lilienthal expressed that thought at the beginning, and it was that spirit and not a court ruling which eventually closed the matter. The new disagreement, which has been mentioned in our news columns, over the right of the city to parallel the tracks of a company to which it has given an exclusive franchise, is an entirely different matter, however, and there is no likelihood that any solution other than a resort to the courts could satisfactorily settle it. Such a case has never before arisen in this country, and if the municipal railway idea is to spread, the importance of the final decision in such a case is apparent. Because a question of constitutional rights is involved, the United Railroads has entered the case in the San Francisco District Federal Court, and it is generally agreed that an appeal is practically certain whichever way the decision goes. The decision in the lower court is important, however, for if it denies the petition of the United Railroads, the city could proceed with the construction, pending the passing of the case through the courts. If a decision adverse to the United Railroads should be handed down and be upheld by the higher courts, another serious hazard to electric railway properties will be created. It is hardly conceivable that the ultimate decision will be unfavorable, but assuming that the city could legally establish the rights of the stand it is taking, the confiscatory nature of the result indicates how unfair this course would be. The company has built up its system in good faith, believing in

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the protection afforded by its franchise agreements with the city, and even if the city could legally repudiate its contracts, manifestly it has not the moral right to do so.

EVERY-DAY LAW—AND DUTY—FOR WOMEN

We have recently had occasion to speak of the waning tendency of popular magazines to publish articles of the corporation-baiting and exposé type, owing to the increasing consciousness and dislike by readers of exaggerated and unfair literature. Unfortunately, however, exceptions occasionally still creep into the columns of even the reputable magazines. For example, our attention has been called to an article entitled "Every-Day Law for Women," which appeared in the June issue of *Good Housekeeping*.

In discussing various points of advice to women on law, the article recounts in exaggerated but somewhat popular journalistic style the inconveniences suffered by the subpœnaed witness in accident cases. It then concludes its remarks on this subject by encouraging the feminine reader to withhold her name from the conductor, in case she should be present at a railway accident. In regard to personal injury in a trolley or railroad accident the author advises the injured party to refuse to see the claim adjuster but refer him to her lawyer. This advice is explained on the ground that fair-minded adjusters who are only interested in getting the facts in order to make a just settlement are as rare as "white crows," as the article expresses it; that the average claim adjuster generally visits the injured person when she is still sick and shaken, and by false sympathy and other craft persuades her to sign a release for a sum which later is often found to be in no way commensurate with justice or proportionate to the amount which could have been secured by suit or settlement through a lawyer.

In warning the injured persons against any intercourse with the claim adjuster, the article casts an absolutely unwarranted slur upon railway claim departments and the methods of railways in general. But, passing that point, it also excludes the course which is not only the most common but is also nearly always the most profitable to the injured person. We would not find fault with advice which suggests that any woman, or man either, who has an important business matter to decide, should talk it over with some one on whose business judgment he or she can rely. But this suggestion, when given to any one injured in an accident, should be coupled with a warning of the danger of going to shyster lawyers whose counsel as to what to do is certainly not apt to be disinterested.

The advice to witnesses of an accident to decline to give their names and addresses is on a par with that to persons injured in accidents, although perhaps more dangerous because it is likely to affect a larger number of persons. The effect of doing as the writer suggests is to prevent the truth from becoming known, and if everyone acted on this principle the courts would be helpless. We hear a great deal at present about "women's rights," but the fact cannot be too strongly emphasized that the citizenship of women, and of men too, involves certain duties as well as rights, and one of these duties is to assist the courts in administering justice. It is hard to imagine any more pernicious counsel short of actually advocating crime, than that of preventing the disclosure of essential facts in a case at law.

ELECTRIC RAILWAY PROSPECTS

The article by Professor Conway, appearing on another page of this issue, presents a timely discussion of factors affecting the electric railway business, particularly with reference to the securing of new capital. We are now in a period when electric railway gross and net earnings are showing, on the whole, a gratifying increase, and an analysis of what this situation means is important. If the benefit is to be permanent, capital to build extensions to existing lines and to promote new enterprises can be obtained. There are a number of adverse conditions, Professor Conway frankly admits, but he points out that in several respects there is a close parallel between the present situation and that after the business revival in 1907, when the electric railways had an important period of growth. Personally, we are not inclined to take quite as sanguine a view of the immediate future as the author of the article. The present increases in earnings are gratifying, but, as we pointed out recently, there is a certain "lag" in electric railway operation between greater expenses from higher unit costs of material and labor and higher earnings so that, in the interim, the net earnings will be better than they will be when the higher operating costs begin to be reflected in the monthly report. Another adverse condition which did not exist eight years ago is more stringent regulation and service conditions, and another is higher taxes.

On the other hand, there are a number of favorable conditions. One of them is greater efficiency of apparatus, brought about by the development of the art, and another is the regulation already mentioned, which, while it brings certain burdens, also puts electric railroading on a firmer business basis and gives greater security for at least the principal invested in the business as well as greater assurance that some return, even if it is not a large return, will be allowed on the investment. Professor Conway, of course, recognizes and refers to all of these factors in his article, but we mention them in a slightly different relationship so as to emphasize the character of the different conditions. Broadly speaking, we believe that those factors mentioned above as favorable are of a more permanent nature than those which are adverse. Electric railways are necessary to welfare of the community, and the fact is becoming better recognized that they must receive encouragement to develop according to the needs of the public. Several important problems confront the industry, and one of the most important of them is the best form of making an increased charge for transportation or otherwise increasing the return to capital. But the fundamental conditions are sound, and noticeable advance has been made in solving the question of greater net earnings.

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ELECTRIC RAILWAYS IN PREPAREDNESS

The program of the thirty-fourth annual convention of the New York Electric Railway Association held in Niagara Falls this week was unusual in that it dealt with no technical phases of transportation. Almost the sole topic discussed was the utilization of the electric railways of the state in mobilizing troops and supplies. The interest which such a subject would always excite was naturally accentuated by the tension over the Mexican situation, and it crystallized in the determination to form a committee on military service which should conserve the results of the preliminary work.

The program on preparedness presented at the meeting was largely the result of two months of effort on the part of a specially-appointed committee which discharged its duty by systematically gathering, compiling and interpreting the fundamental data of the subject, namely, the numbers of men and amounts of material to be mobilized, and the electric railway facilities available for mobilizing them. The committee report, which is abstracted elsewhere in this issue, is a model of directness, meatiness and brevity. It will undoubtedly prove suggestive to other associations. In a perspective, or more accurately, a birdseye view of this report and the accompanying papers and discussion, several points project conspicuously. First, there is evident a desire on the part of railway men as citizens to place their services at the disposal of their country with the hope that their hard-won skill in transportation lines will be utilized directly or indirectly. Further, granting that mobility of men and supplies is in importance second only to intelligent planning, it follows that the flexibility, transporting capacity and availability of the electric railway qualify it as a most useful adjunct to the steam railroad in the national defense. And the skill developed by men in handling electric railway traffic is available in other transportation problems outside this immediate field, such as dispatching road traffic in military operations.

Of course, the patriotic service of electric railway companies and of their personnel does not end here. The railways are employers of large numbers of men above the average in physical condition, and it is gratifying to note the number of railway men who have joined their commands in the National Guard now at points of mobilization in the different states or on their way to the Border. It is equally satisfactory to note that many electric railway companies have announced their decision to continue the payment of regular salaries to those of its employees who are thus called to military duty. The McGraw Publishing Company has issued such a notice and the ruling applies not only to the ELECTRIC RAILWAY JOURNAL editorial and business staffs but to all of the papers issued by the McGraw Publishing Company—*Engineering Record, Electrical World, Metallurgical and Chemical Engineering* and the new paper, *Electrical Merchandizing*, which will make its initial appearance next week. Members of this organization affected by this order will, insofar as possible, be retained on the payroll and returned to the positions they now occupy when the need for their military services has ceased.

AMMUNITION FOR PUBLICITY CAMPAIGNS

The surest way to reach the public is through the newspapers and popular magazines. The advertising pages of these are good, but the editorial pages are infinitely better. To obtain admittance to the editorial pages, however, an article or news note must appeal to the editor as having news value, that is, it must tell something that a considerable portion of his readers want to know. The criminal element in the community produces an inordinate proportion of the news, and it is discouraging to a legitimate news producer like the railway to have to compete with the underworld for space in the public print. It is vital to the future of the industry, however, that it successfully compete because its welfare will depend on the popular understanding of its problems and just treatment at the hands of the representatives of public sentiment. It needs no argument to prove that the electric railways, with a few notable exceptions, have hardly made a start in securing the co-operation of the newspapers of their respective communities. There are at least two perfectly obvious reasons for this, namely, absorption in the difficult problems of administration and the non-sensational character of railway events. A murder case bristles with news. Every word that anyone who has had any connection with the case says about it is of interest to the public, or is supposed to be so in the newspaper office. The fact that the local railway company is trying out a new form of car designed better to serve the public and to decrease the operating ratio is not thought by the average editor to be so inherently interesting, although it touches the people much more closely than the murder does.

The problem of the railway management to-day is therefore to impress on the people through the editors, and to a limited extent through advertising, the really significant things about the transportation business. This is far from easy, but it must be done. The railway manager must first develop his "nose for news" in his own industry. He must discover the interesting things on his own property, and there are plenty of them. He must co-operate with the editors with a view to informing them of his and the industry's problems and getting the editors to study them. One of the functions of the ELECTRIC RAILWAY JOURNAL, and a function of no mean importance, is to supply the managements of the railways with ammunition for publicity campaigns. With its elaborate machinery for gathering the news of the industry, it is able to indicate the tendencies of the time and to illustrate these with numberless news items. Surely every railway manager can find something each week which has news value in his community and which, properly co-ordinated with the local circumstances, would appeal forcefully to the editors of the community. It is the man on the job who can use this ammunition most effectively. Why not try the experiment this week?

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Electrification of an English Freight Line

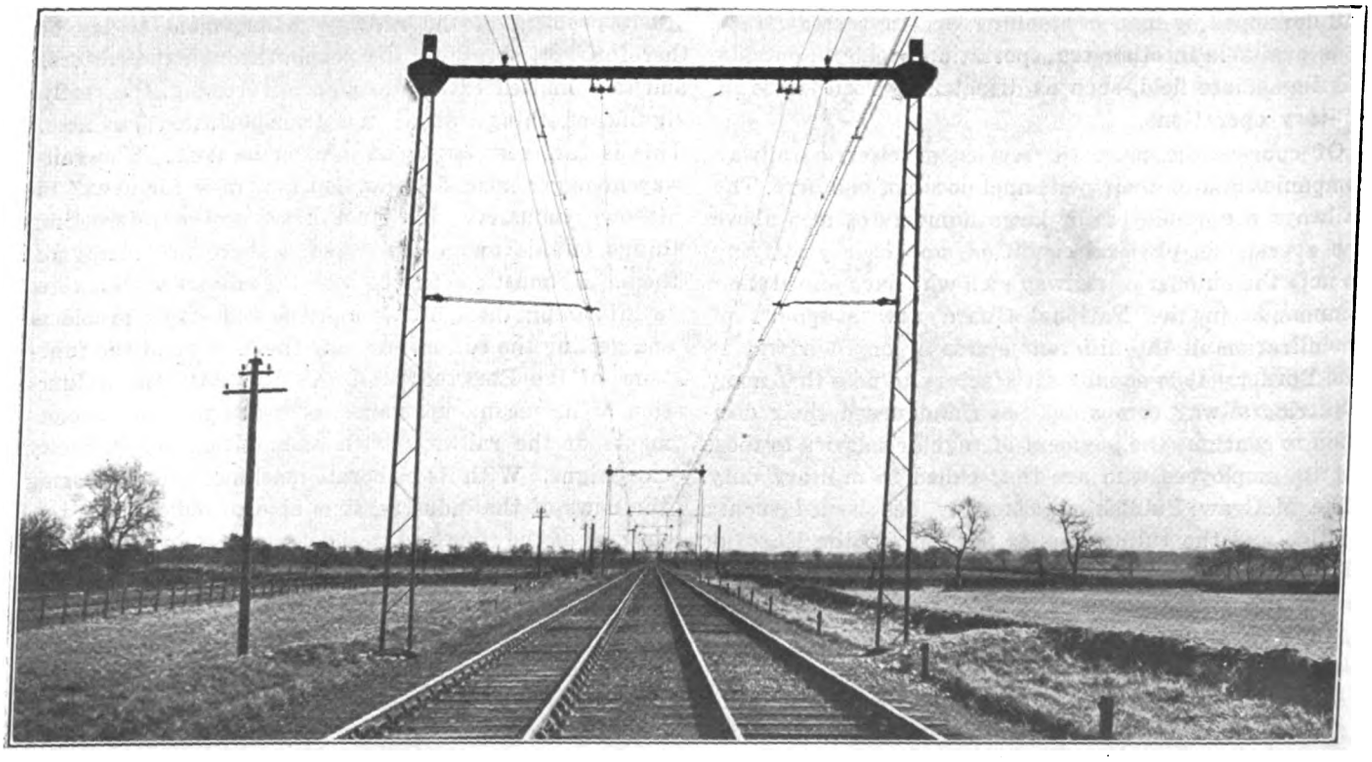
Electric Operation of Freight Trains Has Been Introduced on the Shildon-Newport Branch of the North Eastern Railway in England—Locomotives of 74 Tons Weight Are Used, Direct Current at 1500 Volts Being Supplied From an Overhead Catenary System

CONSIDERABLE historical interest attaches to the electrification of the Shildon-Newport freight line of the North Eastern Railway in England. The track extends over a portion of the original right-of-way of the first public railway on which steam locomotives were used for conveying passengers and freight, the line having been opened in the year 1825. Interest attaches to the installation also because it is the first application of electric traction in England to heavy freight haulage, and here it may be said that this is the second time that the North Eastern Railway has acted as a pioneer in the use of electric operation, inasmuch as the company made its first electrification in 1904 in connection with suburban traffic.

The Shildon-Newport route is an important freight line dealing almost exclusively with heavy coal and ore traffic, and it has been electrified as an experiment in connection with a decision of the company's general manager, Sir A. Kaye Butterworth, to consider generally the possibility of electrification on the North Eastern Railway System. Construction work was begun subsequent to a visit of the railway company's chief mechanical engineer, Vincent H. Raven, and Charles H. Merz of Merz & McLellan, the company's consulting electrical engineers, to the United States in 1911. Electric operation was inaugurated on July 1, 1915, with a limited number of trains, as the overhead construction was not then completed, the service having been gradually extended since that time.

In addition to the usual considerations affecting the decision to apply electric traction to the line, there was a special factor which differentiated the division from others in the United Kingdom. This was because the production and distribution of electric power has been developed upon a larger scale on the northeastern coast of England than in any other part of the country, and a large proportion of the energy derived from electric generating stations which use as fuel the waste heat and gases derived from coke ovens and blast furnaces in the Durham and Cleveland districts. An ample supply of cheap electrical energy was, therefore, available from the systems of existing power companies, and this fact, obviating as it did the necessity for a large capital expenditure by the railway company on a power station, had an important bearing upon the whole scheme.

The electrified line has a route approximating 19 miles in length, and it connects the freight terminal at Shildon, one of the largest classification yards in Great Britain, with the Newport yards near the town of Middleborough. The sidings at both ends of the line are electrified in part, so that altogether about 50 miles of single track are equipped for electric operation. The line carries a heavy coal and ore traffic from the Southwest Durham coal fields to the Middleborough district, supplying a large number of blast furnaces and iron works concentrated there. The general gradient of the line is in favor of the laden traffic, the ruling grade being about 1 per cent. On the return journey the load



BRITISH FREIGHT ELECTRIFICATION—TYPICAL OVERHEAD CONSTRUCTION ON TANGENT TRACK

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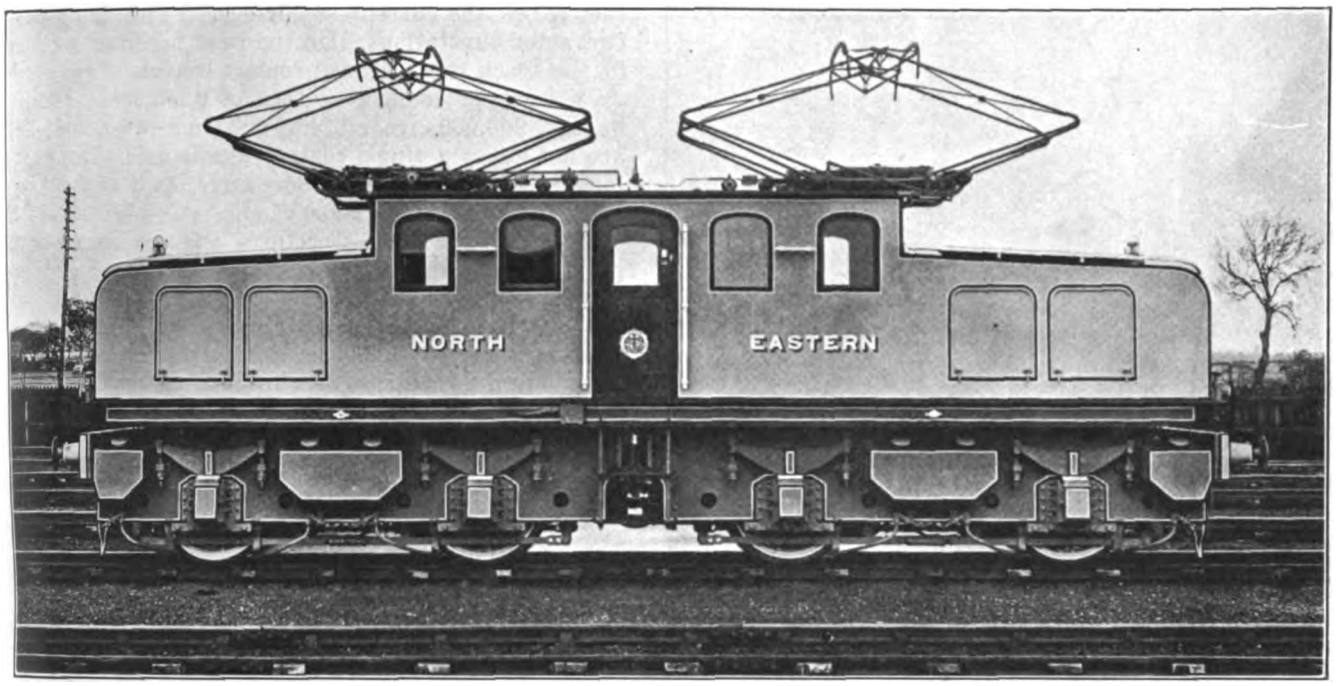

BRITISH FREIGHT ELECTRIFICATION—SIDE VIEW OF LOCOMOTIVE

consists mainly of empty cars that are being returned to the yards at Shildon.

LOCOMOTIVES

The locomotives are designed to haul trains weighing 1400 tons at a speed of not less than 25 m.p.h. on the level. They were designed and built at the railroad company's shop, the electrical equipment having been installed by Siemens Brothers' Dynamo Works, Ltd., Stafford. The construction is of the articulated-truck type, the trucks being connected by means of a buffer coupling arranged for lateral movement with vertical rigidity. The trucks are held together by a drawbar and spring, which can be adjusted for tension, but which cannot be subjected to excessive compression, as a portion of the coupling between trucks receives the buffing stresses directly through the truck frames. The cab is at the center of the engine, and sloping ends are provided to contain the resistance, contactors, switches and all high-tension electrical apparatus. The pantographs on the cab roof are raised by compressed air, and an arrangement is made whereby the doors to the sloping ends of the cab can be opened only when the air is released and the pantographs are not in contact with the overhead wire. The dimensions and weights of the various parts of the locomotive are as follows:

Weight of electrical equipment, 48,500 lb.	Length of commutator...7⅝ in.
Weight of mechanical parts, 100,300 lb.	Number of segments.....195
Total weight .....148,800 lb.	Width of air gap.....15/64 in.
Approximate height, center of gravity.....4 ft. 6 in.	Normal speed of locomotive, 25 m.p.h.
Length of motor over windings .....24 13/16 in.	Speed of motor.....787 r.p.m.
Length over core....11 11/16 in.	Length of locomotive over buffers .....39 ft. 4 in.
Diameter of armature...21⅝ in.	Width over footplate...8 ft. 4 in.
Diameter of commutator, 18 7/64 in.	Total wheelbase.....27 ft. 0 in.
	Truck wheelbase.....8 ft. 9 in.
	Truck centers.....18 ft. 3 in.
	Wheel diameter.....4 ft. 0 in.

The main equipment of each engine consists of four fully-inclosed motors, each of which drives an axle through single-reduction, twin gears with a face dimension of 3 15/16 in., the gear ratio being 1:4.5. The motors are wound for 750 volts, the pair on each locomotive truck being connected permanently in series and controlled with the usual series-parallel system. Each motor is capable of developing 275 hp. at a speed of 20 m.p.h., with forced ventilation providing for 700 cu. ft. of air per minute passed through the motor case. The equipment is capable of exerting a torque sufficient to slip the wheels under any condition of rail, and can exert an average drawbar pull of 28,000 lb. under normal conditions of rail.

The motors are designed to run at a limiting speed of 45 m.p.h., but the normal rate on level track is 25 m.p.h., at which speed a train of 1400 tons can be hauled. The locomotive is capable of accelerating to normal speed a train of 800 tons on a grade of 1 per cent, and in general the design is such that each unit can make four round trips in twelve hours, each trip consisting of a run from Shildon to Newport with a train of 1400 tons, followed by a run from Newport to Shildon with a train of 800 tons, the distance of each half trip being about 18 miles.

Provision is made for either hand or automatic acceleration, the automatic arrangement consisting of a spring, which is wound up by the controller handle so that the speed at which the controller drum follows the handle can be governed by a step-by-step escapement movement. The maximum current taken at each step is controlled by a limit switch, so that when the current rises beyond a predetermined limit a magnetic interlock has its circuit closed and locks the escapement, holding the controller drum until the current has fallen to the required value. A catch is provided inside of the controller which can be lifted when it is desired to disconnect the automatic action and to notch up by hand. A special acceleration switch is also provided so that under unusual circumstances the adjustment of the limit switch can be altered by short-circuiting some of the turns of an opposing coil, thus allowing the passage of a greater accelerating current.

In general the control contactors are electrically operated and are fitted with auxiliary interlocking contacts to insure operation in the correct order. The main automatic circuit breaker is installed on the cab roof, being provided with horn gaps which project through the roof, and red and green lamps are installed to indicate whether it is set or tripped.

Current for the control circuits, as well as for the lighting and heating of the cab, is provided at 750 volts by duplicate dynamotors mounted on the cab floor. These machines have double-wound armatures fitted with two commutators, the control circuit being tapped off between the center point and the earth. The shaft of each machine is extended and is fitted with a fan to

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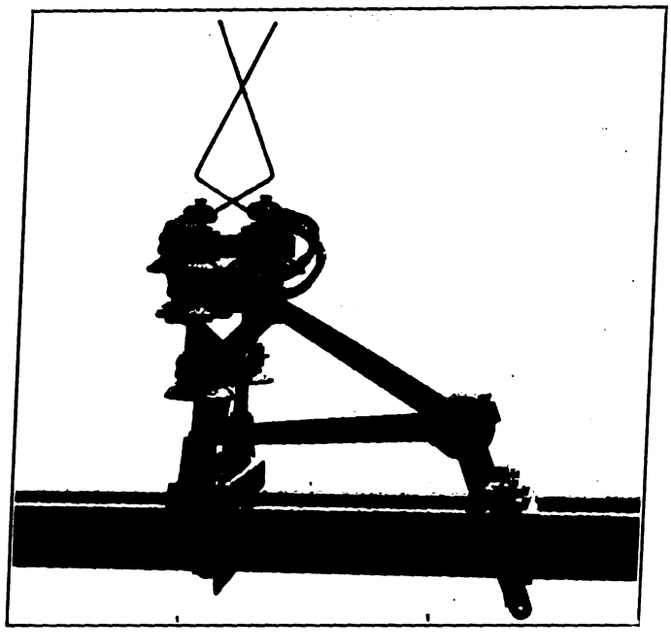


BRITISH FREIGHT ELECTRIFICATION—SECTIONALIZING SWITCH

supply ventilating air for the main propulsion motors. The rated continuous output of each machine is 4.5 kw. The locomotive cab contains, also, the usual motor-driven air compressor for the brake equipment, and there is a hand pump to raise the pantograph when the air supply is low.

Two pantographs are provided on each locomotive, and each one has two contact pans fitted with aluminum rubbing strips to make contact with the overhead copper wire. Thus there are four rubbing strips per locomotive, which with the double contact wire makes eight points of contact. Each of the two contact pans is attached to the pantograph frames by two separate leaf springs, so that any small irregularities in the level of the contact wire are provided for independently of the vertical movement of the pantograph itself.

OVERHEAD CONTACT SYSTEM

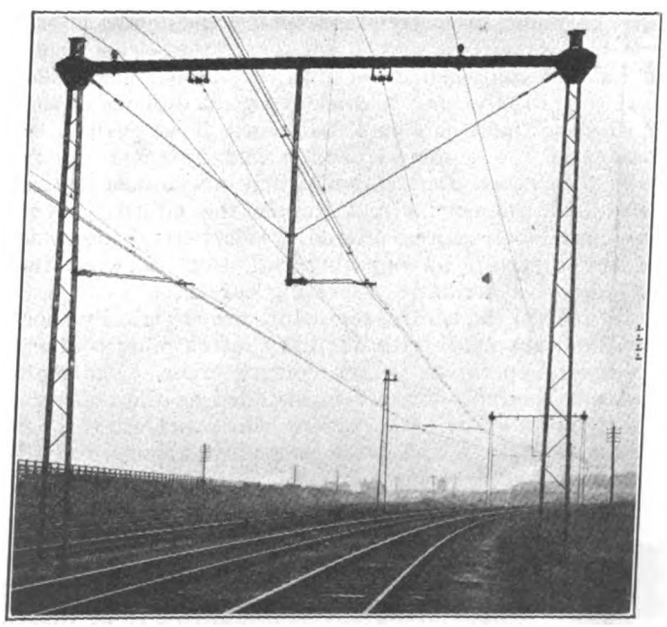
As before mentioned, the locomotives are supplied with direct current at 1500 volts through overhead contact wires, the current supply coming from two rotary-converter substations. On the most important portions of the track the overhead contact consists of two hard-drawn copper conductors each of 0.155 sq. in. section, or, say, 200,000 circ. mil, but on sidings where the loads are not heavy a single contact wire is used. Two auxiliary stranded copper feeder wires, each of 0.194 sq. in. section, or, say, 250,000 circ. mil, are carried on the top of the steel structures and are connected in parallel with the main contact wires at frequent intervals.

The wires are supported by a solid steel auxiliary catenary wire to which they are attached by sliding clips. This auxiliary catenary is in turn suspended from a main stranded steel catenary by means of steel wire hangers. The main catenary is supported from steel structural bridges of light weight by means of special insulators, double insulation being used throughout. The normal span between the steel bridges is 110 yd., but on curves and sidings they are placed at shorter intervals, depending on the existing conditions.

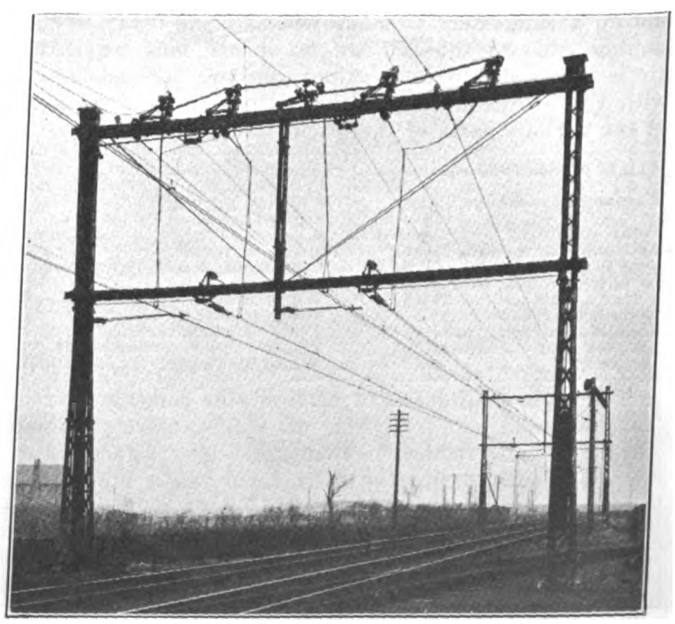
Normally, the height of contact wire from rail is 16 ft. 6 in., but at grade crossings this is increased to 18 ft. 6 in., and under some of the low bridges, of which there are a large number on the route, the height from the rail level is reduced, the minimum being about 13 ft. 8 in.

Each supporting structure carries a pair of steadying arms which are pivoted in all directions and are attached to the contact wires by clips. These fix the position of the contact wire relative to the track in a horizontal plane, the contact wires being staggered in the customary manner to prevent undue wear at the pantograph shoes. On curves, a center strut steadied by steel tie rods is added, the steadying arm on the mast at the inside of the curve being removed and fixed to the center strut so as to place the steadying arm in tension.

In special cases on sharp curves independent pull-off masts have been installed. Also, some of the structures are arranged to cover four tracks of which only two are provided with contact wires, and in this case a strut is provided in the center to carry the steadying arm and avoid the use of a center mast. Some cantilever constructions for bridges have been adopted in places where it was impossible to erect two masts, and in a few cases wooden poles have been used, but the latter were introduced largely for experimental purposes.



BRITISH FREIGHT ELECTRIFICATION—OVERHEAD CONSTRUCTION AT CURVE



BRITISH FREIGHT ELECTRIFICATION—BRIDGE WITH AUTOMATIC TENSIONING DEVICE

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BRITISH FREIGHT ELECTRIFICATION—TERMINAL FOR CONTACT WIRES IN YARD

All of the steel structures carrying the overhead track equipment are bonded to the running rails by means of a hard copper bond of 0.08 sq. in. section, or approximately No. 00 wire. Also, any steel structures carrying signals that are in proximity to the electrical equipment, are similarly bonded to the running rails.

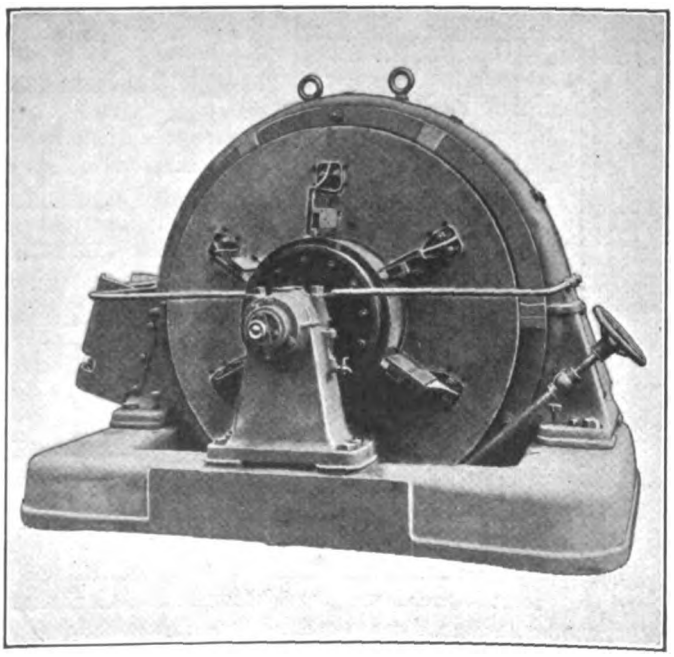
Automatic tensioning has been adopted for the contact wires to limit as far as possible the sags due to temperature variations. The tensioning points are approximately 1100 yd. apart, and at these locations two structures are installed 65 yd. apart, so that the wires from opposite lengths overlap by this amount. The end of each contact wire is raised at the tensioning structure to which it is fixed to give it a height about 18 in. clear of the normal level at that point, so that the locomotive pantographs ride gently and without shock from one tensioning length to the next. The contact wires are anchored to the auxiliary catenary wire at a point two-thirds of the distance along each tensioning length in the direction of train movement.

The tensioning structures consist of strong steel masts made up of four angle irons with angle-iron bracing, together with two cross girders and a center strut. The tensioning weights are slung at the center of the structure by chains passing over pulleys that are attached to the contact wire. By this means a normal tension of about 2000 lb. is maintained in the double contact wires.

In all cases the auxiliary catenary wire is anchored to the lower girder of the tensioning structure, but the main catenary is continuous except at tensioning points where section switches are installed. At such points the main catenary is also anchored to the structure, but in this case the top girder is used for the anchor.

On some of the sidings where only switching work is done a single contact wire is used with ordinary trolley span-wire construction. For sidings which are not equipped throughout their entire length, and which require overhead construction only to permit the electric locomotive to enter and pick up a train, the wires are terminated at bridges as shown in one of the accompanying illustrations. At such points, danger boards have been erected, and the electric locomotives are not permitted to pass these, although the terminal construction is of such a nature that no damage would be done to the pantograph or overhead construction in case this should happen.

At some of the low bridges it has been necessary to make special provision to obtain the necessary overhead contact. In these cases the contact wires, together with the auxiliary catenary, are brought toward the center of the bridge so that contact is made at the extreme edge of the pantograph shoe, the main catenary wire being anchored to the bridge. In order to prevent the other edge of the pantograph shoe from striking the bridge, a guard wire is installed, this being anchored



BRITISH FREIGHT ELECTRIFICATION—ROTARY CONVERTER INCLOSED TO MINIMIZE FLASHOVER

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to the catenary structures on either side of the bridge and being made live only while a locomotive is passing underneath it.

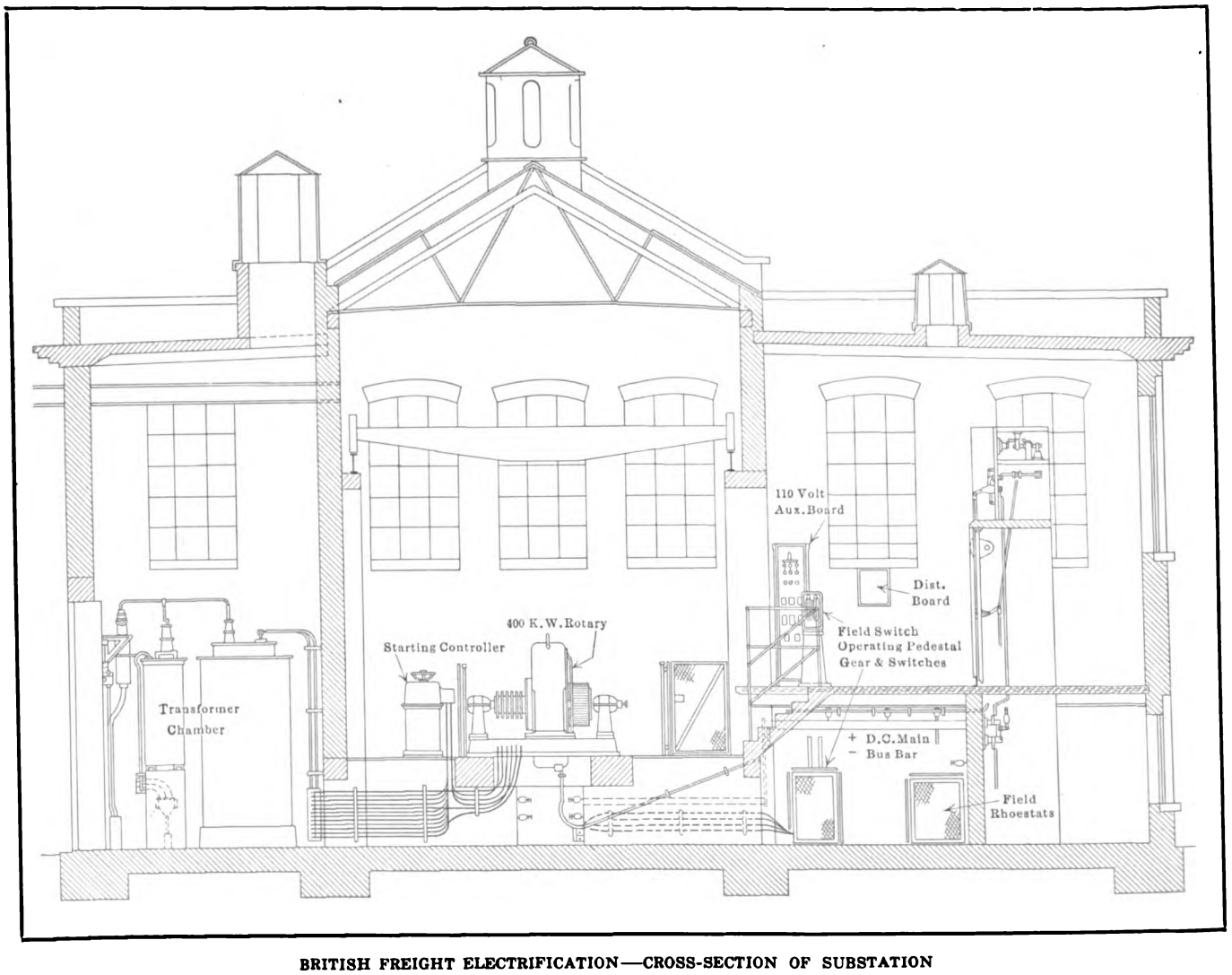
The track is sectioned at intervals of about 2½ miles and considerably more frequently on sidings. Section points are located in most cases at tensioning points so as to avoid the use of section insulators. The type of sectionalizing switch that has been adopted is shown in one of the illustrations, and from this it will be seen that a horn break arrangement has been provided for them. They are erected on the top girders of the catenary structures, and are operated by levers in the nearest signal cabin, being connected through pipes and bell cranks customarily used on manually-operated interlocking plants. As the train-control system of working is in use on the route, the signal cabins are connected by telephone with a central control office situated at Newport, and the handling of these sectionalizing switches is directed from the same point.

The track rails are bonded at the joints with stranded copper bonds fitted under the joint plates, two bonds each of 0.109 sq. in. section, or approximately No. 000 gage, being fixed at each joint. The rails are also cross-bonded at intervals of 300 ft., and bonds are installed also between the two inner rails of adjacent tracks at the same space intervals, but staggered with the cross bonds.

SUBSTATIONS

The electrified line is fed by two substations, one at Erimus, near the Newport end of the route, and the other near Aycliffe, at the junction with the main line of the North Eastern Railway, which is about 4 miles from the Shildon end of the electrified section. Each has a separate supply of high-tension power purchased from local companies, the voltages being respectively 20,000 and 11,000. Three-phase current is furnished in both cases, and this is converted into direct current at 1500 volts by rotary converters connected two together to form one unit. Two 800-kw. units are installed at Aycliffe and one 800-kw. unit at Erimus, each unit consisting of two 400-kw., 800 r.p.m., 750-volt, 40-cycle, six-phase, commutating-pole rotaries.

The machines were designed to operate normally at 95 per cent leading power factor and to withstand an overload of 50 per cent for two hours, 100 per cent for ten minutes and 200 per cent momentarily. They were required to withstand a high potential test of 5000 volts for five minutes, and on account of the high voltage on the commutator, they were specially designed to avoid damage due to flashovers occasioned by short-circuits on the system. Consequently, the operating parts of the brush gear were entirely inclosed, and the distance between brush arms was made as great as possible, the commutator being completely screened by arc-proof insulating material from the armature and frame of the rotary. Severe tests were carried out to determine what load could be suddenly thrown on and off without causing a flash. Out of five times that full load was thrown on no flashes occurred, and out of seven times when full load was automatically tripped off with a breaker only four were followed by a flashover. These machines were furnished by the British Thomson-Houston Company, Ltd., of Rugby, and this company is at



BRITISH FREIGHT ELECTRIFICATION—CROSS-SECTION OF SUBSTATION

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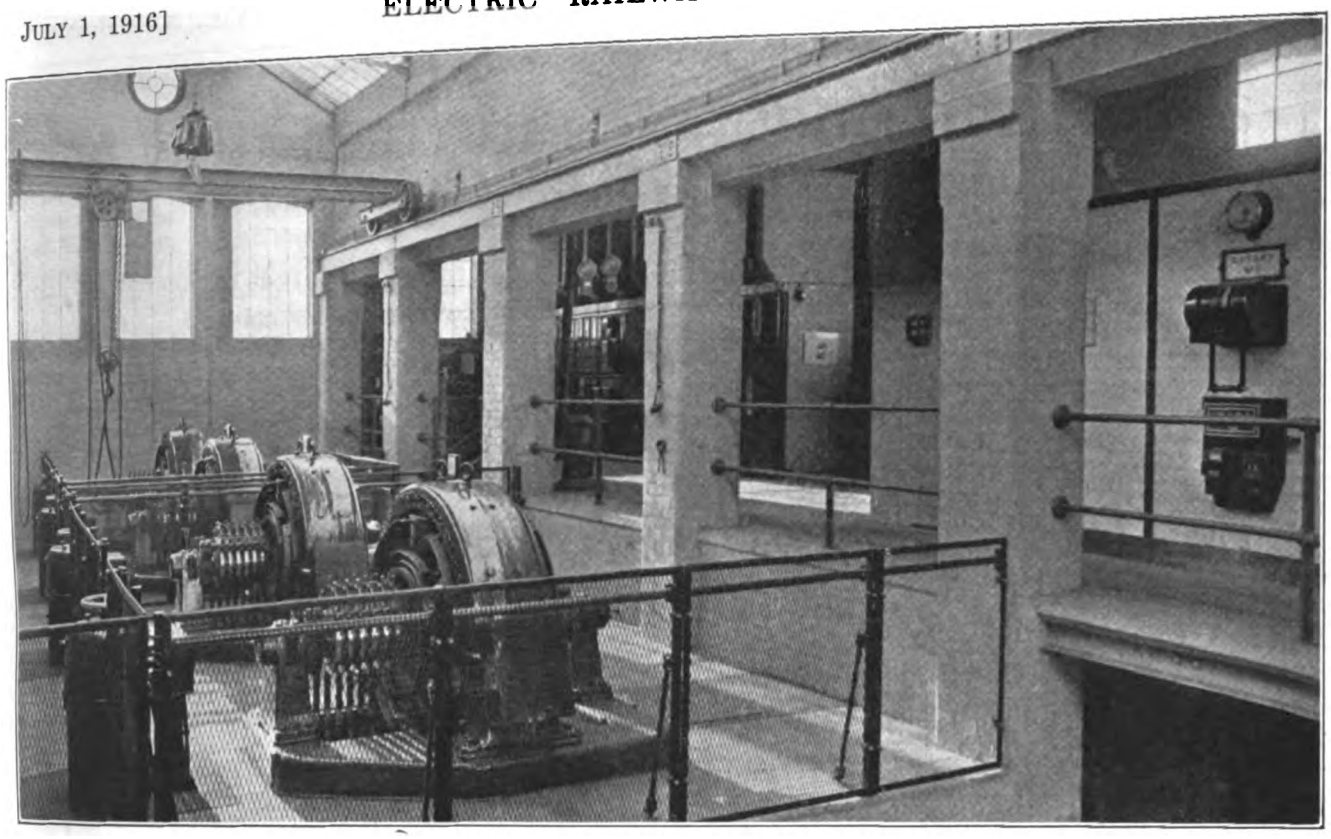

BRITISH FREIGHT ELECTRIFICATION—INTERIOR VIEW OF SUBSTATION

present installing at Erimus another set of 1200-kw. capacity, consisting of two 600-kw. rotary converters coupled in series to form one unit.

The substations in general are arranged in three sections, one for the switch gear, one for the rotaries, which on account of the high tension are surrounded by screens, and one for the transformers. In connection with the latter it may be said that two auxiliary transformers installed in each substation are connected directly across the high-tension terminals of the main transformer. They are fitted with a double secondary winding, one section being used exclusively for metering and the other for supplying lighting and auxiliary power in the stations for portable air compressors and the like. The transformers were furnished by the British Westinghouse Company as sub-contractor to the British Thomson-Houston Company, which acted as main contractor for the substation plants and their equipment.

Each substation is connected to the overhead contact system by four positive feeders consisting of paper insulated, bitumen-sheathed, single-wire, armored cables each of 0.5 sq. in. section, or, say, 600,000 circ. mil, laid in a wood trough that is filled with bitumen. At each substation there are two negative cables which connect the track rails to the negative busbar, these being similar in size and type to those used on the positive side.

Progress on Large Viaduct in Texas

The engineering department of Stone & Webster is completing work on the Northern Traction Company's new large steel and concrete viaduct at the foot of Jefferson Street, Dallas, Tex. This long structure, which will extend from Arlington Street to a point just north of the street railway and interurban bridge across the Trinity River, will span the cluster of steam railroad tracks entering the new Union Basin. It is hoped to complete the viaduct by the time the railroad station is open for public use. The girders which will rest on the concrete form, will be incased in concrete to protect them from the destructive gases thrown off from locomotives as they pass the viaduct. Three of these steel spans have a total weight of 50 tons. When completed, the floor of the viaduct will be of reinforced concrete, on which surface will be laid layers of crushed rock supporting a double tracking.

Chicago Loop Cleared for Preparedness Parade

In order to make way for the military preparedness parade, which occurred on June 3, all cars of the Chicago Surface Lines, as well as all vehicular traffic, were turned back outside of the loop district bounded by the Chicago River on the north and west, by Harrison Street on the south, and by Lake Michigan on the east. The Chicago Surface Lines began turning back cars before 8.30 a. m. and they did not enter the loop district again until the entire parade had passed late at night. During the progress of the parade, however, the elevated railroads continued operation into the loop, and in order to handle the crowds expeditiously Britton I. Budd, president, personally directed the movement of trains for a period of twelve hours. At the close of the day it was estimated that approximately 1,200,000 persons had been carried on the elevated lines and all past traffic records for this system were exceeded, the average being about 560,000 passengers handled daily.

Public utility companies, including the Peoples Gas Company, the Commonwealth Edison Company, the Chicago Surface Lines and the Chicago Elevated Railroad were represented in the parade by 7876 marchers. The representatives of the elevated railroads were headed by their own band of fifty pieces, and the employees of the surface lines wore continental cocked hats. Bion J. Arnold and a number of prominent steam railroad engineers headed the engineers' division, which was represented by more than 2300 marchers. Gen. George H. Harries of Omaha, Neb., led the H. M. Byllesby & Company representatives.

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Current Tendencies in the Railway Business

Author Discusses Effect of Jitneys on Financing and Earnings—Danger of Jitneys in Strikes—According to Analogy Based on 1907, Revival in Gross and Net Earnings Is to Be Expected

By THOMAS CONWAY, Jr., Ph.D.

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At a time when the return of business prosperity is bringing a decided increase in service demands with the consequent requirements for new capital to provide the necessary facilities, it is pertinent to analyze some of the factors that have recently affected and are now affecting the position of electric railways in the security market.

EFFECT OF JITNEYS ON FINANCING AND REVENUES

It is beyond question that the electric railways have been subject to more adverse influences in the last few months than any other class of public utilities. The foremost place in these adverse factors must be given to the jitney. A year ago, when this sporadic plague was in its prime, it was almost impossible for a large proportion of the electric railways to do any new financing. As a matter of fact, however, the demands for new capital at that time were small on account of the business depression and the lessened demands for service.

According to statistics compiled by the New York *Journal of Commerce* and the *Commercial & Financial Chronicle* and published on page 835 of the ELECTRIC RAILWAY JOURNAL for April 29, the total volume of new securities issued and sold by electric railways in 1915 was $135,423,000. This was a decrease of $56,658,600 from the amount of securities marketed by such carriers in 1914. That the electric railways were not the only utilities to show decreased financing, however, is shown by the fact that the total sales for other classes of utilities in 1915 aggregated $188,457,100, a decrease of $88,700,900 from the amount marketed in 1914. In view of the great alarm felt over the threatened inroads of the jitney, the relatively fair showing made by the electric railways is encouraging. The explanation seems simply to be that the jitney did not imperil the solvency of the great majority of the electric railway companies.

Indeed, nothing is more remarkable than 1915 earnings of the electric railways, in view of the jitney competition and other unfavorable factors then prevailing. According to the *Commericial & Financial Chronicle*, as noted on page 838 of the ELECTRIC RAILWAY JOURNAL of April 29, the combined gross earnings of 272 roads in 1915 were $513,967,674, a decrease of only $60,728 or 0.01 per cent. The showing of net earnings was but little less remarkable, inasmuch as the net for 1915 aggregated $194,893,975, a decrease of $2,027,737 or 1.03 per cent.

If anyone had declared a year ago that the destructive influence of the jitney upon electric railway earnings would be so slight, he would have been regarded as an optimist of the first order. There can be no doubt, of course, that the influence of jitney competition was neutralized somewhat by the recovery of business in the latter months of 1915, the period when jitney competition was fast dwindling. In fact, the heavy decrease in earnings during the early months of the year was offset by the corresponding increase in the autumn and winter months. As far as the statistical results are concerned, therefore, the electric railway industry has not relinquished its proud and unique position of remarkable stability of earnings, both gross and net, alike through years of prosperity and of depression.

The effect of jitney competition, and of the European war as well, is to be seen, however, not so much in the actual decrease of earnings as in the stunting of the natural growth of earnings. For the properties reporting gross earnings to the *Commercial & Financial Chronicle* from year to year the normal rate of growth each year from 1909 to 1913 inclusive has been about $30,000,000 per annum. In 1914 the increase in gross earnings over 1913 amounted to only $4,798,944. The marked decrease of about $25,000,000 in the normal rate of growth was the direct result of the acute business depression which swept over the country after the outbreak of the European war, while the change to a slight loss in 1915 was caused by the aggravation of the general situation through jitney competition. If we turn to net earnings, we find that the normal increase has ranged from $10,000,000 to $14,000,000 per annum from 1910 to 1913 inclusive. In 1914, however, the net earnings decreased $1,126,315. In 1915, as has been said, a still further decrease was experienced, the result being that in 1915 the companies earned about $4,247,545 less than in 1913. Such is the net result of the European war and jitney competition.

THE ENCOURAGING LESSON OF 1907

If history repeats itself the next few years should hold great prosperity for the electric railways. The analogy of the period of depression following the panic of 1907 is directly in point. In 1908 the annual increase in gross earnings fell from a normal level of more than $25,000,000 to about $3,000,000 as compared with the preceding year. In 1907 the net earnings, which had normally been increasing at the rate of $12,500,000 per annum, increased only $4,951,601 over the figures for 1906, while in 1908 the increase over 1907 was only $1,118,204. The situation throughout this period was quite similar to that which has prevailed since 1913, the difference being that the reduction in earnings, as the result of the panic of 1907 and the consequent depression, was much less. With the revival of business activity in 1909, a most interesting situation, similar in character to that which has always existed in like circumstances, was evident. The gross earnings for 1909 were $29,298,657 larger than they had been in 1908, while the net earnings showed an increase of $19,746,859. In brief, net earnings were almost 30 per cent greater than they had been in the year preceding the panic of 1907.

There had been a pause in the growth of business and of earnings. Men were out of work or working part time. The amount of travel for pleasure and shopping was curtailed. This accounted for the shrinkage in the rate of growth in the business of the electric railways. Population, on the other hand, had been steadily increasing. Hence, when business prosperity returned

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and the unemployed secured work, those on part time were put on full time, and the larger family budget made it possible to renew the former scale of expenditures. The sudden increase in gross earnings made up for the tardy rate of progress in the preceding years. If business conditions remain as satisfactory throughout 1916 as they are at the present time it seems safe to predict that the net earnings of the electric railways in 1916 will duplicate the performance of 1909. The industry should witness a sharp revival in gross and net earnings.

THE JITNEY IS BECOMING HISTORIC

An examination of electric railway monthly earnings supports the foregoing conclusion. The jitney is passing into history. The regulatory legislation passed by various State legislatures and city councils stunted the jitney industry by eliminating most of the irresponsible drivers who could not get the necessary indemnity bonds and meet the other requirements imposed. The total number of jitney drivers was still further reduced by the general resuscitation of business. The revival of business and the advance of wages therein attracted the jitney driver, whose car was wearing out and who, therefore, was facing a period of lean earnings, back to his former employment. The death blow to the jitney, however, will be dealt not so much by legislation and restrictive municipal regulations as by the advance in the cost of gasoline and the higher price for tires. The jitneys will run in various places for months, and perhaps years, but the plague has run its course, and it is apparent to the careful, discerning investment banker who studies fundamental conditions that the electric railway industry has successfully passed through a trying period.

REMAINING DANGER OF UNFAIR USE IN STRIKES

In the long run, it is very likely that the real danger of the jitney will lie not so much in the undermining of electric railway earning power, as in its illicit and unfair use in connection with strikes and other labor problems. The situation now existing in Wilkes-Barre, Pa., bears directly upon the question. The Wilkes-Barre Railway about a year ago was presented with a demand from its men for an advance in wages. After negotiations, the matter was submitted to arbitration and a signed agreement was made between the company and the men providing that there would be no appeal from the findings of the arbitrators. Shortly thereafter, the arbitrators were appointed, held hearings and rendered a decision. The men were granted an advance in wages. The company accepted the award, paid the advanced wages from the date specified in the agreement and made current payments in connection with the award of the board of arbitrators.

The men, however, were not satisfied with the award, and appealed for a reopening of the entire controversy. The company pointed to the clause in the agreement which specified that the award should be final and not subject to appeal. Early last autumn, without any warning, the men went out on strike, and rioting and disorder prevailed for some weeks. The company has taken the position that it has faithfully observed its contract with the men and that it must insist that the men do likewise. For months a regular running schedule has been maintained in Wilkes-Barre, the cars being manned by local workmen. No disturbances or riots have occurred for many weeks, but anyone who visits Wilkes-Barre will be impressed by the fact that there is an organized and very effective boycott of the street cars.

Wilkes-Barre is situated in the heart of the hard coal field—the stronghold of the United Mine Workers of America. Through the strong affiliations of the labor unions, a large proportion of the regular riders on the street cars have been deterred from using them. The boycott has been caried into every walk of life. If a baker rides on the car, he finds that his customers desert him and buy bread elsewhere. Bank cashiers have feared to use the trolleys because of the threat that the union men will withdraw their savings deposits. This situation, which has continued for more than eight months, is very sinister. Such long resistance would have been impossible were it not for the jitney. The town is overrun with cheap cars of every description, and accidents to vehicles and pedestrians have jumped alarmingly—in short, the whole story of jitney operation has been repeated. The operation of the jitney is made practicable through charging a higher fare to most sections of the city than the ordinary 5-cent rate of the street car. The jitney has been the backbone of the union's resistance in carrying on what might be termed a war of attrition.

The Wilkes-Barre situation is not an isolated example. Within the last month a strike occurred on the electric railway lines in Trenton, and there sprang up over night a swarm of jitneys which carried, in some fashion, those who were previously regular street car passengers.

The great force which has compelled the prompt settlement of labor disputes of electric railways in the past has been public sentiment. The public has been impatient with long delays. The discomfort of walking exceeded whatever zeal might exist for a fight to the finish between the utility and its employees. But the jitney, when used in connection with strikes, removes the reasons for pressure of public opinion. As it is, the struggle is overlong and now the public is invited to assist in its prolongation by adopting a substitute method of transportation.

THE MODEL DECISION IN ROCHESTER

The public service commissions of the various states must come to realize that the jitney should be reduced to its permanent and legitimate place. The most encouraging recent development has been the decision of the New York Public Service Commission, Second District, in the so-called Rochester case. This decision might well serve as a model for the action of every other public service commission. After pointing out that the policy of the public service commission laws of the State of New York is toward regulated monopolies, the commission in its opinion states that unrestricted competition between the electric railways and the jitney must, as has always been the case in the past, inevitably result in disaster to the competitors. In this disaster, the public has a paramount interest. The time is not yet ripe to abandon the electric railway as the standard means of transportation. Yet direct competition between the jitney and the electric railway would so reduce the revenues and the progress of the latter as to induce defective and inadequate service and so lead eventually to the death of the older means of transportation.

The commission asked the question, "What, then, is the proper function of the jitney?" In answer it said: "Except in cases where the existing street railways system obviously cannot or will not supply the reasonable requirements of a community, the use of jitneys, for the present at least, ought to be confined to streets and neighborhoods which now have no electric railway readily available." The commission refused the applications of jitney drivers for certificates of public convenience and necessity, and recommended certain extensions and improvements in the electric railway service which, if not made, might result in another application

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for jitney operation meeting with more favorable consideration by the commission.

DETERRING INFLUENCES IN NEW FINANCING

Although the general tendency is for public utilities to search for new capital, there are certain deterring influences in connection with the financing of new construction, such, for example, as the very high prices now prevailing for material and labor of all kinds. With copper wire selling in the neighborhood of 32 cents a pound and with similar famine prices prevailing for other supplies, the cost of new construction is very great. Moreover, the situation of the electric railways as regards labor is far from satisfactory from the investor's standpoint. All labor is receiving unheard-of wages, and the supply is less than the demand. The unprecedented advance in wages in other industries must inevitably be reflected in demands of electric railway employees for higher wages. Inasmuch as about 60 per cent of the operating expenses of an electric railway are made up of payments for salaries and wages, the importance of the labor situation can be realized. Many investment bankers are more concerned at the present time about the labor aspect of the electric railway situation than thy are with the jitney and with commission regulations.

Although under these circumstances utility managers are inclined to postpone all new construction until the return of more normal conditions, nevertheless the probable increased demand for service will necessitate additional cars, generating apparatus and the many other forms of property employed in the public service. To meet this demand, electric railways must of necessity secure new capital. It is reasonable to presume, therefore, that in the absence of some disturbing influence in the financial markets, directly or indirectly resulting from the European war, the electric railways should again appear as seekers for capital. Indeed, the movement has already begun.

Axle-Mounted Armatures

Discussion of the Master Mechanics' Report on Electric Locomotives Centered on the Influence of Axle-Mounted Armatures on the Track

IN LAST week's issue an abstract was published of the committee report on electric rolling stock which was made before the American Railway Master Mechanics' Association at Atlantic City, and in the following paragraphs the discussion on the report is presented in part.

The discussion was opened by C. H. Quereau, superintendent of electric equipment, New York Central Railroad, who said that this company is using on its electric locomotives what is known as the bi-polar gearless motor. The motor is mounted directly on the axle of the driving wheel, and the drivers can be dropped exactly as they are from the steam locomotive after the side and main rods have been removed. This type of motor is frequently considered not to be a good-riding design. However, it is thoroughly satisfactory under the conditions on the New York Central Lines and other trunk lines using a 100-lb. rail on a good roadbed. It is true that the locomotive develops a tendency toward nosing when a certain amount of lateral motion has accumulated, no matter where it may be—in the center, in the plates, or in the hub. Everyone will agree that the track man, the division engineer or the track foreman would be the first to criticise any device which did any damage to his track, yet it is the consensus of opinion among the track men on the New York Central Railroad in the territory in which the locomotives operate, that there has been no single case of deformation, distortion or damage to the track from these motors. There is no difficulty at all in keeping the lateral motion in such condition that the engine rides literally like a parlor car. In fact, no other design rides so smoothly and quietly under the specified conditions of track. The lateral motion allowed is about three-quarters of what would be considered the limit for steam operation.

The simplicity of this design makes the maintenance cost very low. However, fear of gearing on electrical equipment is really unfounded. A common idea is that it wears out, breaks and makes all sorts of trouble. Nevertheless, the New York Central Railroad has gears on its motor cars, which have made 200,000 miles on 200-hp. motors. With the modern heat-treated steel, 300,000 miles at 30,000 miles a year may reasonably be expected, and then one can forget the gears and pinions and simply watch them once in a few years.

Mr. Quereau concluded his remarks by referring the delegates to an article on electric locomotive drives in the ELECTRIC RAILWAY JOURNAL for June 10, by F. H. Shepard. He was followed by Frank Rusch, Chicago, Milwaukee & St. Paul Railway, who stated that the operation of that company's electric division has been successful even beyond expectations.

G. W. Wildin, New York, New Haven & Hartford Railroad, then commented on the operation of locomotives of the geared type, saying that the New Haven has about sixteen switching locomotives with double pinions, one on each end of the armature, and solid gears on the drivers. In this case flexible gears would be much more satisfactory, because when one puts a new pinion on one end of the shaft, leaving the old pinion on the opposite end, the new pinion does the major portion of the work until it wears down and takes hold. However, with flexible gears a new pinion can be run with an old one without difficulty.

The New Haven has had a remarkable record as regards the operation of these sixteen switching locomotives, having gone for twenty-six months without detention to the switching service due to engine failures. The company is contemplating the purchase of twenty or thirty more with very little change as to size and construction, simply strengthening up a number of parts which were found to be a little weak in design, but nothing that is serious. The company also has thirty-six freight locomotives in operation between Harlem River Terminal and New Haven, a distance of about 65 miles. These are hauling 3000-ton trains, two locomotives being operated in multiple. There are about forty-seven passenger locomotives, and between shopping these locomotives cover about 110,000 miles, the cost having gradually come down so as to compare favorably with steam locomotives. These locomotives operate on both alternating and direct current, and trouble comes in changing from one system to the other, especially in the winter. When the engine passes from the third-rail to the overhead system, the pantograph is rather sluggish, and in the reverse direction the third-rail shoe fails to go down properly because snow and sleet accumulate on it.

Pending the issuance of special passes for various classes of employees and officers of the Kansas City (Mo.) Railways, all who ride on passes are using the aluminum badge which in the case of trainmen is attached to the front of the cap. Recently more than a dozen counterfeits of the badge were taken up, all bearing the same number, 399. The counterfeits were made of stiff glazed cardboard set in a tin rim and closely resembled the badges. The counterfeited number had been reported lost several months ago. When the new system of passes is in effect the general use of the badges will be abandoned.

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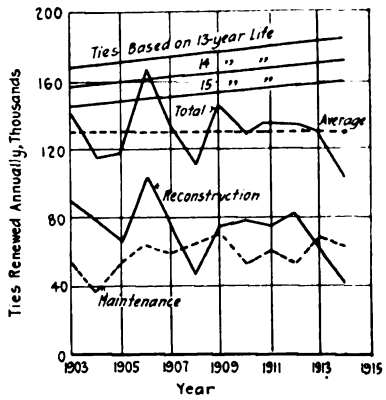
B. J. Arnold Reports on Bay State Street Railway

Transportation Expert Concludes That Economies in Operation Amounting to Nearly $700,000 Per Year Can Be Attained, But That When All the Savings Estimated Are Considered, With an Adequate Depreciation Allowance, the Gross Revenue Cannot Return 5 Per Cent on the Property

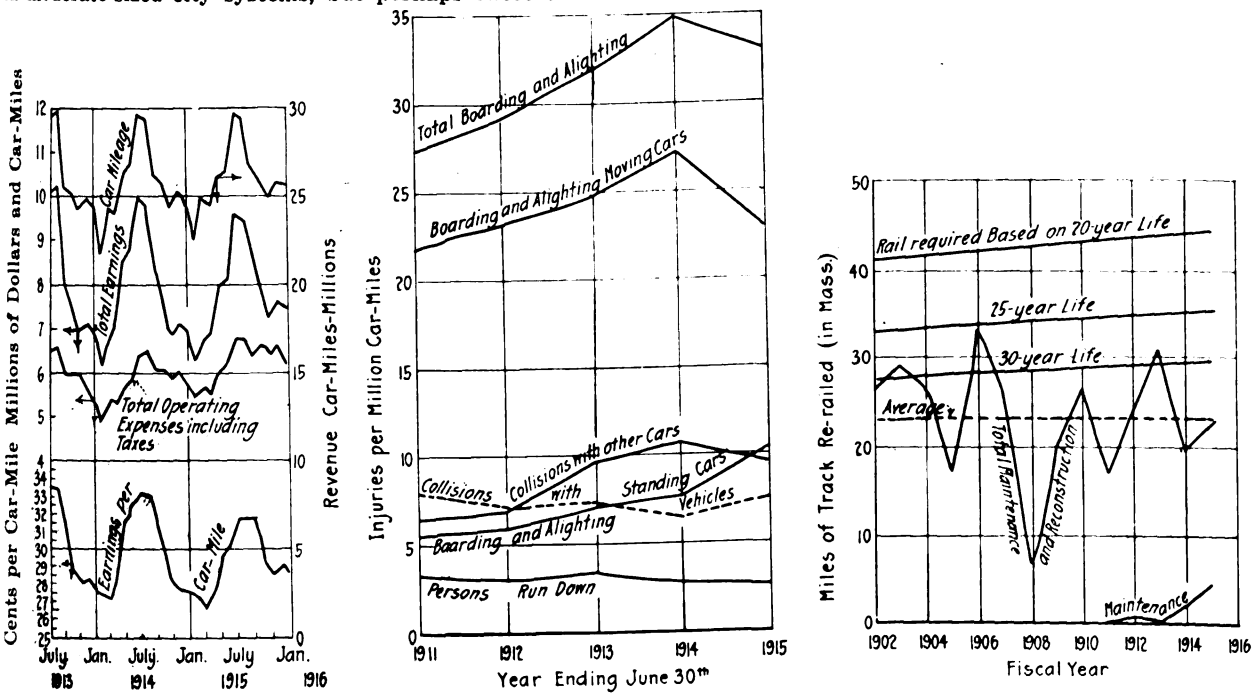
At the request of the board, Bion J. Arnold, consulting engineer, Chicago, has completed a general study of the Bay State Street Railway for the Massachusetts Public Service Commission in connection with the pending fare case of the company. The object of the investigation was to determine whether any material reduction in operating expenses could be effected. Mr. Arnold concludes that from $618,000 to $759,000 a year can be saved by resorting to various economies outlined below, but states that this saving will be insufficient to enable the company to pay 5 per cent upon the value of its present property if an adequate allowance is made for depreciation. The gross revenue must be increased if all the lines of the property are to be continued in operation, properly maintained and ultimately placed on a paying basis. The fullest co-operation was rendered Mr. Arnold by the officers of the company.

Some parts of the company's territory are served by a greater number of lines than the traffic warrants. Mr. Arnold finds that the riding habit is less between the various towns in eastern Massachusetts than in corresponding central or western areas. Keen steam railroad competition exists on the Bay State system, whose gross earnings per capita in 1915 were only $7.02, or $10,000 per mile of track. The average rate of interurban fare is also low on the Bay State system, being about 1.25 cents per passenger-mile, contrasted with 1.5 to 2 cents on Western interurban systems. The company operated 33,300 car-miles per mile of track in 1915, its service density being somewhat less than half that usually found in moderate-sized city systems, but perhaps twice that of normal interurban service. The earnings per mile of track are less than half the normal for a city system of moderate size. The average return on the investment was 3.9 per cent in 1915. Since 1888 the average return has been only 5.3 per cent, and full provision has not been made for depreciation. Transportation revenue totalled 29.49 cents per car-mile in 1915, total operating expense, including taxes, being 24.07 cents. The latter compares with 16.4 cents in 1901.



ARNOLD BAY STATE REPORT—RECORD OF TIE REPLACEMENTS

A portion of the gradual increase in operating expenses per car-mile between 1901 and 1915 is attributable to an increase in weight of the average car of about 30 per cent, say from 13.5 to 17 tons. The whole study indicates that the expenses per car-mile are about 2 cents higher than might be anticipated. There is a 40 per cent seasonal variation in monthly earnings on the system. Track conditions in the cities and towns are in general very satisfactory, but a large amount of rehabilitation is needed on the so-called interurban lines. The report indicates a shortage in tie re-



ARNOLD BAY STATE REPORT—SEASONAL VARIATIONS IN INCOME, ENTIRE SYSTEM; INJURIES IN TERMS OF CAR MILEAGE; RECORD OF RAIL REPLACEMENTS

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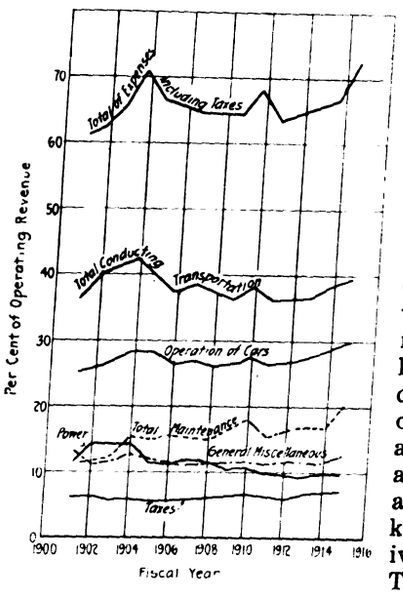
newals of 144 miles of track in the past twelve years. About 150 miles of track should be rebuilt, including both rails and ties. The company has set up no depreciation reserve.

Mr. Arnold states that as long as the direct-current plants of the company (serving the lines north of Boston) are operated at their present efficiency it would appear that no decrease in cost of direct-current power delivered to the lines can be effected by abandoning them in favor of a more modern system when both operating expenses and additional interest charges are considered. The average operating cost of twelve direct-current stations in 1914 was 0.871 cents per kilowatt-hour for a total capacity of 28,930 kw. On the lines south of Boston an alternating-current generating station at Quincy Point furnishes most of the power at an operating cost of 0.577 cents per kilowatt-hour, the station rating being 10,000 kw. Including fixed charges the total costs of direct current and alternating current average 1.375 cents and 0.926 cents per kilowatt-hour respectively at the stations. The cost of substation operation is 0.062 cent per kilowatt-hour, and the operation of the transmission system amounts to 0.027 cent, or a total generating expense for transmission and conversion of 0.089 cent per kilowatt-hour. The corresponding fixed charges on the substation equipment and transmission system amount to 0.152 cent and 0.197 cent respectively, or a total of 0.349 cent, which, when added to the operating costs, gives a total of 0.438 cent. Taking all costs into consideration, the alternating current system generates, transmits, converts and delivers energy to the direct current substation buses at 1.538 cents per kilowatt-hour, estimating transmission and conversion losses at 16 per cent. The transmission voltage of 13,200 appears low for the distances involved.

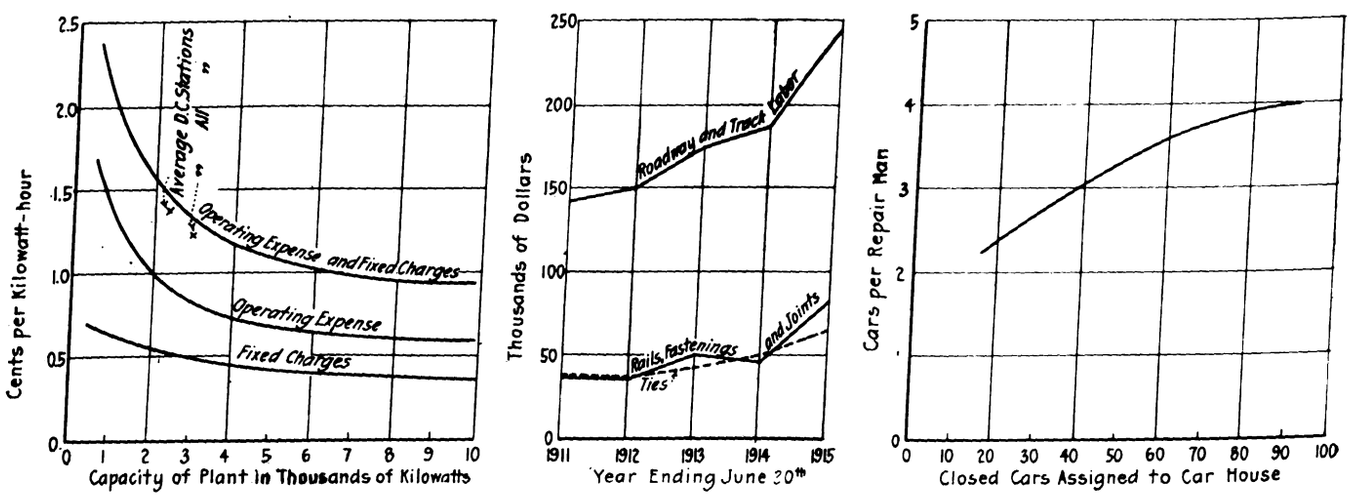


ARNOLD BAY STATE REPORT—OPERATING EXPENSES IN PER CENT OF REVENUE

It is probable that a material decrease in the power requirements can be secured by the installation of additional feeder capacity. Tests indicate an excess loss of about 14 per cent and on several lines the voltage is abnormally low. The addition of feeders costing $850,000 would reduce the average direct-current transmission loss 10 or 12 per cent and save the company about $85,000 a year.

The report discusses the company's rolling stock requirements in great detail, emphasizing the difficulties of standardizing cars for all the service requirements. If rapid transit entrance into Boston can be secured, and through interurban routes outside established, a distinctly new type of car should be developed. It would then be desirable to standardize equipment as far as possible along three lines: First, high-speed interurbans; second, large city equipment; third, light one-man cars, the two last named being prepayment and semi-convertible. Abandonment of open-bench car service is advisable. The drop steps recently installed on summer equipment have increased rather than decreased the menace from accidents and the difficulties of operation through congested streets, due to the increased width and overhang of the steps on curves. The new closed car is a good example of the usefulness of the convertible type. Outside of the Chelsea district the articulated type of car would be of no advantage to the company. The company's estimate for lengthening the old 25-ft. double-truck car bodies into a long double-truck body with a 10-ft. drop section, folding doors and steps, prepay, center entrance, is about $1,200 or over per car, exclusive of overhauling and secondary accessories. Such a rebuilt car would seat thirty-six passengers. A new car body of similar class could probably be purchased for $2,500. The application of trailers is also limited to the congested entrance into Boston.

The company has about sixty-seven carhouses to care for 2594 cars of all types. The number of cars per repairman varies from 2.9 in a thirty-six-car house to four in a ninety-car house. The report points out that the large number of houses is convenient to routes operated, but far from efficient from the standpoints of maintenance and inspection. Storing in larger houses and inspection and maintenance in larger groups is recommended. The need of adequate shop facilities is strongly set forth, in connection with comments upon the depreciated condition of the older rolling stock. With an outlay for proper facilities it is estimated that a saving of not less than $100,000 a year could be effected in equipment maintenance. The use of open cars increases the cost of maintenance.



ARNOLD BAY STATE REPORT—COST OF POWER AT GENERATING STATIONS; COST OF MAINTENANCE OF TRACK AND ROADWAY; RELATIVE EFFICIENCY OF LARGE AND SMALL CARHOUSES

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Considerable attention is paid in the report to the problems of car operation, emphasis being laid upon the severe handicap of the low schedule speed (8.35 m.p.h.). If this could be increased 10 per cent, to 9.2 m.p.h., the saving in platform wages would be about $200,000 a year. Such an increase in speed could only be attained after the vast number of unnecessary stops on the system have been eliminated and the power supply bettered, and by making very radical changes in location of track, double-tracking, standardization of equipment by a more energetic handling of the cars by platform men. Slow speed is due in part to the location of lines in highways often hilly and crooked. Near-side stops are favored. Low acceleration and braking are also handicaps, as are the large amount of single-track line in use. The company lost 1798 car-hours by setbacks in a recent typical week.

At present a large number of lines are being operated with the longest practicable headway to provide any reasonable service and yet they are unprofitable. In such cases, particularly for short lines in suburban territory, the use of the one-man car is recommended during at least the greater part of the day. Such cars should be designed to be readily convertible into full-crew service for periods of heaviest traffic. It is probably not feasible to attempt the use of one-man cars on lines operating over tracks already carrying service on close headway on account of probable delay to the latter. From a group of sixteen to twenty-one low-earning routes it appeared that a saving of from 90,000 to 140,000 car-hours could be effected, or between $25,000 and $39,000.

It is estimated that a saving of from $82,000 to $133,000 per year can be attained by rearranging the car service to cut down over-service, etc. By concentration of carhouse work a saving of $43,000 per year could be effected, in the author's opinion, and a saving of $125,000 per year in general expenses is considered feasible by him.

Increased revenue appears to be possible from the use of prepayment cars, attraction of traffic through higher schedule speed, increase of interurban fares to 1.5 or 1.75 cents per mile, and more extended development of the express and freight business need of increased gross revenue is unquestionable.

Relations of the N. Y. E. R. A. to the Problems of the Industry

President of New York Electric Railway Association Shows Why Railway Operation Is Becoming Increasingly More Expensive

BY J. J. DEMPSEY

Superintendent of Elevated Transportation, Brooklyn Rapid Transit Company

IN his presidential address delivered before the New York Electric Railway Association at the Niagara Falls meeting this week, Mr. Dempsey, after referring to the history of the association since its organization in 1893, discussed the changes which have taken place in the meantime. He said in substance as follows:

The problem of obsolescense alone is one which assumes staggering proportions on any system where the growth of traffic has produced a demand for larger cars, larger units of power production and general increases in capacity of all other equipment. On the Brooklyn Rapid Transit system there are today seven power generating stations, the smallest of which used to produce about 4000 kw., while the largest today has a capacity of 126,000 kw. Three of the seven stations are now in operation, and one is in reserve. Three are unused, not because they are worn out or even necessarily obsolete, but because the increased power demand has made them uneconomical as operating units. There is hardly an electric road operated which has not a similar condition. What is to be done with the capital honestly invested in facilities rendered obsolete by the advance in the art of transportation and the increasing demand for electric railway service?

At the same moment that we confront this question we also face the equally threatening problems of higher cost of labor and materials and the demand for lower fares or their equivalent in improved or extended service. At the same time the cost of public supervision is piling up. For example, the present system of reports required by the present commission of the Brooklyn Rapid Transit Company costs about $20,000 per year more than that required by the previous commission.

To secure fair treatment for the electric railways, to secure for them half a chance to devote their energies to the solution of their problems, is the most important task confronting our association.

We have come to a political era when, to a large extent, the former control of legislation and public administration by party organizations has been done away with, and for it has been substituted a theory of direct responsibility of elected and appointed public officials to the public. The change came about through public indignation over the admitted evils of the old system. But is not the new condition producing evils quite as serious to those responsible for the use of capital invested in electric railways, to the security of the investment itself, and to the public?

In many instances officials refuse to be guided either by common sense or simple arithmetic in dealing with electric railway problems, because of some popular agitation based upon misunderstanding or misrepresentation. The public mind is open to any condemnatory or destructive idea but refuses to be interested in constructive undertakings.

Much of the agitation for decreased fares and extension of service beyond the economic possibilities of the case proceeds upon the theory that the capital involved cannot escape and can, therefore, be made to work for any or no return. What we must impress upon the public mind, and through it upon the official mind, is that while this may sometimes be true with capital already invested, no such condition exists in respect to the new capital which must be brought into the business.

The City of New York discovered that money is a free agent when it undertook to work out its rapid transit problem. Proceeding on the theory that a universal 5-cent fare and the extension of rapid transit into the outlying sections were necessary for proper city development, the city had ultimately to realize that the unprofitable operation involved could only be undertaken if supported by the credit and taxing power of the community. Accordingly the companies' investment was given priority over the city's investment because the city could raise money by taxation to pay interest which the operation of the system would not earn for years, whereas the companies could face such a contingency only with the sacrifice of credit and ultimate insolvency.

The relation between revenue and expenditure in the street railway business has about reached the breaking point. If the public, through its representatives, insists upon stretching it until it at last snaps, the public will in the end be the worst sufferer. It remains for our association to bring this fact home to the people of our communities. If we fail we can hardly expect anything but disaster for our joint enterprise. If we succeed, we shall be doing immeasurable service to the entire people of the State.

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Electric Railways and Mobilization

An Army Officer and Railway Managers Present Concrete Plans for Electric Railway Co-operation in Military Mobilization at Annual Meeting of New York Electric Railway Association This Week—Other Topics Considered Included Standardization

THE thirty-fourth annual meeting of the New York Electric Railway Association was held in the International Hotel, Niagara Falls, on June 27 and 28, 1916. The principal topic was "The Electric Railways in National Defense." Two hundred members and guests were in attendance.

TUESDAY MORNING SESSION

President J. J. Dempsey, Brooklyn Rapid Transit Company, read an address on "The Relation of the Association to the Problems of the Industry" at the Tuesday morning session. This is abstracted elsewhere in the present issue. The Secretary-Treasurer, William F. Stanton, Schenectady Railway, in his annual report showed the association to be in a flourishing condition, with a growing membership and bank balance. The membership committee also reported a very satisfactory year's work, the following having joined during the year:

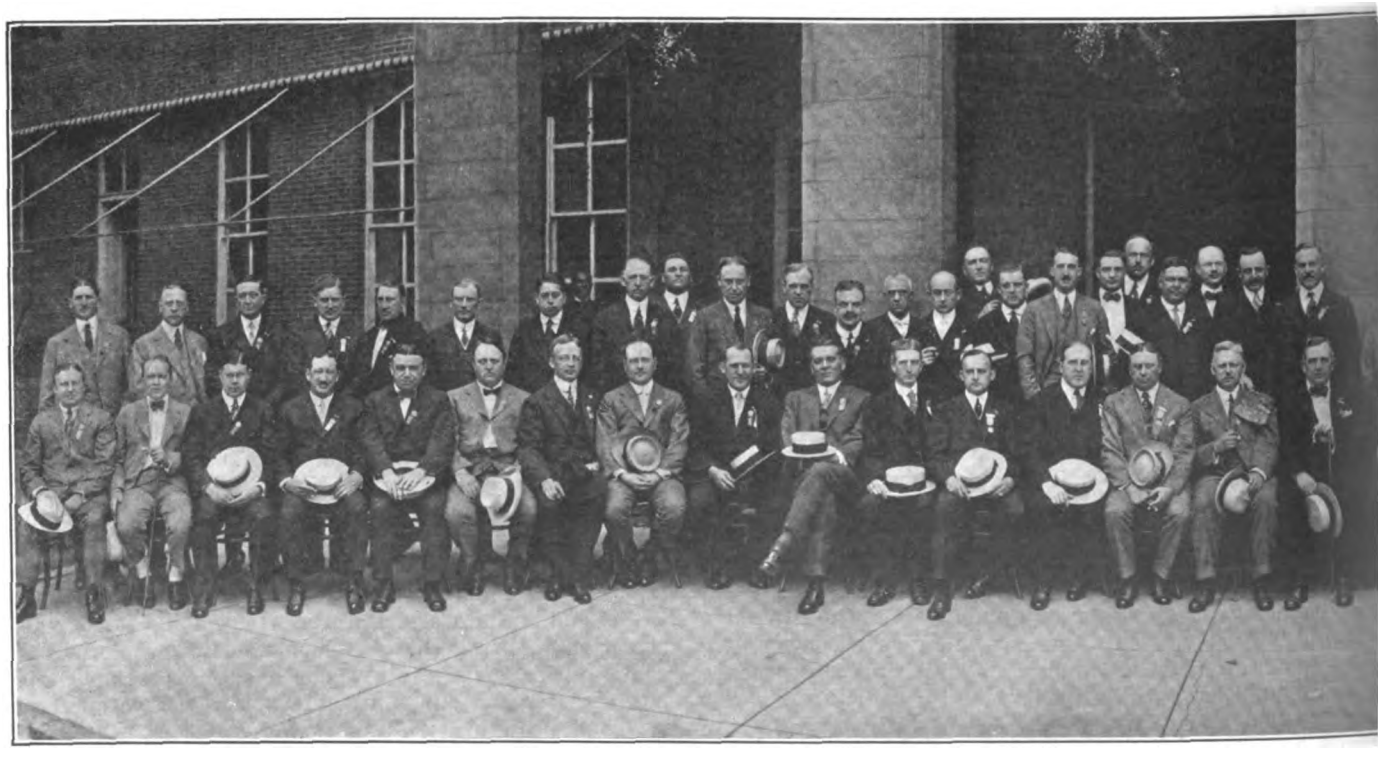
Active Members:
The Third Avenue Railway Company, New York.
Richmond Light and Railroad Company, New Brighton, N. Y.
Binghamton Railway Company, Binghamton, N. Y.
Glen Cove Railroad Company, Glen Cove, Long Island, N. Y.

Allied Members:
Railway Specialties Company, New York.
Electric Cable Company, New York.
Harry DeSteese, New York.
Cooper Heater Company, Carlisle, Pa.
More-Jones Brass & Metal Company, Philadelphia, Pa.
John W. Masury & Son, Brooklyn, N. Y.
Railway Improvement Company, New York.
The Q. & C. Company, New York.

The committee added that but one active member had resigned from the association during the year. This resignation was tendered not on account of any dissatisfaction with the association, but due to financial conditions, and with the promise that as soon as conditions permitted the company will again become a member. Only three allied members had resigned. One company's resignation was tendered on account of its withdrawal from the manufacture of electric railway equipment, and another was due to a receivership. The third was for some unknown reason.

For the committee on workmen's compensation, J. P. Barnes, Buffalo, Lockport & Rochester Railway, presented a comprehensive report showing the status of compensation insurance in the state. This report will be abstracted later. In moving the acceptance of the report, Frank Hedley, Interborough Rapid Transit Company, asked for the continuation of the committee with the request that it investigate and report upon such injustices as have come about through the operation of the compensation act. He showed, for example, that a company could be held for compensation in case of death by suicide. He called attention also to the fact that ordinarily men with few dependents would be selected for hazardous jobs, but when labor was scarce this was impracticable and this imposed a hardship upon the employer.

In seconding Mr. Hedley's motion, E. A. Maher, Jr., Third Avenue Railway, New York, suggested that the committee investigate the relative treatment received by self-insurers and companies insured in the State fund, when compensation cases are being adjusted by the commission. Mr. Maher believed that employees should be held responsible for statements made in applying for employment, and gave an example of the effects of failure along this line. In the case cited a man had given false information as to name, previous employment and number of dependents. After four days' work he was killed and the employer has a widow and four children to take care of.



MEMBERS OF NEW YORK ELECTRIC

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Mr. Hedley's motion was then passed and President Dempsey said that the suggestions would be referred to next year's committee.

DISCUSSION ON MOBILIZATION

Wilbur C. Fisk, Hudson & Manhattan Railroad, New York, next reported for a special committee which the president had appointed April 5, 1916, to study the movement of troops by electric lines, consisting of W. H. Collins, Fonda, Johnstown & Gloversville Railroad; J. E. Hewes, Albany Southern Railroad; J. P. Barnes, Buffalo, Lockport & Rochester Railway; George D. Snyder, Hudson & Manhattan Railroad, and himself, chairman. An abstract of this report appears elsewhere in the present issue. Following this, two papers which had been solicited by the committee were read. One was by J. E. Hewes, Albany Southern Railroad, on "The Advantage of Electric Traction in Time of War," read by himself. The other was by Col. J. B. Bellinger, U. S. A., on "The Use of Electric Railways in the Military Service," read in the author's absence by the secretary. Since he prepared the paper Colonel Bellinger had been assigned to important duties in the National Guard mobilization.

In the discussion of the subject, H. G. Grier, General Electric Company, told of experience in France where, in preparation for using an electric railway for military purposes, turnouts had been installed 15 in. below grade and buried. These had proved useful in the present war.

Mr. Hewes showed that the transportation conditions at the outbreak of the Spanish-American War were disgraceful, and illustrated this from personal experience. He stated that by filling two gaps of about 35 miles each, it would be possible to have a continuous electric railway from New York to Erie, which could be used to supplement the steam lines. The success of Germany and Austria in their drive against the Russians last year was due partly to the possession of transportation facilities, which the Russians lacked. Much of the fighting was done at points selected by the Germans and fortified, temporary electric railways being used to bring up ammunition.

Mr. Barnes said that this general subject has been considered for some months. Electric railways have interesting transportation problems not yet generally recognized. While long moves must be handled by the steam lines, in the collection of individual units the electric railway has an important place. Its organization is such that the work of handling troops could be accomplished like snow fighting. Only a pre-arranged organization and signal are necessary. Snow fighting is part of the everyday business of the electric railway—there is nothing novel about it.

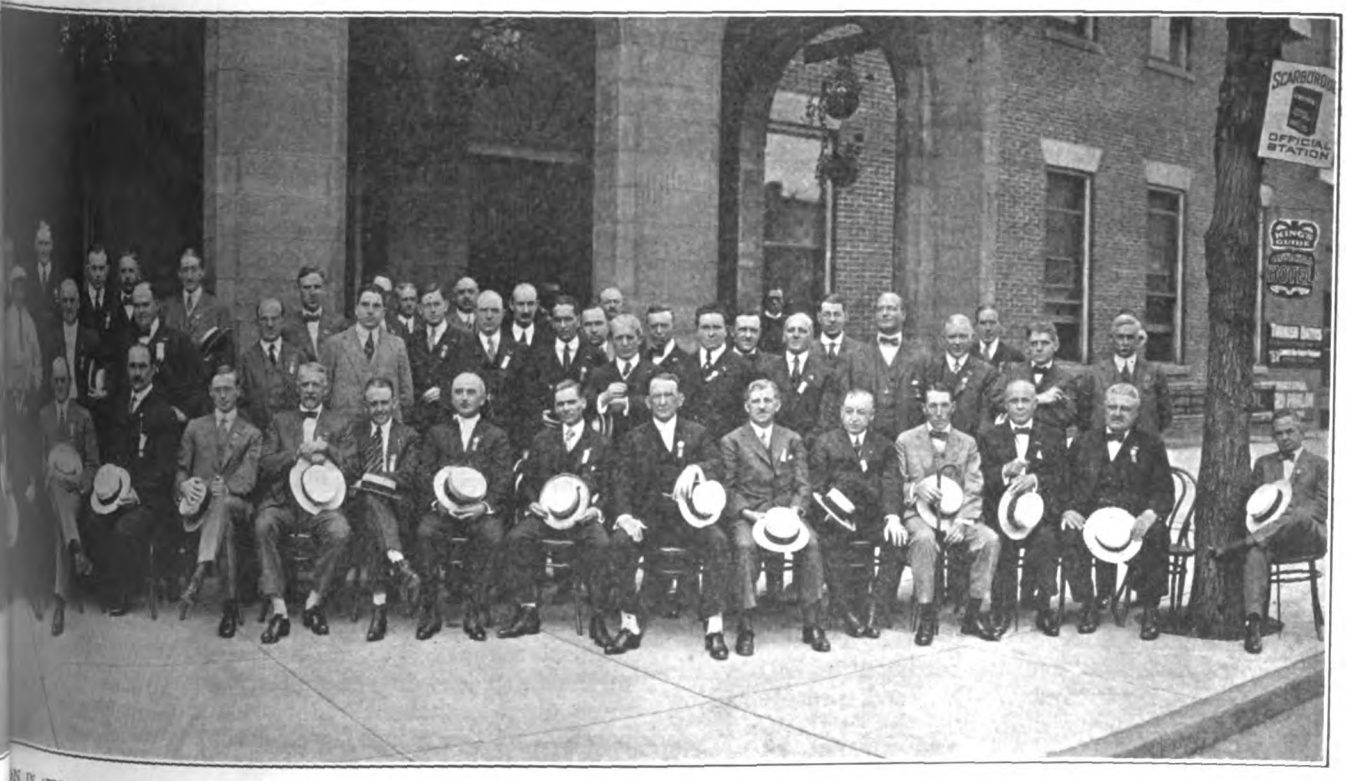
Mr. Barnes also pointed out that the handling of small units prepares electric railway men to do the same on the state railways and roads. Systems of dispatching, telephone stations, etc., could easily be arranged. These men could work in on a system to utilize their own equipment and the state highways effectively. All that is required is a preliminary study to show what must be done in time of emergency.

In closing the discussion Mr. Barnes offered the following resolution, which was passed enthusiastically: "That a committee of five on military service be appointed with instructions to study the problem of military service in New York State, co-operating with the military authorities of the State and the United States in the preparation of plans for movements of troops, munitions and supplies."

ON THE NON-USE OF A. E. R. A. STANDARDS

On behalf of the American Association committee on the use of association standards, W. G. Gove, Brooklyn Rapid Transit Company, made a plea for more attention to the work of the standards committee. A committee had been appointed at Mr. Gove's suggestion to answer the question as to why the standards are not more generally used. The trouble, he said, may be with the manner in which the standards are prepared or with the member companies which pay the expenses of the committees but are not willing to utilize the results of their work.

Among the reasons for the wider use of standards Mr. Gove called attention to the large stocks of supplies required with few standards, and to the space needed in storing these stocks. Each year new parts are being added to the stock lists. The manufacturers are glad to



N IN ATTENDANCE AT NIAGARA FALLS CONVENTION

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co-operate in this work, but the initiative seems lacking. Certain standards already adopted have proved of value to purchaser and manufacturer, and none is effective without the approval of the latter. The tendency toward standardization results in scientific investment.

To illustrate how the standards are not being used, Mr. Gove cited the case of the standard rail, of which but 10,000 tons have been rolled. On the other hand, wheel standards have been of great use to electric railways. While he did not believe in the unqualified use of standards, many of them could be used, for example, wheels and axles. The average railway is not making an effort to furnish its technical staff with information regarding the standards.

Mr. Gove also said a good word for the Engineering Manual, and suggested that the distribution of revisions of the Manual should be simplified and cheapened.

Mr. Barnes supported Mr. Gove, stating that he knew from experience how carefully these standards are prepared. Each has real work behind it, and competent criticism has been secured in formulating it. While the standards need not always be adopted, they should always be considered. The New York State Association formerly paid much attention to standards, but had not done much lately. He moved the appointment of a committee to study the subject, and such was ordered.

J. H. Pardee, J. G. White Management Corporation, said that standards are not adopted because engineers do not agree. The Pennsylvania Railroad would not adopt New York Central standards. The committee should not be discouraged, and the New York Association committee should co-operate with the national association.

Mr. Gove said further that the method of standards exploitation was at fault. The money available for committee activity was limited. Further, in appointing a committee qualifications rather than geographical location should govern. Standardization must be approached in a broad way, and standards cannot be adopted wholesale. The companies must look for return from committee work and abandon their apathetic attitude toward standards.

Mr. Pardee amplified his earlier statements by stating that the adoption of standards, while one test of their quality, is not the only test. They produce results even if not actually adopted.

In closing the discussion Mr. Dempsey said that Mr. Gove's suggestions would be followed in the appointment of the committee. He also announced as the nominating committee, Messrs. Pardee, Hedley, W. H. Collins, Fonda, Johnstown & Gloversville Railroad, and James F. Hamilton, Schenectady Railway.

WEDNESDAY MORNING SESSION

On Wednesday, June 28, a short business session was held in the morning. The committee on nominations presented the names of the following men for the offices named, and they were unanimously elected: For president, James P. Barnes, general manager Buffalo, Lockport & Rochester Railway, Rochester; for vice-presidents, Wilbur C. Fisk, president Hudson & Manhattan Railroad, New York, and C. F. Hewitt, general manager United Traction Company, Albany; for secretary-treasurer, William F. Stanton, assistant to the general manager Schenectady Railway; for members of the executive committee, E. J. Dickson, vice-president International Railway, Buffalo; James E. Hewes, general manager Albany Southern Railroad, Albany; E. A. Maher, Jr., assistant general manager Third Avenue Railway, New York; and W. O. Wood, president New York & Queens County Railway, Long Island City.

Mr. Barnes was then escorted to the chair by a committee, and in a few fitting words accepted the honor and responsibility laid upon him by the association.

On motion of W. H. Collins, Fonda, Johnstown & Gloversville Railroad, resolutions were passed paying tribute to the memory of the late W. B. Rockwell, formerly an active member of the association. Resolutions of thanks to those responsible for the success of the meeting were also passed. W. O. Wood suggested that the members follow the jitney situation, urging upon their respective assemblymen the desirability of enacting regulatory measures.

THE BANQUET

The general topic of the banquet held on Tuesday evening, June 27, was "Preparedness." Mr. Dempsey acted as toastmaster and introduced successively O. E. Carr, city manager Niagara Falls; James H. Callanan, editor Schnectady *Union-Star*, and Dudley Field Malone, Collector of the Port of New York.

Mr. Carr, on behalf of the Mayor of Niagara Falls, welcomed the visitors and reminded them of the extent to which Niagara power is used for car propulsion.

Mr. Callanan, after defining the newspaper as the greatest charity organization in the country, complimented the railways upon their humanitarian work in reducing accidents, especially of the boarding and alighting type. The importance of this work is now generally recognized. He then took up the topic "Leadership and Demagogy," defining the demagogue as "one who can entertain a crowd without letting it know what he thinks," and the "high-brow" as "one educated beyond his capacity." His idea was that "the middleman of poise makes for the world's best progress," and that "the umpire is the type of man needed, for he makes his decisions upon the merits of the case." He then applied these principles to the need for a large navy and to the Mexican situation.

Mr. Malone told some dialect stories in an inimitable fashion and then launched into the general subject of the evening's discussion. In this connection he said that first of all there must be preparedness in spirit. We cannot achieve a patriotic spirit among the great mass of working people unless we are willing to do social service of an honorable and practical kind. Mr. Malone also indorsed the spirit behind citizens' training camps, such as that at Plattsburgh, where he had had experience last year.

OTHER ENTERTAINMENT

The members were delightfully entertained during the meeting under the guidance of a committee headed by H. N. Ransom, Westinghouse Electric & Manufacturing Company, New York. Music for the banquet and dancing was provided liberally and golfing, luncheons, and pleasure trips filled in all of the time of the ladies and the spare time of the men.

Electric Railways in Military Service*

BY COL. J. B. BELLINGER, U.S.A.

Every citizen of a country owes a duty to his country, and every citizen of a country is entitled to be furnished by his country with the facilities for performing that duty. It is because of my belief in the obligation and right of every citizen to render service of some kind to his country that I permitted myself to be beguiled into indicating to your organization, in a general manner, the use to which electric railways might be placed in the military service. This paper must not be construed as being intended to indicate a solution of the general problem of the use of electric railways in the military service. The details of their

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organization for this purpose is, to my mind, a function of the federal government in the solution of the general problem of preparing the country for its proper development and for its protection from harm, internal or external.

After a personal experience with military transportation problems which were large at that time, though they sink into microscopic insignificance when compared with the problems of military transportation which have developed and have been solved during the past two years in Europe, I evolved an expression the correctness of which has certainly been proved by recent events in Europe. It is that transportation is the keystone to the arch, both military and civil. With the application of this principle always in mind, all transportation facilities in a country should be organized so as to insure their rendering the maximum obtainable results.

Of the many forms of transportation which exist, electric railways are most important, but, for military purposes, they will always render their maximum results as auxiliaries. This fact is due to the location of their lines and to the amount and class of equipment necessary for performing the daily service for which they are constructed.

The urban railways can render great service, particularly in large cities, in moving troops, constabulary forces and citizens' municipal protective organizations, readily and rapidly to points of local disorder, as well as to points from which they would be moved for concentration at other points beyond the limits of the municipalities. They can also be used for the transportation of supplies and material between localities within the municipality at which they are to be used and to points therein from which they are to be transported beyond the limits of the municipality. It is believed, however, that the use of urban electric railways for the transporting of supplies would not be as effective as motor trucks, due to their lack of flexibility, but that they would be most effective for the rapid movement of troops about the city.

Rural electric railways can be most effectively and efficiently utilized as auxiliaries to steam railways on the one hand, and to motor truck, animal transportation and marching on the other hand. In other words, the use of the interurban electric railways for military transportation service falls between the use of the steam railway which can transport personnel and material in large quantities per trainload for great distances and the use of the motor truck, animal transport and marching which would transport personnel and material in smaller quantities for shorter distances.

Where existing trolley lines have physical connection for passing the cars from one line to another and thus obtaining a continuous movement without transfer of passengers and freight, their military effectiveness is increased until the maximum effectiveness is reached for any locality. The maximum distance over which they can be used efficiently is determined by the number of men or quantity of supplies which can be handled per car or per train over this distance in some unit of time fixed by the necessity of the occasion.

Just as troops in and about Paris are reported to have been moved by motorbuses, motor trucks and automobiles to reinforce the troops of the Allies which were falling back before Von Kluck's army, so rural electric railways could be utilized for transporting troops and supplies between points along their lines.

DEVELOPMENT OF LINES

In order that the federal government may at all times obtain for military service, in peace or in war, the maximum effective results from the electrical railway systems now existing or which may be built in the future, I recommend that your association form a committee to be known as the Committee on Military Service, whose duty it will be to make a careful study of the location and equipment of the roads represented by this association, formulate plans for constructing lines, as soon as it is considered that they will be paying commercial enterprises, to fill in the gaps which may now exist between lines and obtain continuous movement between extreme points of the lines thus connected and for standardizing the equipment as the present equipment is replaced.

The passenger cars of this standard equipment should, if practicable, be arranged on the basis of transporting complete units or complete fractional parts of units. For example, a war strength company of infantry being 150 men, the standard passenger coach should be able to seat fifty-five or eighty persons, thus making one-third or one-half of an infantry company with the equipment carried on the person of the soldier, in each coach.

Stock cars should carry twenty animals, which would be five four-mule teams.

Flat cars should carry two escort wagons or two ambulances or a field gun, limber and caisson.

The minimum capacity of the baggage cars should be the field equipment of a battalion of infantry, and the maximum should be whatever might be determined to be best for commercial purposes.

A standard of equipment having been established and a definite plan for development of new lines having been agreed upon, the railways should work toward the execution of these standards and plans on the basis of obtaining a proper return on the investment from commercial business as the government of the United States has not yet reached the point of developing the industries of the country by government aid because of the government's ultimate need of the industry.

PURPOSES OF COMMITTEE ON MILITARY SERVICE

Assuming the organization of the Committee on Military Service to have been made, this committee should, at the same time that it is working on the questions of the further construction of lines and the standardization of equipment of the members of this organization, plan to have this organization communicate with similar organizations throughout the country with a view of having each of the organizations creating similar committees on military service.

Assuming that every association of this character in the country has established a committee on military service, these committees should form from their membership a general committee on military service which should represent all of the electric railway associations throughout the country, and the work of this general committee should be that of co-ordinating the building of new lines and the standardization of new equipment, on the basis previously indicated, throughout the entire country.

It should also be the business of this general committee to focus the power of the electric railway associations throughout the country in such a manner on the authorities of the federal government as to insure their aiding the accomplishment of the proper development of the electric railways throughout the country in a manner which will result in service from them for the benefit of the federal government.

It must be thoroughly understood that the efforts of the individuals and of the organizations throughout the country to place themselves and their facilities at the disposal of the federal government can never effectively materialize until the federal government through its agencies co-ordinates the efforts of the individuals and

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of the organizations in such manner as to obtain the benefit of their accumulative effort.

When the federal government finally realizes the importance to the country of seriously undertaking this problem of mobilizing the industrial resources of the country, it will obtain maximum efficiency only by utilizing the personnel of the industries as federal agents when the government takes over the control of the industry for its needs.

For example, the personnel of every industry would be organized in such a manner as to continue the transaction of its business under its own officials who would become local federal officials working under a centrally located permanent federal official, who would simply indicate to the proper local federal official of the federalized industrial personnel what was to be accomplished and when. The details of accomplishment would be executed under the immediate direction of the federalized officials of the industry previously vested with the execution of the orders of the permanent federal official.

ELECTRIC RAILWAYS USED FOR MILITARY SERVICE

It will probably interest you to know that I have personally had occasion to utilize, in a small but most effective way, electric railways for military transportation. I will cite the cases.

In May and June, 1898, I personally suggested the use of the electric railway at Tampa, Fla., for military transport and succeeded in having the electric railway officials there use their road most effectively for the military service. The siege artillery camp was on the hills in the vicinity of Ybor City, Fla., and to reach the camp by wagon road necessitated the hauling of heavy siege pieces through very deep sand. Large Percheron horses had been supplied for drawing these siege pieces, but these animals refused to pull the pieces through the sand. This difficulty was promptly overcome by placing mules on the work, which was then performed but in too slow and inconvenient a manner. I then arranged with the electric railway officials to make physical connection with the steam railroad track and use their electric cars to pull the railroad freight cars containing the heavy gun equipment over their tracks to the artillery camp, where we built an unloading platform for handling it from the cars.

Soon after reporting for duty at Governor's Island in April, 1912, General Fred Grant died, and his funeral escort was concentrated at the Battery to march from there to West Forty-second Street Ferry and then to be returned to their posts. These troops were taken from Governor's Island, Fort Wadsworth, S. I., Fort Hancock at Sandy Hook, N. J., Fort Hamilton in Brooklyn and Fort Totten at Whitestone, L. I.

The concentration of these troops at the Battery in New York City and the returning of them to their posts after the cortège had reached the foot of West Forty-second Street was worked out by me so as to use the electric railways to their maximum as auxiliaries to the steamboat service which it was necessary to use in concentrating the troops at the Battery.

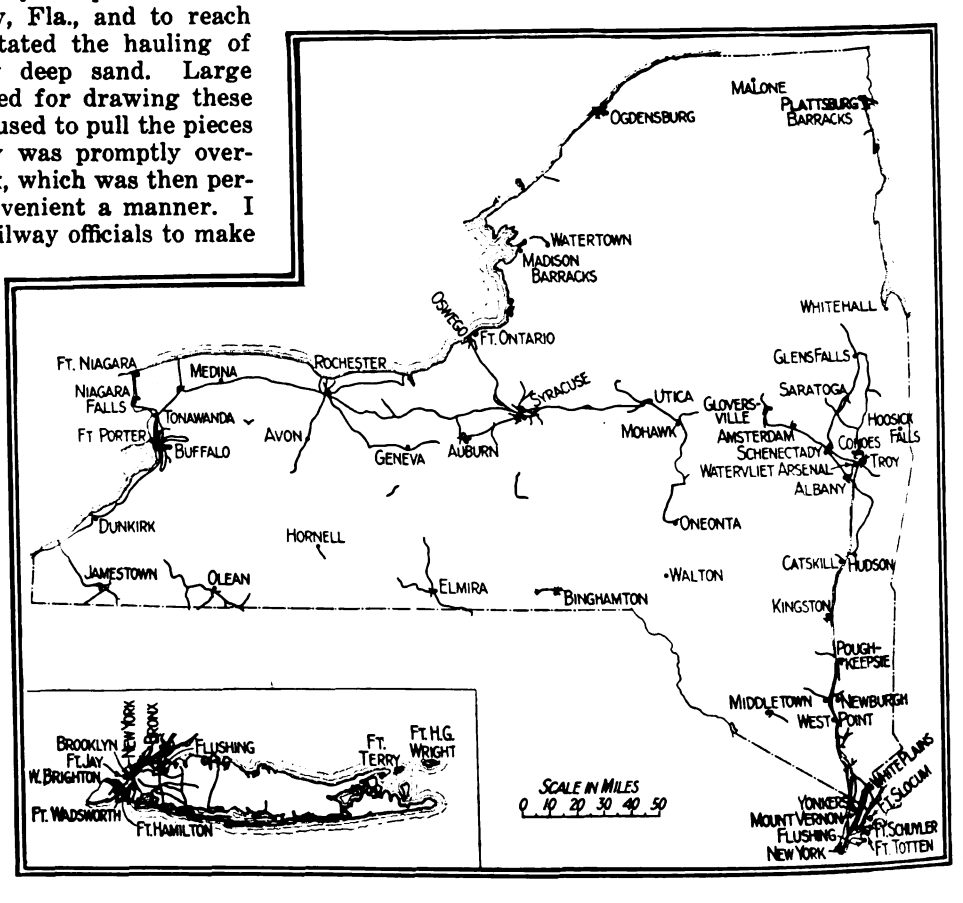
The troops at Fort Hamilton were brought by marching and electric railway to Thirty-ninth Street Ferry, Brooklyn, and by it brought over to New York City. Those from Fort Totten, Fort Hancock, Fort Wadsworth and Governor's Island were brought to New York City by boat.

The Governor's Island troops were returned by the Ninth Avenue Elevated Railway to South Ferry and by ferryboat to Governor's Island. The Fort Hamilton troops were returned by the Ninth Avenue Elevated to South Ferry, by Thirty-ninth Street Ferry to Brooklyn, and then by electric railway to a point as near as possible to the post of Fort Hamilton. The Fort Hancock and Fort Wadsworth troops were returned by boat from the pier at West Forty-fifth Street, and the Fort Totten troops by boat on the East River after marching across town.

In closing, I strongly recommend that you "get busy," for everything that you do in the way of organizing on the general lines indicated will be primarily for the benefit of our country and secondarily for the benefit of your properties.

Report of Committee on Movement of Troops

The report of this special committee, referred to elsewhere in the running report of the association meeting, comprised a résumé of the committee's work and appendices containing data of the equipment of railways, location and sizes of companies making up the several regiments, etc.



ELECTRIC LINES AND TROOP STATIONS IN NEW YORK IN 1916

From Maj.-Gen. John F. O'Ryan data as to the peace and war strengths of the State Guard were secured and with these as a basis maps and tables were prepared. Appendix I of the report is reproduced as Table I herewith, and the accompanying map, also from the report, shows the locations of the National Guard centers re-

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Table I—Data Regarding the N. G. N. Y. and the Electric Railways

WAR FOOTING

Organization	Location	Men	Vehicles: Number	Vehicles: Weight, Lbs.	Animals: Number	Animals: Weight, Lbs.	Baggage, Lbs.	Electric Railway Serving Locality
Headquarters Division	New York City	27	3	6,120	37	43,055	1,000	Brooklyn Rapid Transit, Interborough Rapid Transit, Hudson & Manhattan Railroad.
1st Battalion, Signal Corps	1 Co. Brooklyn	176	14	22,400	208	244,987	6,000	Brooklyn Rapid Transit, Interborough Rapid Transit, Hudson & Manhattan Railroad.
	1 Co. Manhattan							
22nd Corps of Engineers	New York City							
	1 Pioneer Batt. 4 Co	682	12	19,200	193	22,000	4,000	Interborough Rapid Transit.
	1 Pontoon Batt. 4 Co.	682	137	595,104	845	990,000	4,000	Interborough Rapid Transit.
1st Cavalry	Hdq., 5 troops, Brooklyn	585	16	32,640	707	815,252	5,600	Brooklyn Rapid Transit.
	1 troop, Alabny	103	1	2,040	104	120,274	800	Albany Southern (All), United Traction (Men and Baggage).
	1 troop, Syracuse	103	1	2,040	104	120,274	800	N. Y. State Railways, Empire United Railways.
	1 troop, West Brighton	103	1	2,040	104	120,274	800	
	1 troop, Utica	103	1	2,040	104	120,274	800	N. Y. State Railways.
	1 troop, Rochester	103	1	2,040	104	120,274	800	N Y. State Railways.
	1 troop, Buffalo	103	1	2,040	104	120,274	800	International Railway.
	1 troop, Ashantee (Avon)	103	1	2,040	104	120,274	800	Erie Railroad (All).
		1306	23	46,920	1435	1,657,170	11,200	
Squadron "A"	New York—Headquarters							
	4 troops, M. G. T.	488	4	8,160	553	649,251	4,000	Interborough Rapid Transit.
1st Field Artillery	Headquarters—New York							
	4 batteries, New York	842	162	258,888	792	928,374	5,000	Interborough Rapid Transit.
	1 battery, Syracuse	176	37	59,422	157	204,035	1,000	New York State Railways.
	1 battery, Binghamton	176	37	59,422	157	204,035	1,000	Binghamton Railway
2nd Field Artillery	Headquarters—Brooklyn							
	3 batteries, Brooklyn	644	123	191,216	611	755,879	4,000	Brooklyn Rapid Transit
	3 batteries, Bronx	550	113	186,616	495	580,565	3,000	Interborough Rapid Transit.
Armored Motor Battalion	New York	100	.....	.....	.....	.....	.....	Interborough Rapid Transit.
8th Coast Defense	11 Cos., New York	1753	20	40,200	157	160,040	12,000	Interborough Rapid Transit.
9th Coast Defense	10 Cos., New York	1600	19	38,160	153	155,316	12,000	Interborough Rapid Transit, Hudson & Manhattan R. R.
13th Coast Defense	12 Cos., Brooklyn	1906	21	42,840	161	164,764	14,000	Brooklyn Rapid Transit.
1st Infantry	Hdq., 1 Co., Binghamton	232	11	22,440	143	128,544	3,000	Binghamton Railway
	2 Cos., Utica	306	2	4,080	8	9,448	2,000	New York State Railways.
	1 Co., Watertown	153	1	2,040	4	4,724	1,000	Black River Traction.
	1 Co., Ogdensburg	153	1	2,040	4	4,724	1,000	Ogdensburg Street Railway.
	2 Cos., Newburg	306	2	4,080	8	9,448	2,000	Orange County Traction Company.
	1 Co., Walton	153	1	2,040	4	4,724	1,000	
	1 Co., Oneonta	153	1	2,040	4	4,724	1,000	Otsego & Herkimer (All).
	1 Co., Middletown	153	1	2,040	4	4,724	1,000	Wallkill Transit.
	1 Co., Malone	153	1	2,040	4	4,724	1,000	
	1 Co., Mohawk	153	1	2,040	4	4,724	1,000	Otsego & Herkimer (All), N. Y. State Railways.
2nd Infantry	Hdq., 3 Cos., Troy	538	13	26,520	151	137,942	5,000	United Traction (Men and Baggage).
	1 Co., Cohoes	153	1	2,040	4	4,724	1,000	United Traction (Men and Baggage).
	2 Cos., Schenectady	306	2	4,080	8	9,448	2,000	Schenectady Railway.
	1 Co., Gloversville	153	1	2,040	4	4,794	1,000	Fonda, Johnstown & Gloversville Railway (All).
	1 Co., Amsterdam	153	1	2,040	4	4,794	1,000	Fonda, Johnstown & Gloversville Railway (All).
	1 Co., Whitehall	153	1	2,040	4	4,794	1,000	
	1 Co., Glens Falls	153	1	2,040	4	4,794	1,000	Hudson Valley.
	1 Co., Saratoga	153	1	2,040	4	4,794	1,000	Hudson Valley, Schenectady Ry.
	1 Co., Hoosic Falls	153	1	2,040	4	4,794	1,000	Berkshire Street Railway.
3rd Infantry	Hdq., 3 Cos., Rochester	538	13	26,520	151	137,992	5,000	New York State Railways.
	1 Co., Geneva	153	1	2,040	4	4,724	1,000	Geneva, Seneca Falls & Auburn and N. Y. State Railways.
	1 Co., Syracuse	153	1	2,040	4	4,724	1,000	N. Y. State Railways and Empire United Railways.
	1 Co., Oswego	153	1	2,040	4	4,724	1,000	Empire United Railways.
	1 Co., Niagara Falls	153	1	2,040	4	4,724	1,000	International Railway.
	1 Co., Medina	153	1	2,040	4	4,724	1,000	Buffalo, Lockport and Rochester Railway.
	1 Co., Olean	153	1	2,040	4	4,724	1,000	Western New York and Pennsylvania Traction.
	1 Co., Hornell	153	1	2,040	4	4,724	1,000	Hornell Traction.
	1 Co., Elmira	153	1	2,040	4	4,724	1,000	Elmira & Seneca Lake, Elmira, Corning and Waverly.
	1 Co., Auburn	153	1	2,040	4	4,724	1,000	Auburn & Syracuse Railway, Empire United Railways.
7th Infantry	New York City	1915	22	44,880	187	180,508	14,000	Interborough Rapid Transit, Hudson & Manhattan Railroad.
10th Infantry	Hdq., 4 Cos., Albany	691	14	28,560	139	142,716	6,000	Albany Southern (All), United Traction (Men and Baggage).
	1 Co., Catskill	153	1	2,040	4	4,724	1,000	Catskill Traction.
	1 Co., Hudson	153	1	2,040	4	4,724	1,000	Albany Southern (All).
	1 Co., Yonkers	153	1	2,040	4	4,724	1,000	Yonkers Railroad.
	1 Co., Mt. Vernon	153	1	2,040	4	4,724	1,000	Westchester Street Railroad.
	1 Co., Flushing	153	1	2,040	4	4,724	1,000	Long Island Railroad.
	1 Co., Poughkeepsie	153	1	2,040	4	4,724	1,000	Poughkeepsie City & Wappingers Falls Electric Ry.
	1 Co., White Plains	153	1	2,040	4	4,724	1,000	N. Y., Westchester & Boston, Westchester Street R. R.
	1 Co., Kingston	153	1	2,040	4	4,724	1,000	Kingston Consolidated R. R.
12th Infantry	New York City	1915	22	44,880	187	190,508	14,000	Interborough Rapid Transit, Hudson & Manhattan R. R.
14th Infantry	Brooklyn	1915	22	44,880	187	180,508	14,000	Brooklyn Rapid Transit
23rd Infantry	Brooklyn	1915	22	44,880	187	180,508	14,000	Brooklyn Rapid Transit.
47th Infantry	Brooklyn	1915	22	44,880	187	180,508	14,000	Brooklyn Rapid Transit.
65th Infantry	Hdq., 11 Cos., Buffalo	1762	21	42,840	183	175,784	13,000	International Railway
	1 Co., Jamestown	153	1	2,040	4	4,724	1,000	Chautauqua Traction.
69th Infantry	New York	1915	22	44,880	187	180,508	14,000	Interborough Rapid Transit, Hudson & Manhattan Railroad.
71st Infantry	New York	1915	22	44,880	187	180,508	14,000	Interborough Rapid Transit, Hudson & Manhattan R. R.
74th Infantry	Hdq., 11 Cos., Buffalo	1762	21	42,840	183	175,784	13,000	International Railway.
	1 Co., Tonawanda	153	1	2,040	4	4,724	1,000	International Railway.
1st Field Hosp.	New York	73	8	16,320	48	56,272	16,593	Interborough Rapid Transit, Hudson & Manhattan R. R.
2nd Field Hosp.	Albany	73	8	16,320	48	56,272	16,593	Albany Southern (All), United Traction (Men and Baggage).
1st Ambulance Co	Binghamton	84	15	25,620	82	95,598	4,223	Binghamton Railway.
2nd Ambulance Co.	Rochester	84	15	25,620	82	95,598	4,223	N. Y. State Railways.
3rd Ambulance Co.	New York	84	15	25,620	82	95,598	4,223	Interborough Rapid Transit, Hudson & Manhattan R. R.
4th Ambulance Co.	Syracuse	84	15	25,620	82	95,598	4,223	N. Y. State Railways, Empire United Railways.
1st Brigade	Hdq., New York	15	1	2,040	16	18,584	1,000	Interborough Rapid Transit, Hudson & Manhattan R. R.
2nd Brigade	Hdq., Brooklyn	15	1	2,040	16	18,584	1,000	Brooklyn Rapid Transit.
3rd Brigade	Hdq., Albany	15	1	2,040	16	18,584	1,000	United Traction and Albany Southern.
4th Brigade	Hdq., Buffalo	15	1	2,040	16	18,584	1,000	International Railway.

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ferred to in Table I, together with the traction lines mentioned. On the original map some of the troops data given in the table were shown also.

Appendix II of the report contained data of regimental concentration. Sample data from this appendix are given in Table II for the purpose of indicating their nature and the form of presentation. The tables showed that of the 18,700 troops in the State, but 1270 cannot be moved from their home stations by electric lines, although local electric railway service exists at all of these stations.

The committee found that the function of the electric railways is supplemental to that of the steam railways in the following particulars:

1. In the event of sudden mobilization the electric railways can assist in bringing individual soldiers from their homes or places of business to the armories, and when such a call comes at night on lines where an all-night service is not maintained, such lines can readily arrange to continue service during the night.

TABLE II—REGIMENTAL CONCENTRATION, INFANTRY, N. G. N. Y.
(SAMPLE ENTRIES)

1st Regiment

Headquarters, Binghamton

Cos. A and B, Utica.	Co. C, Watertown	Co. D, Ogdensburg
Cos. E and L, Newburg	Co. F, Walton	Co. G, Oneonta
Co. H, Binghamton	Co. I, Middletown	Co. K, Malone
	Co. M, Mohawk	

Cos. A and B (Utica), M (Mohawk) and G (Oneonta) can be concentrated by using the Otsego & Herkimer Railroad and the New York State Railways.

2nd Regiment

Headquarters, Troy

Cos. A, C and D, Troy	Co. B, Cohoes	Cos. E and F, Schenectady
Co. G, Gloversville	Co. H, Amsterdam	Co. I, Whitehall
Co. K, Glens Falls	Co. L, Saratoga	Co. M, Hoosic Falls

All the companies, with the exception of Co. I (Whitehall) and Co. M (Hoosic Falls), can be concentrated by the various electric railways, etc.

2. To assist in assembling the different elements of a command in cases where they are stationed at different points, so that the complete organization can entrain at one point for a concentration camp or other destination. The companies of some regiments are stationed at widely separated points and the electric roads can in many cases advantageously transport these elements to a central point.

3. To transport troops within the larger cities; from armories to steam railway terminals, or from armories to strategic points in case of riot or disorder; or from armories to suburbs or open country for maneuvers or field training.

4. As alternate or supplemental routes when the steam railways are temporarily blocked or disabled, or congested with other more important business, such as munitions, food or supplies.

As most of the electric lines are primarily passenger railroads, the problem of transporting the vehicles, animals and bulky equipment cannot be solved in all cases. The committee, therefore, collected data showing the rolling stock, capacity, running time, etc., on a number of roads in the State and arranged these in tabular form. In concluding its report the committee said as follows:

"The training and organization of the staffs of the electric lines are such that they can assist in the movement of troops even when these are not moved over their lines; for instance, in the regular loading and dispatching of motor cars from terminal points.

"The attention of the military authorities of the nation and the State is called to the fact that the electric railway officers are always ready to confer and co-operate with them in peace or war to further the development of the country's defensive power, as it is felt that the resources in men and material of these transportation lines are elements that will assist greatly in the solution of the problem."

Use of Electric Traction in Time of War

In introducing the discussion on this subject, James E. Hewes, Albany Southern Railroad, presented a paper prepared as part of the program of the special committee appointed to study the movement of troops by electric lines. Mr. Hewes had been an officer in the engineering department of the United States Army during the Spanish-American war, and he first gave a résumé of the transportation conditions during that period. In stating the position of the New York Association he said: "We as members of the New York Electric Railway Association desire to place ourselves in a position before the government as being willing to co-operate with the government in order to offer what facilities we have in time of war. To that end we must lay before the government some definite plan pointing out clearly just how far we can be of service and by what specific methods." Continuing, he said in part as follows:

"I hope that this move on our part may lead to further development of present electric railway systems, which development has been sadly lacking in the past few years, and that a way may be found by which the missing links now existing between the terminals of our interurban lines may be supplied. This will result in more rapid development and may be the means of enabling us to reorganize our present systems into larger units.

"The government and the State are liberally encouraging the development of State roads. Commissions have been appointed to consider the increasing of the strength of bridges on these roads, as many of them cannot sustain loads of 10 tons. The average electric railway bridges can support loaded cars equal in weight to steam equipment, and this is one facility which we can offer the government in the transportation of heavy loads."

Mr. Hewes then gave the results of study of conditions during the present war in Europe, showing that transportation has had much to do with the successes in several campaigns. He said that the German trenches are supplied by means of electric railways, having their bases at the nearest points of contact with a steam railroad. In some cases the electric road was merely a narrow tramway made up of sections using steel ties. All structural features of the tramway were supplied from the steam road base. Electric lighting in the trenches and current for searchlights were supplied from the source of supply of the electric road. He then went into details concerning the military features of the situation with a view to impressing the problems imposed by the transportation of vast quantities of ammunition.

Applying the results of his study to the immediate problem in hand, Mr. Hewes said:

"When vast bodies of troops and supplies are moving it is necessary, in order to avoid confusion, to have a complete system of dispatching. Highways and railroads can be controlled by men having railroad experience. It is quite within our power to lend valuable aid in this way.

"During the Civil War railroad men were appointed to handle the movement of troops, not as officers, but as dispatchers, and railroad men were appointed to take charge of the movement of troops on the steam roads. At times the Pennsylvania and B. & O. systems were turned over to and operated by the government, the operation being under the direction of railroad men.

"The value of electric railway facilities lies, first, in the personnel, our men who are capable of dispatching transportation. Second, an electric road can be built over an irregular country where grades that a steam

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EQUIPMENT AND ITS MAINTENANCE

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.

Recording Second-Hand Special Work

BY C. BENHAM, JR.
Assistant Engineer Maintenance of Way New York State Railways-Rochester Lines

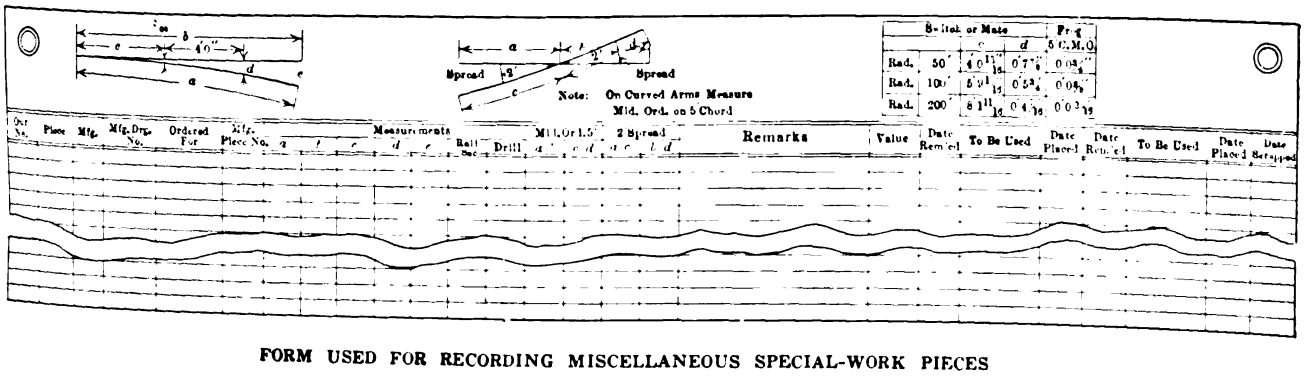
Owing to the rapid growth of our cities, and with it the constant demand for increased transportation facilities, changes are frequently made in special-work layouts on electric railway properties. These are due to the necessity for additional tracks to facilitate operation, revisions to obtain clearance for new and larger equipment, double-tracking, extensions and the like. As a result of the above a number of switches, mates and frogs, which are not completely worn out, are removed from the track. These pieces may be used again, not only in emergency repairs but in regular replacement, and if only slightly worn they can be used in the design of new layouts. In this manner full use is made of expensive material. It is also advantageous to use these pieces in layouts which will be changed in the near future so that the entire layout will wear out and require replacement at the same time, as it is desirable to eliminate the removal of partially worn pieces as much as possible.

It is of the utmost importance that an accurate record be kept in order that it may be utilized to its full extent. A few years ago this company had collected odds and ends of special work at various yards in the city. With the idea of cleaning up, all these pieces were taken to our main storage yard. The locations from which these pieces came were forgotten and the plans misplaced. Other pieces were removed from the track and were kept at the main storage yard, but no systematic effort was used to make these pieces available for regular use. Occasionally in an emergency a foreman would go to the yard and search among the scrap with the hope of finding a piece to fit one that had been broken in the track. In order to make more use of this material the following method was worked out and has been successfully used on the New York State Railways, Rochester Lines.

As soon as the pieces are removed from the track they are sent to the company's storage yard, and are marked with a piece number. To facilitate numbering these pieces, Roman numerals were adopted as these can be cut with an ordinary cold chisel. Those for which there are no manufacturers' special-work plans on file, are measured and the information entered on the accompanying form. In the first column is noted the piece number, in the second column the kind of piece, that is, whether it be a switch, mate, frog or piece of rail. Then, in order, are noted the manufacturer, the manufacturer's drawing number, the location for which the piece was ordered and the manufacturer's piece number as noted on his drawing. These last four columns are filled in at the office. In the column headed "Value" is noted the second-hand value as estimated at the time of removal.

The frogs are measured by taking the spread every 2 ft. from the point, the over-all lengths and the middle ordinate for 5 ft. on the curved arms. In measuring the switches and mates, the location of the 2-in. spread is found and the spread is measured again 4 ft. from this point toward the heel. A glance at the table will show the radius very closely. The over-all lengths are also measured as is the distance from the point of the 2-in. spread to the end. The same method is used for measuring the worn-out pieces to be renewed so that the measurements are readily comparable with second-hand pieces in stock. After making the special-work inspection, or at any time when a piece of special work in the track is reported as needing renewal, the stock sheet is gone over and the location at which any second-hand piece can be used is noted in the column headed "Location to be used," and in the following column is noted the date when the piece is placed. The next three columns are used in case the piece is removed and used again, although this rarely happens.

Keeping this second-hand stock sheet up to date and closely scrutinizing it before ordering new pieces result in a large saving of money as well as a great deal of time in case of an emergency.



FORM USED FOR RECORDING MISCELLANEOUS SPECIAL-WORK PIECES

Welding Manganese Steel

BY A WAY ENGINEER

The article on a new process of welding manganese steel by P. A. E. Armstrong in the ELECTRIC RAILWAY JOURNAL for June 17 brings out some of the inherent difficulties which must be overcome to make successful autogenous welds on this metal. While a large percentage of successes has attended repairs made by various welding outfits where extraordinary care was exercised, the lack of scientific information coupled with careless workmanship, due largely to inexperience, has resulted in a number of defective welds. There are usually two classes of defective welds, as mentioned in the article; either a bond has not been obtained between the welded metal and the old casting, or, where the cast-

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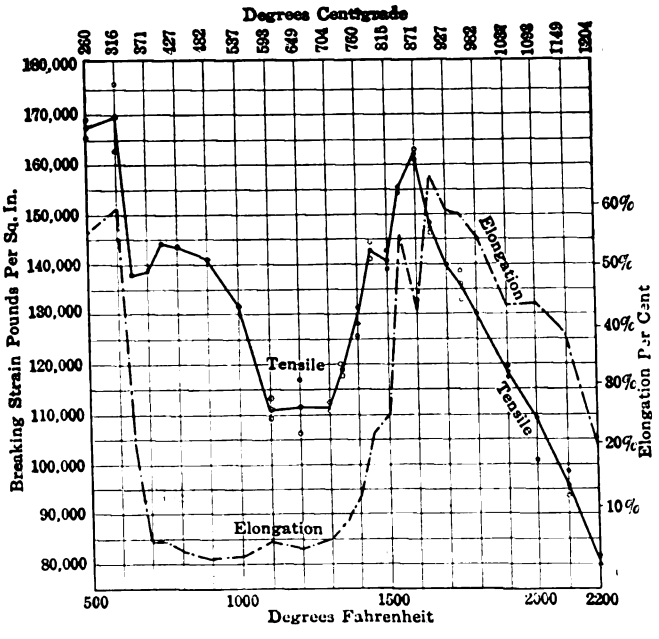
ing is subjected to heavy impacts, the manganese steel surrounding the weld chatters.

Since welds to heat-treated steel are regarded with disfavor by metallurgists, particularly when the work is done in the field, little or no scientific information has been available, which will account for the large percentage of successes. In order to obtain the best information available on this subject a number of authorities were consulted and their suggestions are incorporated in this article. Perhaps the paper by W. S. Potter, president of the Alloy Steel Forging Company, Pittsburgh, Pa., in the April, 1915, *Bulletin* of the American Institute of Mining Engineers, is as authoritative as any available at this time. In this article Mr. Potter presents data showing the relation of heat treatment to the tensile properties of rolled manganese steel. The result of the author's experiments is quite clearly shown in the diagram accompanying this article. Although the method of manufacture of rolled manganese steel differs from cast manganese steel, the chemical analysis is practically the same for both, and the effect



EFFECT OF HEAT ON BREAKING STRAIN OF MANGANESE

of heat treatment is very similar. Since the publication of this article Mr. Potter has been consulted, and he bears out the foregoing statement.

To obtain the points on the two curves shown in the accompanying diagram, Mr. Potter had tested a large number of ⅜-in. round rods, the chemical analysis being as follows: Manganese, 13 per cent, and carbon, 1.02 per cent. These rods were of rolled manganese steel, quenched as it came from the heat of rolling. The relation of heat treatment to the tensile property was obtained from twenty-five lots of test rods containing ten each. Each lot of rods was reheated for one hour at the various temperatures shown, and then water-quenched. In other words, the various tests produced a cycle of changes in the physical properties somewhat similar to those through which the manganese steel surrounding the weld passes when water-quenched following the welding operation.

Reference to Mr. Potter's diagram shows that a marked drop in the breaking strain or per cent of elongation occurs between 600 deg. and 700 deg. Fahr., and, after reaching the low point, this condition obtains until the rods are reheated above 1300 deg. Fahr. At this point the breaking strain and per cent of elongation rise rapidly until a temperature of 1600 deg. Fahr. is reached. As the rods were reheated and quenched at temperatures above this point, both the breaking strain and the elongation per cent dropped off, but not as rapidly as they did at 600 deg. Fahr.

As a result of these tests the author found that there were two temperature regions where the effect of reheating the metal was about uniform. The first region was after water-quenching the rods from the heat of rolling to a point where they were reheated to a temperature exceeding 600 deg. Fahr. and quenched. In other words, if the temperature was maintained below this maximum, the characteristics of the reheated and quenched metal were not changed appreciably. The second region, giving approximately uniform properties, was between 1550 deg. Fahr. and 1750 deg. Fahr. Between these two regions the metal was found to be weak and brittle, and beyond the second region, namely, 1750 deg., the specimen when bent or stretched cracked generally between grains, showing a very low grain of adhesion.

The foregoing information, when applied to welds made on manganese steel special work in the field, largely explains the vagaries of the metal and the causes of the defective welds. If the temperature of the heat-treated manganese steel adjacent to the point of the weld could be maintained below 600 deg. Fahr. doubtless the welds would be successful. Welds in which the temperature of the surrounding heat-treated steel is raised to a point between 1550 and 1750 deg., after which the heated areas are promptly quenched, should also result in successful welds. However, it is impossible to weld at the lower temperature, and to control any temperature to such a nicety is a very delicate operation, because it is impossible to retard radiation from the welded zone. It is not so difficult to restrict the heated area and maintain low temperatures in them, hence it appears that this is about the only practical solution of the problem, and the one which welders should follow. Low temperatures in the body casting may be maintained by frequent quenching or by building on small portions of welded metal at one time. In other words, natural radiation keeps the temperature down within the welded region. This minimizes the damage to the casting, and no doubt accounts for the large per cent of successful welds obtained by those who build on slowly and quench frequently. Another method might be suggested, namely, that of fixing the relation between the size of the metal electrode and the radiation characteristics of manganese steel so that the rate of building on the new metal would be practically equal to the rate at which the heat is radiated or dissipated from the main casting. Experiments along this line might be productive of results very advantageous to operators in obtaining a larger number of successful welds.

Undoubtedly the variation in results obtained by different operators in making repairs by welding on manganese steel special work may be attributed as largely due either to inexperience or lack of authoritative information. The conclusion to be drawn from the results of Mr. Potter's tests as well as Mr. Armstrong's article is that a thorough knowledge of the subject accompanied by scientific methods should be attended by a larger number of successful welds. Lack of this information, however, has made cut and try methods necessary to obtain satisfactory results. Perhaps more extended tests along the lines suggested in these articles would also be very instructive, particularly if the relation of the welding temperature and rate of heat radiation of the manganese steel were known. With this information operators could control their work by timing it rather than by using a thermometer.

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AMERICAN ASSOCIATION NEWS

Committee Meetings of the Week

Meetings of two association committees were held during the current week. The sub-committee on property ledger of the joint engineering-accounting committee met in New York, June 28, to complete its report. Those present were: F. H. Sillick, New York; J. C. Collins, Rochester, N. Y., and Harold Bates, New Haven, Conn. There was also a meeting of the joint committee on claims-transportation at Buffalo on June 26.

Hearing on Clearance and Hours of Service Bill

At the request of the committee on federal relations of the American Electric Railway Association, a sub-committee of the United States House Committee on Interstate and Foreign Commerce held a hearing on the morning of June 21 to hear any objections which electric railway companies might wish to make to the "clearance" bill and the "hours of service" bill now before Congress. These were the bills to which the committee on federal relations recently called the attention of the member companies of the association, as mentioned on page 1044 of the issue of this paper for June 3. The clearance bill (H. R. 9047) specifies that car clearances should not be less than 3 ft., except at stations or freight house platforms, and that the overhead clearance should be not less than 6 ft. The hours of service bill (H. R. 9216) amends the hours of service act by reducing from nine to eight the hours of service of signal and switch operators, but the bill is so worded as to include motormen and conductors of interurban roads engaged in interstate commerce by classifying them with dispatchers in case they receive or report orders by telephone.

Those electric railway managers present at the hearing were: Arthur W. Brady, Anderson, Ind.; W. P. Megaree, Philadelphia; A. V. Brown, Sandusky, Ohio; M. S. Morgan, Springfield, Ohio; John L. O'Toole, Newark, N. J.; H. S. Lyons, Boston; B. F. Weadock, Detroit; E. C. Foster, Manchester, N. H., and R. I. Todd, Indianapolis. Others in attendance at the meeting included the national officers from four of the steam railroad employees' associations, representing the conductors, engineers, firemen and trainmen. The principal argument in behalf of the electric railway interests was made by Arthur W. Brady, chairman committee on federal relations. The members of the sub-committee manifested a close interest in the points brought out by Mr. Brady, and asked a number of questions of him and of some of the other electric railway representatives in attendance. After some discussion, in which the labor representatives in attendance participated, the latter withdrew any objections they might have had to an amendment to the bill to exempt from its provisions all interurban and city railways that were operated entirely by electricity. As that was the object for which the hearing was held, the chairman requested that the official stenographer make a note of the fact that the proponents of the bill had agreed to exempt from its provisions electric street railway companies. The hearing was declared closed without any further discussion on that subject.

On the following day a hearing was held by the full committee on commerce on the hours of service bill. Practically every member was present, and the hearing was continued for about two hours, Mr. Brady giving the principal testimony and presenting a proposed amendment exempting electric railways from the provisions of the act. The committee took the stand that the proposed amendment was so broad that it repealed the present hours of labor law, and requested the electric railway representatives to draw up another amendment which would meet the ideas of the committee, indicating that such an amendment would be acceptable. Mr. Brady agreed to do this, and the meeting then closed.

Rowdyism on Interurban Cars

Placards Calling Attention to Various Sections of Ohio Laws Have Desired Effect in Reducing This Evil

THE Northwestern Ohio Railway & Power Company, Toledo, Ohio, which connects Toledo, Genoa, Port Clinton and Oak Harbor, has for some time had considerable difficulty with rowdyism on its cars. This arose from the fact that a very large part of the riding public consists of foreign passengers from the limestone quarries and gypsum mines in the company's territory. Recently, however, the company had printed a placard (7 in. x 11 in.), as shown in the accompanying illustration, calling attention to various sections of the Ohio laws concerning the police rights and duties of the conductors on interurban cars. Two of these cards were framed and placed in each car, one in the smoking compartment and one in the other part of the car, and some were also placed in stations and at other points within easy view of the public. Since these cards

The Northwestern Ohio Railway & Power Co

Attention of Passengers is called to the following Sections of the Ohio Laws concerning Police Rights and Duties of Conductors on Interurban Cars

Sec. 3433. **[When a passenger conductor is a policeman.]** The conductor of every train carrying passengers within this state and the conductor of the car or cars of every interurban railroad carrying passengers within this state, is hereby invested with all of the powers, duties and responsibilities of police officers, while on duty on his train or on said car or cars, and said conductor may wear the badge of a special policeman [73 v. 166, § 1; 97 v. 84.]

Sec. 3434. **[When conductor may eject a passenger.]** When a passenger is guilty of disorderly conduct, or uses any obscene language, or plays any game of cards or chance for money or any other thing of value, upon any passenger train or upon the car or cars of any interurban railroad carrying passengers within this state, the conductor of such train or car or cars of such interurban railroad shall stop his train or said car or cars at the place where such offense is committed, or at the next stopping place of such train or of such car or cars, and eject such passenger from the train or from said car or cars, using only such force as may be necessary to accomplish such removal; and the conductor may command the assistance of the employees of the company, person, firm or corporation owning or operating such road or roads and of the passengers on such train or on such car or cars to assist in such removal; but before doing so he shall tender to such passenger such proportion of the fare he paid as the distance he then is from the place to which he has paid fare bears to the whole distance for which his fare is paid. [73 v. 166, §2; 97 v. 84.]

Sec. 3435. **[When a conductor may arrest a passenger.]** When a passenger is guilty of any offense upon a passenger train or upon the car or cars of any interurban railroad carrying passengers within this state, the conductor of such train or of such cars may arrest him and take him before any magistrate having cognizance of such offense, in any county in this state in which such train or car or cars of any interurban railroad runs, and file an affidavit before such magistrate, charging him with such offense; but in no case shall the liability of a railroad company for damages caused by the conduct of its conductor be affected by the provisions of this and the next preceding section. [73 v. 166, § 3; 97 v. 84.]

Sec. 3436. **[Penalties against conductors for violations of two preceding sections.]** A conductor having charge of a passenger train or of the car or cars of any interurban railroad carrying passengers within this state, who wilfully neglects his duty as required by the two preceding sections, or fails to use all the means in his power to carry out the requirements of such sections, shall be deemed guilty of negligence of official duty, and on conviction thereof, before any court having competent jurisdiction, shall be fined not less than five nor more than twenty-five dollars. [73 v. 166, § 4; 97 v. 85.]

THE NORTHWESTERN OHIO RAILWAY & POWER CO.
E. A. BURRILL, Gen. Mgr.

PLACARD CALLING ATTENTION TO OHIO STATUTE PROVISIONS CONFERRING POLICE RIGHTS ON CONDUCTORS

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were posted there has been a perceptible decrease in rowdyism, until now it is the exception rather than the rule.

COMMUNICATION

B. & O. Belt Line Electrification Reminiscences

NEW YORK, June 26, 1916.

To the Editors:

I wish to add a few comments to the article on "Operation on the Baltimore & Ohio Electrification," appearing at page 1074 in the issue of the ELECTRIC RAILWAY JOURNAL for June 10. Considerable of my early experience in electric traction work was obtained during the several years I was connected with this company, and, because of holding a leading position in connection with the changing from overhead conductor system to third-rail, I have an intimate knowledge of the difficulties experienced and the methods of solution adopted. It would be possible to make several articles of the interesting experiences had in this early work; however, for obvious reasons I don't expect to make them. Erroneous ideas could very readily become current regarding the history of this matter, and it is well to take the opportune time to place on record some of the leading facts.

I will first refer to an article in the STREET RAILWAY JOURNAL, of March 14, 1903, pages 398 to 405, under the name of W. D. Young, which makes a plain statement of the conditions encountered at that time, although the caption of the cut at top of page 401 should read "Crossing at North Avenue" and not "Huntingdon Avenue." The following facts are worthy of note:

In the Belt Line tunnel, live steam locomotives were frequently passing. Those going up-hill gave out a certain amount of gases even though not working under steam. Those going down-hill gave out still more gas when accelerating trains at the entrance of the tunnel, after a passenger or block signal stop. For some time previous to the receipt of the 1903 type of electric locomotive, the conditions in the tunnel were pretty bad because the steam locomotives going up-hill with the throttles open, due to the inability of the 1894 type of locomotives to handle the heavier freight trains without working steam. The chief difficulty with the overhead structure, therefore, was one of the worst cases of corrosion I have ever seen, due to the gases and dampness. The tunnel was later grouted with cement to make it drier, there being springs in the surrounding ground in places.

I will not here go over again the difficulties of constructing a third-rail in a long tunnel with trains in constant operation, neither the tunnel nor the right-of-way generally, nor the locomotives themselves, having been designed for third-rail operation. The results of our work were quite satisfactory; although doubtless capable of some further improvement, as many years of experience have demonstrated. In comparing this installation with the third-rail systems installed by the New York Central & Hudson River Railroad, and by the Pennsylvania Railroad, it is to be remembered that the New York Central tunnel was entirely reconstructed, and the Pennsylvania tunnels were entirely new, both being built with a view to third-rail operation, and both installations were subsequent to ours and the designers had the benefit of our experience.

The third-rail shoe rigging designed for the 1894-type locomotive and illustrated at page 403, STREET RAILWAY JOURNAL, March 14, 1903, operated quite satisfactorily, and was retained in use until these locomotives were retired from service. The 1903-type locomotive illustrated on page 1077 of the issue for June 10 was designed for third-rail operation, and a different type of shoe rigging was furnished with it. The same is true of the so-called "1910 type." The point I make is: The equipment designed by us in 1902 perfectly met the conditions of overhang, clearance, good contact, etc., and was retained on the locomotives until they were retired. The movable third-rail equipment designed by us is still in operation. The changes in third-rail support and protection are not great. The type illustrated on page 1078 does not differ greatly from the type illustrated on page 400, March 14, 1903. W. D. Young, electrical engineer, and the writer as assistant electrical engineer, were both with the company for some years after the completion of this third-rail work, since our territory covered the whole system from the Atlantic Coast to Chicago.

I am pleased to see the Baltimore Belt Line given the attention its importance merits. To illustrate how readily erroneous impressions are obtained, I will add an anecdote. During the work of third-rail installation, I found myself one day in the cab at the head of a freight train, awaiting the Royal Limited to clear the track ahead. The observation car of the latter had stopped alongside the locomotive out of the window of which I was looking. A gentleman with the appearance of a prosperous traveling salesman, seated on the observation platform, asked a few questions about the electrical equipment and incidentally brought out the fact that he thought the Belt Line tunnel went under the Chesapeake Bay. I explained to him that before its construction, trains to Philadelphia had been ferried across Baltimore harbor by a car ferry, but this harbor was some miles from the Bay although the Patapsco River is very wide between the city and the bay, and only an expert can tell where river ends and bay begins. Probably many persons have traveled between New York and Washington with the idea that they passed through a tunnel under the Chesapeake Bay. It is in the hope of correcting other possible errors in engineering circles just as far from the truth as that of the traveler mentioned, that I have added the foregoing notes to the article in the issue of June 10, 1916.

H. J. KENNEDY, M. E.,
Electric Railway and Industrial Plant Engineer.

Electrical Week Local Committeemen Appointed

Every city with a population of 20,000 or more will have a committee in charge of local arrangements for the America's Electrical Week campaign this fall. The national executive committee in charge of the movement, of which Gerard Swope, vice-president of the Western Electric Company, is chairman, recently announced its appointments of chairmen and local committeemen. More than 1200 representative electrical [illegible] have been appointed. The executive committee, [illegible]gh the Society for Electrical Development, Inc., [illegible] every effort to have the list representative of the [illegible]nt electrical interests, the Jovian Order, the Ro[illegible] Clubs and civic associations where they rendered [illegible]tion during the electrical prosperity week cam[illegible]. The committee list is most imposing. It con[illegible] names of many nationally prominent men who ha[illegible] accepted the chairmanship of local committees, and wh[illegible] pledged their support.

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locomotive cannot surmount can be negotiated. Third, we have a vast number of cars with standard equipment that can be placed in service on short notice. Fourth, the electric road is not handicapped by the necessity of transporting coal and water as is the steam road. It is only necessary for us to put up a trolley wire and the source of energy supply is established. Fifth, there are probably more electric car crews available than chauffeurs or locomotive and train crews. Sixth, the source of power supply can be power houses located in nearly any city with a population over 15,000, and such cities are located within reasonable transmission distances of each other.

"I think that it would be fitting at this time to consider the organization of our members into a transportation unit to be available in time of war, to cooperate with the government along the lines indicated."

Wheel and Tire Specifications Revised

American Society for Testing Materials Recommends Changes in Connection with Tolerances

AT THE nineteenth annual meeting of the American Society for Testing Materials, held in Atlantic City on June 27-30, 1916, the committee on steel recommended a number of revisions of existing standards. Among these is a suggested change in the standard specifications for solid wrought-carbon steel wheels for electric railway service. By these changes the wheels are classified so that rolled wheels would become class A, and machined wheels class B. The requirement as to rotundity for class B wheels is to be changed so that the opening between the tread and the ring gage shall not exceed 1-64 in. instead of 1-32 in. The present requirement as to permissible variation in the tape sizes (six tapes over, or four tapes under the size specified) are made to apply only to wheels with treads less than 3 in. in width. For wheels with treads of 3 in. or over, the permissible variations are nine tapes over, or five tapes under the size specified. The requirement as to thickness of plate is to be changed to agree with those of the specification for wheels for steam railway service. Also, the permissible variation of the diameter of hub over that specified is to be changed from ⅝ in. to ¾ in., and the requirement as to projection of front plate of hub has been omitted. The requirement that the projection of the back plate of hub from the gage line shall not vary more than 1-32 in. over nor more than 1-16 in. under that specified, is to be changed to read that the projection of the hub beyond the back plate of the rim shall not vary more than 1-16 in. from that specified. Changes in marking are also included in the recommended revisions.

Revisions of the standard specification for steel tires are recommended in connection with the chemical properties and tests. The drop test is to be omitted, and the tension test is required only if specified by the purchaser. The requirement as to the permissible variation in inside diameter is to be modified so as always to permit a variation of ¼ in. less than the diameter specified. The present specifications base a variation on the finished diameter, allowing ⅜ in. less than this diameter, and as a consequence, when tires are ordered rough bored ¼ in. less than the finished inside diameter, the available variation is only ⅛ in. below the variation specified. Permissible variations are also specified in the outside diameter amounting to ½ in. over for tires less than 54 in. in diameter.

The committee announced that it would take up, next year, in addition to other matters, the subject of specifications for steel ties.

Boat Trip of C. E. R. A.

Four Days' Cruise Was Successfully Begun—Impromptu Talks Were Given Wednesday Morning—Special Cars Were Run to Place of Embarkation

(By Telegram from Mackinac Island)

THREE hundred members, their families and guests of the Central Electric Railway Association sailed from Toledo on Tuesday morning, June 27, on the steamer South American for the four days' cruise on the Upper Great Lakes. The weather has been fair and warm up to the time of filing this telegram at Mackinac Island, Michigan, and already plans are well under way for another boat trip next year. On Tuesday afternoon a stop of one hour was made at Detroit, where other members joined the boat party. The evening was spent in viewing the scenery along the shores of Lake St. Clair, the St. Clair River and Lake Huron, in dancing and in a musical program.

The only association meeting was held on Wednesday morning, with President A. Benham in the chair. After the usual preliminaries E. B. Peck, vice-president Terre Haute, Indianapolis & Eastern Traction Company, chairman of the joint folder committee, reported the progress it had made in obtaining subscriptions from member companies. He said that the work of this committee had started about three years ago, but the committee had not received full authority to act until November, 1915. The details of the folder have been worked out, and bids have been received from publishers for the printing. He said forms of contracts for the member companies had also been prepared and mailed, but the response had not been very encouraging. Only fourteen contracts out of fifty-eight sent out had been returned signed.

Mr. Peck then said that the cost of the interline folders was $21.30 per thousand, and that no railway's timetable would appear in the folder unless it subscribed and was a member of the association. The benefits to be derived from such a folder were apparent, and it was of just as much value to the smaller companies as to the large ones. He said that there was no question but that the public's lack of information concerning interline schedules and connections lost the member companies a large amount of passenger traffic annually. If all companies would subscribe, the folder could be made to cover 8000 miles of electric railways. It would be placed in 668 folder racks, and it was intended to issue 10,000 folders monthly under the contract to be made with the printers. The cost will vary with the market price of paper, and with the quantity of folders printed. The number of member companies which had subscribed up to the time of the meeting was just sufficient to make the first issue of the folder possible.

Mr. Peck then urged other member companies to subscribe. He said that the Traffic Association had issued an interline passenger traffic tariff which had been distributed to all member companies. With this the cost of a trip could be determined, but the time and connections could not. The committee also decided that the folders should not contain any outside advertisements to detract from its value. If any railway, however, cared to advertise its service, that would be permitted. In conclusion, he said that the association map had been one of the most creditable things the association had done in a traffic way, but that the interline folder was needed to give the map value as a traffic stimulator.

Charles L. Henry then moved that the association approve the acts of the committee and recommended that it diligently push the work of obtaining signatures to contracts. This motion was adopted.

President Benham then read a telegram he had re-

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ceived from J. J. Dempsey, president of the New York Electric Railway Association, which was also holding a meeting at Niagara Falls, extending its best wishes for a successful meeting. Upon motion, the president was authorized to respond with greetings and best wishes by wireless telegraph.

President Benham then introduced F. D. Carpenter, president Western Ohio Railway, who spoke of the difficulties encountered in the early days of the association and told of its growth and work. He believed that the Central Electric Railway Association was of more value to the members than the American Electric Railway Association, because the latter devoted its work to a larger sphere and not to local problems. He then announced that the executive committee, which had held a meeting on the boat Tuesday afternoon, had decided to hold the next meeting of the association in Toledo on Nov. 23 and 24. At this point, Secretary Neereamer read the names of five applicants for membership, and announced that this brought the total supply men membership up to 151, or the largest number in the history of the association.

The remainder of the session was given over to extemporaneous speeches, which were opened by J. H. Drew, president Drew Electric & Manufacturing Company. Hugh M. Wilson, vice-president McGraw Publishing Company, followed with a few complimentary remarks about the work of the Central Electric Railway Association. He said he was particularly impressed by its endeavor to humanize the business. This policy helped to solve many business problems and was a step toward improving relations with the public. S. D. Hutchins, Westinghouse Traction Brake Company, emphasized Mr. Wilson's thought, and as chairman of the Supply Men's committee which arranged the trip, he called attention to its work, and thanked the members, the press, and particularly John Benham, who had done most of the work. John Benham responded fittingly, and then urged the members to support the interline folder committee in its program.

J. A. McGowan, secretary and treasurer Terre Haute, Indianapolis & Eastern Traction Company, then reminded the members of the great strides made in modes of transportation, and predicted a bright future for the association and electric railways. Frank Garland, director of the welfare department, Dayton, Ohio, outlined the Dayton plan of government and the work of his department in particular. He urged the humanizing of business and government as a means of increasing efficiency and to meet the crisis which he predicted would follow the ending of the European war. A. Swartz, Cities Service Company, Toledo, closed the addresses with a few well-chosen remarks. Mr. Henry then read a telegram of greeting from L. S. Storrs, vice-president of the American Electric Railway Association, and E. B. Burritt, its secretary. President Benham then read a letter from J. F. Collins, vice-president and general manager Michigan Railway, inviting all those who intended to return to Toledo to accept the use of his private car from Holland, Mich., to Grand Rapids, Jackson, Detroit, and Toledo. C. K. Minary, president Benton Harbor-St. Joe Railway, also invited the association to take lunch with him at the "House of David," a religious colony at St. Joseph, Mich.

Prior to the trip special cars to Toledo were run from Indianapolis by way of Fort Wayne and by way of Dayton. S. W. Greenland, general manager Fort Wayne & Northern Indiana Traction Company, served a tent lunch at Fort Wayne for one party, and R. A. Crume, general manager Dayton & Troy Electric Railway, served a box lunch at Dayton for the other party. There were forty-seven passengers on the car that ran by way of Fort Wayne, and the 263-mile run was made in nine hours and thirty-seven minutes. The trip by way of Dayton was made in the same time, although the total run was 11 miles further.

Third Avenue Railway Coasting Contest

Recently an argument arose between Inspector McElroy and Chief Inspector Broderick of the Third Avenue Railway System, New York, as to relative coasting ability of the day and relief men on the 145th Street Broadway line. The men made a wager for new hats, Mr. Broderick backing the relief crews and Mr. McElroy the day crews. The contest resulted as follows:

DAY MEN, MOTORMEN

Cunniff, No. 668	47.0 per cent
O'Brein, No. 785	41.4 per cent
Gillespie, No. 504	41.0 per cent
McBride, No. 865	38.4 per cent
Newman, No. 859	36.4 per cent
Westhausen, No. 878	36.0 per cent
Average for week ending June 7	40.0 per cent

RELIEF MEN, MOTORMEN

Heaney, No. 896	56.5 per cent
Foley, No. 799	54.0 per cent
Sheehan, No. 802	44.0 per cent
Henry, No. 781	43.3 per cent
McConnell, No. 845	42.0 per cent
McDonough, No. 543	36.6 per cent
Average for week ending June 7	43.3 per cent

Average number of passengers carried daily	7,705
Average daily mileage	988
Average speed, miles per hour	8.52
Average mileage per crew per day	82
Total hours for week	799
Total number of hours in which motormen operated their cars with the controller on off position	333 out of 799

It may be added that the relief men work from 11 a. m. to 1 p. m. and then from 5 p. m. onward. In both classes the evening rush is included. Therefore the running conditions were fairly comparable.

New Haven's Efforts for Automatic Train Control

The New Haven Railroad, the better to handle its investigation of automatic train control, has appointed F. H. Nicholson assistant engineer. Mr. Nicholson will devote his whole time to this important subject. The appointment is to come under the jurisdiction of Signal Engineer Morrison's office. It is the intention of the New Haven management to conduct further experiments and tests on its own lines; to make thorough investigation of trial installations on other roads, and to continue the examination of train control devices brought to its attention by inventors and others. The investigation will be directed in an effort to determine the degree of practicability of each scheme measured by conditions on the New Haven Railroad. During the past four years the New Haven has examined a large number of plans of automatic stops, and has conducted tests of two trial installations on its own lines. The examination of these plans, more than 4000 in number, has convinced its engineering and operating officials that automatic train control has not reached the degree of development that would eliminate introduction of other and greater hazards, and warrant either universal or limited adoption by the New Haven. It is recognized, however, that a great deal of persistent and intelligent effort is being directed to the solution of the problem involved in the automatic control of trains, and the appointment of Mr. Nicholson to follow this work is in line with the purpose of the management to keep itself thoroughly and promptly informed of progress in the development of automatic train control.

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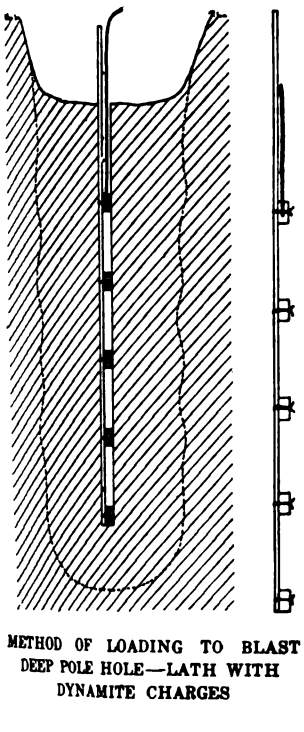
Blasting Pole Holes in Clay

BY J. H. SQUIRES, M.S., PH.D.

The use of dynamite for digging deep pole holes in hard clay is a new development that is proving effective in saving time and expense. It is also reducing the number of laborers required for hole digging. The old method of using small charges of dynamite to loosen the ground to make digging easier is well known and has been in use for a long time. After an extended series of tests, a method has been perfected for blasting deep holes. In brief, this method is as follows:



METHOD OF LOADING TO BLAST DEEP POLE HOLE—LATH WITH DYNAMITE CHARGES

A hole from 6 in. to 10 in. deep to the full diameter of the desired hole is dug. This shallow hole has the effect of relieving the pressure on the soil that is to be excavated and assists in preventing excessive shattering of the sides.

A small bore or loading hole is put down in the middle of this shallow hole to the desired depth. This is done by means of augers, bars, drills or churn drill, depending on the nature of the ground and personal preference of the worker.

The charge is made up by tying small pieces of dynamite to a light lath. The charge intended for the bottom of the hole is placed at the end of the lath. The other charges, which may be from one-fourth to a full cartridge of dynamite, are spaced along the lath at intervals of from 6 in. to 24 in., depending on the hardness of the ground and the size of the hole desired. The top piece of dynamite is primed with a blasting cap and fuse or with an electric blasting cap. This primer charge is so placed on the lath as to be from 20 in. to 25 in. below the surface when the charge is loaded into the bore hole. The two accompanying sketches show the general method. In the larger drawing the dotted line shows the size and shape of the blasted hole.

The long charge is loaded into the bore hole, cap end up. The explosion of the top charge will fire the others. Care must be taken to keep clods of earth and stones from falling in the hole, as these may interfere with the loading or firing. Frequently no tamping is used in the top of the hole. In some soils a few inches of tamping will materially help the blast. Tamping should never be permitted to go below the top charge, as it will interfere with the explosion of the bottom charges. From this method of loading the following results were obtained.

All holes mentioned below were 4½ ft. deep. The soils varied from hard, dry clays to wet, compacted clays with some shale. In all cases the ground was of such a nature that the use of digging bar or chisel was necessary when hand labor was employed.

1. One-half cartridge low freezing extra 40 per cent dynamite in bottom of hole, untamped, results poor; large cavity blown in bottom of hole about 30 in. in diameter; earth for 2½ ft. below the surface thoroughly disturbed.

2. One-third cartridge straight 60 per cent dynamite in the bottom of the hole; one-third cartridge of same 8 in. from bottom; half cartridge 40 per cent low freezing extra 20 in. below surface; cap in the top, untamped, results good. Hole clean and open.

3. One cartridge straight 60 per cent dynamite at bottom; same 12 in. up; same 12 in. up; cap in top, untamped; results same as 2, except more earth was thrown out of the hole.

4. Five quarter cartridges straight 60 per cent dynamite, evenly distributed about 6 in. apart, beginning at bottom of hole, untamped, cap at top. Results good, hole uniform in size, top and bottom, dirt blown out.

5. Four quarter cartridges low freezing extra 40 per cent dynamite, distributed same as 4. Results good, same as 4 with not so much dirt blown out of hole.

Additional tests over a variety of soil conditions gave the same results.

From the above it will be learned that a few trial shots may be needed to determine the exact loading required. Better holes can be blasted in moist than in dry clay. All of the dirt is not blasted out of the hole, as much of it is packed tightly into the sides of the holes. Sometimes a plug or bridge of earth is left in the top of well-blasted holes after the blast. This is not objectionable, as it can be easily shoveled out. This leaving of the plug in the top frequently is a necessary safeguard to prevent excessive shattering or loosening at the top of the hole. A little hand finish is always required for blasted holes. This usually requires from two to six minutes of work. Good blasting does not injure the sides of the holes to such an extent as to interfere with good tamping.

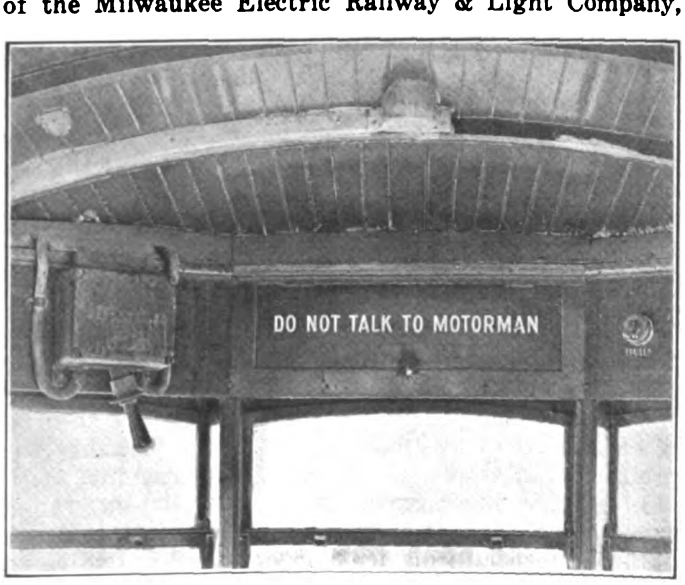
The explosives used in the work as cited above are low freezing extra, 40 per cent or stronger, dynamite for cold weather. This can also be used in warm weather, but as the straight dynamites are more sensitive and quicker in their action they are frequently found more satisfactory in warm weather.

Sealed Fuse Cabinet Guarantees Supply

BY H. A. MULLETT

Superintendent of Rolling Stock Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

Occasionally delays in service may be attributed to the fact that an insufficient quantity of fuses for replacements have not been made a part of a car's equipment. In order to obviate any possibility of delays being charged to this account, the mechanical department of the Milwaukee Electric Railway & Light Company,



SEALED FUSE CABINET ON MILWAUKEE ELECTRIC RAILWAY CARS

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Milwaukee, Wis., has installed suitable sealed fuse cabinets in all of its cars. Experience has demonstrated that this method of carrying the fuses guarantees that the standard quantity will be carried on all cars.

Each car is provided wih a small compartment over the center sash of the vestibule, which is locked with a meter seal. In case a fuse blows in service, the motorman breaks the seal and uses the fuse required. As he is not able to reseal the box the fact that the seal is broken is a notification to the repair force that the full quota of fuses is probably not in the cabinet. In that case it is the inspector's duty to check all the fuses and supply the proper number, after which the cabinet is again sealed. This method of handling fuses not only insures the presence of the proper quantity, but eliminates all delays to service which might be attributed to the fact that the car did not have extra fuses in good condition.

Renewal of Collector Rings on 400-Kw. Rotary Converters

BY JAMES W. BROWN
Superintendent of Shops Wilkes-Barre & Hazleton Railway and Lehigh Traction Company.

It is seldom necessary to renew collector rings on rotary converters, but occasionally one or more of the rings will wear down until the available thickness is such that a new ring will be required, or if one ring has worn thin and is perhaps ⅛ in. to 3/16 in. smaller than the other rings it must either be renewed or built up. As renewals are expensive, the following plans for rebuilding these rings to their original diameter have been used. The first instance is a converter which had been in service for about ten years and necessitated a renewal or rebuilding of all three rings.

The armature of this rotary, a 400-kw one, was taken out and placed in an engine lathe and a cut was taken on the ring of smallest diameter to true it up. In this case the ring was next to the d.c. winding. The next ring was similarly trued up except that it was made 1/64 in. smaller in diameter. The next or outside ring was trued up 1/64 in. smaller than the second ring. A bronze ring-band was then shrunk onto the ring next to the winding, it being 1/64 in. larger than the second ring and 1/32 in. larger than the outside ring.

The ring-bands were made of a bronze shell casting and were easily trued up to the proper inside and outside dimensions. The casting from which all three ring-bands were made was placed in a lathe and a cut taken on the outside, which left about 1/32 in. of metal to true up the rings after they had been shrunk on. It was then bored to the proper inside dimensions to fit the three rings respectively, and the ring-bands were cut off to the proper width. The inside ring-band, being of the largest inside diameter, was slipped over the two outside rings and shrunk on, in the same manner the middle ring-band was slipped over the outside ring and shrunk onto the middle ring. The outside ring-band was then shrunk onto the outside ring. Four ¼-in. holes were drilled through the ring into the spider arm. These were tapped and ¼-in. brass screws with twenty-four threads to the inch were put in. A single finishing cut was then taken on all these rings, after which they were sanded and polished. The armature was then replaced, and the rings were in such shape that they will probably outlast the usefulness of the machine.

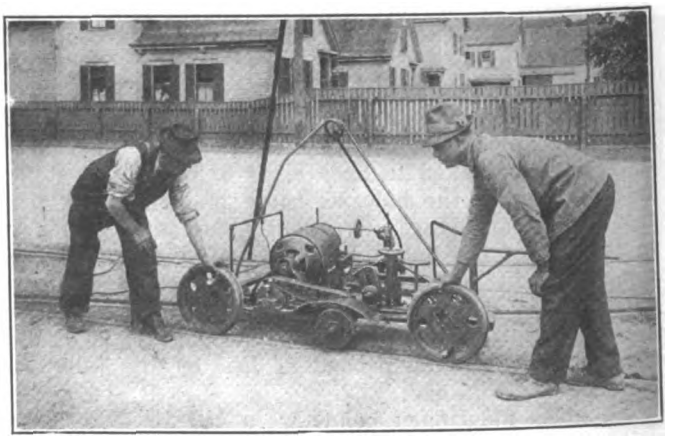
In another instance, on one of our 400-kw. rotary converters the inside ring was worn down until it was 5/16 in. smaller in diameter than the other two rings. The problem was, therefore, to add a bronze ring about ⅜ in. thick to the inside ring so it would true up 1/64 in. larger than the middle ring and 1/32 in. larger than the outside ring. This was accomplished in the following manner: A cut was taken off the inside ring, then a ring-band was made so that the outside diameter would true up 1/64 in. and 1/32 in. larger than that of two other rings respectively. The inside diameter of the ring-band was bored to the same diameter that the inside ring had been previously trued up to. This ring-band was then cut off the proper width and a cut was taken through it on a 45 deg. angle with a hack saw. This ring-band was spread and slipped over the two larger rings. An iron band 3/16 in. thick by 2 in. wide with flanges turned back to take a ⅜-in. bolt was then slipped over the ring-band, which was in position on the inside ring. Four ¼-in. holes were drilled in this iron band opposite the spider arms. The ⅜-in. bolt was tightened up, which caused the ring-band to be drawn tight to the ring and thus made a perfect fit. Holes were drilled in the ring and spider arms and tapped to take ¼-in. brass screws with twenty-four threads to the inch. The screws were then put in, the iron band removed, and the joint made by the hack saw was soldered and filed. A finishing cut was taken to bring the ring to the proper diameter, so that bands could be shrunk on, as previously described in this article.

These machines have been running for several years since the bands were shrunk on and have given excellent results. The cost of doing this work was very small, as the scrap turnings and borings were sold for a price that went a great way toward reducing the cost of renewing the collector rings.

Rail-Grinding Practice of the Bay State Street Railway

The practice of the Bay State Street Railway in building up rail joints for the last two years has been greatly improved by the use of Seymour portable electric rail grinders and Indianapolis portable electric welders. One of the grinders is shown in an accompanying illustration. By this means track which would otherwise have required costly repairs has been put in good condition at a small cost.

A hard-center frog, built up with the welder, has been ground 3/16 in. to the true surface of the rail



TYPE OF PORTABLE RAIL GRINDER USED BY BAY STATE STREET RAILWAY

over a length of 12 in. in about fifteen minutes. An average depression of 3/16 in. caused by battered and pounded joints has been removed in about the same length of time by grinding 24 in. on either side of the joint.

The average cost of grinding a repaired joint which is 12 in. long and ⅛ in. above the surface of the rail has

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been 25 cents. As many as twenty-eight rail joints, 8 to 20 in. long, built up with manganese steel, have been ground to the required level in a single working day.

These Seymour grinders are now used on the following divisions of this road: Lowell, Lawrence, Lynn, Salem, Chelsea, Fall River and Brockton. This grinder was perfected and patented by E. P. Seymour, roadmaster of the Lowell division of the Bay State Street Railway system.

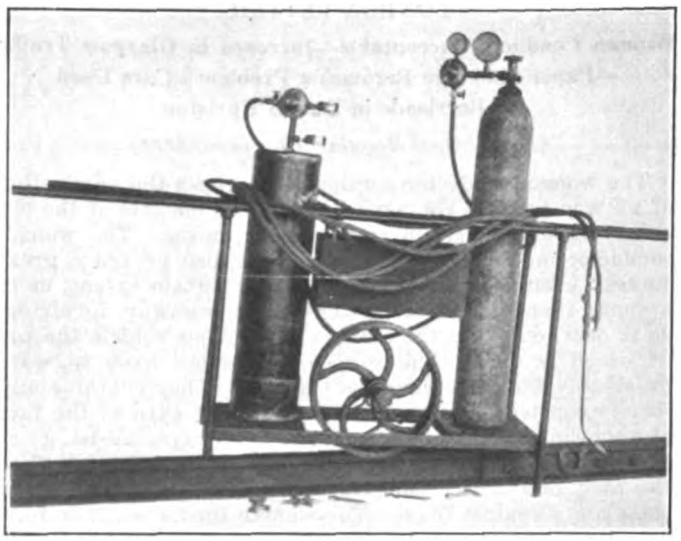
Steel Terminal Casing Increases Strength of Rail Bond

Increased mechanical strength in conjunction with a reduction in weight without a proportionate decrease in electrical conductivity, has been obtained in a rail bond by the substitution of a copper terminal incased in a steel sleeve for the usual all-copper terminal. The Simplex rail bond recently put on the market by the Hartman Electrical Mfg. Company, Mansfield, Ohio, conforms to these claims, and it is designed to be attached to the ball of the rail by the gas-weld or oxy-acetylene process.

The advantage of applying bonds by this process is the low initial cost of the equipment required and the ease with which it may be transported. To further increase portability this company has built a special carriage designed on the wheelbarrow principle, which reduces the weight to a minimum. The application of the steel sleeve as a substitute for the copper bar at the bond terminal reduces the weight of this No. 0000 bond to approximately ½ lb. The average welder, after some experience, is able to install these bonds at an approximate price of 25 cents each, or at a total cost of 59 cents per bond for all material and labor. The labor cost in this instance was figured on a basis of two men receiving $2.50 per day each.

Increased mechanical strength in this bond is obtained through the split-steel sleeve which incases the compressed ends of the bond cable. This casing is provided with a ledge or table at a point about ¼ in. from the end of the bond, and immediately above and below this ledge the steel casing tightly grips the compressed copper cable. The casing is flared where the bond cable emerges in order to absorb service vibrations without injuring the cable. In case of an attempt at theft the split sleeve tends to open when the cable is raised toward a horizontal position, thus reducing the leverage and making the bond more difficult to remove. The features of this bond are shown in the accompanying illustrations.

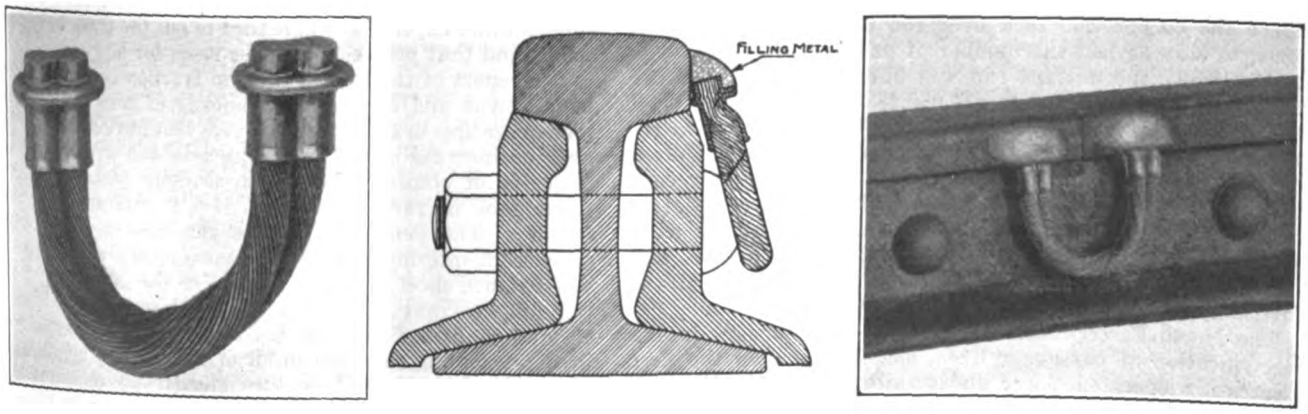
In applying the bond to the rail it is held in position by a spring clamp fastened to one bond terminal while the other is being welded. The oxy-acetylene flame is directed against the rail and the terminal until



TRUCK WITH COMPLETE WELDING EQUIPMENT

both are heated to a welding temperature, at which time the filling metal, in rod form, is inserted in the flame and melted. The molten metal welds to the rail and to the steel casing of the bond, as well as to the exposed ends of the compressed copper strand. The welding operation is continued until the filling metal is built up from the ledge of casing over the bond terminal. The mechanical strength of this bond is thereby increased by the weld between the filling metal and the rail, and the filling metal and the steel sleeve. At the same time the bond conductivity is maintained by the weld between the filling metal and the rail and the filling metal and the exposed end of the copper cable in the steel casing. In connection with this bond, it is also of interest to call attention to the electrical advantages of the short bond over the long one. The conductivity of copper cable of No. 0000 capacity in a 7-in. bond is equivalent to 24 in. of 70-lb. rail, whereas a 10-in No. 0000 bond is equivalent to 34¼ in. of 70-in. rail, and a 36-in. No. 0000 bond is equivalent to 123¼ in. of 70-lb. rail. In other words, the advantage in any type of bond is in favor of the short bond as opposed to the long one.

The Board of Public Utility Commissioners of New Jersey, Trenton, N. J., has issued Volumes II and III of its proceedings for the period from June 9, 1913, to May 12, 1914, and from May 12, 1914, to July 12, 1915. These volumes contain only the opinions and decisions of the board and are distinct from the annual reports made to the Governor. The board has also issued under date of 1916 an index to Volume I of its proceedings for the period from May 1, 1911, to June 1, 1913.



SIMPLEX RAIL BOND WITH STEEL CASING SHOWING SECTION THROUGH WELDED TERMINAL AND INSTALLED BOND

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LONDON LETTER

Woman Conductor Acceptable—Increase in Glasgow Traffic —Paper Shortage Becomes a Problem—Cars Used in Barricade in Dublin Uprising

(From Our Regular Correspondent)

The woman conductor continues to arouse the admiration of all who come in contact with her, and officials of the big cities are unanimous in singing her praises. The woman conductor on the London omnibus has also proved a great success, even though her work is, to a certain extent, more arduous than that of her sister on the tramway, involving, as it does, climbing the stairs of a moving vehicle the top of which is open. The women conductors have to work practically the same hours as the men. They continue uniformly courteous, persevering and patient even in the face of annoyances. Many managers of tramways, indeed, go so far as to say that the women make fewer mistakes than the men, and collect more fares, and that there are fewer complaints against them. The woman conductor, therefore, has become popular not only with the traveling public, but also with her employers, both municipal and company. It might be interesting to state the number of women employed in a few of the largest cities. Glasgow, for instance, employs 1200; Birmingham, 700; Liverpool, 300; Sheffield, 600; Leeds, 400; while Salford, Aberdeen and Manchester each employs between 200 or 300. In Leeds there will soon be not more than fifty men conductors left, and as the average weekly wage earned by the women is now in the vicinity of 30s. there are still plenty of applicants for vacancies. While the women drivers in Glasgow continue to prove successful, it is not likely that women will be employed to run cars on the London tramways, as the chief commissioner of police has stated that he is not satisfied that women can safely be licensed to drive a tramcar or a motor bus in the metropolis. He previously refused to allow women conductors to be employed until pressure became too great for him.

The returns for the financial year of the Glasgow Corporation tramway department show an increase in the traffic receipts of £78,570, the total income from this source being £1,149,264. In the number of passengers there was an increase of 26,110,706, and the total carried is returned at 362,371,464. The car mileage run was 24,963,309, which was greater than that of the previous year by 748,849. The traffic receipts per car-mile work out at 11.049d., an advance of 0.437d. There is a decrease of 0.003d. in the receipts per passenger, which are given at 0.761d. There were 14.516 passengers carried per car-mile, representing an increase of 0.629. The average track mileage open during the year (single) was 196¼. There are eight different fares in operation on the system, and it is remarkable that last year there was a large increase in the number of passengers carried in each of the stages. The most striking was in the case of the long journeys, for which the fare is 4d. In this section the number of passengers rose to 192,956, compared with 153,270 in the previous year. At the other end of the scale the number carried at the ½d. fare was 232,871,360, almost 20,000,000 more than last year. The numbers of passengers dealt with at the other fares were as follows: 1d., 93,768,671, against 89,890,042 in the previous year; 1½d., 22,712,943, against 21,384,305; 2d., 6,913,560, against 6,410,027; 2½d., 3,075,567, against 2,834,795; 3d., 1,453,771, against 1,285,605; and 3½d., 1,382,636, against 1,136,895. Since the corporation took over the tramways on July 1, 1894, to May 31 last the number of passengers carried was 4,417,319,065, the mileage run was 361,006,250, and the car traffic revenue amounted to £16,060,483.

The rebellion of the Sinn Fein organization in Dublin resulted in the suspension of the service of the Dublin United Tramways from April 24 until May 4. While a few cars used by the rebels to entrench themselves were completely destroyed the damage done to the tramway system as a whole was not nearely so great as at first reported, and in a comparatively short time the power station and the distributing station were working normally.

The North-Eastern Railway, one of the pioneers in the electrification of passenger lines, has inaugurated the first electrically operated heavy goods railway in Great Britain. Electric locomotives, using current at 1500 volts, and each capable of hauling a 1400-ton train at a normal speed of 25 m.p.h. on the level, are now at work on the Shildon-Newport route, which is used to carry mineral between the coalfields of Southwest Durham and the blast-furnaces and iron works of the Middlesborough district. Particulars of the installation are published elsewhere in this issue.

The success which has attended the electrification of the North Manchester suburban line, has induced the Lancashire & Yorkshire Railway to augment the electric service between Manchester, Prestwich and Bury.

The Tramways & Light Railways Association recently made application to the Royal Commission on Paper that licenses be granted to paper manufacturers so as to insure to tramways and other bodies the full amount of their normal requirements in tickets. A reply has been received from the commission stating that it is unable to license a greater import on account of tramway tickets than two-thirds of the quantity of pulp imported in 1914. It adds that it can see no special need for discrimination, and that there are obvious methods of economizing in the production of such tickets. The council of the association has appointed a committee to deal with the matter further, and, in the meantime, recommends that wherever possible the size of tickets should be curtailed.

Owing to the paper shortage and in order to effect economies during the continuance of the war, the Underground Electric Railways, London, will discontinue the printing of pictorial posters for exhibition on its stations. This will mean that the many new and striking posters which adorned the stations will no longer be a familiar feature of the tubes, and the spaces originally occupied by these bills will in many cases remain blank. For some time past it has been increasingly difficult to spare members of the staff to do the necessary posting. For the present only essential notices relating to the working of the trains will be exhibited at the stations.

The increased workmen's fares on the Newcastle Corporation tramcars have come into operation. The increase has been put on the books of coupons, and in future all workmen and workwomen who do not tender coupon tickets will have to pay the full ordinary fare for the journey. With this regulation all cars hitherto labeled "workmen's car" will be abolished. The increase is 3d. on the shilling and 18d. books, and 2d. on the 6d. books.

The excellence of the management of the Liverpool Corporation tramways department is shown in statistics which have just been issued. From these it would appear that during May the receipts increased by £3,057, compared with the corresponding period of last year. The number of passengers carried shows an increase of 454,508. For the four and a half months since Jan. 1 the receipts increased £13,100, and the number of passengers increased 2,126,826, while the mileage run, by which a large saving has been effected, decreased by 55,636 car-miles.

Some time ago the Ilkeston Corporation received an offer from the Notts & Derbyshire Power Company, Ltd., to take over the tramways and electricity undertakings on certain terms. The tramways and electricity committee has passed a resolution recommending that the Town Council accept the terms offered. The Council, as a general purposes committee, after considering the matter in detail, has decided to sell the undertakings. The tramways were publicly opened in May, 1903. During that time there has been an annual loss of from £2,000 to £3,000, equal to a rate of from 6d. to 9d. in the pound. It is also recognized that a considerable expenditure is needed to put the track in better order, and that provision must be made for new cars.

The report of the British Electric Traction Company, Ltd., which owns and controls the majority of tramway companies operating in Great Britain, says that in view of the war and the increase in the cost of material and wages, and the difficulty of obtaining labor, the directors consider the improvement in revenue derived from investments is satisfactory. The general conditions have prevented the company from entering to any large extent upon new enterprises. The balance sheet this year is based on the scheme of reduction and rearrangement of capital which was recently adopted, and confirmed by the court, and which is put into effect in the accounts. The net profit of the company approaches £200,000, after paying debenture interest. The company was able to pay the 6 per cent on the preference stock and 3 per cent on the ordinary shares.

A. C. S.

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NEWS OF ELECTRIC RAILWAYS

RAILWAY MEN QUICK TO MUSTER IN

Six Companies Lose 565 Men—Mr. Kealy Uses a Motorcycle and a Bugler in the Call to Arms

Electric railway men will share equally with their brothers from other walks of life in the work in Mexico if the anticipated break should come. Men from all departments of electric railway corporate life have prepared to leave for the front. A canvas of the entire industry in so short a time as that intervening between the order for mobilization and the publication of this article was obviously impossible, but the data so far secured with regard to the probable number of men from this industry and the attitude of the corporations employing them indicate a ready response and unusual willingness on their part to shoulder the burden, which in some instances required the quick readjustment of official duties and involved no small sacrifices. To cite a few instances of the men higher up, there is the loss to the companies of the services of Brig.-Gen. E. W. Hine, secretary of the Public Service Corporation of New Jersey, and the loss to the Kansas City Railways of the services of the president, Philip J. Kealy, who is lieutenant-colonel of the Missouri National Guard. Coming to the men in the ranks the instances of the depletion of the forces of the New York Railways, the Interborough Rapid Transit Company and the Public Service Corporation of New Jersey furnish criteria of some of the readjustments that have had to be made.

The New York Railways has lost fifty-six men from the transportation department, two clerks, eleven men from the car equipment department, ten men from the engineering department, two men from the motive power department, one man from the office of vice-president and general manager, six men from the law department, two men from the accounting department and one man from the payroll and register division. Until further action of the board of directors, the wages or salaries of all of these men will be continued and upon the termination of their service with the militia the employees will be reinstated so far as possible in their former positions.

The Interborough Rapid Transit Company has lost fifteen men from the train service on its elevated lines, one man from the superintendent's office, twelve men from the station department of the elevated lines, forty-five men from the subway division, thirteen men from the engineering department of the elevated lines, nine men from the engineering department of the subway division, thirteen men from the motive power department, thirty-one men from the car equipment department, two men from the accounting department, one man from the treasurer's department, one man from the purchasing department, one man from the law department and one man from the office of the vice-president and general manager. As in the case of the New York Railways, the wages and salaries of all of these employees will be continued until further action by the board of directors and upon the termination of their service the men will be reinstated as far as possible in their former positions.

About 100 employees of the railway, electric and gas companies included in the Public Service Corporation of New Jersey have been summoned to their respective camps for service. Of these fifty-three are from the Public Service Railway, twenty-one from the Public Service Gas Company and twenty-four from the Public Service Electric Company. Most of the men from the railway company are platform men. The directors of the corporation at their monthly meeting on June 20 resolved that all employees of the company who are full members of the National Guard called for service should receive their wages during the time they were engaged in military service and their positions be held open for them. The employees were instructed to file with the treasurer power of attorney, designating the person to whom the wages should be paid. The decision of the directors in this connection was an amplification of a committee report made before the Mexican situation resulted in calling out the men. The committee had approved paying the wages of the men who desired to attend the Plattsburg Camp or other military training camps under State or federal direction.

In Missouri, Mr. Kealy, previously referred to, found himself confronted with extraordinary conditions. When the call came for the Missouri National Guard it was discovered that the Third Regiment—Kansas City's regiment—was nearly 200 men short of its full quota. Col. Fred A. Lamb, in the militia twenty-seven years, was sick in bed. Mr. Kealy assumed command and took the regiment to Nevada, Mo. He then returned. Mr. Kealy saw his opportunity. He acted at once. The days of Paul Revere are gone, but his methods are still applicable. Mr. Kealy immediately engaged the rooms occupied by the committee that had tried to arrange a preparedness parade. The sign for the proposed parade was still up. He had a motor-cyclist, Ross Landes, bugle the call to arms. Mr. Landes did more than merely notify the citizenery that men were needed—he actually brought back twenty recruits in his Indian sidecar. Dr. E. M. Hiner, former leader of the old Third Regiment band, made some trips recruiting for the new band. Colonel Lamb resigned as colonel on June 26. The men of the regiment are unanimous in wanting Mr. Kealy to succeed him and lead the regiment to the border.

Last November Colonel Kealy was elected to his position in the Third Regiment, though he had not previously been connected with it. A practice hike was ordered for June 18 to Fairmount Park, 12 miles, and Colonel Kealy commanded on this trip. The orders to mobilize came while the regiment was in camp. Colonel Kealy's previous engineering training was said to be largely responsible for his ability to grasp the needs of the moment. He had had militia experience at the university. The citizens of Kansas City are grateful to Mr. Kealy for his service to the regiment. The prospect was that Kansas City would be found wanting when the call came for a regiment. The story of how Mr. Kealy raised the necessary recruits has just been told. He set the example to other employees by the showing that nearly forty men are going with the Third from the Kansas City Railways. The company will pay their wages while the men are gone, and will hold their jobs for them. Colonel Kealy has been performing his duties as president of the Kansas City Railways, spending two or three days a week in Kansas City, and being in constant touch by telephone with the offices while at Nevada.

About fifty of the employees of the United Railways & Electric Company, Baltimore, Md., are enrolled with the Maryland militia. Under date of June 21, William A. House, president of the company, transmitted to the heads of all departments the following official notice:

"It is the earnest wish of the United Railways & Electric Company that those of its employees who now belong to military organizations respond at once to the order for mobilization of troops on account of the Mexican situation, and we would make it plain to all national guardsmen who are in our employ that in no way will their positions be jeopardized by temporary absence in the discharge of their patriotic duty as American citizens. In confirmation, therefore, of verbal instructions this letter will authorize you to inform the employees of your department or divison at once, that those who are now members of the State militia which has been called by the President of the United States, the Secretary of War, and the Governor of the State of Maryland, to the service of the country and to uphold the honor of its flag, will be paid their salaries during their absence, and upon returning will find their positions waiting for them."

Immediately following President Wilson's call of the Illinois State Militia for military service at the border, L. A. Busby, president of the Chicago Surface Lines, issued the following bulletin:

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"Effective this date, all employees of the company who are now members of the state militia or naval reserve, and who are called into the military service of the United States will be given leave of absence while engaged in such service, and their positions will be held for them until mustered out. Until further notice, employees while engaged in such military service will continue to receive their present average amount of pay per month. This sum will be paid in semi-monthly installments, pursuant to written directions left by each employee with his department head." About 150 employees have joined the colors.

The Chicago Elevated Railroads, through Britton I. Budd, president, also announced that it would hold the positions of militiamen until they were mustered out, and would care for their dependent relatives on a liberal basis.

Among the announcements which have come to hand with respect to the electric railways and their employees in connection with service at the border, other than those previously noted, are the following:

All employees of H. M. Byllesby & Company, Chicago, Ill., who are members of the National Guard will receive full pay during their absence and their positions will be held for them.

All employees of the Illinois Traction Company, Peoria, Ill., who are members of the State Militia and are called out for service will have their positions held open for them and will not lose their present rating with the company.

The Connecticut Company, New Haven, Conn., announces that forty-seven of its employees are members of the Connecticut Militia, of whom thirty-four are conductors and motormen. Up to June 26 the company had not made any formal statement to the men, but expected to retain the positions for all who went to the border.

The Brooklyn (N. Y.) Rapid Transit Company announces that between 100 and 200 men would be called from its service and that all men would be kept on full pay for three months and if the service lasted longer than that the company would consider the problem again. It was also said that the rate of insurance carried under the Brooklyn Rapid Transit group insurance plan would not be affected. In serving their country the Brooklyn Rapid Transit employees will not lose their seniority rating, but will resume their jobs with the same standing of promotion as before.

The Rochester Railway & Light Company announced that any of its employees who belonged either to the National Guard or who wished to recruit for Mexican duty could do so and that their positions would be left open with full pay while they were away.

The Kentucky Traction & Terminal Company, Lexington, Ky., through F. W. Bacon, vice-president, announced that all men who enlisted would be reinstated in their former positions at the conclusion of their term of service.

Henry L. Doherty & Company, New York, N. Y., announce that all employees of the Cities Service Company and other Doherty public utility companies, including the Toledo Railways & Light Company, who are members of the National Guard will be allowed their full pay for three months' military service. A policy to provide for the families of such guardsmen, if their services are needed longer, will be announced later. All employees on the return from military service will receive their old places or positions equally remunerative.

The Terre Haute, Indianapolis & Eastern Traction Company and Indianapolis Traction & Terminal Company, Indianapolis, Ind., were the first employers in the State to go on record as to their employees who were members of the militia companies. A brief statement issued early on June 19 by Robert I. Todd, president of the Terre Haute, Indianapolis & Eastern Traction Company and Indianapolis Traction & Terminal Company, announced the action to be taken by these companies as follows: "Any employees of this company who are at present members of the National Guard, and called to service in connection with the Mexican troubles, will, until further notice, have their positions held open for them and wages continued."

The McGraw Publishing Company, Inc., publishers of the ELECTRIC RAILWAY JOURNAL, *Electrical World, Engineering Record, Metallurgical and Chemical Engineering* and *Electrical Merchandising*, announced that its employees who are members of the National Guard will be paid while away in the service of their country.

NASHVILLE-GALLATIN LINE PROPOSES 18.4-MILE EXTENSION

Plans are now practically complete for an extension of the Nashville-Gallatin Interurban Railway from Edenwold to Springfield, Tenn., a distance of 18.4 miles. Springfield is the county seat of Robertson County, and the center of a rich agricultural section. A stockholders' committee composed of H. H. Mayberry, James E. Caldwell, Clarence M. Clark, H. H. Corson, N. S. Keith and Norman McD. Crawford has been formed to arrange for the financing and construction of this extension and certain improvements to the present property of the company. It is proposed that a new company be organized that will own the enlarged system. The Nashville-Gallatin Interurban Railway has a capital stock of $750,000 and has $600,000 of 5 per cent first mortgage bonds outstanding. To make the proposed extension it is estimated that $600,000 will be required, and an exchange of stock of the present company for that of the new company and in equal amount is being arranged among the stockholders, and new bonds will be issued to provide funds for the extension and improvements. The new bonds will be secured by mortgage on the present line and the extension to Springfield, and certain treasury stock will be held to be available for financing, if required.

If the deal is successful the E. W. Clark & Company Management Corporation will have charge of the construction. An agreement is also to be made with the E. W. Clark & Company Management Corporation for the operation of the combined lines. The length of the line from Nashville to Springfield will be 27 miles. It is to be electrically operated for the entire distance. All surveys have been completed and rights-of-way are now being secured. The First Savings Bank & Trust Company, Nashville, is depositary for stock certificates and bonds of the present company pending the issuance of the certificates of the new corporation.

THIRD TRENTON ARBITRATOR AGREED UPON

Arbitration has begun between the Trenton & Mercer County Traction Corporation and the employees, with the selection of Clifton Reeves as the third arbiter. After several conferences between Peter E. Hurley, general manager of the company, and C. Howard Severs of the union, the situation became deadlocked. The names of more than two-score prominent business and professional men were submitted and turned down. Mr. Severs then named Mr. Reeves, and he was accepted by the company. On June 28 the three arbiters began going over each case. The conferences are being held daily in the city hall in Trenton.

Mr. Reeves is president of the Reeves-Cubberley Engine Company, Trenton, N. J., and has been a United States Commissioner of Conciliation for nearly two years. The most noted case in which he succeeded in bringing about an amicable adjustment of labor and capital differences was when the traffic clerks and telegraph operators of the New Haven Railroad threatened to strike. He worked with Patrick Gilday, chief conciliator of Pennsylvania's Department of Labor. Other cases in which Mr. Reeves acted with good results were the Westinghouse strike in Pittsburgh, in which he was the sole representative of the United States Department of Labor in this matter; the Providence street railway trouble, International Silver Company strike, New England Steamship Company strike, Lake Torpedo Company strike, Hindee Machine Company strike and the Cincinnati machine strike.

ARKANSAS ASSOCIATION OF PUBLIC UTILITY OPERATORS ELECT OFFICERS

Officers have been elected as follows for the Arkansas Association of Public Utility Operators to serve for the ensuing year: President, W. J. O'Brien, secretary-treasurer and manager of the Helena Gas & Electric Company, Helena, Ark.; first vice-president A. Patterson, general superintendent of the Southwestern Gas & Electric Company, Texarkana, Ark.; second vice-president, E. T. Reynolds, manager of the Arkansas Light & Power Company, Paragould, Ark.; secretary-treasurer, R. B. Fowles, auditor of the Pine Bluff (Ark.) Company.

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ADDITIONAL DUAL SYSTEM LINE OPENED

On June 24 the New York Municipal Railway Corporation began the operation of trains over the New Utrecht Avenue elevated branch of the Fourth Avenue subway in Brooklyn. Complete operation of the new line was possible as far south as Sixty-second Street, where connection is made with the Sea Beach line, another Fourth Avenue subway branch. Beyond Sixty-second Street trains were operated over a single track as far south as the Eighteenth Avenue station. However, through operation was made and is to be continued from the Municipal Building in Manhattan south to the Eighteenth Avenue station. It is hoped to get the rest of the line in shape for operation during the late summer or in the coming fall. The New Utrecht Avenue line is a three-track elevated branch of the Fourth Avenue subway, leaving the latter at about Thirty-eighth Street, and running through the Thirty-eighth Street cut to New Utrecht Avenue, and thence over New Utrecht Avenue, Eighty-sixth Street and Stillwell Avenue to Surf Avenue, Coney Island. It is a city-owned line, and was built mainly over the right-of-way of the old West End line, which originally was a steam road, but in latter years has been operated as a rapid transit line by the Brooklyn Rapid Transit Company.

Since the signing of the dual system contracts on March 19, 1913, the following lines having been placed in operation: Interborough Rapid Transit Company lines — Queensboro subway, from station in Manhattan to Long Island City, opened June 22, 1915; Third, or express, tracks on Second, Third and Ninth Avenue elevated lines in Manhattan and The Bronx, complete operation began on Jan. 17, 1916.

New York Municipal Railway Corporation lines—Centre Street Loop, temporary operation began on Aug. 4, 1913; Fourth Avenue, Brooklyn, subway, Sea Beach railroad and completion operation of the Centre Street Loop commenced on June 22, 1915; extension of Fourth Avenue subway, Sixty-fifth to Eighty-sixth Street, on Jan. 15. 1916; operation of third, or express, track on Broadway, Brooklyn, elevated line from Havemeyer Street to Myrtle Avenue, commenced on Jan. 17. 1916; Service on Liberty Avenue elevated extension of Fulton Street, Brooklyn, elevated, inaugurated on Sept. 25, 1915; the Lutheran Cemetery extension of the Myrtle Avenue. Brooklyn, elevated line, placed in operation on Feb. 22, 1915.

WHITE CORPORATION TO MANAGE SHORE LINE

The J. G. White Management Corporation, New York, N. Y., has been retained as operating manager of the Shore Line Electric Railway System and the Norwich & Westerly Traction Company. The combined property operates 250 miles of interurban electric railway and serves all the towns and shore resorts on Long Island Sound east of New Haven, and continues the service from New London, Conn., through Westerly, R. I., to Watch Hill, Atlantic Beach, Weekapaug and other resorts on the Atlantic Ocean. The main line of the systems runs from New London north through Norwich, Conn., to Webster, Mass., and by connection with other lines reaches Worcester, Mass. In addition, city service is furnished in New London and Norwich, Conn., and several important lines radiate from each of these points.

Indiana's Last Horse Car to Go.—This year will mark the passing of the last horse car in Indiana. The old line in Brownstown, Ind., has been sold to allow for street improvements and modern transportation.

Illinois Traction Divides General Claim Department.—The general claim department of the Illinois Traction System, Peoria, Ill., was divided into two departments on July 1. The personal injury department will be removed from Springfield to Peoria in charge of G. R. Whitmore. The freight claim department will be retained at Springfield in charge of J. B. Hardaway.

Service Agreement at Pittsfield.—A new agreement has been signed by the Berkshire Street Railway, Pittsfield, Mass., and its employees. The men on the Berkshire division retain straight runs while those on the Pittsfield division can have straight time or relief as preferred. The men have been granted an advance in wages from $2.85 to $3 a day. The agreement is for one year from June 1.

Bond Issue Proposed for Transit in Cincinnati.—On June 20 the Cincinnati Rapid Transit Commission recommended to the rapid transit committee of the City Council the adoption of an ordinance providing for an issue of $6,000,000 of 4½ per cent fifty-year bonds. This ordinance will probably be introduced at the next meeting of Council. Chief Engineer Krug has been authorized to contract for boring in Walnut Street to ascertain the nature of the material that will be encountered there.

Extension of Long Island Electric Zone to Babylon.—The engineers of the Long Island Railroad are at work on plans and estimates for the extension of the electric zone of the company from Lynbrook to Babylon along the south shore. This will add 19 miles to the 20 miles of road now electrically operated between the Pennsylvania Station and Lynbrook. It is expected that the plans for the electrification as prepared by the engineers will be ready for submission to the directors for action this winter with the prospect that if the extension is decided upon work will be begun next spring.

Chicago Traction Commission Funds Increased.—An additional appropriation of $30,000 for the Chicago Traction & Subway Commission was authorized by the Chicago City Council at its regular meeting on June 19. The ordinance creating this commission, which is composed of Bion J. Arnold, Robert Ridgway and William Barclay Parsons, appropriated $220,000 for the undertaking, and the additional appropriation increases this total amount to $250,000. A recent progress report made by the commission to the local transportation committee indicated the scope of the investigation and the way in which the local transportation problem in Chicago is being analyzed.

Examination for Accounting and Statistical Clerk.—The United States Civil Service Commission announces an open competitive examination for accounting and statistical clerk, for men only, on Aug. 9 and 10. From the register of eligibles resulting from this examintion certification will be made to fill vacancies as they may occur in the position of clerk in the division of carriers' accounts and in the division of statistics of the Interstate Commerce Commission, at salaries ranging from $1,200 to $1,620 per annum, and vacancies as they may occur in positions requiring similar qualifications. Applicants must have reached their twenty-first, but not their fortieth birthday on the date of the examination. High-grade experience for at least three years in accounting or statistical work in connection with railway or other common-carrier service is a prerequisite for consideration for this position. Experience with the Interstate Commerce Commission or with any of the state commissions engaged in the regulation of the affairs of common carriers will be accepted in lieu of similar experience in the service of railways, express companies, or other common carriers. Persons who desire to take this examination should apply at once to the United States Civil Service Commission, Washington, D. C., for Form 1312, stating the title of the examination desired.

Another Effort to Force Extensions in Seattle.—Councilman Oliver T. Erickson, of Seattle, Wash., has introduced a resolution into the City Council with a view of initiating proceedings whereby it may be determined by what right or power the Puget Sound Tracton, Light & Power Company may be required to extend its lines. Mr. Erickson wants to know whether the company can be forced to make extensions, and it is to determine this that he proposed to call upon the legal department for an opinion as to the proper method to pursue in order to determine the question. A similar effort was made without result several years ago. At that time an ordinance was passed making it a misdemeanor for officials of the company to fail to extend the East Union line within a certain time. Several of the officials were arrested, but the cases against them were dismissed by the Superior Court. No appeal was ever taken by the city in these cases. Later, the city petitioned the Public Service Commission to order the extension of the company's line on Fourth Avenue South. The Public Service Commission held that it was without power to force the company to extend its lines. Still later, property owners along the Sixth Avenue Northwest line petitioned the Public Service Commission to order an extension of that line. The commission, however, held that it was without power to compel the company to make such extension.

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Financial and Corporate

ANNUAL REPORTS

Republic Railway & Light Company

The comparative statement of income, profit and loss of the Republic Railway & Light Company, New York, N. Y., and its subsidiaries for the twelve months ended Dec. 31, 1914 and 1915, follows:

	1915	1914
Operating revenue	$3,121,286	$3,001,285
Operating expenses and taxes	1,874,082	1,856,467
Net earnings	$1,247,214	$1,144,818
Non-operating income	1,753	175
Gross income	$1,248,967	$1,144,993
Interest charges*	688,952	679,987
Net income	$560,014	$465,006
Dividends on preferred stock	311,484	311,484
Balance	$248,530	$153,522

*The interest figures for the respective years are in accordance with the accounts of the subsidiary companies and in 1914 include $16,844 for interest on bonds held in the sinking funds. Beginning with 1915 this item is included in sinking fund payments instead of in the interest item. Therefore to put the column of increases on a comparative basis the items of interest, net income and balance are subject to adjustment by the amount of $16,844.

Business activity in the territory served by the subsidiaries decreased to some extent during the early part of the year 1915, although not so notably as in other districts, owing to the diversification of industries located in their territory. During the latter part of the year conditions improved and are now prosperous. The earnings on the Youngstown railway lines also suffered somewhat from the competition of the jitney buses. This competition was never so severe in the district served by the company as in some parts of the country and is rapidly disappearing, owing partly to the fact that the operation was not as profitable as anticipated by the owners, and partly to the passage by the City Council of a regulatory ordinance which has been upheld by the courts.

Notwithstanding these adverse conditions the gross earnings increased $120,012, or 4 per cent. Operating expenses and taxes, however, increased only $17,616, or 0.95 per cent, so that the net earnings increased $102,396, or 8.94 per cent. Owing to a marked increase in non-operating income, the gross income increased $103,973, or 9.08 per cent. The net income gained $95,008, or 20.43 per cent, and the balance after preferred dividends the same amount, or 61.88 per cent.

The combined properties of the company owned 170.9 miles of track at the end of 1915 as compared to 169.63 the year before. During 1915 they operated 7,497,489 car miles as compared to 7,341,971 in 1914, and carried 46,036,596 and 47,587,578 passengers respectively. During 1915 the light and power business of the subsidiaries increased 15.9 per cent.

The J. G. White Companies

According to the report of the J. G. White Companies, New York, N. Y., the amalgamated balance sheet as of Dec. 31, 1915, showed the following items: Assets—good-will, contracts, etc., $1,515,540; securities owned and syndicate participations, $2,512,245; bills receivable, less reserve for doubtful items, $346,560; accounts receivable, less similar reserve, $475,453; interest and dividends accrued, $5,382; deferred charges and sundries, $11,876; cash in banks and on hand, $543,339, and working capital and cash in branch offices, $10,621. Liabilities and capital—capital stock issued, $4,290,900; bills payable, $325,000; accounts payable, $147,416; dividends payable, $53,840, and surplus of undivided profits, $603,862.

The companies during 1915 adhered strictly to their fixed policy of taking no large engineering or construction contracts except on a percentage or fixed-fee basis. During this period there undoubtedly was a considerable volume of rehabilitation and extension work in connection with the enlargement of industrial plants brought about by the abnormal condition due to the European war, but practically no new enterprise involving large work along the usual lines that the companies had been identified with in the past was initiated, which made it impossible for the companies to secure work of this nature.

The companies, however, secured a considerable amount of purchasing for clients, which business developed into a large volume during the year owing in great part to the prevailing conditions in the European markets. It is believed that the connections made may produce a very satisfactory volume of business in this line even after the close of hostilities in Europe.

During the year there was liquidated for cash a large block of securities at very satisfactory profits over the balance sheet figures, which accounts in a large measure for the reduction in value of $446,995 in securities owned.

The officers of the companies believe that with the continued increase in the industrial development now going on in this country and South America, conditions along the lines of the companies' usual endeavor should improve during the year. With the general unsettled political conditions throughout the world and uncertainties depending upon the outcome of the European conflict, however, it is very difficult to forecast the immediate future.

OPERATING RESULTS IN MANCHESTER, ENGLAND

The tramways committee of the Manchester Corporation has agreed to contribute £100,000 in relief of the rates, as it has done on two previous occasions, but to do this it is calculated that it will be necessary to take £10,865 from the reserve fund. This rate contribution was fixed by the City Council three years ago, and before another year passes a new arrangement will have to be made. The position of affairs is regarded by the committee as very serious. The large payments in respect of war service allowances are a very serious drain on the financial resources of the department. For the year ended March 31, 1915, the allowances amounted to £31,764. Last year the amount was £92,881, and for the current year it is thought the allowance will go up to £94,000, making a total in three years of £218,645. To meet these payments the committee has been obliged to transfer smaller sums each year to the reserve and renewals. fund than it would have done in normal circumstances. For example, in 1915 the transferred sum was £48,614 less, and in the year just ended it was £78,000 less than it would have been in ordinary times. For the current year the committee will make no addition to the fund, instead of transferring £99,450 as it would wish to do. In three years the fund will be £226,922 less than it would otherwise have been under normal conditions. The general manager gives the total revenue, the car mileage, the revenue per car mile, and the number of passengers carried during the last three years as follows:

	1914	1915	1916
Total revenue	£925,310	£901,876	£939,416
Car miles run	19,463,646	19,155,051	18,486,440
Revenue per car mile	11.41d.	11.3d.	12.196d.
Passengers carried	205,608,741	202,768,420	209,853,344

The estimates for the current year are based upon an estimated car mileage of 18,500,000. They show that, after making provision for the payment of £100,000 to the city fund and meeting the extraordinary expenditure arising out of the war—namely, £94,000 for war service allowances, etc., and £40,000 income tax—the department will not be able to make any provision for renewals, and it is estimated that there will be an actual deficit of £10,865 in the revenue. It is proposed to meet this deficit by a transfer from the reserve and renewals fund.

Leading members of the Manchester Corporation recently met for the purpose of considering the question of traffic congestion in the principal streets of the city. The matter has been before the Corporation for several years. The tramway, watch and improvement committees have reported on the subject, and the City Council has long been awaiting the outcome of their joint deliberations. It was decided to appoint a special committee, consisting of the chairmen and deputy chairmen of the tramways, traffic congestion, watch, highways, infirmary old site, and improvement committees to consider the matter further and present a complete report to the Council.

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Chicago City & Connecting Railways, Chicago, Ill.—A semi-annual dividend of $1 was paid on July 1 on the 250,000 shares of preferred participating certificates of the Chicago City & Connecting Railways. This payment compares with 75 cents in January, 1916, and $1.25 in July, 1915.

Choctaw Railway & Lighting Company, McAlester, Okla.—The plans for the reorganization of the Choctaw Railway & Lighting Company under the recent foreclosure and sale have not yet been fully completed. A bondholders' protective committee was formed last fall, and all but $14,000 of the $894,000 of first mortgage bonds were deposited with the Guaranty Trust Company, New York, N. Y., as depositary under a deposit agreement dated Sept. 15, 1915. On April 8, 1916, the property was bought in at foreclosure sale by C. N. Mason, Julius A. Trawick and Nathan S. Smyser, in trust for the bondholders' protective committee. On June 23 it was reported that the plan of the committee was to incorporate one or more companies to take over the property.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—Judge Murphy of the Common Pleas Court at Hamilton, Ohio, announced his decision on June 26 in the case of Albert D. Alcorn, Cincinnati, against the Cincinnati, Dayton & Toledo Traction Company. The court said that the company was insolvent and that there was evidence of a conspiracy to defraud bondholders. A receiver will be appointed to collect monthly receipts from the Ohio Electric Railway, which is operating the property under lease. At a meeting of the bondholders' committee of the Cincinnati, Dayton & Toledo Traction Company on the same day the decision of Judge Murphy was discussed. It is said that the company, through the committee, will carry the case to the higher courts. At the present time the Ohio Electric Railway is turning over the money collected from the operation of the road to this committee, which is making an effort to readjust the finances of the company.

Cleveland (Ohio) Railway.—The operating report of the Cleveland Railway shows that during May 32,004,274 passengers were carried, a gain of 12.32 per cent over the same month in 1915. The operating revenue for the month was $809,262. After deducting the allowances, $507,694, the net operating revenue was $301,567. The net income was $266,420 and the net surplus, $48,820. This increases the interest fund to $562,638.

Cumberland County Power & Light Company, Portland, Me.—A B. Leach & Company, New York, N. Y., are offering for sale $825,000 of first lien and consolidated mortgage 5 per cent gold bonds of the Portland Railroad dated Nov. 1, 1915, and due on Nov. 1, 1945, making the total amount of this issue $1,825,000. The present issue is to retire $600,000 of 4½ per cent notes of the company due on Dec. 1, 1916, and to provide funds for additions and improvements. The bonds are a direct mortgage on the property of the Portland Railroad subject to an issue of first consolidated 3½ per cent gold bonds of which, however, $1,400,000 are pledged as security for this issue, leaving a balance of only $1,600,000 outstanding in the hands of the public. The company is operated under lease by the Cumberland County Power & Light Company for ninety-nine years from Feb. 1, 1912. The application of the company to the Maine Railroad Commission in connection with this issue was noted in the ELECTRIC RAILWAY JOURNAL of June 10, page 1108.

Mexico (Mex.) Tramways.—A joint meeting of the holders of the bonds issued by the Mexico Tramways, Mexican Light & Power Company, Ltd., the Mexican Electric Light Company, Ltd., and the Pachuca Light & Power Company will be held in London on July 14, to consider and decide upon the policy to be adopted for the protection of the bondholders' interests until conditions in Mexico improve. In order that the bondholders might have full information as to the present position of the company, F. H. Phippen, Toronto, Can., and E. D. Trowbridge, Detroit, Mich., recently visited Mexico in the interest of the bondholders at the request of the National Trust Company, Ltd., the trustee under the various trust deeds, and with the approval of the committee. On their return they made a report on the properties, with important recommendations. The general meeting on July 14 has been called to enable bondholders to meet Mr. Phippen and Mr. Rundle, the general manager of the National Trust Company, before these gentlemen are compelled to return to Canada. At the office of Bell & Schell, New York, the American agents for the Canadian Bank of Commerce, it was stated on June 28 that copies of the report and of the statement issued by the trust company were expected to be received from London on June 30.

Monmouth County Electric Company, Red Bank, N. J.—The interests that purchased the property of the Monmouth County Electric Company under foreclosure recently have applied to the New Jersey Board of Public Utility Commissioners for permission for the successor company to issue $325,000 of stock.

Northern Ohio Traction & Light Company, Akron, Ohio.—At the hearing of the request of the Northern Ohio Traction & Light Company before the Public Utilities Commission on June 26 for authority to issue $14,075,000 of bonds, Mayor Stolberg, representatives of the Chamber of Commecre and members of the City Council of Canton appeared and insisted that if this authority is granted, the company be required to spend $300,000 on improvements and extensions in Canton. The company claims that Canton, with 21 miles of track, produces only one-third as much revenue as Akron, with 37 miles of track. The company planned to spend $65,000 in Canton, but tentatively agreed to increase this to $100,000. The commission will render its decision later.

Public Service Corporation of New Jersey, Newark, N. J.—A gain of nearly 10 per cent in total business for May, 1916, over May, 1915, is shown in a financial report of the Public Service Corporation of New Jersey. The increase amounted to $361,250. For the five months ending May 31, the total increase in business was nearly $2,000,000, on 13.3 per cent gain over the corresponding period of last year. The report for May, 1916, is as follows: Gross increase in total business, $361,250; balance available—after payment of operating expenses, fixed charges, sinking fund requirements, etc.—for amortization, dividends and surplus, $400,800; increase in surplus available for dividends over the corresponding month of 1915, $48,291. The report for the five months ended May 31, 1916, is as follows: Gross increase in total business, $1,960,485; balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus, $1,963,766; increase in surplus available for dividends over the corresponding period of 1915, $436,171.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—The St. Joseph Railway, Light, Heat & Power Company has applied to the Missouri Public Service Commission for authority to issue $15,000,000 of thirty-year 5 per cent bonds, which, it is said, will be partly used to take up outstanding mortgages of $5,000,000.

Seattle, Renton & Southern Railway, Seattle, Wash.—A deed to the Seattle, Renton & Southern Railway, by which the bondholders, who recently purchased the line at a receivers' sale, acquire title to the property, has been formally approved by Judge A. W. Frater in the Superior Court. The deed was signed by August Peabody and Burton Thomas as trustees for the committee representing the bondholders, who bid in the road at the up-set price of $1,200,000. The physical property of the railroad was actually transferred to the new owners on June 10, and they have since been operating the line under Walter M. Brown, acting for President Marshall P. Sampsell. All that is left to be determined in the long litigation in which the company was involved is the compensation of Scott Calhoun and Joseph A. Parkin, the receivers. W. R. Crawford, in the Superior Court, has served notice of appeal from Judge A. W. Frater's order of June 17, directing the receivers to pay claims against the line amounting in the aggregate to about $175,500. In a recent order Judge Frater directed the receivers to pay the Class "A," or first preferred claims against the road, and 50 per cent of the class "B," or second preferred obligations. The Seattle & Rainier Valley Railway was incorporated recently in Delaware with $360,000 of stock presumably as the successor of the Seattle, Renton & Southern Railway.

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United Light & Railways Company, Grand Rapids, Mich.—The board of directors of United Light & Railways Company has adopted a resolution amending the by-laws by adding thereto an additional by-law to provide for a finance committee, consisting of five directors, of whom the president of the company, ex-officio, shall be one. The other members of the finance committee shall be elected by the board of directors to hold office for a term of one year and until their successors are elected and qualified.

United Railroads, San Francisco, Cal.—M. B. Starring, president of the United Railways Investment Company, is in San Francisco, where he is holding a series of conferences with Jesse W. Lilienthal, president of the United Railroads, on new financing plans for the latter company.

United Railways & Electric Company, Baltimore, Md.—The United Railways & Electric Company arranged to retire at maturity on July 1 the $500,000 of Baltimore, Catonsville & Ellicott Mills Electric Railway first mortgage 5 per cent bonds dated July 1, 1896. They were cared for under the terms of the indenture securing the first consolidated 4's of the United Railways & Electric Company.

Union Traction Company of Indiana, Indianapolis, Ind.—The Public Service Commission of Indiana has been pertitioned by the Muncie & Portland Traction Company, the Indianapolis, New Castle & Eastern Traction Company and the Union Traction Company of Indiana to approve the details of a lease for 999 years of the property of the Muncie & Portland Traction Company to the Union Traction Company through the Indianapolis, New Castle & Eastern Traction Company. The Muncie & Portland Traction Company operates between Muncie and Portland. The company is capitalized at $1,000 000, all common. It is proposed that this capital stock shall be made $500,000 preferred and $500,000 common. The Union Traction Company would guarantee to pay the holders of the preferred stock 2½ per cent semi-annually. In addition to this, the Union Traction Company would pay to the Muncie & Portland Traction Company the sum of $2,265 semi-annually, and when the net income of the Union Traction Company amounted to $191,320 a year or more, it would pay any excess to the Muncie & Portland Traction Company until $17,370 had been paid. The payments in any one year under the lease, however, would not aggregate more than $46,900, made up as follows: $25,000 in guaranteed payments on the preferred stock; $17,370 as the maximum excess payment, and the two payments of $2,265 each made semi-annually.

West Penn Traction Company, Pittsburgh, Pa.—The West Penn Traction Company has declared an extra dividend of 3 per cent on the preferred stock, payable on Aug. 15 to stock of record as of Aug. 1 and an extra dividend of 3 per cent on the preferred, payable on Sept. 15 to stock of record as of Sept. 1. These dividends complete the payment of all accumulated dividends on this issue. The quarterly dividend of 1½ per cent was deferred on Sept. 21, 1914, and regular disbursements were not renewed until March 8 of this year. At that time an extra dividend of one-half of 1 per cent was paid on accumulated dividends. On May 19, 1916, a dividend of 2½ per cent was paid on the accumulated dividends. This makes a total of 9 per cent which has been paid on the back dividends of the preferred stock.

DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1¾ per cent, preferred.

Birmingham Railway, Light & Power Company, Birmingham, Ala., 3 per cent, preferred; 1 per cent, on account of accumulated preferred dividends.

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.

Chicago City & Connecting Railways, Chicago, Ill., $1, preferred participating certificates.

Chicago (Ill.) City Railway, quarterly, 2 per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent preferred; quarterly, 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbus, Newark & Zanesville Railway, Springfield, Ohio, quarterly, 1½ per cent, preferred.

Halifax (N. S.) Electric Tramway, quarterly, 2 per cent.

Interstate Railways, Philadelphia, Pa., 30 cents, preferred.

Iowa Railway & Light Company, Cedar Rapids, Iowa, quarterly, 1¾ per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Omaha & Council Bluff Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Ottawa (Ont.) Traction Company, Ltd., quarterly, 1 per cent.

Philadelphia Company, Pittsburgh, Pa., quarterly, 87½ cents, common.

Philadelphia & Western Railway, Upper Darby, Pa., quarterly, 1¼ per cent, preferred.

Porto Rico Railways, Ltd., P. R., 1¼ per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 2 per cent.

Republic Railway & Light Company, Youngstown, Ohio, quarterly, 1½ per cent, preferred.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent first preferred, quarterly, 1¼ per cent preferred.

Stark Electric Railroad, Alliance, Ohio, quarterly, 1 per cent.

Toronto (Ont.) Railway, quarterly, 2 per cent.

United Gas & Electric Corporation, New York, N. Y., quarterly, 1¾ per cent, first preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 1 per cent.

West End Traction Company, Pittsburgh, Pa., 3 per cent extra, preferred; 3 per cent, on account of accumulated preferred dividends.

York (Pa.) Railways, 2½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	May,	'16	$174,517	$114,811	$59,706	$41,711	$17,995
1 "	"	'15	165,033	114,124	50,909	39,078	11,231
11 "	"	'16	1,793,309	1,152,800	640,509	449,541	190,968
11 "	"	'15	1,818,854	1,175,488	643,366	438,487	204,879

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m.,	May,	'16	$709,085	$20,113	$688,972	$44,121	$644,851
1 "	"	'15	287,365	14,358	273,007	40,834	232,173
12 "	"	'16	6,012,968	201,343	5,811,625	503,454	5,308,171
12 "	"	'15	3,952,799	143,095	3,809,704	478,333	3,331,371

DALLAS (TEX.) ELECTRIC COMPANY

1m.,	April,	'16	$151,269	*$96,674	$54,595	$36,597	‡$19,998
1 "	"	'15	131,945	*85,308	46,637	33,394	13,243
12 "	"	'16	1,870,966	*1,152,216	718,750	417,656	‡310,294
12 "	"	'15	2,062,879	*1,182,824	880,055	396,994	483,061

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m.,	April,	'16	$62,995	*$34,387	$28,608	$8,864	$19,744
1 "	"	'15	50,669	*29,484	21,185	8,728	12,457
12 "	"	'16	773,901	*403,133	370,768	105,766	265,002
12 "	"	'15	669,127	*389,106	280,021	103,868	176,153

FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.

1m.,	April,	'16	$138,186	$83,189	$54,997	$53,237	‡$1,875
1 "	"	'15	135,938	80,430	55,508	53,257	‡2,534
4 "	"	'16	558,277	334,433	223,844	215,201	‡9,364
4 "	"	'15	566,280	324,465	241,815	213,871	‡29,263

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m.,	April,	'16	$27,765	*$14,389	$13,376	$5,453	$7,923
1 "	"	'15	21,850	*11,812	10,038	5,581	4,457
12 "	"	'16	298,288	*164,925	133,363	66,131	67,232
12 "	"	'15	267,496	*173,886	93,610	66,805	26,805

PENSACOLA (FLA.) ELECTRIC COMPANY

1m.,	April,	'16	$23,391	*$12,657	$10,734	$7,678	$3,056
1 "	"	'15	20,472	*11,433	9,039	7,201	1,838
12 "	"	'16	271,383	*150,630	120,753	87,617	33,136
12 "	"	'15	253,353	*159,167	94,186	86,982	7,204

TAMPA (FLA.) ELECTRIC COMPANY

1m.,	April,	'16	$78,959	*$44,595	$34,364	$4,394	$29,970
1 "	"	'15	81,176	*42,739	38,437	4,376	34,061
12 "	"	'16	987,491	*515,777	471,714	52,221	419,493
12 "	"	'15	993,777	*510,893	482,884	52,988	429,896

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m.,	May,	'16	$849,056	$515,264	$333,792	$145,206	$188,586
1 "	"	'15	791,472	499,382	292,090	144,120	147,970
5 "	"	'16	4,156,224	2,631,142	1,525,082	713,387	811,695
5 "	"	'15	3,833,818	2,544,656	1,289,162	702,038	587,124

*Includes taxes. ‡Includes non-operating income.

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Traffic and Transportation

RAILWAY ATTEMPTS JITNEY SERVICE

Five Jitney Buses Operated by the Bakersfield & Kern Electric Railway in Bakersfield, Cal., Pile Up $7,000 Loss in Seven Months

The Bakersfield & Kern Electric Railway, Bakersfield, Cal., in order to compete with private jitney buses, and by way of providing temporary transportation beyond certain of its electric lines, has been operating an automobile service since last October. Five Ford cars were used. Each was equipped with a twelve-passenger bus body with longitudinal seats. Two of these were put on the Baker Street run, two on Niles Street, and one on the West Park extension. In each case the operator was paid motorman's wages and the passengers were transferred to and from the electric lines of the company at convenient points.

The figures given in the accompanying table show the mileage traveled each month on each route, and it is notable that the greater the mileage in each case, the greater the deficit for the line. The operating expense includes wages of operator, maintenance and operating costs, as well as depreciation and interest on the investment. The income is the total cash fares received on the buses. This does not represent the number of passengers hauled, as those who transferred from electric cars to buses would not, of course, swell the bus receipts.

	Revenue Mileage	Revenue	Operating Expense	Loss
Baker Street Run (Two Buses)				
October, 1915	1,812	$39.55	$140.88	$101.33
November, 1915	4,239	79.95	349.63	269.68
December, 1915	4,209	106.80	297.78	190.98
January, 1916	5,877	199.15	498.45	299.30
February, 1916	7,839	299.70	766.08	466.38
March, 1916	8,417	337.30	792.89	455.59
April, 1916	8,134	364.05	751.32	387.27
Total	40,527	$1,426.50	$3,597.03	$2,170.53
Niles Street Run (Two Buses)				
October, 1915	2,278	$52.45	$177.11	$124.66
November, 1915	5,340	108.20	440.44	332.24
December, 1915	5,569	162.00	394.07	232.07
January, 1916	7,753	281.65	657.63	375.98
February, 1916	10,704	452.00	1,046.05	594.05
March, 1916	11,348	476.60	1,068.90	592.30
April, 1916	10,980	507.00	1,014.22	507.22
Total	53,972	$2,039.90	$4,798.42	$2,758.52
West Park Run (One Bus)				
October, 1915	4,915	$133.10	$382.07	$248.97
November, 1915	5,500	167.55	453.58	286.03
December, 1915	5,933	194.70	419.76	225.06
January, 1916	5,933	192.50	503.29	310.79
February, 1916	5,556	202.70	543.04	340.34
March, 1916	5,928	228.90	558.47	329.57
April, 1916	5,771	239.35	532.72	293.37
Total	39,536	$1,358.80	$3,392.93	$2,034.13
Total for five buses	134,035	$4,825.20	$11,788.38	$6,963.18

HEARING ON JULY 5 ON COMPANY'S REPLY IN ROCHESTER JITNEY CASE

A conference between representatives of the New York State Railways and the Public Service Commission for the Second District of New York has been set for July 5, at Albany, for the discussion of the details through which the company will comply with certain of the orders of the commission contained in the recent denial of the Rochester jitney certificates. At the request of the Chamber of Commerce the company and the commission will not discuss any structural changes until the Chamber has completed the study it is making of this problem. The features of the commission's order which will be discussed at the coming conference are as follows: Private telephone system, emergency trucks, electric switches, additional seats to be furnished, periodical checks of travel to be made, operation of crosstown bus lines, improvements in service to and from Fairport, and improvements in conditions at the State Street carhouse.

These topics have been arranged after a comparison between the commission's order and the company's formal and tentative answer filed at the required thirty days after the order. It is understood that the company in this answer has substantially offered to comply with all of the commission's recommendations aside from those which require new construction, but that in some instances it has claimed that the requirements are already fulfilled or might better be filled by modifications of the commission's plans.

The operation of the crosstown bus lines is typical of these cases. The company is understood to have suggested this as a substitute for the crosstown line recommended by the commission which will be impossible to build until a new bridge is erected across the river near Driving Park. A bus line, the company has said, could use the present bridge. Such a bus line, run as a part of the electric railway system, would afford transfers to the other lines, and generally fit in better with the present facilities than independent jitneys. None of the applicants for jitney certificates had applied for a route on this line or any like it.

PITTSBURGH RAILWAYS INCREASE OWL FARE

At midnight on June 22 the Pittsburgh (Pa.) Railways put into effect a 10-cent fare on its owl cars. This is an increase of 5 cents over the previous fare for this service, and is the first of the changes made by the company to secure additional revenue, growing indirectly out of the settlement of the strike of the employees of the company in May. It was upon condition that the company would receive the co-operation of the mediators in the strike in securing necessary additional revenue that it consented to pay an advance in wages greater than its present earnings would permit. The company said at that time that it desired it distinctly understood that if it was to pay the wages demanded, it would be necessary to provide increased fares partially to cover the advance to the men and that action would be taken for such adjustments of the fare zones as were deemed proper and reasonable. In announcing the increase in the owl fares the company posted placards in its cars which read as follows: "The old rate of night fare will be re-established on Thursday morning, June 22, namely, double the day fare. This action becomes necessary because of the abnormal increase in the price of labor and materials."

Opposition to the increase in the fares developed at once. A committee of the Council of Pittsburgh dispatched a messenger to Harrisburg with a resolution to the Public Service Commission in which protest was made against the action of the company. The Public Service Commission on the afternoon of June 23 made an order requiring the company to issue certificates of rebate to be redeemed in case the commission decided that the increase in rates should not stand. Accompanying this decision was the announcement that the commission had set Friday, June 30, at 10 a. m. for a hearing at the Capitol on all of the questions involved in the complaint against the company.

One-Man Cars for Bristol.—The Bristol (Tenn.) Traction Company has completed the conversion of most of its cars for one-man operation and has installed the one-man system except on one route.

Advertising Campaign Started in Denver.—The *Tramway Bulletin*, published by the Denver (Col.) Tramways, announced in the June issue that the company has started on the first of several newspaper advertising campaigns "to let Denver people know about their own town."

Accident on Pennsylvania Road. — Three persons were killed and a number of others were seriously injured on June 23 when a freight car of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., crashed into the rear end of a heavily-loaded passenger car at North Sewickley, near Elwood City.

Restrictions on Packages in Kansas City.—A new order by W. C. Harrington, superintendent of transportation of the Kansas City (Mo.) Railways, prohibits the carrying of passengers with bundles too large to hold in the hand or store under the feet. The order also prohibits trainmen from carrying bundles of the proscribed sizes.

Sale of Low-Fare Tickets Abolished.—The Indiana Public Service Commission has abolished the issuance of fifty-four-ride tickets for $2.15 on the Gary & Interurban Railroad between Gary and Indiana Harbor, Ind. This service was

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on the basis of 1¼ cents per mile between the two cities. The fare was considered too low by the commission.

Traveling Instructors With a Roving Commission.—The transportation department of the Kansas City (Mo.) Railways has added two traveling instructors, a motorman and a conductor, who spend all their time on the cars, on special assignments to certain men, following up the work of the school of instruction, or in observing the men, and giving suggestions.

Decrease in All Except Auto Accidents in Brooklyn.—Gen. George W. Wingate, president of the Brooklyn Institution of Safety, has issued to 10,000 automobile owners in the borough of Brooklyn a letter calling attention to the fact that while other classes of street accidents have shown very encouraging decreases in the first four months of 1916 as compared with the first four months of 1915, accidents in which automobiles were involved have not only failed to show similar decreases, but on the contrary have tended to increase largely.

Massachusetts Court Dismisses Fare Case.—The Massachusetts Supreme Court has dismissed a bill brought by the town of Arlington against the Bay State Street Railway to restrain the latter from carrying into effect a schedule providing for an increase of fares. The town claimed that the company was bound by the agreement with the Arlington & Winchester Street Railway when it received a location in 1897 that a charge of not more than 5 cents should be made to any point in either town. The court holds that the matter is entirely within the jurisdiction of the Public Service Commission.

Experimental Operation With New Cars Authorized.—The City Council of Seattle, Wash., has passed an ordinance authorizing the experimental operation of light-weight cars on the Summit Avenue line of the Puget Sound Traction, Light & Power Company. Trials will begin on or about July 5 and will continue until the company and public officials are convinced that the cars are practical, useful, economical and safe, or that they are lacking in these qualities. If the experiments are counted a success, the company plans to install this new type of car on various routes where they will be the most practical.

Spokane Service Readjustments Arranged.—According to officials of the Washington Water Power Company and the Spokane & Inland Empire Railway, Spokane, Wash., the readjustment of the street railway schedules for owl service will be made soon after July 1. D. L. Huntington, president of the Washington Water Power Company, states that the Public Service Commission has asked for considerable additional data in connection with the hearing on June 9 and 10, reported in the ELECTRIC RAILWAY JOURNAL of June 24, page 1205. This information is being prepared. Mr. Huntington states that the service adjustment in all probability will be in operation by July 15. He said: "I believe that we can work out a schedule which will cover the city adequately and at the same time offer a measure of relief for the companies." Under the new schedules there will be no duplication of service in the owl lines; where parallel lines are operated by both companies at this time, the field will be divided and the district served by one or the other line.

Service Standard Rules in Effect in Baltimore. — The United Railway & Electric Company, Baltimore, Md., recently advised the Public Service Commission of Maryland that beginning on June 15 it would issue transfers upon transfers on the Woodlawn branch of the North Avenue line. This is designed to give a 5-cent fare to persons traveling from the territory north of North Avenue served by the St. Paul Street and parallel lines, to the Electric Park section. The rules prescribed recently for the company by the commission went into effect on June 15 with the exception of the one requiring "full-car" signs upon cars loaded to capacity and that forbidding passengers to stand upon the running boards of cars. These rules become effective on July 15. The rule restricting overloading provides that except during rush hours there shall be an average of a seat for every passenger. The rush hours are from 6 a. m. to 9 a. m., 4 p. m. to 7 p. m., and from 1 p. m. on Saturdays, Sundays and holidays. During the rush hours the cars may carry, in addition to seating capacity, one passenger for each 3 sq. ft. of clear floor space.

Personal Mention

S. W. Reynolds has resigned as general claim agent of the Illinois Traction System at Springfield, Ill.

J. B. Hardaway, an attorney in the general claim department of the Illinois Traction System, has been appointed head of the freight claim department, with offices in Springfield, Ill.

Walter N. Walmsley has been appointed general manager of Alabama Power Company, a subsidiary of Alabama Traction, Light & Power Company, New York, N. Y., to succeed F. H. Chamberlain, resigned.

G. R. Whitmore, an attorney in the general claim department of the Illinois Traction System, has been given charge of the personal injury claim department. His headquarters will be moved to Peoria, Ill.

Edward Ostrander, assistant secretary of the Public Service Commission of Oregon, has been appointed secretary of the commission to succeed H. H. Corey, who has been made a member of the commission.

W. B. Miser, general superintendent of the Jacksonville Railway & Light Company, Jacksonville, Ill., has been appointed supervisor of new business for all gas and electric properties of the Illinois Traction Company, Peoria, Ill.

W. S. Brackett, storekeeper of the Denver (Col.) Tramway, has been appointed purchasing agent of the company to succeed C. F. Musgrove, resigned. Mr. Brackett has been in the company's employ more than sixteen years.

J. J. Bonfield, for twelve years local freight agent for the Kentucky Traction & Terminal Company at Lexington, Ky., has been promoted to the position of general freight agent, succeeding John D. Sallee, who has retired to private life, as noted elsewhere in this column.

V. A. Gillette, dispatcher of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., has been appointed local superintendent to succeed L. E. Hollar, who has been advanced to superintendent of transportation.

L. E. Hollar, local superintendent of the Chicago, South Bend & Southern Indiana Railway and the Southern Michigan Railway at South Bend, Ind., has been appointed superintendent of transportation of the companies succeeding F. I. Hardy, who has been made general manager.

Irwin M. Ristine has been appointed supervisor of employment of the Denver (Col.) Tramway. Mr. Ristine has been educational secretary of the Denver Y. M. C. A. schools for the last year and a half. Before that he was office and employment manager of the firm of Sears, Roebuck & Company, Chicago.

James M. Smith, secretary of the Cleveland & Erie Railway, Girard, Pa., has been appointed acting manager of the company to succeed R. W. Palmer, whose appointment to the Auburn & Syracuse Electric Railroad, Auburn, N. Y., was announced in the ELECTRIC RAILWAY JOURNAL of June 24.

C. F. Musgrove, who has been purchasing agent for the Denver (Col.) Tramway since Jan. 1, 1897, has resigned. Mr. Musgrove entered the company's employ in February, 1888, as secretary to William G. Evans, president at that time, and, after nine years in this capacity, was made purchasing agent.

C. D. Emmons has resigned as general manager of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., effective on July 1, to accept the position of second vice-president and general manager of the Boston & Worcester Street Railway, with offices at Framingham, Mass.

F. I. Hardy, superintendent of transportation of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, South Bend, Ind., has been appointed general manager of the company, succeeding C. D. Emmons, whose appointment to the Boston & Worcester Street Railway is announced elsewhere in this column.

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E. H. Gray, superintendent of the Illinois Traction System properties at El Paso, Ill., and contiguous territory, has been appointed general superintendent of the Jacksonville Railway & Light Company, Jacksonville, Ill., effective on July 1, to succeed W. B. Miser, made supervisor of new business of the McKinley properties.

J. C. Donald has resigned as general superintendent and purchasing agent of the Asheville Power & Light Company, Asheville, N. C., effective on July 1 to accept the position of assistant to the vice-president and general manager of the Ironwood & Bessemer Railway & Light Company, with headquarters at Ashland, Wis. Mr. Donald was born in Conecuh County, Ala., on Nov. 16, 1876. He was educated in the public schools of Columbia, S. C. He entered railway work witih the wire and conduit department of the Boston (Mass.) Elevated Railway, with which he was connected for five years. He then served for a year in the electrical equipment department of the Pittsfield works of the General Electric Company. He was next connected with the Southern Railway & Light Company, Natchez, Miss., for a year as electrical engineer and superintendent of the company. Subsequently he served for a year as superintendent of the Citizens' Light, Heat & Power Company at Montgomery, Ala. He then re-entered railway work and served for two years as foreman of electrical construction for the Chattanooga Electric Company and Chattanooga Railway & Light Company, Chattanooga, Tenn. He has been connected with the Asheville Power & Light Company for the last five years as electrical engineer, general superintendent and purchasing agent.

J. C. DONALD

H. H. Corey has been appointed to the Public Service Commission of Oregon to succeed Clyde A. Aitchison, who resigned to become solicitor to the National Association of Railroad Commissioners. Mr. Corey has been secretary of the commission and at the May primary was nominated as the Republican candidate for commissioner from the eastern Oregon district.

John D. Sallee has resigned as general freight agent of the Kentucky Traction & Terminal Company, Lexington, Ky., and will retire from active business life. Mr. Sallee had been connected with the company at Lexington for more than twenty-six years. He has been general freight agent of the company since the fall of 1911. Previous to that he was superintendent of the lines of the company in Frankfort for six years. Before going to Frankfort he was dispatcher in Lexington for seven years. As general freight agent of the company, Mr. Sallee had supervision over the Frankfort terminal and also looked after the terminals at Paris, Georgetown and Nicholasville.

N. E. Drexler has been appointed chief engineer of the Newport News & Hampton Railway Gas & Electric Company, Hampton, Va., to succeed C. D. Porter, resigned. Mr. Drexler is a graduate of the Rensselaer Polytechnic Institute, Troy, N. Y. Since graduation he has been with the Newport News & Hampton Railway, Gas & Electric Company as assistant engineer, master mechanic, assistant chief engineer and assistant superintendent of tranportation. For the last three months he was acting electrical engineer for the Maryland Electric Railways with headquarters at Annapolis, Md. As stated in the ELECTRIC RAILWAY JOURNAL of June 10 Mr. Porter has been appointed general manager of the Maryland Electric Railways.

William R. Willcox, former chairman of the Public Service Commission for the First District of New York, was named on June 27 as chairman of the Republican National Committee to direct the campaign of Mr. Hughes. Mr. Willcox was the first chairman of the Public Service Commission in New York to which he was appointed during the administration of Mr. Hughes as Governor of New York. He was formerly postmaster of New York. Mr. Willcox was born in Smyrna, N. Y., fifty-three years ago. It was while Mr. Willcox was chairman of the commission that the plans were developed for the dual rapid transit system now under construction in New York. This is the largest single municipal undertaking in the history of the world.

John Weigel has resigned as chief of the time-table department of the Brooklyn (N. Y.) Rapid Transit System to become superintendent of schedules for the International Railway, Buffalo, N. Y. Mr. Weigel will also give part of his time to supervising the schedules of the southern properties of the United Gas & Electric Corporation, which controls the International Railway. Mr. Weigel's electric railway career began twenty years ago, when he entered the shops at Brooklyn. He soon was transferred to the transportation department, serving successively as inspector, chief inspector, assistant superintendent and chief of the time-table department. The Brooklyn Rapid Transit System was one of the first roads to inaugurate scientific schedule making. Largely under Mr. Weigel's direction practices were developed in Brooklyn that have since served as models for many other city railways.

Charles A. Drew has been appointed superintendent of the time-table department of the Brooklyn (N. Y.) Rapid Transit Company to succeed John Weigel, resigned, whose appointment to the International Railway is noted elsewhere in this column. Mr. Drew was born in Bloomfield, N. J., thirty-eight years ago. He started railroading on Sept. 26, 1894, with the Newark (N. J.) Passenger Railway and continued with that company until June 1, 1900. At first he acted as a conductor and as a dispatcher. He was later promoted to the auditing department of the company, where he served from 1897 to 1900. On June 11, 1900, Mr. Drew entered the service of the Brooklyn Rapid Transit Company as a motorman. He worked in that position until the latter part of 1901. He was then made starter. In February, 1902, he was advanced to office dispatcher. He held that position until Nov. 1, 1907, when he was made depot master at East New York. He continued as depot master there until March 1, 1916. He was then made schedule maker in the main office, and on June 1, 1916, was appointed superintendent of the time-table department, the title of the head of the department being changed from chief to superintendent.

James P. Barnes, who was honored on Wednesday of this week by election to the presidency of the New York Electric Railway Association, has been prepared for the responsibilities of this office by active committee work in this and the American Electric Railway Association, and by the extension of his acquaintance with the railways and railway men of the State and country. His interest in the big problems of the industry is indicated by the report on compensation insurance presented at this week's meeting and to be printed in a later issue of the ELECTRIC RAILWAY JOURNAL, and by his two years' work on the equipment committee of the Engineering Association during which he devoted his energies to the steel wheel and other specifications. Mr. Barnes has been identified with the Allen & Peck properties for four years past, having resigned the position of chief engineer of the Syracuse (N. Y.) Rapid Transit Railway to become general manager first of the Syracuse & Suburban Railway, and later of the Buffalo, Lockport & Rochester Railway, the position which he now occupies. Since graduating from the Massachusetts Institute of Technology, Mr. Barnes has occupied several positions in succession, in each of which he has demonstrated marked technical and executive ability.

J. P. BARNES

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Central Florida Interurban Railway, St. Cloud, Fla.—Incorporated to construct about 300 miles of electric railway. Capital stock, $100,000. Carl E. Carson, president, and William S. Alyea, secretary. [June 10, '16.]

Tampa & Eastern Traction Company, Tampa, Fla.—A charter has been granted to the Tampa & Eastern Traction Company to construct a line from Tampa to Lakeland, about 33 miles. Capital stock, $750,000. Officers: F. W. Cole, president; E. J. Binford, vice-president; Frank L. Cooper, secretary, and F. M. Williams, treasurer, all of Tampa. [May 27, '16.]

***Seattle & Rainier Valley Railway, Seattle, Wash.**—Incorporated in Delaware presumably as the successor of the Seattle, Renton & Southern Railway, the property of which was sold recently under foreclosure and purchased by the representatives of the bondholders. Capital stock, $360,000.

FRANCHISES

Santa Monica, Cal.—The Pacific Electric Railway has refused the offer of the city of Santa Monica for a franchise over Montana Avenue from Third Street to Fourth Street and north on Fourth Street to San Vicente Boulevard in exchange for removing its tracks from Ocean Avenue, north of Santa Monica Boulevard.

Quincy, Ill.—The Quincy Railway has asked the Council for a franchise to construct a loop from near the southwest corner of Twenty-second and Washington Streets to the terminus of the branch of the State Street line.

Russellville, Ky.—The Tennessee & Kentucky Interurban Railroad has received a franchise from the Council to construct a line into Russellville. The company plans to construct a line from Nashville to Russellville. Paul D. Denton, Nashville, secretary. [May 20, '16.]

Buffalo, N. Y.—The International Railway has asked the Council for a franchise to construct an extension through Franklin Street from Chippewa to Allen Streets.

Astoria, Ore.—It is reported that the Pacific Power & Light Company has decided to surrender all rights to operate street cars in upper Astoria. It is stated upon the refusal of the company to construct lines under the new franchise, an ordinance will be introduced in the Council at an early date revoking the privileges of the franchise granted last year.

Oregon City, Ore.—The Portland Railway Light & Power Company has received a freight franchise from the Council of Oregon City. The life of the franchise will be ten years instead of twenty-five, as originally proposed.

Walla Walla, Wash.—The Walla Walla Valley Railway has asked the City Commissioners to submit to a vote of the people the matter of a franchise for a street railway line out Ninth Street to the city limits. The company plans the construction of a line to the south and west of the city limits, also a branch line to the fair grounds. The company also wants permission to operate a freight train over the line any hour of the day.

TRACK AND ROADWAY

Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.—This company is fixing up its property about halfway between Tuscaloosa and Holt for a picnic grounds and park and is erecting a dancing pavilion and large swimming pool.

***Duncan, Ariz.**—The Carlisle Mining Company plans to construct an electric railway from Duncan to its mines at Steeplerock, N. M., 13 miles. H. K. Welch, Steeplerock, manager.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will extend its line from Los Angeles to San Diego via Fullerton, Anaheim and Santa Ana.

Martinez & Concord Interurban Railway, Martinez, Cal.—Contracts will be let at once by this company for construction work on Pine Street and Pacheco Avenue, Martinez, in connection with its proposed line between Martinez and Concord. Clifford McClellan, San Francisco, is interested. [June 17, '16.]

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The Railroad Commission of the State of California has issued an order authorizing the San Francisco-Oakland Terminal Railways to abandon a part of its double track on Fifth Avenue, Oakland.

San Diego (Cal.) Electric Railway.—This company is constructing 1¾ miles of single track from its Point Loma line at Roseville to the Government Reservation line at La Playa.

Pensacola, Fla.—The House of Representatives has passed a bill authorizing George H. Hervey of Pensacola to construct and operate an electric railway on the Fort Barrancas and Fort McRae military reservations. The bill had already passed the Senate. [Feb. 19, '16.]

***St. Petersburg, Fla.**—It is reported that plans are being considered for the construction of an electric railway from St. Petersburg to Tampa, about 20 miles, including a bridge 3½ miles long over Old Tampa Bay. George Gandy, Sr., and Lewis B. Brown, St. Petersburg, are interested.

***Charleston, Ill.**—A project to construct a line from Charleston to Terre Haute is being considered. J. W. Dawson, Westfield, is interested.

Danville Street Railway & Light Company, Danville, Ill.—This company has begun work on the west approach to the Fairchild Street subway. Grading and laying of ties are now in progress. The company has also received a new switchboard for installation in connection with this subway. It is expected that work will be completed by Aug. 1.

Kankakee & Urbana Traction Company, Urbana, Ill.—Regular passenger and freight service was installed on this company's line between Urbana and Paxton on June 28.

Union Traction Company, Anderson, Ind.—This company is making extensive repairs to its tracks at Marion, the work beginning at the bridge in Washington Street and progressing northward.

St. Joseph Valley Railway, Elkhart, Ind.—This company is seeking permission from property owners to string wires supporting the trolley wires from the buildings, thus doing away with poles on Main Street from Hickory Street to Jefferson Street.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company has awarded a contract to the Topeka Bridge & Iron Company for the construction of a concrete bridge consisting of two 65-ft. arches over Land Creek. The cost is estimated at $4,250.

Duluth-Superior Traction Company, Duluth, Minn.—The formal order was issued by the Railroad Commission of Wisconsin on June 21, rescinding the order of the commission of Nov. 13, 1912, under which the Duluth-Superior Traction Company was required to reduce fares in Superior. Reference was made to this order in the ELECTRIC RAILWAY JOURNAL for April 29, page 840. Under the terms of the agreement, the company will place in service double-truck cars on the Billings Park line as soon as the viaduct has been strengthened to permit the operation of this line. The company will also construct a line from Tower Avenue to the dock front on the Bay of Superior, to be completed by Dec. 1, 1917. The Tower Avenue and Belknap Street lines will be connected to serve what is known as the Normal School district. The latter line must be completed before Nov. 1, 1919. Approximately $200,000 will be required to construct the extensions.

Kansas City (Mo.) Railways.—Preliminary to the paving of Main Street from Twelfth to Nineteenth Streets with creosoted wood blocks, the Kansas City Railways will lay new track and bring same up to grade. A 20-in. solid concrete base, sawed-oak ties and 95-lb. T-rails with welded joints will be used. The company is now welding 25 miles of track in the city.

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Beaver Valley Electric Railway, Baker, Mont. — This company proposes to build an electric railway from Baker to Ekalaka, Mont., via Webster, 50 miles. The final location has been made for 25 miles of the line and the right-of-way has been secured. It is estimated that from 10,000 to 15,000 cu. yd. of material will be handled per mile. The contract for the grading work will be awarded by Aug. 1. The company will also construct a 150-ft. trestle.

Brooklyn (N. Y.) Rapid Transit Company.—Operation was begun by the New York Consolidated Railroad on the West End elevated line on June 24. Regular service will be from Chambers Street, Manhattan, as far as Sixty-second Street and New Utrecht Avenue, Brooklyn, and a shuttle service will be operated on the west-bound track from Sixty-second Street to Eighteenth Avenue.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has rejected all bids received on June 5 for the supply of about 52,000 tons of structural steel, for use in the construction of various portions of the dual system of rapid transit. The commission in rejecting the bids took cognizance of the fact that the steel market is falling and that the prices of steel will almost certainly be lower in the future. The commission has approved the awarding by the New York Municipal Railway Corporation of the contract for track laying and electrical equipment on the Jamaica extension of the Broadway elevated line in Brooklyn from Crescent Street to Cliffside Avenue to Lewis H. Woods, New York City. Bids were taken on four types of construction, Mr. Woods' ranging from $136,947 to $149,829.

Interborough Rapid Transit Company, New York, N. Y.—Bids were opened on June 26 by the Public Service Commission for the First District of New York for the construction of the 180th Street yard of Route No. 18, a part of the White Plains Road elevated extension of the Lenox Avenue branch of the first subway, the lowest bidder being Thomas J. Buckley Construction Company, New York, at $26,922.50.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company has applied to the Public Utilities Commission of Ohio for authority to issue $14,057,000 first lien refunding gold bonds, of which $1,955,300 is for improvements. Among the improvements planned are the following: Double-tracking A. B. C. line to Falls and north end of Bedford; improvements from Bedford to Newburg; double-track line between Canton and Massillon; extension to Mahoning line in Canton; Massillon extension; extension on Wooster Avenue, Akron; double-track line between Blue Point and Springfield Lake, 3.83 miles; double-track from Akron terminal over iceway to gorge, 2¾ miles.

Bangor & Portland Traction Company, Bangor, Pa.—Plans are being made by this company for direct track connection with the Northampton Traction Company at Bangor, giving a through line from Easton to Portland, a distance of 26 miles.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Plans are being considered for the organization of a company to succeed the Nashville-Gallatin Interurban Railway for the purpose of constructing an extension to Springfield. The new line will be 18.4 miles long, the total distance from Nashville via the present Nashville-Gallatin Interurban Railway and thence by the route surveyed for the extension to Springfield being about 27 miles. The line will pass through Goodlettsville, Baker, Ridgetop and Green Brier. All surveys for the extension have been completed and rights-of-way are now being obtained, and it is expected that within the next month or two actual construction work will be begun.

Dallas, Northwestern Traction Company, Dallas. Tex.—E. P. Turner, vice-president of the Dallas Northwestern Traction Company, states that the company has not abandoned its railway project, although the bond interests prefer that a line be built from Dallas to Slidell, through Denton and Krum instead of the Denton-Krum line. Engineers have completed surveys and negotiations now under way regarding financial arrangements are expected to be completed shortly. [Jan. 29, '16.]

Galveston (Tex.) Electric Company.—This company is reconstructing about 1½ miles of ballasted track.

Houston, Richmond & Western Traction Company, Houston, Tex.—It is reported that construction will be begun about July 15 on this company's proposed line between Houston and San Antonio. The first section will be built between Houston and Gonzales, C. C. Godman, Kansas City, president. [June 17, '16.]

Temple & Marlin Interurban Railway, Temple, Tex.—S. D. Hanna, chief engineer of the Marlin-Temple Interurban Promotion Company, reports that he will have all surveys and right-of-way plans completed within the next sixty days for this company's proposed line from Marlin to Temple. As soon as these surveys are finished, plans for the line will be submitted to Eastern financiers who have already tentatively agreed to finance the project. [April 29, '16.]

SHOPS AND BUILDINGS

Massachusetts, Northeastern Street Railway, Haverhill, Mass.—This company has awarded a contract to E. A. Peabody & Son, Lawrence, for the construction of a carhouse at Merrimac to replace the one recently destroyed by fire. The building will be 90 ft. x 90 ft., and will be of brick and steel construction, with reinforced concrete floors and granite and cast stone trimmings.

Kansas City (Mo.) Railways.—The interurban railways entering Kansas City and the board of control of the Kansas City Railways have agreed upon a site for a terminal freight depot. Plans are now being perfected for the organization of the Kansas City Transfer & Warehouse Terminal Company, which will ask a franchise from the city for the operation of the terminal. The site selected is on Wyandotte Street between Third and Fourth Streets. Interurban freight cars will run over Kansas City Railways' tracks only to reach the terminal, and the Kansas City Railways will build and maintain the tracks for this purpose. The Kansas City, Clay County & St. Joseph Railway probably will abandon its present freight depot, which it has outgrown. The Kansas City Western Railway now uses the Strang line freight depot at Third and Grand Streets, which will be abandoned.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has authorized the advertising for bids, to be opened on July 14, for the construction of station finish for the Grand Central Station of the Queensboro subway. This work is to include the lengthening of the island platform of the present station of the Queensboro subway in Forty-second Street, between Lexington and Third Avenues. This platform is to be extended westerly for about 500 ft., and connecting with this extension there will be an underground passageway to the present Grand Central station of the first subway.

Beaumont (Tex.) Traction Company. — A contract has been awarded to H. Weber for the construction of an addition to the paint shop of the Beaumont Traction Company at the Irving Street carhouse. It is estimated that the addition will cost about $1,800.

POWER HOUSES AND SUBSTATIONS

United Railways & Electric Company, Baltimore, Md.—A report from this company states that plans are being made to construct an additional substation to be located adjacent to its Electric Park carhouse to be known as the Belvedere Avenue substation. The company plans to install two or three 1500-kw. rotary converters with necessary transformers, switchboards and auxiliary apparatus.

Columbus Railway, Light & Power Company, Columbus, Miss.—It is reported that this company plans to purchase a 500-kw. generator.

Helena Light & Railway Company, Helena, Mont.—It is reported that this company plans to extend its transmission lines to Lenox.

Columbia Railway, Gas & Electric Company, Columbia, S. C.—This company is contemplating extensions to its transmission system.

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Manufactures and Supplies

RETURN OF GOOD BUSINESS

Comparison of Rolling Stock Purchases for First Six Months of 1915 and 1916 Shows Satisfactory Increase

A review of the rolling stock columns of the ELECTRIC RAILWAY JOURNAL for the first six months of 1916 indicates that the electric railway industry, so far as rolling stock is concerned, is resuming its activity of the years prior to the general business depression of 1914 and 1915. This undoubtedly is due in part to the lifting of the retrenchment policy which has been pursued during the past two years but also to the increased traffic caused by better industrial conditions.

A comparison of the number of cars ordered in the United States and Canada during this period in 1915 and 1916 shows that 951 more cars have been ordered this year than last. This is a gain of more than 74 per cent over the 1273 cars which were ordered during the first six months of 1915. It is interesting to note from the following table that while the Eastern and Middle West States predominate in the number of cars ordered the percentage of increase in rolling stock purchased is distributed pretty evenly throughout the various sections of the country.

	First Six Months 1915	First Six Months 1916	Increase
Eastern States	730	1,257	527
Middle West States	462	805	343
Western States	22	49	27
Southern States	41	88	47
Canada	18	25	7
Total	1,273	2,224	951

The largest car orders placed this year to date are as follows: Bay State Street Railway, Boston, Mass., 200 cars; New York Municipal Railway, 200 subway cars; Public Service Railway, Newark, N. J., 197 cars, 177 of which are being built in its own shops and twenty of which have been ordered from an outside car builder; Cincinnati (Ohio) Traction Company, 100 cars; Connecticut Company, New Haven, Conn., 100 cars; Toledo Railways & Light Company, Toledo, Ohio, 100 cars; Kansas City (Mo.) Railways, seventy-five cars; New York (N. Y.) Railways, seventy storage-battery cars; Boston (Mass.) Elevated Railway, fifty-two articulated center-section bodies and fifty trail-car bodies; New York State Railways, Rochester, N. Y., fifty cars; Rhode Island Company, Providence, R. I., fifty cars; Detroit (Mich.) United Railway, fifty trail cars.

The industry naturally welcomes this return of good business conditions, which simply for rolling stock and its equipment, means the expenditure of $4,755,000 more than was spent during the first six months of 1915. This figure is based on the conservative estimate of $5,000 per car.

ROLLING STOCK

Tazewell (Va.) Street Railway is reported to have ordered one car from The J. G. Brill Company.

Willamette Valley Southern Railway, Oregon City, Ore., is reported to be in the market for additional equipment.

Columbus Railway, Light & Power Company, Columbus, Miss., is reported to be in the market for three double-truck cars.

Harrisburg (Pa.) Railways, noted in the ELECTRIC RAILWAY JOURNAL of March 11 as expecting to order five double-truck passenger cars, has purchased this equipment from The J. G. Brill Company.

New York Central Railroad, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of June 10 as expecting to purchase twelve 70-ft. cars, to seat ninety persons, has ordered this equipment from the Standard Steel Car Company.

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received a large order for Cleveland type splicers from the Connecticut Company, New Haven, Conn.

Cornell S. Hawley, president of the Laconia Car Company, has been elected president of the Consolidated Car Heating Company, Albany, N. Y., succeeding F. W. Kelley. Mr. Hawley will retain the presidency of the Laconia Car Company.

Heywood Brothers & Wakefield Company, Wakefield, Mass., reports the receipt of orders for seats for six interurban cars of the Schenectady (N. Y.) Railway; fifteen cars of the Buffalo & Lake Erie Traction Company; 105 cars of the Connecticut Company, and 200 cars of the Bay State Street Railway.

Roller-Smith Company, New York, N. Y., announces that it has recently established a St. Louis agency in the person of George W. Pieksen, who is located in the Railway Exchange Building, St. Louis, Mo. Mr. Pieksen will handle Roller-Smith products in St. Louis and in parts of the States of Missouri and Illinois.

Lord Manufacturing Company, New York, N. Y., reports the receipt of the following orders for screenless air cleaners: Bay State Street Railway, Boston, Mass., twelve; Middlesex & Boston Street Railway, Newtonville, Mass., eight; Westinghouse Traction Brake Company, sixteen, for the cars being built for the Binghamton (N. Y.) Railway. This company has also received an order from the Cape Electric Tramways, Capetown, South Africa, for twenty-four ratchet handles.

Ohio Brass Company, Mansfield, Ohio, effective July 1, will act as general sales agent in the United States for the entire line of Crouse-Hinds Imperial headlights for railway and mine use. The Imperial line enables them to furnish the headlight best suited to any condition as it contains a complete assortment of luminous arc, carbon arc and incandescent headlights. The Ohio Brass Company has made extensive preparation for taking over this line, its entire sales force and others having spent three days at the Crouse-Hinds plant in Syracuse, and will be in position to offer its customers the same service on headlights that has been given with the sale of its other materials.

Railway Improvement Company, New York, N. Y., reports the receipt of an order from the Kansas City (Mo.) Railways for 3000 No. 1A sanitary straps for use on present equipment, and an order for 1125 straps for the seventy-five cars now being built for this company by the St. Louis Car Company, Rico anti-climbers have been ordered for the 100 cars being built by the G. C. Kuhlman Car Company for the Toledo Railways & Light Company, the 200 cars being built by the Laconia Car Company for the Bay State Street Railway, and the 100 cars being built for the Connecticut Company. This last company, which operates 676 miles of line in New Haven, Hartford, Bridgeport and other cities and has 1826 motor and about fifty other cars, is gradually equipping its old cars with anti-climbers.

Rail Joint Company, New York, N. Y., announces that the Bonzano Rail Joint Company, as well as the Q. & C. Company, by advice of their counsel after investigation, have recognized the utility and validity of the Thomson & Thomson rail joint patents owned by the Rail Joint Company and have taken a license thereunder in order to utilize the Thomson & Thomson novel system of metal distribution, for head reinforcements, in connection with their Bonzano types of splice bars. Accordingly notice is given by the Rail Joint Company that the aforesaid companies are authorized under the Thomson & Thomson patents in the manufacture and sale of the Bonzano type of splice bars having the Thomson & Thomson system of metal distribution for head reinforcement.

ADVERTISING LITERATURE

British Thomson-Houston Company, Ltd., Rugby, England, has issued an eighty-eight-page pamphlet on steam turbines and generators. It contains an explanation, in simple language, of the principles of operation of the Curtis turbine and is well illustrated with diagrams and pictures of detail parts and assembled machines. Electric generators, both alternators and d.c. machines, are also described, and ventilating systems and air filters receive attention. Technical data are included in the form of curves and tables and as a whole the publication forms a convenient and readable treatise on the subject covered by its title.

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Electric Railway Journal

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Vol. XLVIII NEW YORK SATURDAY, JULY 8, 1916 No. 2

MILITARY VALUE OF ELECTRIC ROADS

At its Niagara Falls meeting held last week the New York Electric Railway Association concentrated its attention largely upon the ways in which the railways can assist the government in mobilizing troops and supplies. The immediate benefit of this concentration appears in the reports abstracted in last week's issue. Through devotion to a common cause the railways will themselves benefit by reflex action. Whether or not the railways are needed for mobilization purposes in the near future, intensive analysis of facilities at this time will bring out the shortcomings of our electric railway systems, considered as a unit; will show the government what each State has to offer in the way of electric transportation facilities, and will weld together the railway organizations of each territorial division as each company considers itself a component part of a whole. Already it is seen that with the exception of two comparatively short gaps there is a continuous electric railway across New York State in the general direction of the steam railroads and the canal. These gaps should be bridged in the interests of both the State and the nation.

ARE SUBSIDIES NECESSARY?

In saying this we do not mean to assert that a policy in favor of subsidies for military railways is necessary in this country yet, although such a policy has been followed very extensively abroad. We do believe, however, that the committee on the movement of troops at the New York convention last week has shown conclusively the great assistance which electric railways can be in mobilization and in other military operations, and that for this reason the State or national government could well encourage their construction at certain points and their maintenance in effective condition. This aspect of the use of electric roads has received practically no attention in the past. But if the electric railways, like the steam railroads, are liable to be taken over by the government in time of actual or threatened war, then the government is vitally interested in having them where they are needed and in the condition in which they will be needed. We suggest, therefore, that the committee on military service take under consideration the desirability of formulating a plan for rounding out in peace the electric railway system of the State so that it will be effective in war, and the best means by which this result can be accomplished. Such a plan would make the public realize more keenly the intimate relation which really exists between its members and the electric railways.

TEN CENT FARES ON OWL CARS

The raising of the owl car fares in Pittsburgh to 10 cents is logical as it is based on the principle that fares should be proportioned to the cost of operation. If there is to be an increase in fares, those passengers whose transportation is the least profitable or those who are carried at a loss should be the first to bear the increased charge. The cars on a city system which run after midnight and before 5 a. m. are rarely filled, yet they require the operation of the power station and much other equipment for the service of a few passengers only. The Pittsburgh Railways claim that the plan inaugurated on midnight of June 22 was not the establishment of a new fare but a return to a plan in use before 1907 and that the only reason for the previous reduction to 5 cents was that it was required by a law which has since been declared unconstitutional. The chief argument during the past week has not been on the propriety of the fare but on the method of its establishment, its opponents declaring that proper notice was not given to the public. Whether there would have been less opposition to the plan if it had been advertised extensively in advance is an open question. It does not seem, however, that there should be any real objection to an increased fare, *per se*, as riders at that time are enjoying a special service.

A RAY OF HOPE FOR HIGHER FARES

The refusal of the up-State New York Public Service Commission to allow the United Traction Company to increase its rates between Albany and Troy, N. Y., noted elsewhere in this issue, seems to rest upon the belief that the company failed to prove the justice and reasonableness of the proposed increase. Furthermore, the commission felt that the company's losses from operation were not caused by the Albany-Troy line, and that to increase the rates here would involve unjust discriminations. While refusing to sanction the new schedules, however, the commission appears to appreciate the fact that the company needs increased revenue, and a really encouraging feature of the decision is the intimation that under the recent interpretation in the Ulster & Delaware Railroad case by the Court of Appeals the commission has the power to permit urban fares of more than 5 cents, in spite of the old railroad law, if the need for such fares is shown. Moreover, Commissioner Carr in a separate memorandum frankly recognizes that the company, particularly in Albany, is as a whole giving more service than its earnings justify, and suggests a thorough rearrangement of service so as possibly to give better accommo-

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dations to the public at a lower cost to the railway. All these points seem to indicate the feeling of the commission that it is the urban fares rather than the interurban fares that need adjustment to increasing costs. Is it too much to hope that a full realization of its responsibility for removing old and unjust legislative restrictions may lead the commission before long to a real settlement of the urban problems of the United Traction Company?

INFLUENCE OF TRAFFIC DENSITY ON INVESTMENT

In an article appearing on a later page of this issue D. J. McGrath, research assistant of the Massachusetts Institute of Technology, presents some additional results of the study of the research division of that institution concerning the relation of the investment per revenue passenger to the density of traffic on city lines. Our readers will doubtless remember that the same author contributed an article to our issue of May 8, 1915, in which he suggested for the first time the use of the figure "investment per revenue passenger" as a unit of comparison for judging the relative capitalizations of electric railway companies. The article pointed out some advantages which this unit possessed as a standard over those more commonly used, such as "investment per mile of track" or "per dollar of gross revenue." Mr. McGrath's investigation showed a variation of investment, in the properties considered, ranging from 13 to 32 cents per revenue passenger.

The present article is largely an extension of Mr. McGrath's article of fourteen months ago, and deals with the question of the variation in the investment per revenue passenger as between properties operating under varying conditions of traffic density. His conclusion is that the investment per revenue passenger becomes rapidly greater where the density of traffic is less than 100,000 revenue passengers per mile of single main track. When the density of traffic is greater than 100,000, the chances for profitable operation increase until a certain point, as yet undetermined, is reached. The increasing length of passenger haul per 5-cent fare, the congestion of street traffic, the necessity for heavier and more expensive construction, the requirements for greater current-carrying capacity of the power distribution system, together with many other factors, all combine to increase the investment per passenger.

Studies such as Mr. McGrath has made are extremely interesting because they throw additional light upon the difficult problem of the proper adjustment of fares, particularly in the large cities. While in one sense the new line of investigation has not brought out any additional truths concerning urban transportation economics, it has served to confirm that which is already known. The growth of a city beyond a certain point, instead of working to the advantage of its surface railway system, brings additional financial burdens and decreases profits.

So far as can be seen at the present time, our cities will continue to grow; the average length of haul will increase; congestion in the retail business and financial districts will become greater; the investment in cars, track and equipment per mile of main track will be increased, and the profits will be adversely affected. As cities grow, there is a progressive decrease in the rate of profit per passenger carried. But the net earnings per revenue passenger of our electric railways must not decrease if the necessary new financing to provide additional facilities is to be successfully accomplished.

It is to be hoped that the Massachusetts Institute of Technology will continue the valuable studies which Mr. McGrath and others have been making. Such scientific work, carried on without bias by our leading educational institutions, will lay the groundwork of scientific fact which must be recognized by commissions and public authorities in dealing with the problems of the electric railways.

DEVELOPING THE FREIGHT BUSINESS

Our leading article this week is on the methods of developing freight traffic employed by the Illinois Traction Company, and we believe that it will attract a great deal of attention. In many respects Illinois is well suited for electric railway development. Owing to the topography of the country, construction costs are fairly low, and the population served is prosperous. It would be improper to say, however, that equally favorable conditions do not exist elsewhere, so that the reasons for the successful development of freight on the Illinois Traction System must be attributed more largely to methods and men rather than to environment. But the effectiveness of the men and methods is shown by the fact that during 1915 the company handled approximately 25,000 carloads of freight and earned about $500,000 in freight revenue on its 460 miles of line.

Of course, such a traffic would not come spontaneously. The management early realized that if it was to do a considerable business in freight it must have the facilities in the way of track necessary for such a service. Where freight rights could not be secured through the towns, or where such transportation in that way did not seem advisable, cut-offs were built. At other points short curves and steep grades were removed, and agreements were made with steam railroads for freight interchange. The population along the route was interested to aid in the construction of grain elevators, and a liberal policy was adopted in the way of installing temporary industrial tracks. This energy in the development of freight was not allowed to interfere with the passenger service, however, as that still constitutes on the Illinois Traction System, as on most roads, the great bulk of its transportation business.

In the words of the Illinois Traction System officials, they have as yet only begun to "scratch the surface" of the company's freight traffic possibilities. Nevertheless, the experience in Illinois is one which can well be commended to the careful consideration of other electric railway managers who see opportunities in their freight business, but are uncertain as to the methods which they should adopt to develop it.

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WHAT KIND OF COMPENSATION INSURANCE SHOULD BE ADOPTED?

After so thorough a review of the various ways of insuring under workmen's compensation laws as that presented before the N. Y. E. R. A. at Niagara Falls last week and published elsewhere in this issue, it would be useless for us to discuss all these plans in detail. The committee report on this subject ably summarizes the characteristic merits and demerits of the respective methods of insurance, although no specific findings are made as to their relative worth. Of course, generalizations on a subject containing so many intricate points and possessing so few experience data are difficult, but it is to be regretted that the committee did not use its extensive knowledge of the subject to draw up more definite conclusions for its report.

For example, in our opinion it could justly have said that of the four possible insurance methods—stock company, mutual insurance, State fund and self-insurance—the first is one that should be clearly recognized as being quite unnecessary for a large unified industry like electric railways. The asserted advantages of this method fall far short of counterbalancing the heavy loading of premiums with acquisition expenses and profits. With the development of the theory of workmen's compensation, other and better methods of insurance have been originated solely to avoid the undesirable and still existing features of stock-company insurance, and the railways should understand that a proper choice need involve a consideration of only the other three methods. As to the relative merits of these, it could well be held that self-insurance is the most desirable form for some of the largest companies, while the remainder of the railways would better begin the development of a mutual group instead of wasting money in stock-company insurance or experimenting with the State fund.

As matters stand now, the issue between mutual trade insurance and the State fund method has not been conclusively threshed out, but the latter method involves too many points of speculation before it can be considered the favorite. The loss ratio of a mutual group and the State fund, under similar conditions, would be the same, but the expense ratio is a doubtful point. The State fund, which began operating at an expense ratio of 15 per cent, has reduced it to 12 per cent, but this figure has almost been equaled by the expense ratio of the Brewers' Mutual Indemnity Insurance Company, a new trade mutual that was organized under the New York compensation act. What is needed, of course, are more exhaustive and exactly comparable data, and these can only be obtained if electric railways make an earnest effort at mutualization while the State fund is trying to prove its efficiency. One cannot yet be certain that the State fund can make the transfer to a self-supporting basis after July 1 of this year without an increase in rates or a curtailment of dividends. An even more important question is whether the State will really continue to reduce the expense ratio—in other words, whether it will in the long run be as diligent in its efforts to reduce expenses as are the mutual companies or will go the way of practically all other governmental attempts at business-like operation. Actual experience over a reasonably long period of years will afford the only authoritative answers to these questions, but in the meantime electric railways need not be passive.

The hesitancy of electric railways thus far in adopting the mutual form of insurance has undoubtedly been due in large part to the lack of an experienced medium. A proposition has now been made, however, whereby electric railways may join the Utilities Mutual Insurance Company, which was originally organized for gas and electric lighting utilities of the State. Although in theory such a union of interests might not be desirable, the plan of participation provides for such proportionate control in the board of directors and for such separation of experience records as render the proposal a practical and commendable one. When to these features there is added the fact that this mutual company has been in successful operation for more than eighteen months, it is evident that the railways no longer have an excuse for not taking quick and concerted steps toward the mutualization of their industry under the compensation law.

While the mutual plan, with its exact experience and equitable division of burdens, is one that well deserves trial by electric railways, there are, as we said before, some companies which, on account of their magnitude, will find their ends served best by the self-insurance plan. It has been said that the low cost of self-insurance thus far should be considered in the light of the fact that no catastrophe burdens were present and, in another instance, that sooner or later the inability of some self-insured company to handle a catastrophe would result in the prohibition of self-insurance. It should be noted, however, that the catastrophe hazard for electric railway employees is almost negligible as compared to that in industrial plants and similar institutions where all the employees work together or in large groups. Moreover, the height of development in safety, claim and medical work that has been reached by many electric railways in the normal course of their business makes it possible for them to assume the compensation risk of employees with practically no additional work. When a large electric railway has convinced the State authorities that it is financially capable of carrying its own risk, has deposited in bonds one-half of the State-fund annual premium, and thereafter has annually reported its financial showing, little ground exists for fear that the company's surplus will not cover deferred or continued compensation payments and the small catastrophe hazard. Under self-insurance, insurance cost becomes simply accident cost, with adequate protection for the future comparable to the mutual or State-fund reserves if the State examiners do their work properly. In the case of companies financially sound, self-insurance is not a gamble, and we do not believe that those using this method will change to another.

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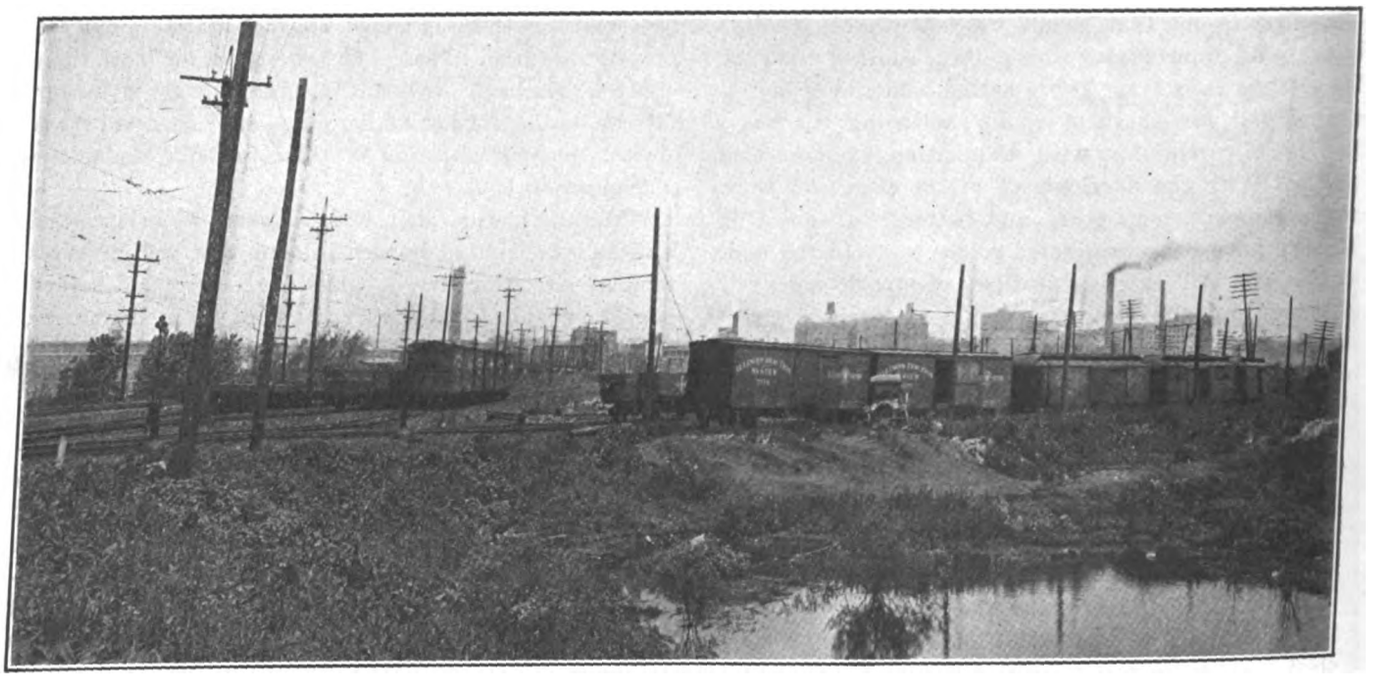
Developing Carload Freight Traffic on Illinois Traction System

Article Outlines How This Large Interurban Railway System Made Its Freight Traffic Earn More Than $500,000 Annually and Also Describes Its Relations with the Industries and Steam Railroads, Both of Which Made Wholesale Freight Transportation Possible

During the year ending Dec. 31, 1915, the Illinois Traction System, Peoria, Ill., handled approximately 25,000 carloads of freight and earned about $500,000 in freight revenue. This freight earning represents about 20 per cent of the gross income of the Illinois Traction System's interurban lines. and the freight transported amounted to 734,483 tons. In connection with freight transportation, 3,154,313 revenue freight car-miles were run, and the results for 1915 show an increase of 115 per cent over that obtaining in 1908. The foregoing figures give an inkling of what this 460-mile interurban railway system is doing in the way of developing its freight business.



ILLINOIS TRACTION CARLOAD FREIGHT—FREIGHT YARDS AT EAST PEORIA, BRIDGE AND ENTRANCE INTO PEORIA IN BACKGROUND

MORE and more are electric interurban railways realizing the folly of trying to make ends meet with earnings from a strictly passenger traffic. Many roads, from their inception, have devoted attention to the development of an express or less than carload freight business, which is handled in equipment resembling passenger cars. Franchise restrictions have prohibited the handling of standard freight cars and freight trains through the city streets on a number of lines, and very little has been done to lift these unwarranted embargoes against the handling of a general freight business. Those companies that have entered the bulk or carload freight business have found it more profitable than other classes of traffic, and there is a marked tendency on the part of many other companies at the present time so to equip their lines and correct the physical errors that they can handle carload freight on an unlimited scale. Early in its history the Illinois Traction System was confronted with the same obstacles which have prevented many other electric interurban lines from going into the general freight business. This company, however, realized the tremendous possibilities of freight traffic and inaugurated a consistent campaign to remove the physical barriers and obtain relief from the franchise restrictions. Where this was not possible belt lines were built around the cities.

Chronological History of Freight Development

Illinois, perhaps, afforded as favorable an opportunity for the successful construction and operation of an electric railway as any other State in the Union. In general, construction costs were within reason because the topography is but slightly rolling and traffic possibilities were almost ideal, and because the State is rich in natural resources, containing large deposits of high-grade bituminous coal, fertile prairies and navigable waterways. Statistics show that Illinois leads all other States in the yearly area and yield of corn and oats, and in the number and value of horses. It also leads in extent and value of farm implements manufactured, meat products marketed yearly, and the extent and

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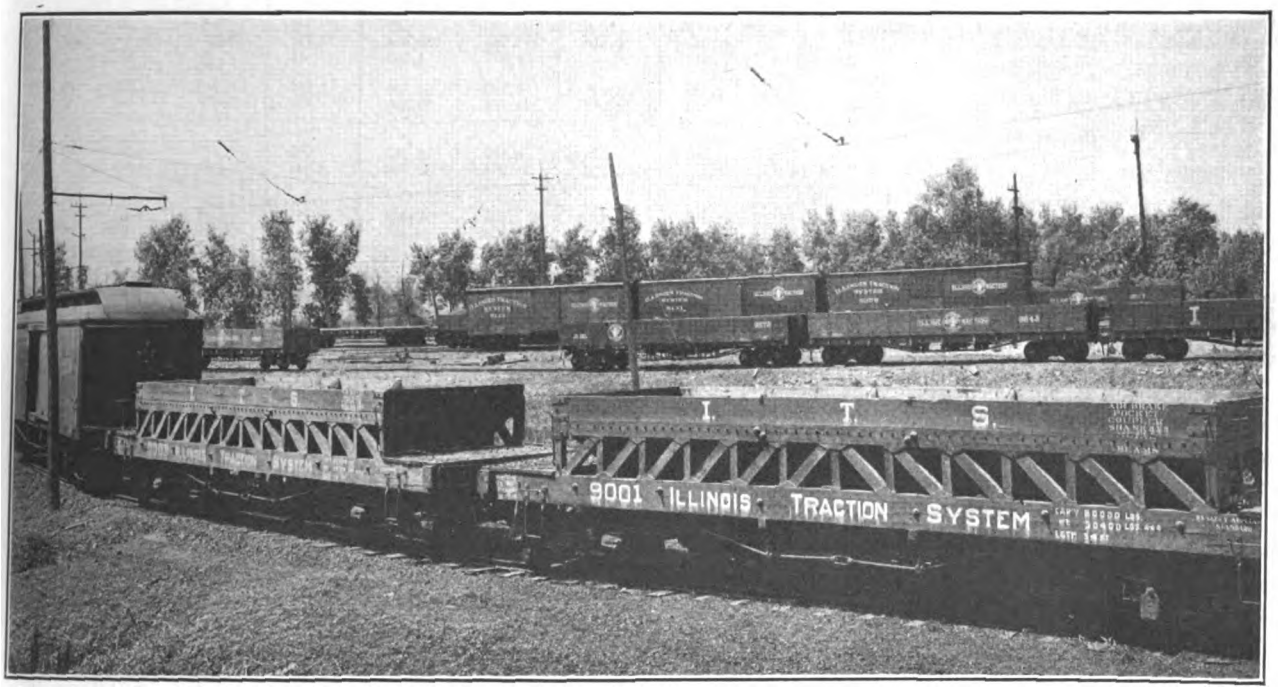
value of yearly crops produced. All of these factors, together with a number of thriving industrial centers with populations ranging from 30,000 to 100,000 people, situated at intervals of from 30 to 50 miles along the Illinois Traction lines, furnished local markets for the products of the farm and the mine. Natural lines of intercommunication which could be highly developed also afforded favorable prospects for passenger traffic. Such promising territory has had everything to do with the stability of the railway earnings of this property, and the management had in mind almost from its inception a character of construction and equipment which would permit the handling of all classes of traffic. In case there is a lull in the output of the mines, the quantity of traffic is sustained by handling the products of the farm, and vice versa, when the agricultural season is unfavorable, the coal industry assists in counteracting this loss of revenue.

During construction this electric interurban line, like many others, made the mistake of operating over the streets of villages and cities under contracts which, in many cases, limited the quantity and character of traffic, particularly as it related to freight. Moreover, in so doing, physical restrictions were frequently necessary, such as sharp curves and steep grades which would permit the handling of freight only in specially designed cars. As the freight business grew and interchange relations with steam railroads were arranged, these physical and contractual limitations became serious obstacles in the way of a rapid development, and as early as 1906 this company began to remove many of the physical obstructions. Sharp curves and steep grades on private rights-of-way were first eliminated, and, in many instances, private rights-of-way were purchased through villages and towns in order to straighten the line and obtain relief from franchise restrictions. In the larger cities where it was inadvisable to disturb franchise conditions, private rights-of-way were purchased and belt lines were constructed.

At the close of the year 1911 approximately $1,000,000 had been expended in the construction of freight belt lines, and about the same sum had been spent in removing sharp curves and steep grades at other points. The removal of these physical limitations and the relief from franchise restrictions permitted the Illinois Traction System to handle a general freight traffic from Champaign, Ill., to St. Louis, and from Springfield to Peoria, as well as from Peoria by way of Bloomington to Decatur. These improvements alone, however, did not expand this class of business beyond such local freight as originated and was delivered on the Illinois Traction's lines. During the period of construction connections were made with steam railroads at various points, but under contracts permitting only company material for construction purposes to be delivered over them. At a few points the railway company's lines connected with coal mines, and the first carload freight shipments largely consisted of this commodity. These coal mine connections, however, were made primarily to obtain coal for the railway's generating station, and the sale of coal to consumers along its lines was merely incidental.



ILLINOIS TRACTION CARLOAD FREIGHT—FREIGHT YARDS AT EAST PEORIA, SHOWING "BROADSIDE" VIEW OF DIFFERENT TYPES OF CARS

Even with the favorable sites afforded on the belt railways around Decatur, Springfield, Edwardsville and Granite City, industries could not be induced to locate their plants on the electric line unless a steam railroad connection was also to be had. Confronted with this obstacle, the management decided that the success of the freight business depended upon a full interchange with steam railroads. Applications to the State commission for physical connections and freight interchange failed to obtain relief, but the favorable locations for industries afforded along the belt lines influenced different commercial organizations to take up the question of interchange between steam and electric lines with the State commission. In some instances they were successful in obtaining an order for track connections and interchange contracts. On the other hand, the first interchange contract consummated by the traffic department of the Illinois Traction System was that made through a friendly arrangement with the Chicago & Eastern Illinois Railroad and the Rock Island System. A physical connection was made with the former railroad at Glover, Ill., and less than carload freight was

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ILLINOIS TRACTION CARLOAD FREIGHT—DESCRIPTION OF FREIGHT MOVED AND TONNAGE

Description of Freight Moved and Tonnage (Company Material Excluded)	December, 1915-1914				December, 1913-1912			
	Month December, 1915	Comparative Same Month Last Year	Cumulative from Jan. 1, 1915	Cumulative Period 1914	Month December, 1913	Comparative Same Month Last Year	Cumulative from Jan. 1, 1913	Cumulative Period 1912
PRODUCTS OF AGRICULTURE								
Grain	7,483	4,951	63,306	45,007	1,299	4,716	26,428	34,474
Flour	252	207	2,774	2,790	224	230	1,888	2,235
Other mill products	171	242	2,821	3,051	159	138	1,707	2,141
Hay	155	167	2,424	2,824	193	182	2,039	1,656
Tobacco	15	.....	148	2	.....	.....	.....	5
Cotton	55	.....	55	.....	.....	.....	.....	.....
Fruits and Vegetables	148	262	3,769	5,265	172	78	1,520	2,295
Other products of agriculture	.....	.....	6	277	.....	9	47	217
PRODUCTS OF ANIMALS								
Livestock	41	85	668	1,707	77	226	2,790	3,656
Dressed meats	27	34	480	651	54	5	292	120
Other packing house products	14	.....	246	3,444	23	4	73	200
Poultry, game, fish	37	20	109	61	8	11	19	57
Wool	.....	.....	5	19	.....	.....	12	22
Hides and leather	4	4	41	40	.....	14	124	139
Dairy products	11	.....	25	1	.....	.....	6	2
Other products of animals	.....	2	61	1,066	51	2	187	282
PRODUCTS OF MINES								
Anthracite coal	.....	5	20	42	2	1	51	32
Bituminous coal	43,057	34,546	373,364	258,914	29,504	33,141	274,938	305,448
Coke	441	60	2,237	1,180	31	3	493	1,193
Orea	.....	.....	.....	.....	.....	.....	.....	26
Stone, sand, etc	1,485	2,207	72,130	92,829	2,275	5,220	74,207	87,318
Other products of mines	652	2,917	43,134	52,390	21	1,274	7,694	16,844
PRODUCTS OF FOREST								
Lumber	605	619	6,487	8,222	293	578	8,264	5,617
Other products of forest	4,186	4,729	31,981	22,553	2,840	1,329	14,876	19,190
MANUFACTURES								
Petroleum and other oils	109	173	1,525	2,435	148	124	1,871	1,315
Sugar	57	63	954	1,395	81	14	494	331
Naval stores	.....	.....	.....	.....	.....	.....	.....	.....
Iron pig and bloom	.....	.....	.....	.....	.....	.....	80	2
Iron and steel rails	27	72	1,484	1 228	15	106	428	1,074
Other casting and machinery	580	248	5,184	5,272	98	203	2,577	1,978
Bar and sheet metal	37	34	527	1,062	82	48	334	502
Cement, brick and lime	1,103	1,121	38,460	22,768	963	1,611	14,930	19,207
Agriculture implements	225	.....	314	488	3	14	242	560
Wagons, carriages and tools	66	10	329	269	29	16	298	311
Wines, liquor and beer	268	204	3,951	3,587	101	238	1,811	2,539
Household goods and furniture	242	226	3,383	3,543	286	281	4,021	3,618
Other manufactures	2,070	905	17,935	13,990	979	1,498	12,675	20,051
Other commodities under 2000 lb. lots	4,453	2,997	54,146	116,670	16,705	9,195	173,703	107,865
Total tonnage	68,076	57,110	734,483	675,042	56,716	60,509	631,119	642,522

ILLINOIS TRACTION CARLOAD FREIGHT—FREIGHT AND MILEAGE STATISTICS

Freight Traffic	December 1915-1914				December 1913-1912			
	Month December, 1915	Comparative Same Month Last Year	Cumulative from Jan. 1, 1915	Cumulative Same Period 1914	Month December, 1913	Comparative Same Month Last Year	Cumulative from Jan. 1, 1913	Cumulative Same Period 1912
Number of tons of revenue-earning freight carried	68,076	57,110	734,483	675,042	56,716	60,509	631,119	642,522
Tonnage company freight	.....	.....	.....	.....	279	238	4,592	3,790
Total tonnage—all freight	68,076	57,110	734,483	675,042	56,995	60,747	635,711	646,312
Number of tons carried 1 mile—revenue	3,024,054	3,229,589	35,431,307	35,667,477	3,338,816	3,120,314	34,141,510	32,857,012
Number of tons carried 1 mile—company	501,976	540,382	5,016,000	2,519,056	13,467	12,953	247,292	203,835
Total mileage—all frieght	3,526,030	3,769,971	40,447,307	38,186,533	3,352,283	3,133,267	34,389,802	33,060,847
Number of tons carried 1 mile per mile of road (revenue)	8,297	8,871	95,171	89,851	7,856	7,342	80,333	77,311
Number of tons carried 1 mile per mile of road (all freight)	8,297	8,871	95,171	89,851	7,888	7,372	80,915	77,790
Average distance haul of 1 ton (revenue), miles	51.80	66.01	55.07	56.57	58.87	51.57	54.09	51.14
Average distance haul of 1 ton (all freight), miles	51.80	66.01	55.07	56.57	58.82	51.58	54.10	51.15
Total freight revenue	$45,450.58	$37,124.48	$477,147.31	$482,011.73	$41,759.04	$43,342.19	$483,401.52	$464,197.66
Average amount received for each ton of freight	$0.66	$0.65	$0.65	$0.71	$0.74	$0.72	$0.77	$0.72
Average receipts per ton per mile	$0.015	$0.011	$0.013	$0.014	$0.013	$0.014	$0.014	$0.014
Miles of road operated in freight service	425	425	425	425	425	425	425	425
Freight revenue per mile of road	$106.94	$87.35	$1,122.70	$1,134.15	$98.26	$101.99	$1,137.42	$1,092.23
Freight revenue per loaded car-mile	$0.2512	$0.2331	$0.2445	$0.2475	$0.2427	$0.2504	$0.2446	$0.2388
Revenue from switching service	$3,218.10	$1,855.22	$24,129.48	$17,542.17	$1,226.75	$1,308.07	$16,006.48	$16,212.40
LOCOMOTIVE MILEAGE								
Freight locomotive miles	21,848	20,082	233,281	222,127	17,387	16,967	210,535	203,198
Passenger locomotive miles	211	6	678	556	12	201	8,283	4,497
Switching locomotive miles	11,999	9,861	113,914	124,723	11,461	4,766	123,911	46,690
Total in revenue service	34,058	29,949	347,873	347,406	28,860	21,934	342,729	254,385
CAR MILEAGE REVENUE SERVICE								
Freight car-miles:								
Loaded	180,866	159,242	1,951,486	1,946,871	172,047	173,098	1,976,361	1,943,582
Empty	90,732	85,534	923,624	940,761	84,037	75,973	889,909	868,479
Caboose	27,591	20,171	279,203	231,758	17,848	14,820	222,456	163,228
Total	299,189	264,947	3,154,313	3,119,390	273,932	263,891	3,088,726	2,975,289

Statistical Data Showing Character and Tonnage of Freight Moved, and Mileage

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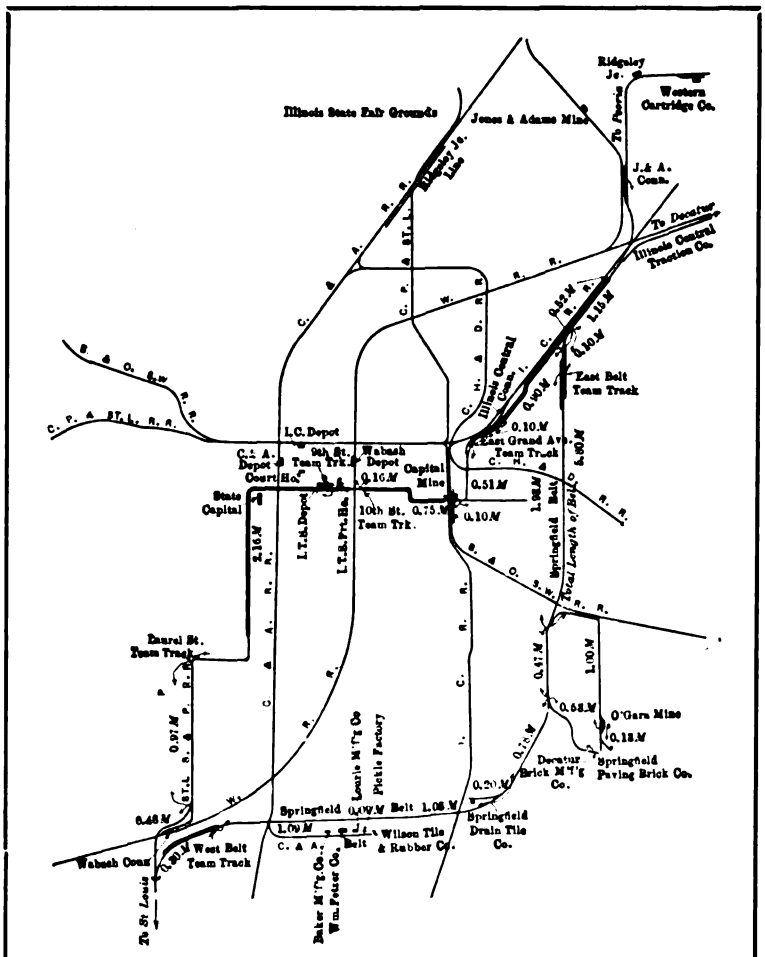
transferred by teams between the terminals of the electric line and the Rock Island Railroad at Peoria, Ill.

With a steam railroad outlet for carload freight, the Illinois Traction System proceeded to direct its attention to the development of freight on its own lines. In order to handle this business on a large scale, however, freight equipment, including cars and locomotives, was necessary. For the local freight business the company had in service eleven 40-ton electric locomotives of the sloping-cab type, having a drawbar pull capacity of 12,000 lb. In 1910 six 60-ton locomotives with steel box bodies and a motor capacity for 30,000 lb. drawbar pull was added to this equipment. Since that time other 60-ton locomotives of the same type have been added to the service. Coal cars of 80,000 lb. capacity and box cars for handling grain and other commodities which require that class of equipment were also purchased. At the present time the Illinois Traction System's freight equipment includes 759 freight cars of all kinds, fifteen cabooses, thirty locomotives and pulling cars, sixteen express motors, ninety-eight express trailers and nine refrigerator cars. Views of the 60-ton locomotive and other standard freight equipment are shown in the accompanying illustrations.



ILLINOIS TRACTION CARLOAD FREIGHT—SPRINGFIELD BELT RAILWAY AND CONNECTIONS

Preparations for the handling of a general freight business occurred simultaneously with plans for originating this business. Among the first profitable sources of bulk freight revenue was that obtained from grain elevators. Of these, the Illinois Traction System now serves twenty-three, which have a combined capacity of 590,500 bushels of grain, and they ship approximately 4000 cars annually. In connection with these some interest may be attached to the manner in which the traffic department induced the location of elevators on its lines. Most of this work was handled through the traffic department's industrial agent, who also investigates all industrial connections before they are granted.

Possible locations for elevators were first selected, and then the industrial agent would obtain the cooperation of two or three influential farmers in the neighborhood. After these farmers had been convinced of the value of the elevator, they would call a meeting of all the farmers in that vicinity at a country schoolhouse. The industrial agent would address these meetings and explain what an elevator would mean to the farmer in the way of reducing the haul and the number of teams and saving in horseshoes, wagon repairs and help. He would dwell particularly on the relief it would bring to the farmer's wife. In fact, every argument that could be brought to bear upon the situation was presented, and as soon as the agent had convinced his audience he proceeded to organize a farmers' elevator company by getting the farmers to subscribe for shares of stock in the elevator. When enough subscriptions were obtained, a State license to organize a stock company was secured, the company was organized and the officers elected.

In a general way an elevator having a capacity for 10,000 bushels of grain costs approximately $3,800, including the office building and the mechanical equipment. Most of these elevators have been installed since 1910, and in practically every instance they have been a financial success. As an aid to this end the traffic department has been of no mean importance. From time to time it mails to all interested grain brokers a circular showing the names, addresses and capacities of all the elevators located on its lines. This induces competitive bids for the grain, and the farmers thus served are in a position to obtain the maximum market prices for their grain.

At first all grain was forwarded in the traction company's cars in the usual way. In a comparatively short time, however, it was found that the steam railroads had relatively few carloads of freight to deliver to the electric line, whereas the electric line was originating grain and other coarse freight in carloads on quite a large scale. As a result, the Illinois Traction System's equipment was soon practically exhausted, and it had only a few steam railroad cars which could only be loaded with shipments to foreign lines. In order to relieve this situation the railway company built a grain transfer elevator at Glover, Ill., the point of interchange with the Chicago & Eastern Illinois Railroad. This elevator had a storage capacity for 9000 bushels of grain, which permitted prompt release of cars either loading or unloading at this point, and when there were enough of both steam and electric railway cars the transfer was made direct; that is, without placing the grain in the storage bins. All grain passing through this elevator is weighed automatically on a scale which has a capacity of 5000 bushels per hour. On a single day as many as sixty-five cars of out-bound grain have been transferred, at an average cost of transfer of about ⅜ cents per bushel. Recently other grain transfer elevators have been installed at Decatur and East St. Louis.

Since the first interchange contract was consummated in 1910, similar contracts and reciprocal switch-

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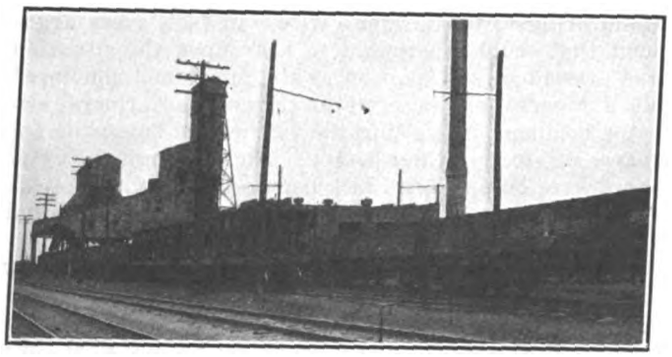
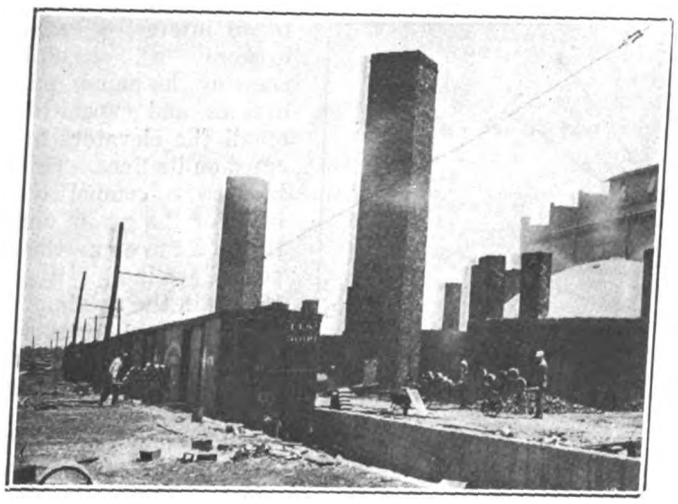


ILLINOIS TRACTION CARLOAD FREIGHT—CARS SET AT COAL MINE



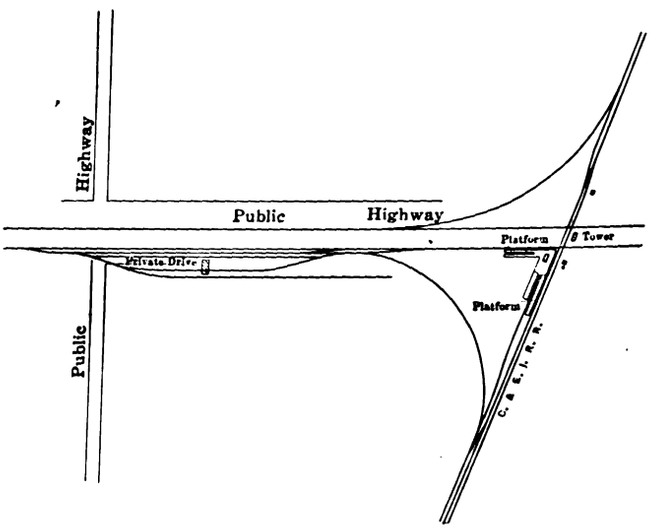
ILLINOIS TRACTION CARLOAD FREIGHT—LOADING TILE INTO I. T. S. BOX-CARS

ILLINOIS TRACTION CARLOAD FREIGHT—FREIGHT HOUSE AT PEORIA

ILLINOIS TRACTION CARLOAD FREIGHT—ST. LOUIS RETAIL COAL DELIVERY PLANT

ing arrangements have been made with the St. Louis Terminal Railway Association, with a connection at Granite City, and with the Southern Railroad, which has a connection at Venice, Ill. Through these two connections the Illinois Traction System has access to all steam railroads operating out of St. Louis, Mo., and East St. Louis, Ill. It also interchanges with the Wabash Railroad at Decatur, Springfield, Mount Olive, Staunton and Tilton, with the Chicago & Alton Railroad at Shelbytown and Anderson, with the Illinois Central Railroad at Springfield and Decatur, and with the Peoria Railway Terminal at Peoria, thus giving a connection at that point with the Chicago & Alton Railroad and the Chicago, Rock Island & Pacific Railroad. Through tariffs are in effect with the Rock Island and the Minneapolis & St. Louis Railroads, and interchange contracts with these railroads also provide for full working arrangements with both the steam and the electric line for all classes of traffic.

A complete set of rates to all Illinois points is in effect with the Chicago & Eastern Illinois Railroad. The Wabash Railroad System is also open to the electric line from Buffalo, N. Y., to Omaha, Neb., with both class and commodity rates and reciprocal switching arrangements at the connections. The switching rate is based on 10 cents per ton, with a minimum charge of $2 and a



ILLINOIS TRACTION CARLOAD FREIGHT—GLOVER INTERCHANGE TRACKAGE

maximum charge of $4 per car. Similar arrangements have been made with the Chicago & Alton Railroad and the Chicago, Peoria & St. Louis Railroad. A decision by the Interstate Commerce Commission forced the Peoria & Pekin Union Terminal Railway at Peoria to open up its terminal track facilities to the Illinois Traction System. This gave it access to all the industries in Peoria, a privilege for which the traction line pays a terminal switching charge.

Interchange with the Illinois Central Railroad was only obtained through a ruling of the Public Utilities Commission, brought about by complaint of Springfield manufacturers and the Springfield Chamber of Commerce. This company also has physical connection with the Big Four Railroad, the Litchfield & Madison Railroad and the Baltimore & Ohio Southwestern Railroad. Recently joint rates on several commodities have been filed to govern shipments from and to the Illinois Traction System to points on the Baltimore & Ohio Southwestern Railroad. In all, the Illinois Traction System connects with eighteen steam and electric railroads and has access to all points in Missouri, Illinois, Indiana, Iowa, Michigan, Minnesota, and North and South Dakota. It also has combination rates and services with boat lines

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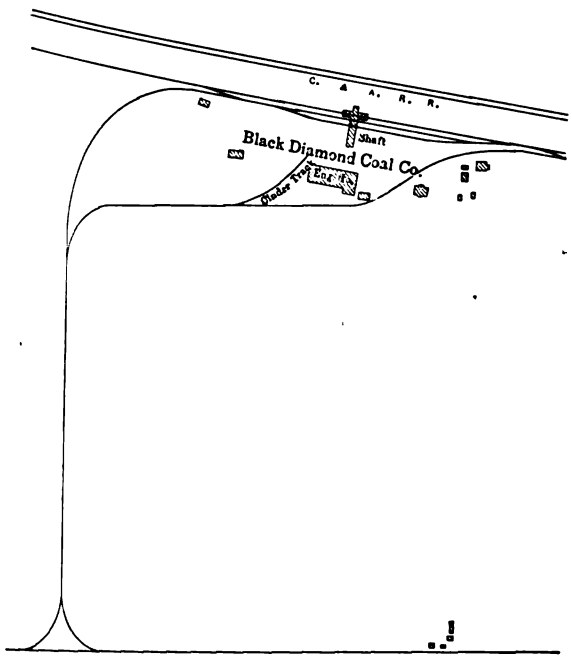
on the Mississippi River, the Illinois River and Lake Michigan. Unquestionably these interchange contracts with foreign lines have been of more value to the traction system as a traffic accelerator than perhaps any other one factor, unless it is these contracts taken in conjunction with the facilities for industries afforded by the four belt lines. Since these interchange contracts became effective, the traction company has had no difficulty in locating industries on its lines.

Other Sources from Which Carload Freight Is Secured

Among the first carload freight revenue-producing industries located on the lines of the Illinois Traction System was a gravel-washing plant at Mackinaw, Ill. At this point the traction company owned several acres of right-of-way underlaid with excellent deposits of sand and gravel. This tract was leased to private parties after the railway company had completed ballasting its line, and a gravel-washing and screening plant was

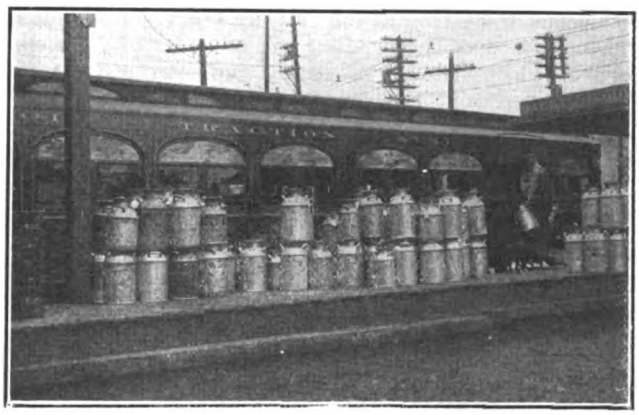


ILLINOIS TRACTION CARLOAD FREIGHT—PLAN OF LARGE COAL MINE CONNECTIONS

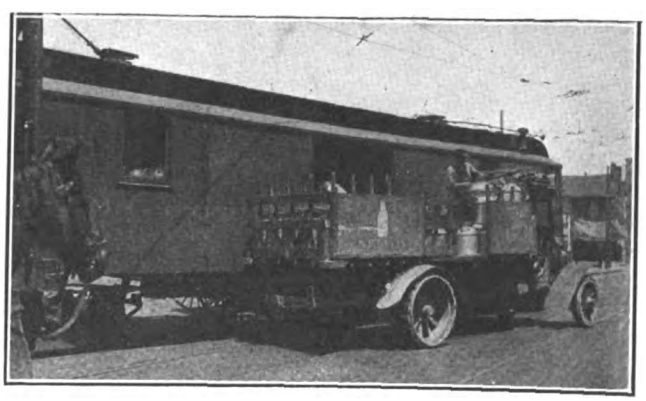
installed. The lease was made on a royalty basis, and it has now been in operation about eight years. During the construction season of the year this pit ships as many as forty cars a day over the electric line, and averages twenty cars a day. Gravel deposits are scarce in central Illinois, hence a good price is paid for this material and quite a long haul is to be had by the railway. A view of this pit is shown in one of the accompanying illustrations.

At the present time the Illinois Traction System serves ten coal mines and nine paving-brick plants. Aside from these a number of other industries requiring in-bound shipments of raw materials and out-bound shipments of manufactured products have been located along this railway's lines. To give some idea of the amount of freight which one of these brick companies delivers to the electric line, it may be of interest to state that the Decatur Brick Manufacturing Company, which has its brick kilns on the Decatur belt railway and mines its shale and clay on the Springfield belt railway, shipped 785 cars of shale, weighing approximately 50 tons each, from Springfield to Decatur during 1915. In addition this company, during the same period,

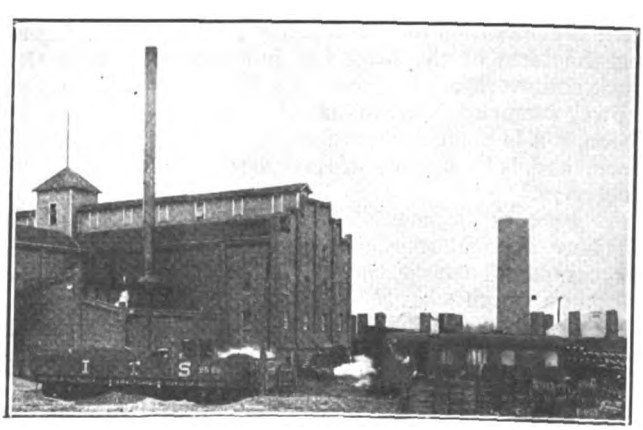
ILLINOIS TRACTION CARLOAD FREIGHT—SHALE MINING ON SPRINGFIELD BELT



ILLINOIS TRACTION CARLOAD FREIGHT—LOADING EMPTY MILK CANS AT SPRINGFIELD



ILLINOIS TRACTION CARLOAD FREIGHT—ARRIVAL OF MILK TRAINS IN ST. LOUIS



ILLINOIS TRACTION CARLOAD FREIGHT—FREIGHT TRACK TO DRAIN TILE PLANT

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shipped to points on the electric line eighty carloads of brick and received thirty-five carloads of coal and eight carloads of sand. The Springfield Paving Brick Company, another large concern located on the Springfield belt railway, shipped 250 carloads of brick over the electric line during 1915. One of the larger coal mines to which a track connection has been made ships about 2000 cars of coal over the electric line annually.

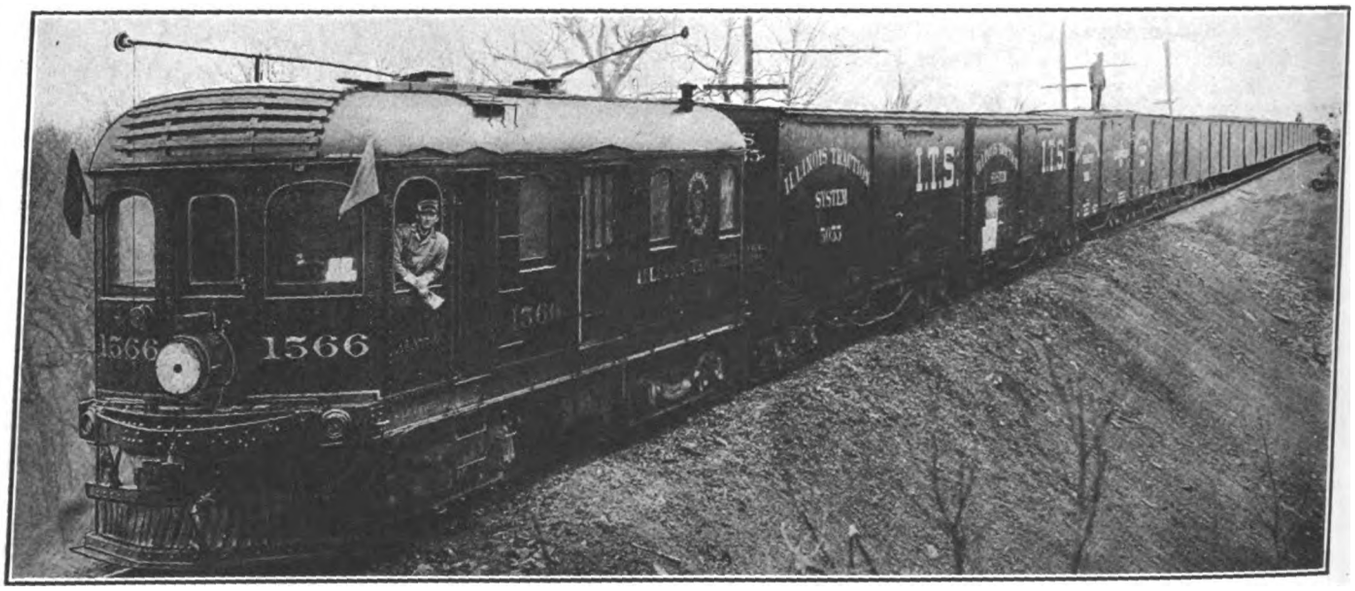
Terms of Contracts for Industrial Track Service

All industrial tracks which extend beyond the electric railway's right-of-way are arranged for by contracts with the industries which receive the service. Generally these contracts provide that the railway company lease the right-of-way from the industry on which the track is laid and that it build the railway track. The industry, in turn, does the grading and pays for all material necessary to construct the track and overhead. It is also specified that the industry shall pay the railway company the estimated cost of the material within sixty days after the contract is signed, and if the estimate is in error an adjustment is made at the completion of the work. In most instances the railway company supplies all the material for the track and overhead, and it charges the industry for its transportation from the point of origin to the point of delivery. During the period of construction the industry is required to carry liability insurance, and the contract remains in effect until the operation of the industry is abandoned. During the term of the lease the industry maintains the track and overhead, but the work is usually done by the railway company at the industry's expense. Special provision is also made for accidents in the operation of the track, and both parties are responsible for their own employees.

As soon as shipments are delivered to the railway company it reimburses the industry at the rate of $2 per car on all cars from which it receives at least a minimum freight charge of $10. These payments cease, however, when the industry has been fully reimbursed for the money it expended in constructing the track. Monthly settlements between the railway company and the industry are also provided, and the contract states that the railway shall continue to refund the industry until the tracks are fully paid for unless the freight received does not permit full reimbursement within a period of five years. This latter provision is required by the Interstate Commerce Commission to preclude any evidence that might be considered as a case of rebating. In every instance the ownership of the track remains with the railway company, and when the contract expires or is annulled, the railway company is permitted to remove the track. This form of contract is practically the same as that used by steam railroads, so that, as a rule, industries desiring locations do not quibble over the terms.

Installing Team and Farm Side Tracks

Whenever a request for a side track is made and the industrial agent's investigation shows that the probable traffic is sufficient to pay interest on the company's investment the track is built. Many of these farm and team sidings have been installed at various points along the company's lines, and in the majority of instances have proved to be profitable sources of revenue. In some instances industries express the desire to locate on the railway company's right-of-way, and this is arranged for under leases. In connection with these arrangements the Interstate Commerce Commission ruled in 1912 that carriers could not lease their right-of-way in industries for a nominal sum but should receive a compensation equivalent to 6 per cent on the value of the property so leased. Since that time the Illinois Traction System has conformed to this ruling. The Illinois Public Utilities Commission has also issued an order to the effect that these industrial-spur contracts shall contain a sixty-day cancellation clause. This commission held that such a clause was necessary to protect the public's interest.



ILLINOIS TRACTION CARLOAD FREIGHT—VIEW OF TYPICAL FREIGHT TRAIN

In many instances requests for the team and industrial sidings have been voluntary, and in others the installation has been entirely due to the work of the traffic department. Many of the spurs for the sale of coal and gravel have been put in because the traffic department has interested parties in different localities in selling these products. Dealers are secured and a portion of the company's right-of-way leased to them for installing coal, sand and gravel bins. In this manner quite a large coal and gravel traffic has been developed on all divisions of the system. In connection with the coal business, the traffic department has done much to stimulate it by keeping in touch with the coal jobbers at

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different points along its lines, particularly in the fuel contracting season. As shown in the statistical data, coal and gravel make up an important item in the total quantity of freight tonnage shipped.

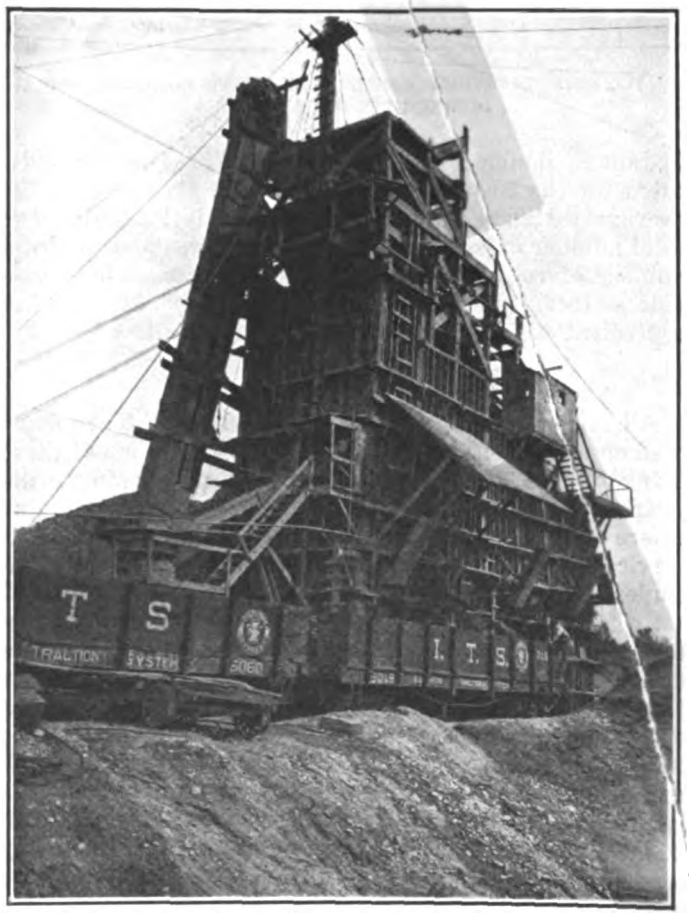
Temporary team tracks for handling construction materials have also proved to be quite a factor in stimulating carload freight traffic. Steam railroads, as a rule, refuse to install temporary team tracks at points convenient to large construction jobs unless the tonnage is very large, and this has opened quite an attractive field for the electric line. These temporary team tracks are installed under contract, and since the Illinois Traction System now has connections with all steam railroads, it not only delivers materials originating at industries along its lines but it also shares in part of the freight earnings from materials originating on connecting lines. The policy of installing these temporary industrial spurs has been of particular value of late in connection with the good-roads movement, because it has permitted the Illinois Traction System to handle large quantities of materials used for road construction purpose. A number of temporary side tracks have also been installed to deliver materials to large building construction jobs at various points along this company's lines. In almost every instance the contracts for these spurs are on the basis that the parties for whom they are installed pay the entire cost of constructing them and taking them out when the work is completed.

Good Return from Installing Side Tracks

To give some idea of the money expended for these team and industrial side tracks annually, it may be of interest to state that during 1914 approximately $10,000 was expended in this way. In 1915 more than $18,000 was spent for freight side tracks, and for the first two months of 1916, more than $6,000 has already been spent for this purpose. These amounts, of course, do not include the cost of the track beyond the railway company's right-of-way, but simply represent the expense which the railway company must bear. A few examples of expenditures for side tracks and the returns expected are as follows: $2,850 was expended for a siding to an elevator which, it was estimated, would develop at least 100 cars of grain annually. For an expenditure of $800 for a track connection to a brick company, the traction company received a revenue of $1,050 during the first ten months it was in operation. In six months a grain elevator, which was erected beside a siding already installed, delivered to the traction company eighty-three cars of grain, returning a total revenue of $3,820. It was estimated that this grain elevator would ship approximately 150 cars a year.

A track connection was built to a large cartridge manufacturing plant which was arranged for switching cars from foreign lines, and at the same time the electric railway furnished a special service for the employees. This plant employed between 350 and 500 men, and most of them had to be transported to the factory site. In two months the traction company also switched 226 cars from connecting lines and received a switching revenue of approximately $700. Aside from the switching service, 147 carloads of freight originating on the electric line were delivered to this plant, returning a total revenue of $3,100. The securing of this plant on the electric line also resulted in a steam railroad's agreeing that the electric line should do the switching which, of course, meant that it would receive the switching revenue. These figures are largely for construction materials, and it is expected that when this plant is in operation that the traffic will be divided between the electric line and the steam road as far as freight is concerned, and in addition the electric railway will have a 6-mile haul for the plant's employees.

Aside from the team tracks installed at practically any point along the company's lines, upon request and evidence that they will be productive of sufficient business to make them a paying proposition, team tracks are also installed at way stations, and in many locations the railway company has provided wagon scales. Usually these team tracks, unless the carload freight business is heavy, also serve as house tracks with an elevated freight platform on the freight-room side and a driveway on the team side. This plan of construction



ILLINOIS TRACTION CARLOAD FREIGHT—LOADING CARS AT GRAVEL PIT NEAR MACKINAW

permits a single track to serve for both less than carload and carload shipments.

Several of the accompanying diagrams and views have been reproduced to illustrate the plans used in making these industrial plant connections.

Freight Service Increases Power Requirements

As the freight business grew and the length of the freight trains increased from four or five cars to thirty or forty cars, additional substation capacity became necessary, and as a substitute for increased feeder capacity, the trolley voltage was raised from 550 to 650. This necessity for increased substation and line capacity was not entirely due to the freight traffic but largely so. On the other hand, as the quantity of freight increased, particularly that of carload freight, more and more of the trains were scheduled for night runs when the passenger cars had handled the evening traffic peak. A number of new substations were added to the system in 1909 and 1910, and the standard substation equipment of one 300-kw. rotary converter was, in many

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ILLINOIS TRACTION SYSTEM

REPORT OF CARS ON HAND AT Springfield 10 A. M. Apr 21 1916.

Note—Numbers and Initials must be taken from the cars and not from way-bills. This report is to be made in triplicate DAILY EXCEPT SUNDAY up to 8:00 A. M. One copy to be sent to Car Accountant, one copy to Chief Dispatcher and one copy for Station File. Forward on first passenger train

INITIAL	NUMBER Loaded	NUMBER Empty	KIND	CONTENTS	Date Received	Date Sent	C. L.	CONSIGNED	STATE CAUSE OF DELAY OR IF WANTED FOR LOADING
		11776	G	X					Weather Condition
	1188		G	— Mdse					
	1066		M	—					Gaining
		1103	G	X					
	5065		B	Hay					A.R.S.

ILLINOIS TRACTION CARLOAD FREIGHT—GENERAL CAR DISTRIBUTER RECORD FORM

instances, doubled, or a 500-kw. machine was substituted for the 300-kw. machine. At the present time the average distance between substations is 9.8 miles, the total number of substations is thirty-eight, and the total number of rotary converters is forty-four. These provide a total kilowatt capacity of 22,600 kw., or the equivalent of approximately 51 kw. per mile of track.

Scheduling Freight Trains

All freight trains handling carload freight are operated on night schedules, except in two cases, one of these being of necessity a day run in order to complete deliveries, and the other a short run on a branch line where there is practically a store-door delivery. Freight service between Springfield, Ill., and St. Louis, Mo., includes two trains each way daily, which pick up and set out loaded cars en route. The other train is known to the service as a drag, or a dead-freight train, and besides handling what is termed "rough freight" or freight in carloads, this train does all the miscellaneous switching en route. All freight trains are scheduled to leave the freight terminals, but they run as extras, with rather liberal running time so that they will have ample time to do the road work. The usual freight train from St. Louis to Springfield averages about thirty loaded cars and four empty cars. The train making the run in the opposite direction is somewhat lighter, consisting of an average of about seven loaded and fifteen empties. The merchandise train out of St. Louis to Springfield averages about eight loaded cars daily, and the merchandise train running in the opposite direction averages about four loaded and six empties daily. Aside from these two there are also two trains operating over part of this same division, which usually consist of seven loads of freight out-bound from St. Louis, and the in-bound train usually averages about two loaded and six empty cars.

A typical weekly report of the total amount of freight handled by the Illinois Traction System on the three divisions is as follows:

EASTERN DIVISION

422 loads of coarse freight handled.
Sixty-eight loads of merchandise handled.
One load of coarse freight received from C. & E. I.
Six loads of merchandise received from C. & E. I.
Twenty-four loads of coarse freight delivered to the C. & E. I.
One load of grain transferred at Glover.

NORTHERN DIVISION

514 loads of coarse freight handled.
218 loads of merchandise handled.
Fifty-seven loads delivered from P. & P. U.
Five loads received from P. & P. U.
Nine loads delivered to P. R. T.
Nine loads of grain delivered to Wabash at Decatur.

SOUTHERN DIVISION

235 loads of merchandise handled.
377 loads of coarse freight handled.
Eighty-eight loads of merchandise out of St. Louis.
Two cars of stock.
Nineteen loads of cinders.
Sixty-one loads received from the M. B. T.
Seventeen loads delivered to the M. B. T.
Twenty-four loads received from the Southern.
Two loads delivered to the Southern.

Distributing Freight Cars

No small part of a successful carload freight handling business is the promptness and fairness of distributing empty cars. These must not only be sent promptly, but it is often necessary to distribute empties in proportion to the needs when there is a car shortage. In that case considerable diplomacy is necessary in order to eliminate friction. Cars to the various side tracks and industries are distributed by the division superintendents through the dispatchers. Records of interchange of cars between divisions as well as of the distribution of cars to the industries over the entire system are kept at the office of the assistant general manager by a general car distributer. In order to get a line-up on the car situation daily all way-station agents are required to make car reports to the division superintendents. "Blind" sidings or sidings between stations are checked by the first train crews over the road each morning, and these crews report to the division superintendents through the dispatchers. As soon as this information is in the hands of the division superintendent he arranges for the car distribution which is executed by the dispatcher, who also reports over the telephone to the general car distributer as to what he has done. In general there are seldom more than 10 or 15 per cent of foreign cars on the system at any one time, so that the work of distributing empties is that of handling the company's own equipment. On the

ILLINOIS TRACTION SYSTEM

Report of Equipment, 24 hours ending 1:00 p. m. _____ 19____

Nos.	Stations	ON HAND										WANTED					BAD ORDER										FOREIGN CARS				REMARKS
		Trailers		Box Cars		H. B. Coal Cars		F. B. Coal Cars		Flat Cars		Trailers	Box Cars	H. B. Coal Cars	F. B. Coal Cars	Flat Cars	Trailers		Box Cars		H. B. Coal Cars		F. B. Coal Cars		Flat Cars		Initial	Number	Kind	Contents	In Transit
		Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty						Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty					
	C. P. & P. DIVISION	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AB	AC	AD	
1	Decatur Rhine																														
2	Decatur																														
3	Race Track to Johnson, Ind.																														
4	Clinton																														
5	Scotts to I. C. Cross, Ind.																														
	P. B. & C. DIVISION																														
6	Bloomington																														
7	Stillwell to Farm Creek, Ind.																														
8	Peoria																														
	P. J. & S. DIVISION																														
9	Cook																														
10	Summit to Kinsey, Ind.																														
	S. & N. K. DIVISION																														

ILLINOIS TRACTION CARLOAD FREIGHT—WAY STATION AGENTS' CAR REPORT FORM

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other hand, foreign cars are kept moving in order to keep the per diem charges at a minimum. The forms employed by the station agents in reporting the checked cars to the division superintendents are shown in the accompanying illustrations, as well as the general form used by the car distributer in distributing cars over the entire Illinois Traction System.

Quantity and Kind of Freight Handled

As mentioned earlier in the article, freight traffic during the past seven years has increased 115 per cent, and the earnings from freight now represent about 20 per cent of the gross earnings of the interurban lines. Freight revenue is received from two sources, namely, revenue for transporting freight and revenue from switching service rendered to industries and connections. Earnings from these two sources for the last seven years are as follows:

Year	Freight Revenue	Switching Revenue
1909	$271,389.20	$10,280.97
1910	357,873.20	14,057.50
1911	372,443.97	13,437.27
1912	462,055.83	16,446.66
1913	485,084.35	16,122.88
1914	483,060.76	16,396.73
1915	475,696.84	24,186.06

Another table of statistics on page 50 indicates the sources of the tonnage and shows the growth of freight traffic beginning in 1912 and ending Dec. 31, 1915.

Regarding the future the management of the Illinois Traction System believes that it has only begun to "prick the surface," so to speak, of its freight traffic possibilities. Only within the past few years has this company been able to offer attractive inducements to industries to locate on its lines and belt railways, and during the present year contracts already executed and others in process will add a number of other important industries to those already using the electric railway freight service. While connections, through rates and reciprocal switching arrangements have been made with steam railroads, they have as yet not fully opened their doors to the electric railway traffic, but there is no longer any doubt that they will realize the error of their ways in the past, and full interchange and through routeing of freight will be in effect with all connecting steam railroads.

Massachusetts Commission Issues Report

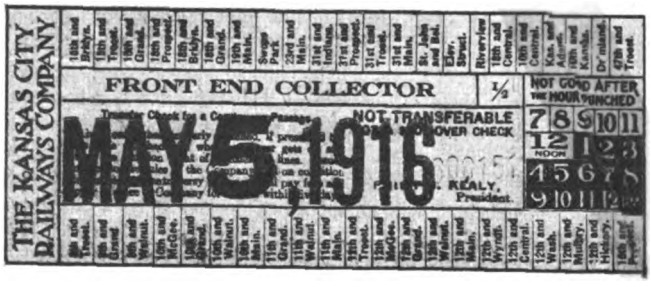
The third annual report of the Massachusetts Public Service Commission has been issued, the first volume from the press covering reports and orders and including 185 pages of introductory reports and general statistics and 648 pages of orders, special reports and exhibits, with the usual maps of steam and electric railways in the State. Among the special reports of interest to electric railways, which have in the main been abstracted in the ELECTRIC RAILWAY JOURNAL at previous times, are a twenty-four-page review of the jitney bus situation in Massachusetts and elsewhere, prepared by Charles E. Mann, executive secretary of the commission; street railway power requirements in Massachusetts; important decisions in the fare cases of the Blue Hill Street Railway, New Bedford & Onset Street Railway, and Norfolk & Bristol Street Railway; an investigation of safety conditions on the Boston rapid transit lines, and an eighty-eight-page report by the commission to the Legislature on metropolitan transportation problems at Boston.

Front-End Collector's Transfer

The Adoption of This New Transfer Has Simplified the Collectors' Work and Accelerated Traffic 15 Per Cent

THE Kansas City Railways on May 1 adopted a special transfer for "front-end collectors," which eliminates the necessity of these conductors handling several different transfers. Heretofore the front-end collectors, in serving each car, have had to use the transfer of its particular line, and the delay in selecting and punching these various transfers has been a serious retardant in the movement at congested corners. The new front-end collector transfers have in the margins the names of about forty boarding points where front-end collectors are customarily used, and before he starts work the collector punches the designation of the corner where he is to collect. The conductors on any lines where the transfer may later be used have then only to note that the passenger is not being carried back to his starting point.

These transfers are punched for hour periods, instead of for fifteen-minute periods as are the ordinary transfers, removing more of the burden from the front-



TRANSFER FOR FRONT-END COLLECTION—THE PUNCH INDICATES BOARDING POINT, NOT TRANSFER POINT

end collectors. A note on the back of the transfer instructs the collector to punch the printed location nearest his actual working place, in case such place is not included in the list. The Kansas City Railways use ordinarily forty to fifty front-end collectors. During the "Billy" Sunday revival ten or fifteen more were used, where attendants at the services boarded the cars homeward bound. It is estimated that the use of these transfers will save four to six seconds on each car taking passengers at these boarding points.

Heretofore the collections of front-end men have been averaged and estimated among the various lines served at the corners where they were stationed, and credited to those lines. The new transfers will not allow of quite such close reckoning, but the same system of estimating as is used for discovering the course of a transfer over various lines, based upon occasional record-taking by conductors, will be employed. Eventually a coupon system may be adopted in order to attain accurate records of origin of travel and course of transfers. The front-end transfers constitute usually about 2 per cent of the 6,000,000 or 7,000,000 transfers issued every month, but it is estimated that their use makes a difference of more than 15 per cent in the expedition of traffic.

A ticket office has been opened in the American Trust Building on the Public Square, Cleveland, Ohio, for the accommodation of patrons of the Lake Shore Electric Railway and the Cleveland, Southwestern & Columbus Railroad, the cars of which are compelled to stop there for passengers instead of in front of the interurban depot.

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Investment per Revenue Passenger and Density of Traffic

The Author Analyzes the Relation Between Electric Railway Investment and Traffic Density on the Basis of His Suggested Unit of Investment per Revenue Passenger —Charts Based on Statistics of Existing Properties Are Also Presented

By D. J. McGRATH
Research Assistant Massachusetts Institute of Technology

IN dealing with the relation of the capitalization of street railways to the fair value or the actual investment, a unit of comparison called the "investment per revenue passenger" was suggested by the author in an article appearing in the ELECTRIC RAILWAY JOURNAL for May 8, 1915. It was pointed out at that time that while this unit was not by any means a fixed quantity, or capable of exactly defining a standard of reasonable capitalization for all transportation companies, it seemed to have certain advantages over the more commonly used standard units such as the "mile of track" or the "dollar of gross revenue." Some ten examples which were considered fairly typical were given. The figures in these particular cases varied from a minimum investment of 13 cents per revenue passenger to a maximum of 32 cents. Some of the reasonably probable causes of this variation were outlined in the article.

During the past year, in connection with the investigation which is being made of the electric railway fare and traffic problem, the research division of the Massachusetts Institute of Technology has acquired a considerable amount of additional data along the lines of the actual investment in various street railway companies and has reduced these data to the revenue passenger unit.

As a result of this form of analysis it has been found that while there is a certain natural and proper variation in the costs of constructing and equipping different street railways, there appears to be, if the data available may be considered fairly representative, a reasonably consistent relation between the investment per revenue passenger and the density of traffic.

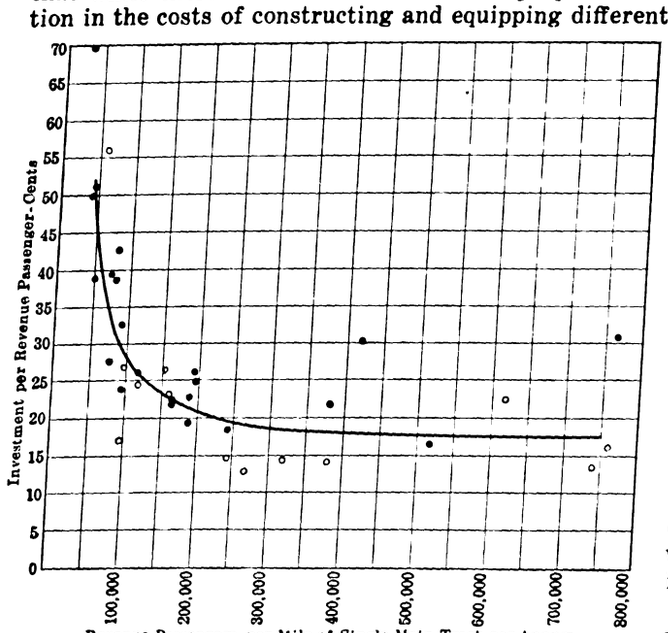

FIG. 1—RELATION BETWEEN TOTAL ANNUAL COST OF PERMANENT PROPERTY PER REVENUE PASSENGER PER ANNUM AND DENSITY OF TRAFFIC FOR THIRTY-FIVE TYPICAL STREET RAILWAYS

In this diagram the cost of parks and similar non railway property is excluded. Circles indicate companies which have little or no investment in power plants; dots, companies having power plants.

In considering the following discussion and statistics, it must be remembered that they are applicable only to ordinary street railways which are wholly, or almost wholly, engaged in passenger business at small unit fares such as 5 or 6 cents. The curves were derived from the data of thirty-five different street railways, more than half of which are in the State of Massachusetts, where the capitalization of the companies has always been limited to the actual investment of money in the property and has been under the supervision of a State commission. The remainder of the companies included in this study were ones for which reliable engineering appraisals were available in which the investment or the reproduction value had been determined. Systems serving various classes of territory were included, city suburban and rural lines all being treated alike, but the high-speed interurban type of electric railway, which corresponds more nearly to the steam railroad type of service, was excluded. No company was included which rented or leased any considerable part of the track or cars which it operated, unless the investment represented by such rented property could be determined and included. On the accompanying plots, the data are specially indicated for companies which purchase all or most of their power, and so have little or no investment in power plant. The figures are practically all from reports of the years 1914 or 1915.

The principal relation is shown in Fig. 1. The curve which has been drawn in is merely intended to guide the eye to the approximate average location of the points and not to represent any arbitrary standard. Granting that the data used are fairly typical of street railway conditions generally in this country, it may be concluded from this plot that the average investment per revenue passenger decreases as the density of traffic increases up to a certain point, after which higher traffic densities fail to cause any material decrease in the investment per passenger. This seems to indicate that in the larger cities, the traction companies have to put in so much more investment in heavier track, better cars, more power plants and the added track and equipment required for long hauls that any advantage which might be gained from increasing density of traffic is offset.

An example of this is shown by the two points which are considerably above the average curve, one near 400,000 and the other near 750,000 revenue passengers per mile of single main track. These points represent the investment in two very large cities where long hauls are given for the single fare and where there is a material amount of unusually expensive construction.

The points for companies which do not own their

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power plants are shown by the hollow circles as distinguished from the other solid dots. The former are generally somewhat lower on the curves than the others, as would naturally be expected.

It is plain that the investment per revenue passenger is subject to some considerable variation on different systems even at approximately the same densities of traffic, but this form of analysis seems to give somewhat more consistent results for comparative purposes than a mere scattering of investment data without reference to any of the limiting conditions.

Where the density of traffic is less than 100,000 revenue passengers per mile of single main track, the investment per revenue passenger becomes rapidly greater. In fact, these statistics indicate that operation is not so likely to be profitable at 5-cent fares where the density of traffic is much less than 100,000 per mile of track.

When the investment per passenger gets to be 30 cents or more, as it evidently does at these low densities, an average rate of return of, say, 7 per cent on investment, requires 7/100 of 30 cents, or 2.1 cents at least, out of each passenger's fare. Since a low density of traffic also means higher operating expenses per passenger, there is little likelihood of 2.1 cents being available for return on investment after the nickel fare has been "split" for the other expenses. A 7 per cent average return is used here merely as an illustration; it is not intended to stand as an arbitrarily selected "fair" rate.

The general precept may be laid down that the more revenue passengers per mile of track, the better are the chances for profitable operation. However, a practical limit is reached along this line in the operation of street railways in very large cities where the length of passenger haul for the 5-cent fare becomes so great as materially to reduce the earnings per car-mile. Moreover, when any part of the trackage becomes so congested that the company has to resort to the building of subway or elevated lines to handle the traffic, then the investment will be abnormally increased.

In Fig. 2 there is shown that part of the investment which is devoted to the construction of road and track, exclusive of power plant buildings, power equipment and rolling stock. The curve is similar in shape to the total investment curve shown in Fig. 1 but of course it is somewhat lower on the scale. All the companies included in making up Fig. 1 were not included in the

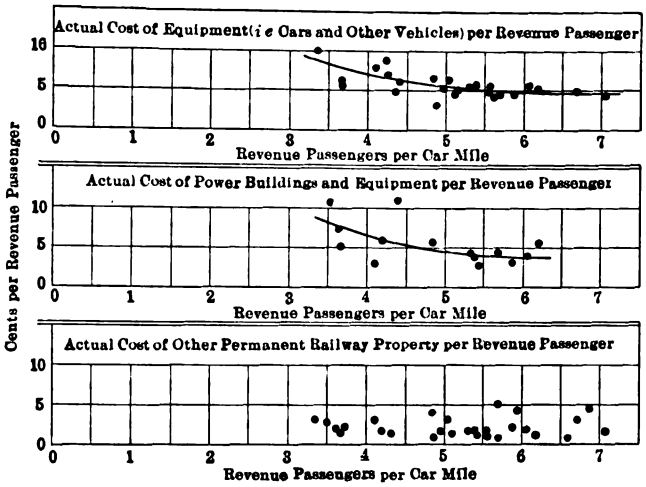
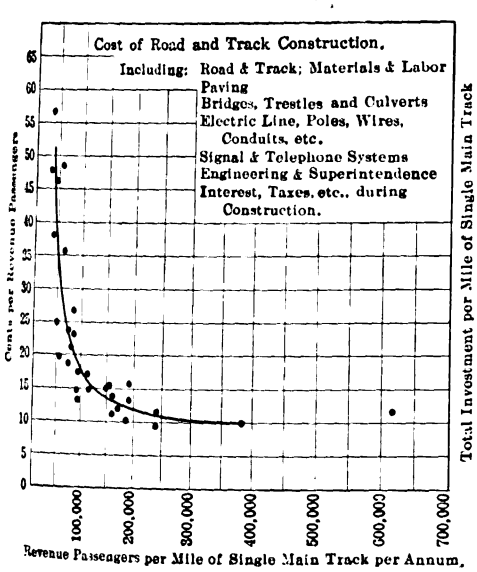


FIG. 3—RELATIONS BETWEEN ACTUAL COSTS OF EQUIPMENT, ETC., PER REVENUE PASSENGER AND REVENUE PASSENGERS PER CAR MILE

construction of the following charts because the more specific data required were not available.

In Fig. 3 the other elements which go to make up the total investment are compared with density of traffic. These elements, however, seemed to be somewhat more closely related to the density of traffic expressed in terms of revenue passengers per car-mile, rather than per mile of track, although the same general form of relation naturally holds true in both cases.

The old unit, investment per mile of track, is also capable of analysis with respect to the density of traffic as is shown in the plot marked Fig. 4, which should prove generally useful when considering statistics in this form of comparison. The reasons for the increase in investment per mile of track as the density of traffic increases are not difficult to explain. In the first place track built for dense traffic is generally, and should be, of heavier and more expensive construction. The electric line for distributing the power along the track must be of greater current carrying capacity and consequently requires more copper. These railways with dense traffic are almost always in the large cities and towns where expensive paving is required which is not necessary in rural districts. Fully as important is the fact that the denser traffic requires more cars and power plant equipment for each mile of track operated.



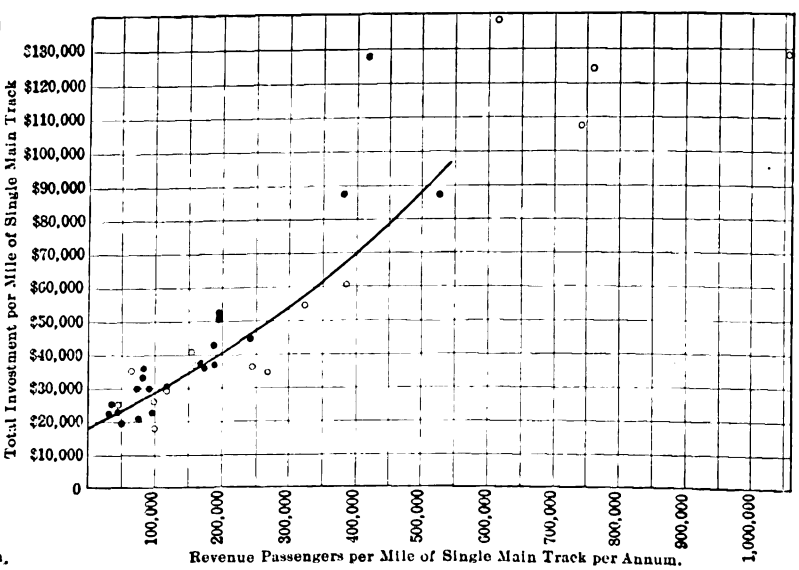


FIG. 2—RELATION BETWEEN COST OF ROAD AND TRACK CONSTRUCTION AND DENSITY OF TRAFFIC. FIG. 4—RELATION BETWEEN TOTAL INVESTMENT PER MILE AND REVENUE PASSENGERS PER MILE

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It is not to be supposed that these general statistics can be used to make any definite or final decision as to whether a given company's capitalization represents a fair investment value or not. Obviously there can be no absolute statistical standard for determining investment or fair value.

If in any given case the unit capitalization falls above the average curve it is by no means a proof of over-capitalization. All the conditions and local circumstances as well as the past history of the up-building of the system must be given due consideration. Indeed, the mere fact of the data falling exactly upon the average curve is not in itself a demonstration that a company is not over-capitalized for the actual amount, condition and kind of property it has on hand.

The statistics of any one particular year are not always a safe criterion to rely upon in these comparisons. A company may have been obliged to make a large investment in an extension or improvement, which investment is included in its capitalization for a certain year before the extension or improvement has been put into use. This would naturally raise the investment per revenue passenger somewhat above its normal level and it might take one or two years before the extension or addition began to receive its normal share of the traffic.

In general, however, it would seem that these average curves should be of service in broad general considerations of the cost of street railway service and the determination of reasonable systems and rates of fare. They show clearly the general nature of the effect of density of traffic upon the investment in street railway property used for the transportation of passengers. These statistics may also prove useful in making rough comparisons of the capitalization of any particular street railway with others of a similar nature.

Workingmen's Compensation Insurance

Report on Different Plans Followed in New York State and Their Advantages, Disadvantages and Costs as Regards Electric Railway Operation

By J. P. BARNES (Chairman)
W. H. COLLINS, C. L. STONE, THOMAS PENNY and ERNEST GONZENBACH

THE workmen's compensation law of the State of New York became effective on July 1, 1914, and it became necessary for each of the employers to designate prior to July 1, 1914, which of the forms of insurance, (1) stock company, (2) mutual company, (3) state fund, or (4) self-insurance, it elected for its protection. In most instances arrangements covering the full term of one year were made. Agitation in the Legislature for amendment to the law was active during the session of the Legislature following the effective date of the law, but material amendments were not enacted until the legislative session of 1915-1916.

During the last few months figures have been made available showing the experience of insurers and carriers under the various plans, and it is intended in this report to set forth briefly some of the figures which have been made available to your committee. Considering the four alternatives, we find certain inherent advantages and disadvantages in the various forms which may be briefly summarized as follows:

(1)—STOCK COMPANY INSURANCE

The insurer in the stock company is protected under a form of policy, not only against those injuries entitling the workman to compensation under the compensation law, but also against other classes of injuries to workmen, insuring to the employer that the expenditure of his insurance premium definitely protects him against all claims of workmen for injuries, provided that the company in which he insures is sound and stable. The insurer is relieved of the negotiations of settlement of claims, appearances before the commission at hearings upon claims and defence of suits arising therefrom.

The rates of insurance under the policies of the stock companies are, for urban operation, $3.24 per $100 of payroll and for interurban operation, $5.18 per $100 of payroll. There is no refund or dividend to apply in reduction of these rates, but we understand that policies may be obtained at a lower rate by insurers who have fulfilled certain requirements as to the appointment of safety committees, safeguarding of hazardous machinery, locations, etc.

(2)—MUTUAL INSURANCE

The mutual company is in effect a pool entered into by employers in a similar class of business, under the terms of which expense and hazard are shared between those participating in the pool, so that if the mutual company includes all or nearly all of the companies in a certain class of industry, the experience of the mutual company will, over a term of years, reflect the true experience of the industries, equitably dividing the burdens of that industry among all employers participating.

The insurance rates are the same as for stock company insurance, but the unexpended portion of premiums paid is returnable as dividends after the establishment of a sufficient reserve fund, and arrangements may be made for distribution of dividends on a basis of prorating, which will recognize comparative merit claims to consideration of the various insurers. This feature is distinctly valuable and should be emphasized, as it makes possible an equitable distribution of the burden of insurance of an industry and does this without over-burdening the well-managed company for the faults of another company in the same pool not so well or skillfully handled.

The policyholders in the mutual company are able, by choosing directors suitable to them, to administer the funds of the company and assure themselves that the business of the mutual company is carried on along lines of policy agreeable to the policyholders. This influence over the manner of settlement and handling of funds is not had by the policyholder either in the stock company or in the state fund, although the individual has even greater latitude under the plan known as "self-insurance" than under any of the other three.

Under the plan of mutual insurance the extreme or catastrophe hazard is shared generally throughout the industry and may be further guarded against by reinsuring of the catastrophe hazard on the part of the mutual company. Many mutual companies reinsure against liability in excess of, say $15,000 or $20,000 aris-

*Abstract of report presented at annual meeting of New York Electric Railway Association, Niagara Falls, N. Y., June 27-28, 1916.

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ing out of one accident, thus minimizing the catastrophe hazard to their policyholders.

(3)—STATE FUND

Insurers in the state fund pay a lower initial rate than in either stock or mutual insurance ($2.50 for urban and $4.75 for interurban, as contrasted with $3.24 and $5.18). Under the provisions of the law a separate group may be established in the state fund for any particular industry, and dividends based upon the experience of the group may be had, the benefit of the favorable experience not being shared with employers in other industries. The general conduct of the business of the state fund is similar to that of the mutual company, except that the administration of the funds is in the hands of officers appointed by the commission and is not subject to any control on the part of the insurers in the fund. Up to July 1, 1916, the administration expenses of the state fund have been paid by the state, but after this date these expenses will be borne by the state fund, which will increase the cost of this form of insurance. Insurers in the state fund are not protected against catastrophe losses of other insurers in that fund, the catastrophe hazard of all lines of industry being shared by all insurers in the fund, at least to the extent of their premium payments. The manager of the state fund is authority for the statement that insurers in the state fund are not subject to any assessment liability. The commission, however, has authority to revise rates from time to time. The State Industrial Commission has ruled that it has no right or authority under the law to assess the state fund policyholder, which ruling has been confirmed in an opinion by the attorney-general. On the other hand, the members of the mutual company incur an assessment liability of 100 per cent of their premium and do not secure release from liability to pay compensation as do insurers in the state fund.

(4)—SELF-INSURERS

Employers may elect to settle compensation claims directly upon presentation of satisfactory evidence to the commission of their ability to meet these obligations. In this connection the commission requires the deposit of an approved security in an amount equivalent to six months' premium at the rate of the state fund, and in addition a cash deposit from which claims are paid, it being the duty of the employer to keep this fund always at the amount specified by restoring thereto any amount that may be withdrawn by the payment of claims. The self-insurer pays the least for his compensation insurance of any of the classes, but on the other hand, bears alone the burden of his catastrophe hazard. The commission is authorized to require payment by the self-insurer of an amount estimated by the commission to be sufficient to meet all deferred payments arising out of any accident, which renders the self-insurer liable to relatively large lump-sum payments at the will of the commission.

The experience of insurers under various forms of policies has tended to show that the rates charged for stock and mutual insurance are excessive, or else that the experience of the companies in this state, since the enactment of the compensation law, has been unusually favorable. So far as your committee could ascertain, there does not seem to be, in the experience of the companies in this state, a justification for the higher rate charged for interurban as compared with urban operation, and it would appear that these rates, and especially the interurban rate, are subject to adjustment downward.

The experience of the self-insurers under the law shows a considerably lower cost than any of the other forms of insurance, but this statement should be viewed in the light of the fact that the companies from whose records information was obtained have not suffered the burden of any accidents of unusually disastrous nature, a danger which confronts all self-insurers.

PLAN OF "UTILITIES MUTUAL"

The gas and electric companies, a business similar to, and to some extent allied with, the electric transportation business, have formed a mutual insurance company, known as the Utilities Mutual, eighteen months of whose experience is available for comparison. The expense ratio of this company over the eighteen months has been 22 per cent, the loss ratio 22.50 per cent, leaving a balance to apply on surplus and reserve of 55.5 per cent. The tendency toward increase of settlements and general cost of this form of insurance is illustrated by the following comparative table, showing the experience of the company just quoted for the first twelve months of its operation, as compared with the eighteen months, the latter figures including the former:

	For Twelve Months	For Eighteen Months
Loss ratio	16.19 per cent	22.50 per cent
Expense ratio	20.27 per cent	22.00 per cent
Surplus	61.76 per cent	55.50 per cent

The increased loss and expense ratios and decrease in surplus for the eighteen months, as compared with twelve months, is stated by the Utilities Mutual Company as due to reductions in advance premium through individual ratings by the compensation inspection rating board. These reduced premiums illustrate the immediate advantage to be obtained in the mutual company from favorable experience.

No figures of loss ratio, as applied to the electric railway industry, are available, but it seems fair to presume that the loss ratio, being dependent upon the state of the industry rather than on the form of insurance carried, would be practically constant under either the mutual or state fund plans.

The Utilities Mutual, whose officers and directors are chosen from among the officials of lighting companies throughout the state, and whose affairs are under the management of Parsons & Company, is willing to extend its plan of operation to include electric railway risks and has, at least in one instance, already done so.

The plan of participation on the part of the electric railway industry contemplates keeping the statistics as applied to electric railway companies separate from those of the other industries, so that each industry may know its own experience, individually and also as compared with the experience of the other industry. They further propose that upon participation in that company by the electric railways, places will be made on the board of directors for representatives of the electric railway interests, and by-laws will be adopted such that the relative representation on the board of directors of the railway and lighting representatives will be proportional to the premium payments from the two industries.

The estimated premiums of the entire electric railway industry of the state, based upon payroll figures, is four times that of the lighting industry, and under the plan proposed, assuming that all or nearly all of the electric railways insured in the Utilities Mutual, the board of directors would comprise a majority of railway representatives.

CONCLUSION

There are then, five plans from which the railways of the state have to choose: (1) stock company insurances; (2) mutual company insurance in a company composed entirely of street railway policyholders; (3) in-

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surance in a utilities mutual, composed of railway and lighting interests; (4) insurance in state fund; (5) self-insurance.

Your committee deems best to refrain from any recommendation to the member companies as to the various forms of insurance, confining itself solely to a statement of the conditions and possibilities of each method and to form the basis for discussion on the floor of the convention. Your committee has in its possession considerable data regarding the costs and conditions of the various forms of insurance, which are omitted from this report for the sake of brevity, but which are available to member companies interested in securing the information.

Fare Increase Denied

United Traction Company Said Not to Have Proved Case for Higher Interurban Fares—Albany Service More than Is Justified by Earnings

UPON the ground that the United Traction Company, Albany, N. Y., had not proved its need for an increase of fares between Albany and Troy and that the proposed increase from 10 to 15 cents with full transfer privileges would be unjustly discriminatory against users of the Albany-Troy line and residents along the Troy road, the Public Service Commission for the Second District on June 28 refused to permit the company to put its proposed new schedules into effect. Commissioner Frank Irvine wrote the opinion in the case, in which all the other commissioners concurred. Commissioner Carr, however, submitted a memorandum in which he agreed that the proposed schedules should not be permitted, but suggested that as the company undoubtedly needs additional revenue it might gain this by keeping the fares as at present and withdrawing the transfer privilege to and from the interurban line for local lines both in Albany and Troy.

Although figures were presented to show that including a profit from the ownership of the Hudson Valley Railway the United Traction Company operated last year at a deficit of about $70,000, and although it was testified that a "practical study" of the situation had convinced the company that the only means to increase the revenue to meet this deficit was to increase the Albany-Troy fares, Commissioner Irvine did not attach much value to such evidence. He said that there was no evidence as to the value of the property employed in the Albany-Troy service, or in the entire service rendered by the company. Commissioner Irvine then quoted a table of the company's earnings as filed with the commission, showing that the revenue per car-mile on the Albany-Troy line was greater from 1910 to 1914 than the revenue per car-mile either on the Albany or Troy divisions. In 1914 and 1915 the revenue per car-mile was slightly less than on the Albany division but much greater than on the Troy division. "An inspection of the tables shows conclusively," said Commissioner Irvine, "that the losses, if any, are not because of the Albany-Troy operation." He also stated that while no figures were procurable showing the cost of operation on the Albany-Troy line, the company not distributing costs to the various divisions, it seemed more than probable that the operating expense per car-mile is less than on the urban lines. He was led to this conclusion by the fact that there is less paving expense on much of this line, that more economical rails can be used, and that the higher-speed interurban operation reduces platform expense.

Of the discrimination in the proposed schedule, Commissioner Irvine wrote as follows:

"It is said that as no suggestion has been made that unjust discrimination would result from the proposed tariff, its establishment is within the managerial discretion of the company. In order to establish discrimination it is not necessary that any witness should use the word. In Albany or in Troy, one on a 5-cent fare may ride 7 miles without a transfer and 9.24 miles in the same general direction with a transfer. In view of what has been shown as to revenues and expenses, how can it possibly be contended that there is no discrimination in charging three times as much for a distance of 7.3 miles (the mileage of the Albany-Troy line) as is charged for 7 miles or 9 miles or 10 miles, and twice as much between the Schuyler Bridge and Grabrance Lane district and Albany or Troy, a maximum of about 5 miles, as is charged for those other distances in the Albany district or the Troy district? These are certainly discriminations and if they are not unjust discriminations the duty devolved upon the company of presenting evidence to justify them. The record is absolutely barren of such evidence."

Not the least important part of this decision, it is said, was the suggestion in Commissioner Irvine's opinion that the public service commissions have the power in the light of the recent Ulster & Delaware Railroad decision of the Court of Appeals to permit increases in rates where the need for them is proved, notwithstanding previous legislative enactments limiting such rates. Under such an interpretation of the law as handed down by the highest tribunal, it might be possible for the commissions to permit an increase of fares above 5 cents in any city, notwithstanding the provisions of the railroad law which on its face restricts street railroads from charging more than 5 cents for a ride between any two points on its system in any city or village. "This statute by its terms," said Commissioner Irvine, "does not apply to passengers between different communities in the Troy district or to passengers between Albany and Rensselaer. But in view of the recent decision it seems that the restriction is no longer operative in any case where a company can show that at the statutory rate it is unable to earn a fair return. Even if the statutory restriction applied in the present case and the company was not earning a fair return, it would not follow that this increase should be permitted. One class of patrons may not be subjected to a rate in itself unreasonably high in order to recoup losses sustained in serving other classes at unprofitable rates. It can make no difference in this respect that the unprofitable rate is imposed by law. The company rather than its patrons must bear the burden thereof."

Commissioner Carr, while concurring in the refusal of the commission to approve of the proposed increase of fare to 15 cents between Albany and Troy, stated that the problem might best be solved by keeping the fares as at present—10 cents between Albany and Troy on the direct line and 5 cents from the intermediate zone to any place on the direct line in either city—but withdrawing the transfers to and from the Albany-Troy line and any of the local lines in Albany and Troy.

In his opinion this would be a fair arrangement of these rates and it would not work any hardship upon the public in any respect, while it would give the company a reasonable return for the service which it performs. Of the general financial situation of the company with regard to the service furnished, Mr. Carr had this to say:

"Another thing which should be borne in mind in connection with this case is that, in Albany particularly, the company is as a whole giving more service than its earnings justify. Whether this is due to the fact that it runs cars on a close headway during the non-rush hours as well as during the rush hours, I can not state. It may be that the people in Albany could get better

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service than they get now with a considerably less number of car-miles per mile of road. The figures show that the car-miles per mile of road in Albany are considerably more than 60 per cent higher than any other road in the State of New York outside of the metropolitan district. If a thorough rearrangement of service could be made in Albany it is possible that much better accommodations could be given to the public at a lower cost to the company."

C. E. R. A. Reaches Home

Britton I. Budd Describes Activities of Illinois Electric Railways Association—Other Events of Last Two Days of Cruise

At the meeting of the Central Electric Railway Association held on the steamship South American on the morning of June 28, J. A. McGowan, secretary and treasurer Terre Haute, Indianapolis & Eastern Traction Company, and chairman of the committee on resolutions presented a report. It took the form of extending the sincere thanks of the association to the supply men's committee of arrangements for the excellent work it had done in arranging all the details of the four-day cruise; to the Terre Haute, Indianapolis & Eastern Traction for the special car it ran from Indianapolis via Dayton and Toledo, Ohio; to the Union Traction Company of Indiana for the special car it ran from Indianapolis to Toledo via Fort Wayne; to the Ohio Electric Railway Company, the Toledo Railway & Light Company, the president, officers and speakers at the sessions held on the boat trip, and to S. W. Greenland, Fort Wayne, R. A. Crume, Tippecanoe City, and C. K. Minary of Benton Harbor, Mich., for the courtesies they had extended the association; to L. C. Smith & Brothers for the loan of a typewriter; and A. B. Dick Company for the loan of a mimeograph which was used to publish the "C. E. R. A. Deep Blue Daily." The following resolution regarding this daily was also presented by this committee: "Resolved: That the Central Electric Railway Association extends its sincere thanks to the ELECTRIC RAILWAY JOURNAL, through its representatives Messrs. Hugh M. Wilson, L. E. Gould and E. M. Haas, for the publication on board the steamer of the sparkling and witty 'Deep Blue Daily,' giving an account of all the accidents and incidents of the voyage." A proposed amendment to the constitution of the association affecting the qualifications of its officers was also proposed and it will be submitted for consideration of the members in printed form.

HANDLING LEGISLATIVE MATTERS

Britton I. Budd, president Chicago Elevated Railroads, was then introduced, and he expressed much interest in the co-operative spirit that was so prevalent among the members of the Central Electric Railway Association. He said that he was very much in favor of the railway officers taking an active part in association work because he believed that they could derive great benefit. Mr. Budd then proceeded to tell of the work of the Illinois Electric Railways Association which, he said, was four years old and embraced forty railway companies. In the second year of this association's existence many bills were introduced in the State Legislature affecting electric railways. This fact was called to the attention of the association, and little or no information was found available concerning the progress of the bills nor the exact wording of them. In fact, bills affecting the transportation industry including both steam and electric railroads had been introduced and were passed without the legislators consulting the officers of the railways concerning the effect they would have on operation. Accordingly the Illinois association decided that it must take an active part in legislative matters, become personally acquainted with the legislators and openly endeavor to prevent the passage of vicious bills. Mr. Budd said that whenever bills of interest to electric railways were now up for consideration as many as thirty-five or forty officials were present at Springfield and openly used arguments and their personal influence to defeat them. He remarked that it was his experience that when legislators were acquainted with the actual facts concerning the effect of a bill both on the public and on the railways, most of them were reasonable and would not give their support to unjust measures.

Mr. Budd said the association made it a point to have some of the officers of every railway company personally acquainted with their representatives in the State Legislature. He was also of the opinion that the best results could be obtained by bringing the actual operating officers into personal contact with the legislators. The legislators had more respect for views of these practical men than they did for lawyers or paid lobbyists. On the other hand, the experience which these department heads obtained in this work was of much value and a great asset to the railway company they served. The steam railroad representatives have followed about the same plan as the electric railways, and in many instances the representatives of the two forms of transportation have co-operated in bringing about amendments or actually killing detrimental legislation. In conclusion Mr. Budd stated that the work as done by the association in connection with legislative matters had alone justified its existence. The work that its representatives had done before the State Legislature had also brought them in closer friendly relations with the steam roads than they were before.

Charles L. Henry, Indianapolis, responded to Mr. Budd's address. He said that in Indiana the electric railways have a special organization which looks after legislation. This organization is not allied with the association but has all the association's members' interests at heart. It has been the practice of this special organization to have a paid employee attend all the sessions of the legislature and obtain copies of all bills introduced which in any way affect railway operation. The copies of these bills are filed, and whenever they are up for consideration in the Legislature, the officers of the railways affected are called in to the hearing. All bills affecting detrimentally electric railway operation are followed from the time they are introduced until they are killed or amended so that they will not prove vicious. Mr. Henry said that because the Central Electric Railway Association embraced four states, it was practically impossible for it to act in legislative matters, but the representatives from each state have found it more advantageous to act for themselves.

OTHER SPEAKERS AND EVENTS ON TRIP

At this point John Benham, vice-president International Register Company, told the association of his very pleasant relations with the Chicago, Duluth & Georgian Bay Transit Company's officers and how they had endeavored to make the trip the success that it was. Upon motion Mr. Benham was authorized to write a letter to the president of the boat company commending the service and thanking the officers most cordially for the many courtesies they had extended to the association. E. M. Walker, general manager and purchasing agent Union Electric Company of Dubuque, Iowa, who was a guest on this trip, was then introduced and made a few complimentary remarks. G. F. Allen, Railway Materials Company, Chicago, Ill., also addressed the association.

After a stop of from 5 o'clock until 10 o'clock in the morning at Mackinac where most of the party made a

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tour of the island, the steamship South American proceeded to Harbor Springs, Mich., where it docked for two hours. Owing to the inclement weather, however, very few of the members went ashore, and at the scheduled hour, 4 o'clock in the afternoon, the cruise proceeded to Macatawa Pier in Black Lake, Mich. The steamer arrived there at 7.30 o'clock in the morning, June 30, where a large number of the party disembarked and took the private cars furnished by John F. Collins, vice-president and general manager Michigan Railway, for Toledo, Ohio. The cruise was officially completed at Benton Harbor, Mich., where C. K. Minary gave the association a luncheon at the "House of David" a religious colony near Benton Harbor. At this point the Indiana members were met by the special cars of the Terre Haute, Indianapolis & Eastern Traction Co. and of the Union Traction Company of Indiana, and they proceeded to Indianapolis and Fort Wayne via South Bend and Peru. More than 100 of the party remained aboard the steamship and took the trip across Lake Michigan from Benton Harbor to Chicago.

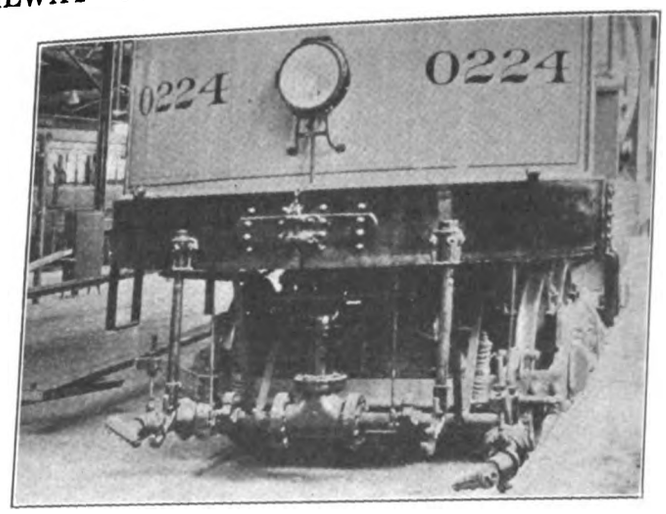
Cleveland Pays Railway to Flush Streets

Plan Whereby the Cleveland Railway Flushes the City Streets and a Description of the Flusher Provided for This Purpose

BY H. C. EBELING
Engineer Cleveland (Ohio) Railway Company

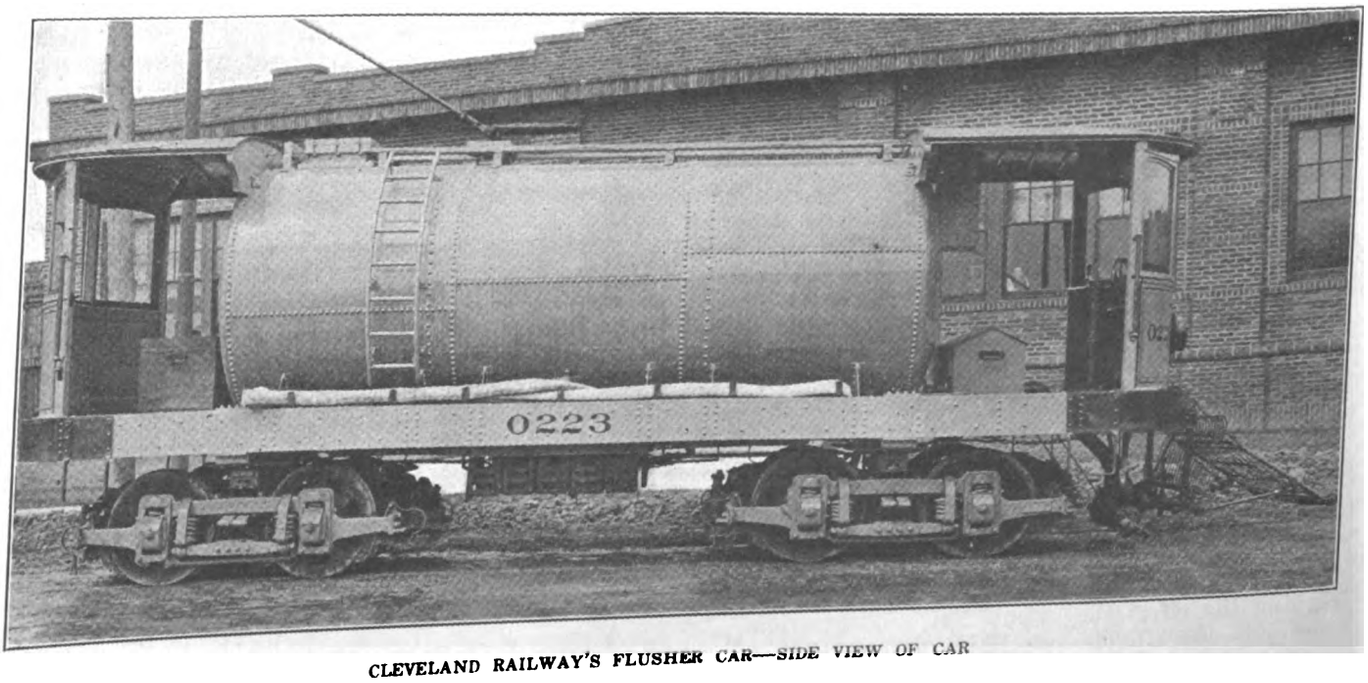
A DISCOVERY by the city officials that a provision of the Tayler ordinance, under which the Cleveland (Ohio) Railway operates, provided that the railway should also "operate hospital and supply cars for the city and such other cars for exclusive municipal purposes as the city shall furnish and maintain," led them to require the railway company to operate tank cars to be employed in flushing and cleaning the streets. For a number of years the city has been flushing its streets to clean them.

The first efforts of this kind were to flush the streets by discharging water over the surface of the pavement by means of suitable nozzles on tank wagons. The water for these was obtained from the fire hydrants, pressure equal to the city water pressure being secured by closing the tank outlets and forcing the water into it until the water-main pressure was reached. This method of flushing was found satisfactory for the congested districts, but a tank mounted on a wagon was necessarily small and frequently had to be refilled. Moreover, only a comparatively small section of a street could be cleaned at one filling of the tank, and the streets cleaned in this way were few owing to the limited amount of equipment the municipality had for this purpose.



CLEVELAND RAILWAY'S FLUSHER CAR—VIEW OF NOZZLE ARRANGEMENT

Prior to the arrangement whereby the railway company flushed the streets it was required under its franchise to sprinkle them, consequently it had a number of service cars for this purpose. When the municipal authorities decided to avail themselves of the provisions of the ordinance, the railway company was instructed to convert its sprinkling cars into flushers. With the advent of the street car flusher it was no longer necessary for the railway company to sprinkle the streets, because the dust and refuse were flushed away sufficiently often to make sprinkling unnecessary to keep down the dust. Furthermore, under the old arrangement the expense of sprinkling its right-of-way was borne by the railway, but under the new plan the city reimburses the company to the extent that it furnishes and maintains the flusher cars, pays the cost of operating them including the wages of the employees and the cost of the power,



CLEVELAND RAILWAY'S FLUSHER CAR—SIDE VIEW OF CAR

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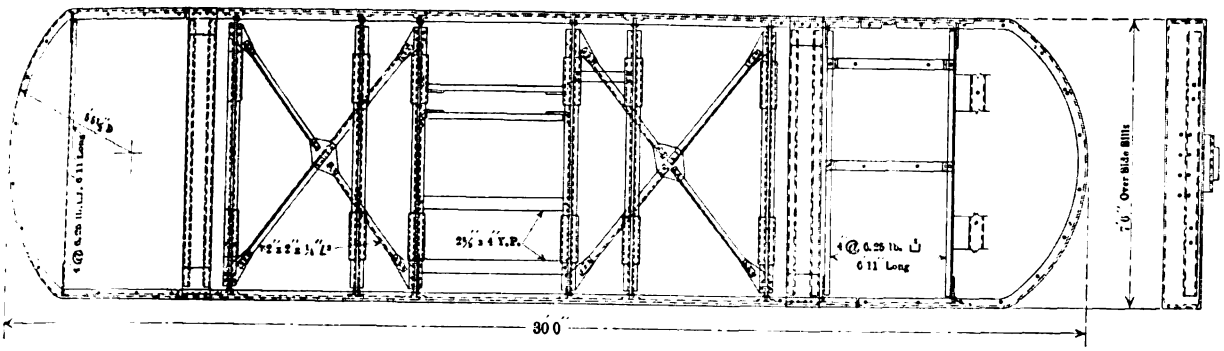

CLEVELAND RAILWAY'S FLUSHER CAR—DETAILS OF UNDERFRAME

but contributes nothing toward fixed charges or for track maintenance and renewals.

CONVERTING SPRINKLERS INTO FLUSHERS

It was a comparatively simple task to equip the old sprinkler tank cars so that they would serve as flushers. A De Laval centrifugal pump, direct connected to a 15-hp. Westinghouse motor mounted on the same base as the pump, was placed on the front platform of the car. The suction line of the pump was connected to the tank as close to the bottom as possible. The discharge line was furnished with a Y fitting, and a line from each branch of the Y connected to a nozzle over each track rail and about 11 in. above them. A quick-opening lever gate valve was placed in each branch of the discharge line and arranged to be opened and closed from the car platform by means of foot-pedal operating levers. Each valve is operated independently so that either or both sides of the street may be flushed. The motor operates at 550 volts or the trolley voltage, and it is equipped with a suitable starting rheostat.

The nozzles are designed to discharge a fan-like sheet of water over the surface of the street, the nozzle on one side of the car being so adjusted as to clean the devilstrip and the track upon which the car operates, and the other nozzle catches the refuse washed from the track and devilstrip by the first nozzle and carries it to the curb, whence it flows to the sewer. Views of the nozzle arrangement are shown in the accompanying illustrations. The flushing nozzles are made of cast brass with inner and outer casings. The inner casing has a narrow slot through which the water passes, and the outer casing has a slot a trifle wider. The width of the stream of water is controlled by turning the inner casing. Under ordinary conditions a slot ¾ in. wide by 6 in. long is used.

After the sprinkler cars which had been converted into flushers had been in operation a short time, they proved so satisfactory that the company was requested to build two additional double-truck flusher cars. This is the type of flusher shown in the accompanying illustrations and its construction is described in detail. An all-steel underframe built of structural shapes was provided to carry the 4488-gal. steel tank. Owing to the weight of this tank when filled with water, the underframe construction is rather heavy, and the 12-in. side-sill channels were each reinforced by a ½-in. x 10-in. plate placed between the flanges of the channels. The tank cradles were made of 5/16-in. plates cut to fit the curve of the tank, and where these cradles rested on the underframe they were reinforced with 4-in. 6¼-lb. channels. Six cradles were installed to support the tank and they were secured to the side sills by connecting angles. Diagonal braces of 2-in. x 2-in. x ¼-in. angles were provided in the underframe to stiffen it against transverse deflection. The bolsters were formed of two 8-in. 11¼-lb. channels placed 4¾ in. back to back and fitted with ⅝-in. x 10-in. cover plates. The other framing shown in the plan of the underframe was installed to support the pump and motor, the air-brake cylinder and grid resistances.

The tank is built of ¼-in. and 5/16-in. plates, and it is 18 ft. 4½ in. long over all and 6 ft. 7 in. in diameter. Angles were placed on the bottom of the tank so that it could be bolted to the supporting cradles, and a manhole and cover were provided to give access to the interior for cleaning and inspection. Brackets secured on the top of the tank support the trolley board, and a ladder beside the manhole was installed for convenience in operating. A De Laval rotary turbine pump, the same as mentioned earlier in the article, having a capacity of 175 gal. of water per minute at a head of 124 ft., was also provided on these flushers. These tank cars are mounted on Brill 27-F trucks, and are equipped with four Westinghouse No. 49 motors and type K control.

While much depends upon the condition of the street and the skill of the operator of these flusher equipments, some idea of their effectiveness may be obtained from the following data taken from the original flusher cars:

Capacity of the tank	3,247 gal.
Width of part of street flushed	25 ft.
Distance flushed	3,500 ft.
Time required	8 minutes

On this basis the double truck or large flushers having a capacity of about 4488 gal. will flush 4850 ft. of street on one side only, in about twelve minutes with one filling of the tank.

Electrical Engineers Discuss Transmission Problems

Discussion at Cleveland Meeting Showed Important Problems to Be Those Connected with Reliability of Service

THE thirty-third annual convention of the American Institute of Electrical Engineers was held from June 27 to 30. The headquarters were at the Hollenden Hotel in Cleveland, where the Tuesday, Wednesday and Thursday meetings were held. Thursday afternoon was spent in an outing at Nela Park, where dinner was served in the evening. The last day of the convention was spent on shipboard cruising among the Lake Erie islands. More than 600 members and guests registered for the convention and the technical sessions were unusually spirited and well attended.

In the technical sessions several papers of interest to electric railway men were delivered. These took up some of the latest problems in power transmission, and they are briefly abstracted below.

Methods of minimizing the duration of unavoidable interruptions to service were outlined in a paper presented by F. E. Ricketts. It was advocated that, since

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the amount of service affected by opening switches depends upon the nearness of the switch to generator, generator switches should not open automatically on overload. A scheme was described for extinguishing short-circuit arcs by interrupting the generator field current and then restoring it before motor-driven apparatus on the line came to a stop. The difficulties arising with synchronous convertors in this connection were pointed out and relay connections for automatically taking care of the converters were described.

The report of the transmission committee, of which Percy H. Thomas, consulting engineer, New York City, is chairman, listed the comments of a number of central station men regarding the effect of altitude on the operating temperature rise of electrical apparatus and the use of grounded neutrals on high-tension transmission lines. It was brought out that the effect of grounding the neutral will not be the same on all systems. Opinion as to the desirability of lower ratings on machines for use in high altitudes was divided.

The experiences of the Public Service Electric Company of New Jersey with the various modern central station protective devices were described by N. L. Pollard and J. T. Lawson. In five years of experience with the arcing-ground suppressor, it has operated in every case of fault to ground. Top and bottom dampers on all air-blast transformers, especially where a common chamber is used, were recommended.

In a short paper, O. O. Rider, assistant to general superintendent, Public Service Electric Co. of Northern Illinois, pointed out the value of the isolating transformer with a 1-to-1 ratio as a means of localizing disturbances on extended systems transmitting energy at moderate voltages.

F. L. Hunt, chief engineer, Turner's Falls Power & Electric Co., gave the results of megger tests made on disk insulators on a 66,000-volt transmission line in central Massachusetts. The cost of testing per insulator on the line varied from 7.3 to 11 cents. The highest percentage of damaged units was found at the line end of the strings.

A method of grading suspension insulators so as to secure uniform distribution of voltage over the various disks of a string was described by R. H. Marvin, electrical engineer, R. Thomas & Sons Co. Grading is accomplished by placing flat metal rings of different size around each insulator cap and stud.

In a paper by E. E. F. Creighton, consulting engineer, General Electric Co., the advantages and disadvantages of the overhead ground wire as a protective device were discussed at length. To render the paper of interest to the greatest number of readers the mathematical portions were segregated as much as possible from the remainder of the text. From a theoretical standpoint, a single grounded wire should be placed as near as practicable to the power wire in order to get the greatest electrostatic protection. It was pointed out that additional ground wires properly placed increased the protection. In general, where more than one ground wire is used a great advantage can be obtained by keeping them as far apart as possible. Mechanical and economic conditions often affect the location of grounded overhead wires.

A bulletin has been issued by the Ohio State University which describes the itinerary taken on an Eastern inspection trip by four instructors and the fourth-year students in mechanical engineering and electrical engineering. The itinerary included a visit to a number of important manufacturing and power generating plants. Two days were spent in Cleveland, two days in Pittsburgh, two days in Niagara Falls and one day in Buffalo.

AMERICAN ASSOCIATION NEWS

Section No. 7 Discusses Safety, Preparedness and Traffic Checks

The last regular meeting of the Connecticut Company section for the season was held on June 13 with a record-breaking attendance of 216 persons. The meeting was preceded by a "shore" dinner. It was followed by a visit to a local theater where a safety film, "The Price of Thoughtlessness," and a number of comic films were shown for the entertainment of the members.

The program of the meeting included a talk by Hon. Russell A. Sears, general attorney Boston Elevated Railway, on "The Reasons for the Safety-First and Preparedness Movements," a talk by R. A. May, comptroller Connecticut Company, on "The Work of the Connecticut Company Section," and a paper by Walter Camp, Jr., traffic engineer Connecticut Company, on "The Duties and Work of the Traffic Engineer."

Mr. Camp said in part: "The main object of the work of the traffic department of the Connecticut Company is to fit the service to the actual riding and to avoid making fixed schedules and then trusting that the riding will adjust itself to them. The day has passed for street railways of any size when any one individual can by his personal observation have sufficient knowledge of the demands for service on the various lines to enable him to adjust and place service where it will do the most good. Our traffic studies are to secure, with the co-operation of the local managers, such details and accurate information of traffic demands that we can tell where to place our cars.

"We have started off with the largest three divisions, New Haven, Hartford and Bridgeport, in each of which is an inspector who makes passenger counts daily at points of maximum load. The checks are taken each day at maximum load points in the direction of heaviest riding. Ordinarily, in-bound cars are checked from 6 o'clock to 10 o'clock in the morning and out-bound cars from 2 o'clock to 7 o'clock in the afternoon. Occasionally all-day checks, requiring two men, are also made.

"Each inspector has a regular printed form on which to make his report, and as each car comes along he puts down the name of the line, the car number, the time of arrival and the number of passengers. Every line is checked about once a week and lines are checked on different days each week, that is, a line checked on Tuesday one week will be checked on Wednesday the following week. Inspectors also note upon their reports matters affecting the service, such as accidents, delays, crippled cars, tie-ups, fires, parades, etc., or reasons for unusual riding such as picnics, games, etc. They also note the weather conditions during the check.

"The records for each line are divided into half-hour periods, and in the office the times at which each car is due at the checking points are entered on the record sheet in a special column and every car more than three minutes off time is checked off. Overloads are checked also, 50 per cent above the seating capacity being considered an overload. Monthly statements are made up for each line showing the number of cars operated, the percentage of cars on time within two minutes, those on time within three minutes and the percentage more than three minutes off time. Cases where cars are more than three minutes off time are investigated. Summaries are also made up for each line comparing the riding during each half-hour period of one day against the corresponding half-hour period of another day."

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EQUIPMENT AND ITS MAINTENANCE

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.

Drying Out Motor Generator Sets

BY J. G. KOPPEL

Electrical Superintendent of Bridges, Sault Ste. Marie, Mich.

During the rainy season while installing a 400-kw., 600-volt, d.c. to 2200-volt 600 hp. a.c. motor-generator set, the windings were exposed to moisture to such an extent that the insulation resistance fell to 1 megohm. This being a low value, it was decided to dry out the stator winding.

The incoming line was three-phase, 60-cycle, 24,000-volt, and the voltage was stepped down to 2200 by three

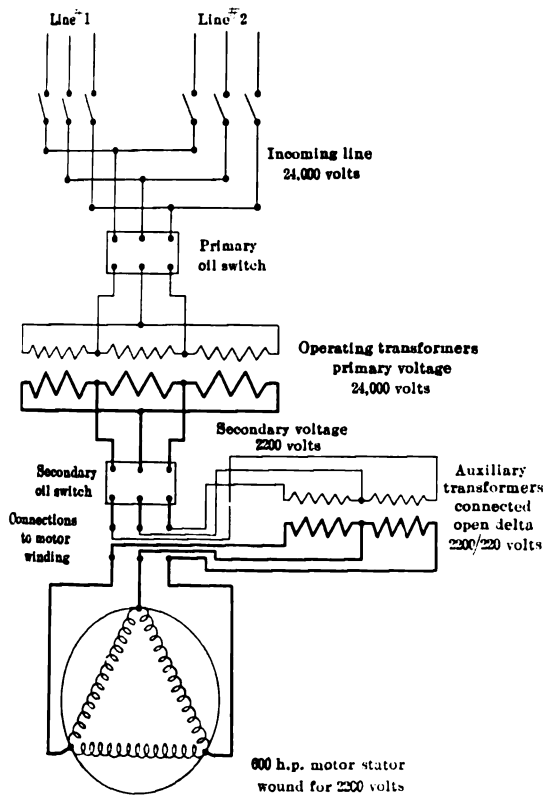
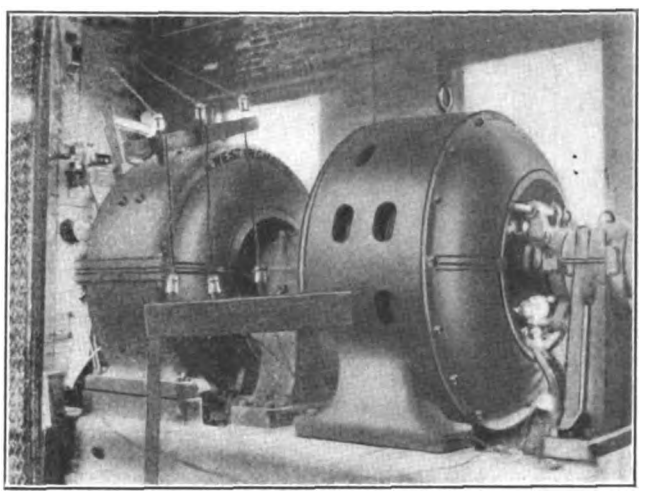


DIAGRAM OF CONNECTIONS FOR DRYING OUT STATOR OF MOTOR-GENERATOR SET

single-phase transformers, each of 185-kva. capacity. The transformers were connected delta-delta and fed the motor stator directly. The leads running from the oil switch to the motor were disconnected, and two 2200 to 220-volt auxiliary transformers were connected in as shown on the accompanying diagram. The transformers, which were brought to the door of the substation in a box car, were secured from the central station supplying the power. A temporary line was run out from the operating transformers to take the primary leads of the auxiliary transformers, and another temporary line was employed to bring in the secondary 220-volt leads to the motor stator.

It required 48 amp. to raise the temperature of the stator windings to 90 deg. C. Readings of temperature were taken every fifteen minutes and an insulation test was made every twelve hours. At the end of three



MOTOR-GENERATOR SET READY FOR DRYING OUT PROCESS

days and three nights the insulation resistance had been brought up to 15 megohms, after which the drying was discontinued and current was cut in for operating the set.

Foundation Resilience and Rail Corrugation

BY T. NORMAN JONES, JR.

Chief Engineer Virginia Railway & Power Company, Richmond, Va.

This company has had, within the last few years, some very interesting experiences with rail corrugations which developed on approximately 2 miles of track. Prior to taking charge of this department in 1911, the writer had had no experience with girder rails in paved streets. His personal experience, therefore, with corrugations dates from 1911, although he found well developed corrugations on many sections of track at that time.

After having carefully inspected various sections of girder rail tracks constructed on various types of foundations, the writer, in the spring of 1912, reached the definite conclusion that track constructed on a resilient foundation was superior to track constructed on a rigid foundation, and that the use of a resilient foundation would greatly retard the development of corrugations. He, therefore, recommended the abandonment of concrete foundations in Richmond, and the use of crushed stone or washed gravel under and partly between the ties, with a slab of concrete partly between and on top of the ties, to support the paving.

Having succeeded in convincing the street committee of the City Council that a change from concrete foundation to crushed stone would be desirable from the city's standpoint, as well as that of the company, the management of the road was permitted by the city to adopt a resilient type of construction. During the summer and fall of 1912 a considerable amount of track was constructed on crushed-stone foundation, which type has been standard with the company ever since.

Confirmation of the writer's belief in the superiority of a resilient foundation over a rigid one is found in the

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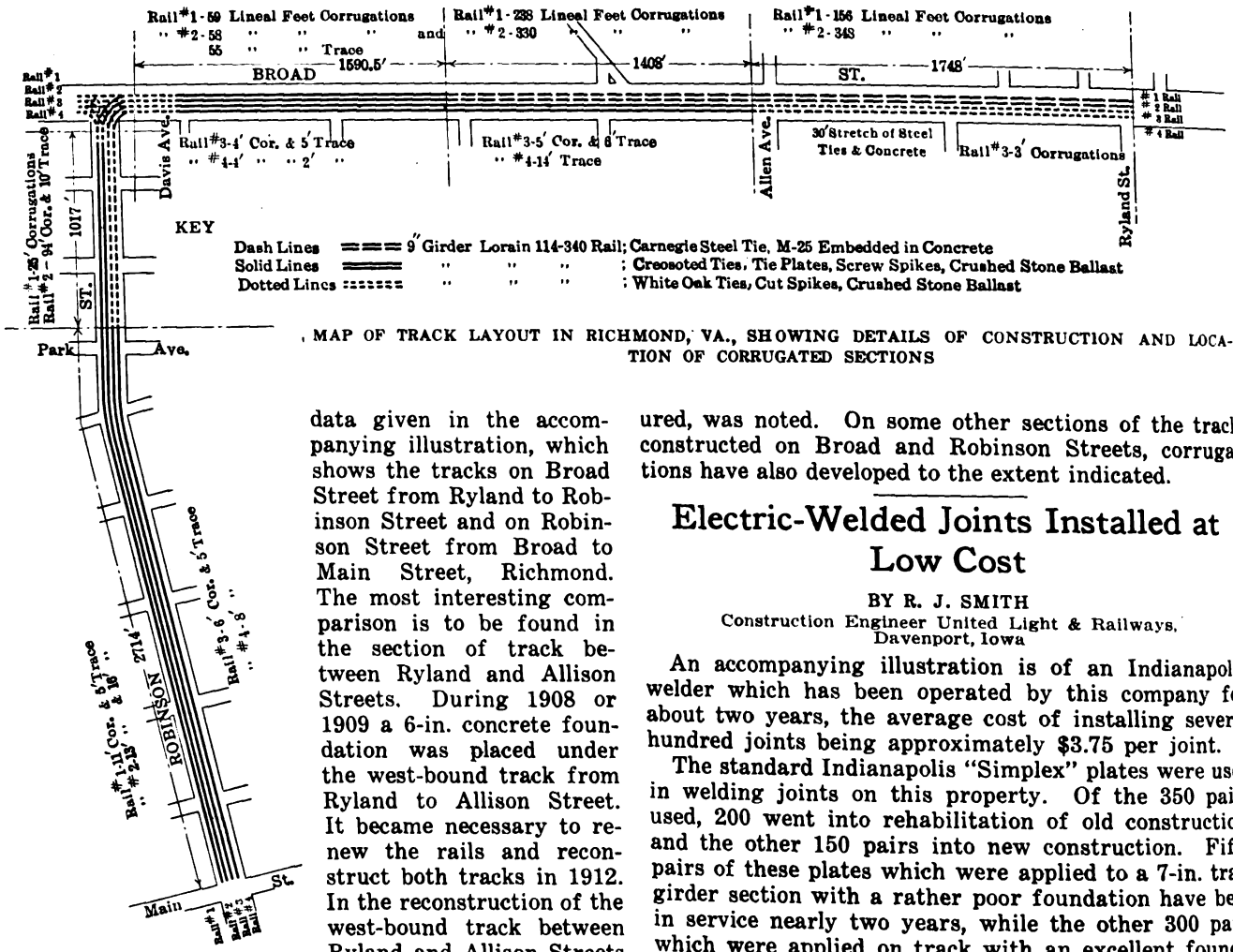


MAP OF TRACK LAYOUT IN RICHMOND, VA., SHOWING DETAILS OF CONSTRUCTION AND LOCATION OF CORRUGATED SECTIONS

data given in the accompanying illustration, which shows the tracks on Broad Street from Ryland to Robinson Street and on Robinson Street from Broad to Main Street, Richmond. The most interesting comparison is to be found in the section of track between Ryland and Allison Streets. During 1908 or 1909 a 6-in. concrete foundation was placed under the west-bound track from Ryland to Allison Street. It became necessary to renew the rails and reconstruct both tracks in 1912. In the reconstruction of the west-bound track between Ryland and Allison Streets the concrete foundation referred to above was utilized, as the concrete was of good quality and the whole base in excellent condition. In the existing concrete foundation, trenches were cut crosswise of the track at 8-ft. intervals. In these excavations Carnegie steel ties were placed and bolted to the rails, and fresh concrete was placed around and under the Carnegie ties to secure them in place.

In the construction of the east-bound tracks between the points above mentioned, the foundation was thoroughly rolled before the placing of crushed-stone ballast, after which the ties and rail were placed. For a portion of the distance, as noted in the illustration, white oak ties were used, the rails being fastened to them with cut spikes. In the remainder of this section, creosoted pine ties were used with tie plates and screw spikes. In order to eliminate the difficulty of working under traffic, a third or temporary track was constructed, over which cars operated during the reconstruction of both tracks.

Over both sections of track cars of the same type have been operated; in other words, the same cars that operate over the west-bound track return over the east-bound track. Some of these cars were equipped with cast-iron wheels, others with steel wheels.

From the data given it will be seen that in both rails of the track on concrete, or rigid, construction there is a total of 1072 ft. of rail affected by corrugation, whereas in the same length of track constructed on a crushed stone, or resilient, foundation, only 8 ft. of corrugation is to be found.

The writer, with an assistant, took the measurements noted but a short time ago. Only rail on which the wave length of the corrugation could be accurately measured, was noted. On some other sections of the track constructed on Broad and Robinson Streets, corrugations have also developed to the extent indicated.

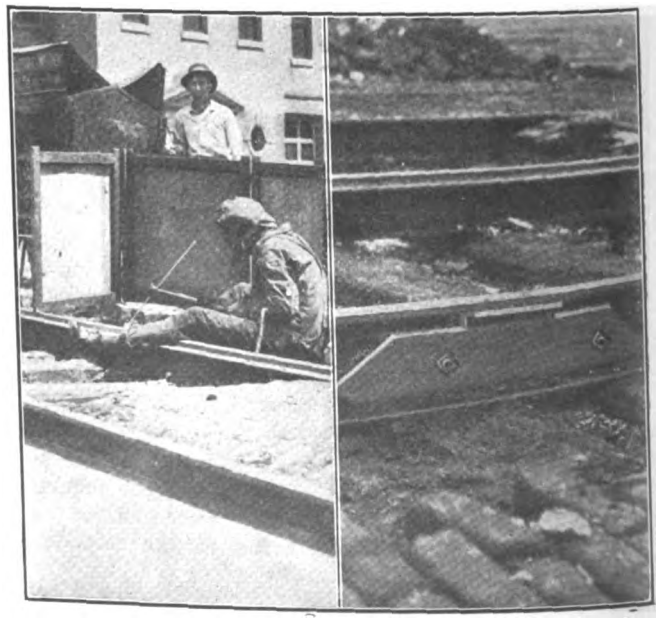
Electric-Welded Joints Installed at Low Cost

BY R. J. SMITH
Construction Engineer United Light & Railways, Davenport, Iowa

An accompanying illustration is of an Indianapolis welder which has been operated by this company for about two years, the average cost of installing several hundred joints being approximately $3.75 per joint.

The standard Indianapolis "Simplex" plates were used in welding joints on this property. Of the 350 pairs used, 200 went into rehabilitation of old construction, and the other 150 pairs into new construction. Fifty pairs of these plates which were applied to a 7-in. tram girder section with a rather poor foundation have been in service nearly two years, while the other 300 pairs which were applied on track with an excellent foundation, and with light traffic, have been in service for only a few months. From this it follows that only the fifty pairs first mentioned can be regarded as having complied with a satisfactory test so far as the mechanical service of the joint is concerned. Electrically, however, they are perfect.

In addition to the above, at Cedar Rapids, we have fixed up some old 45-lb. angle-bar track in paving by putting in new bolts, spotting them with the welder and



BUILDING UP JOINTS BY ELECTRIC WELDING PROCESS; RIGHT-HAND VIEW SHOWS JOINT INSTALLED

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welding the bases of rails to ½-in. bearing plates placed beneath the joints. This work, however, which was undertaken merely as an experiment, is unlikely to produce desirable results because of the generally run-down condition of the track structure as a whole, and should not be given serious consideration. As far as joint work is concerned, the above constitutes the very limited experience of this company, the welder being chiefly engaged in building up cups and in special work.

If a great deal of this kind of welding was to be performed the costs might be slightly reduced through the adoption of an efficient motor-generator set. A power test of the Indianapolis welder made on our property gave the following results: Trolley voltage, 545; current under normal conditions of operation, 198 amp.; current when the welding point was held directly on the rail, 210 amp.; voltage around arc from cable to rail, 25 to 40, average 30; total kilowatts used under normal conditions of operation, 107.9; total kilowatts used at the arc in the process of welding, 5.94; kilowatts lost in resistance 101.9; efficiency 5½ per cent. The total energy per weld was about 50 kw.-hr. The cost of installing the regular "Simplex" joint on this property was as follows:

Cost of one pair of plates	$2.05
Cost of two bolts	.07
Cost of power	.60
Cost of labor	.65
Cost of welding metal	.18
Total	$3.55

If no more than 10 per cent for time lost in delay due to schedule is allowed, three men will install ten joints per day of ten hours, and in exceptional cases a maximum of fourteen. The costs just enumerated do not include overhead charges, interest, depreciation or repairs of plant. These items have been estimated at 20 cents, making a total cost of $3.75 per joint.

The company is at present installing joints complete on about 1 mile of double track, which is laid with Pennsylvania Steel Company's 80-lb. section No. 238 rail, that has been in light service for ten years. This track was poorly laid with four-hole channels and compressed terminal bonds and has been loosened, battered, and kinked at all of the joints although the greater part of the rail is but little worn. The joints were originally laid even, greatly facilitating the rehabilitation, which consists of renewing joint and shoulder ties, replacing the ballast for a distance of 6 or 8 ft. each side of the joint, substituting welded plates for the channels and bonds, inserting "dutchmen" where expansion had originally been allowed, grinding and occasionally building up cups, the placing of 6 in. of 1:3:6 concrete paving base and 1 in. of 1:4 grout bed or "cushion," and the relaying of the old brick with a sand filler.

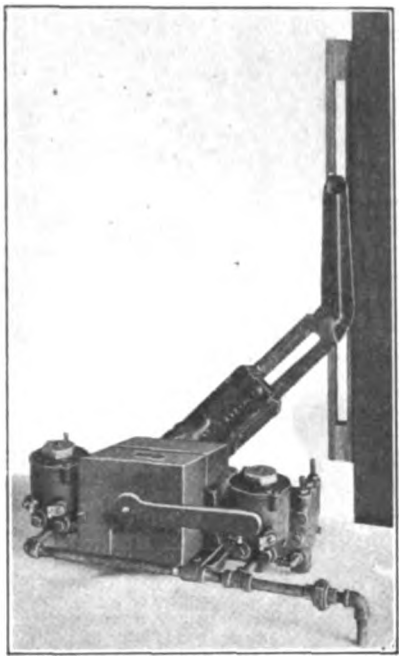
The detailed costs are not yet available but a close approximation based upon the installation of 100 joints with labor at 20 cents per hour is as follows:

Cost Per Joint	
Miscellaneous labor (excavating, tamping, etc.)	$5.00
Ballast	1.50
Ties	2.00
Concrete	3.00
Brick	.25
Plates installed	3.75
Grinding	.50
General	.25
Total	$16.25

About 10 per cent waste in this relaying is being supplied from a stock of second-hand brick. In this work we "cock" the joint up about ½ in. in the endeavor to counteract both the ballast settlement and the set of the ends of the rails downward due to the battering that they had received.

New Type of Door Engine

The Consolidated Car Heating Company has recently brought out a new type of pneumatic engine for closing car doors, illustrated herewith. The engine is electro-pneumatically controlled by the valves which are placed one on each end of the engine. The air is cut off the engine at each end of the stroke. This economizes on the amount of air used as it eliminates all questions of leather leaks. At the same time it permits of atmospheric check or cushioning which has proved to be the most reliable.



NEW DOOR ENGINE FOR NEW YORK MUNICIPAL RAILWAY

The engine has a safety feature by which a small amount of pressure exerted by the passenger will hold up the door in case of premature closing. Further, the door may be pushed open 5 in. when fully shut to release clothing or anything that might be caught in the door. This is the limit of emergency opening, there being a positive stop to prevent a false opening. The engine is extremely light on account of its construction, the cylinders being of brass tubing. The arm, rack and pinion are made of cast steel and are all accurately machined. The engines are controlled by the standard Consolidated type push button for door control, which has been perfected for the past four years.

Fifty equipments of these engines are being installed on fifty cars of the New York Municipal Railway.

A Cast-Steel Wheel with Manganese Tread and Flange

A one-life, cast-steel wheel with a manganese-steel tread and flange and a ductile steel plate around the hub, has recently been introduced in the electric railway field by the American Steel Foundries of Chicago, Ill. This product is known as the Davis steel wheel, and its first cost approximates that of a rolled steel wheel. Its wear life, however, is similar to the wear life of a cast-steel wheel or even better because of the tough wheel tread and flange produced by manufacturing them of manganese steel. The method by which the two kinds of steel are incorporated in one casting was devised especially for the manufacture of the Davis steel wheel. It includes revolving the mold in which the first metal entering is treated with ferro-manganese during its passage from the ladle into the mold where the centrifugal action throws it to the wheel tread and flange. As the pouring continues, the manganese steel rim is gradually blended into a ductile-steel plate and hub by tapering off the ferro-manganese treatment.

The manufacturers claim the advantage of this wheel is that it retains the one-wear principle of the cast-iron wheel and at the same time secures greater strength, safety and a lower maintenance cost. It also avoids the disadvantages of a rolled steel wheel introduced by

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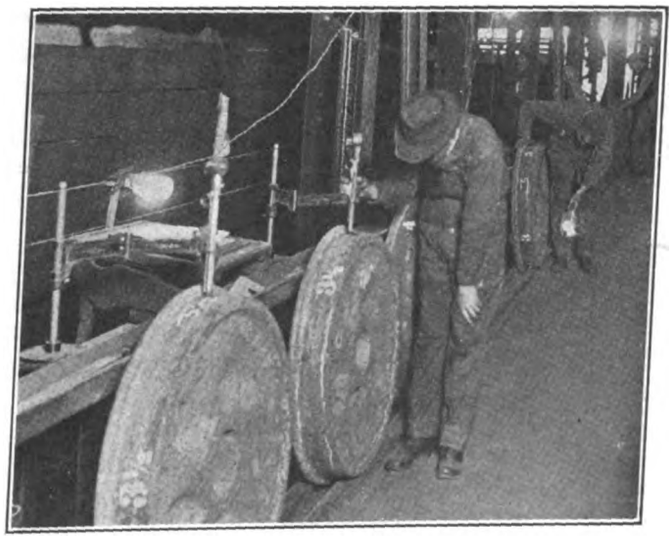
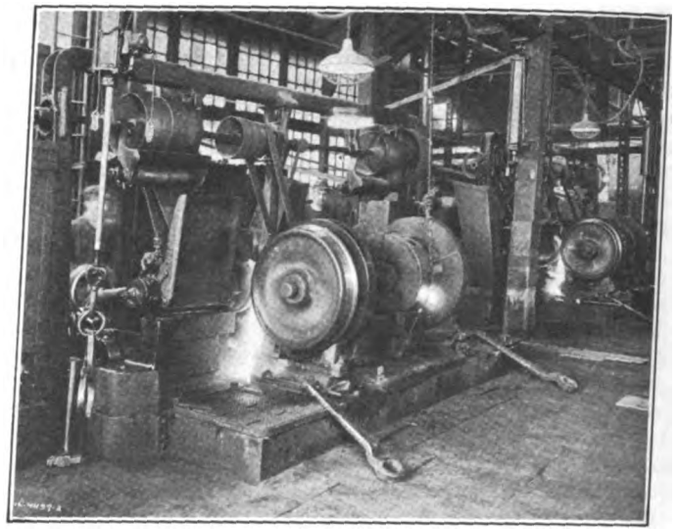


CAST-STEEL WHEEL RECEIVING HARDNESS TEST



TRUING CAST-STEEL WHEEL BY GRINDING

turning which must be followed by adjustments in the bearings and brake rigging whenever wheels are changed. The following are service data for 83,000 Davis wheels under 40- and 50-ton equipment.

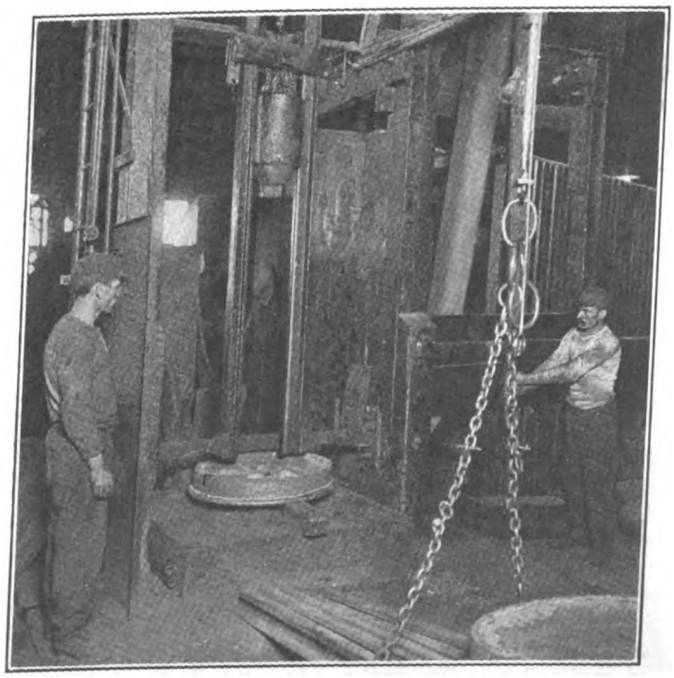
Periods of Service:
4,000 in service for 3 years and 11 months.
10,400 in service for an average of 3 years and 7 months.
59,600 in service for an average of 2 years and 7 months.
83,000 in service for an average of 2 years and 4 months.

Record of Service:

Worn wheels removed	69	(1/12 per cent)
Damaged wheels removed	60	(1/15 per cent)
Defective wheels removed	56	(1/15 per cent)
Slid-flat wheels removed, reground and returned to service	482	(7/12 per cent)
Total number removed, eliminating "slid-flats," which have been reground and put back in service	185	(1/5 per cent)

Only fifty-six wheels were removed because of defects, out of a total of 83,000.

Other important claims for this one-life, cast-steel wheel are that cars are not held out of service as long as would be the case when wheels are turned, and the higher resistance to wear maintains a practically uniform wheel diameter throughout their life in the trucks. Fewer wheels are also required in stock because turning is unnecessary and this also tends to reduce the labor materially. In order to insure perfect rotundity, the treads of all Davis wheels are ground to contour, and this greatly minimizes the possibility of wheels sliding when the brakes are applied, hence the possibility of slid-flats with this particular type of wheel is practically removed. Wheels undergoing this grinding treatment are shown in one of the accompanying illustrations.



CAST-STEEL WHEEL UNDERGOING DROP TEST

It is also of interest to note that every wheel is subjected to a drop test. Each wheel is laid on an anvil with three points of support, where it is given a blow with a 500-lb. hammer dropped from a height of about 6½ ft. This test is made after the wheels have been ground true and tempered. The impact test is made sufficiently severe to reveal all casting imperfections, and at the same time not permanently to affect the strength of the wheel. In addition to this each wheel is tested with a scleroscope for uniform hardness and it is also taped to determine the uniformity of diameter. A view showing the application of the hardness test and a wheel undergoing the impact test are shown in the accompanying illustrations.

The extraordinary strength and resistance to wear obtained by the combination of metals in the Davis steel wheel, makes it possible to produce them in weights lighter than could be obtained with any other metal. Moreover, being a one-wear wheel it carries no added thickness at the rim and this, together with other reductions in the wheel sections, makes it approximately 20 per cent lighter than the cast-iron or the multiple-wear steel wheels. Actual tests have shown that this product has a flange strength of approximately eight times that of a cast-iron wheel under an impact test and four times that of a cast-iron wheel under a static load test. These tests also indicate that these wheels have a strength equivalent to that of rolled-steel wheels.

The tests from which these results were obtained were conducted by Prof. L. E. Endsley of Purdue University, at the East St. Louis, Ill., plant of the American Steel Foundries, November, 1913. The average maximum static load on the flanges of the Davis wheels was 381,000 lb., that for the rolled-steel wheel was 386,500 lb., and that for the cast-iron wheel 111,250 lb. Under the impact test the strength of the rolled-steel wheel and the Davis steel wheels was about the same, while the cast-iron wheel flange was broken with every 10-in. blow of a 1640-lb. hammer in a standard M. C. B. coupler drop-testing machine. In no case were the flanges of the Davis or the rolled-steel wheels broken off under this height and, in fact, fifty 10-in. blows did not cause a

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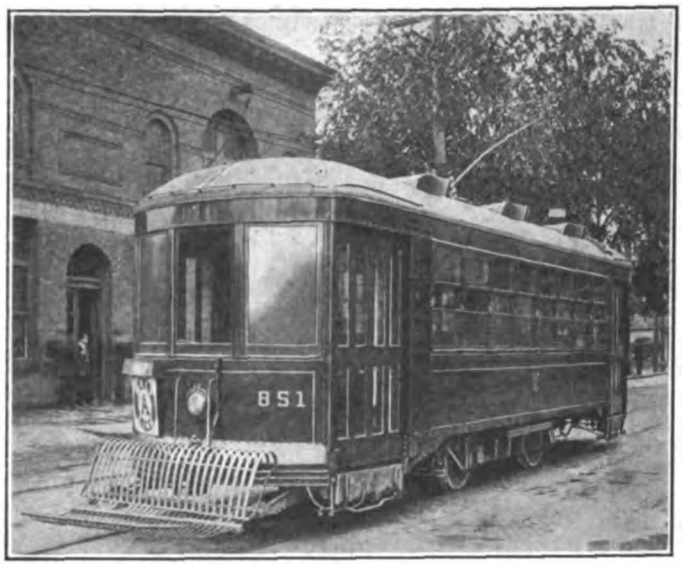
single failure. Neither the Davis wheel nor the rolled-steel wheel flange failed after fifty blows with a drop of 20 in., and each Davis wheel stood at least four blows with a 40-in. drop of the hammer before a fracture occurred. In actual tests none of the steel wheels were broken under less than a blow from a height of 80 in.

Professor Endsley also made friction tests in a standard M. C. B. brake shoe testing machine with a standard cast-iron brake shoe and a rail shoe made of a piece of 80-lb. rail bent to conform to the wheel contour and of the same length as the standard cast-iron brake shoe. This test showed that the coefficient friction between the Davis wheel and the standard cast-iron brake shoe was approximately the same as that for the cast-iron shoe and the rolled-steel wheel. The coefficient of friction between the Davis wheel and the rail shoe, however, was from 9 per cent to 48 per cent higher than that for either the cast-iron or the rolled-steel wheels. This quality is of great advantage in starting acceleration as it reduces the amount of wheel slippage.



EXTERIOR VIEW OF ALBANY CAR

Single-Truck, Arch-Roof Cars of the United Traction Company, Albany

An instructive example of superior service economically rendered is afforded by the substitution of modern single-truck cars weighing 22,000 lb. each for double-truck cars weighing 48,000 lb. each on the Belt Line of the United Traction Company, Albany, N. Y. The headway has been cut from seven to five minutes with considerable satisfaction.

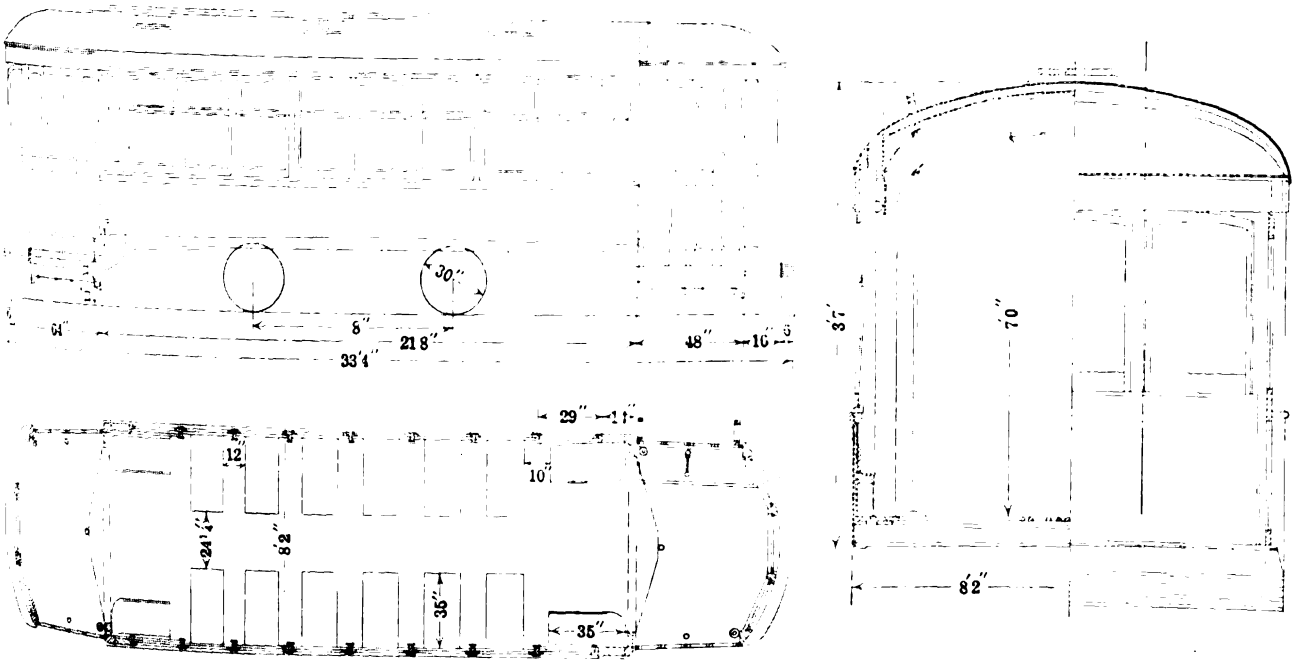
The United Traction Company now has in service fifteen of these cars, built by the Wason Car Company, and ten more are under construction by the Laconia Car Company. The first three cars went into operation on March 25, 1916. Their general dimensions and other data are given in the accompanying table.

The bottom framing is of steel throughout with ⅛-in. steel girder plates bent around the corner posts from bulkhead posts to bulkhead posts and riveted to the lower sill angle, which is made in one length and spliced in the center of the end sill. The cross joists are punched to receive 1½-in. loricated motor wiring conduit. All door posts, corner posts, belt rails, letterboards and carlines are of steel; the side and corner posts are riveted at the bottom to the lower sill angles and side girder plates and at the top to a steel letterboard, which is L-shaped with a web of sufficient depth at the top to make a suitable fastening for the steel roof carlines. The roof is of plain arch type, with steel carlines with poplar roof boards. It carries six Automatic ventilators.

The interior finish is red cherry. The inside lining below the sash rests of the car body is ½-in. cork glued to the side plates and covered with 3/16-in. Agasote in fourteen cars and of Nevasplit in one car. The headlining is of 3/16-in. Agasote. The cars are painted olive-green with gold lettering.

The cars are arranged for double-end pay-within operation, with two double-hinged folding doors on both sides of each platform, folding outward and closing

Length over bumpers	33 ft. 4	in.
Length over corner posts	21 ft. 8	in.
Length of platform from outside of dash to corner posts	5 ft. 4	in.
Width over girder plates	8 ft. 2	in.
Height from under side of the sill to the top of the roof	8 ft. 7¾	in.
Height from rail to the top of the floor at the corner posts, maximum	33	in.
Height from floor to the top of { in center of car	27⅝	in.
the sash pocket cover { at corner post	29⅝	in.
Width of opening between vestibule corner post and the car-body corner post	40	in.
Width of letterboard	9¾	in.
Weight of body completely equipped within	10,000	lb.



ELEVATIONS AND SECTIONS OF ALBANY SINGLE-TRUCK CARS

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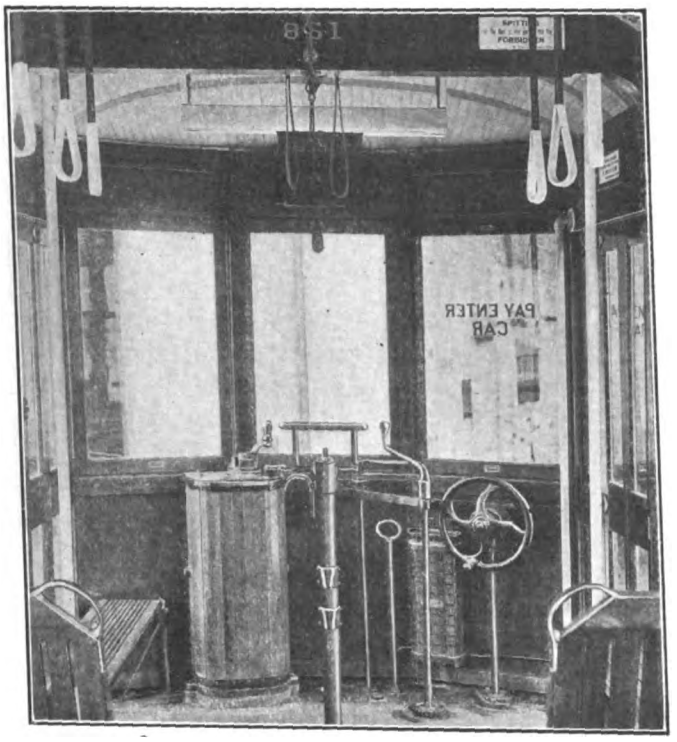
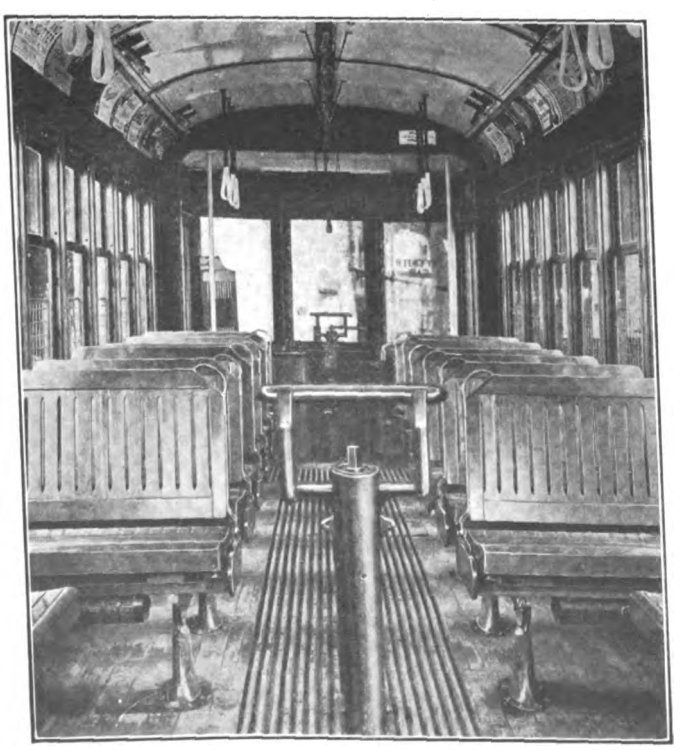


FRONT PLATFORM OF ALBANY CAR

against the edge of the platform. The doors are hand-controlled in connection with a folding step, and are operated in connection with the National Pneumatic Company's interlocking safety door control, which does not permit the cars to start until all doors are closed. The successive levels of these cars are as follows:

Ground to step	13 in.
Step to platform	11 in.
Platform to body floor	9 in.
Ramp to center of car	2 in.

The cars are fitted with the new Brill Renitent posts, Curtain Supply Company's window fixtures, and Pantasote curtains. The seating is made up of twelve transverse seats, four longitudinal corner seats and one folding seat in each vestibule. These seats, furnished by Heywood Brothers & Wakefield, are of wood with reversible backs and have pedestals and ends of pressed steel.



INTERIOR VIEW OF ALBANY CAR

Each car is mounted on a Taylor truck carrying two Westinghouse 323-B motors. The control is K-36. The heaters, thermostatic control and passengers' buzzers are Consolidated. The fare collecting equipment embraces Dayton straight-cash fare boxes and International R-5 registers.

The safety features of these cars include Peacock improved brakes for service applications, Brill vertical wheel brakes for emergency use on steep grades, Mason treads for all steps, Rico anti-climbers, Providence fenders, De Witt Simplex sanders, and Crouse-Hinds headlights.

Power Station Records in Havana

The annual report for 1915 of the Havana Electric Railway, Light & Power Company gives some interesting statistics in regard to the operation of the company's new power plant, described in the ELECTRIC RAILWAY JOURNAL for May 15, 1915. Although completed in 1914, and in continuous operation since October of that year, it was necessary to keep some of the old power plants in operation until the entire distribution system was completed, so that it was not until June of last year that the new plant furnished all of the power used by the company in Havana and its suburbs. The following facts and statistics of operation appear in the report.

There are three turbine-generators each of 12,500 kw. capacity for continuous operation and 15,000 kw. maximum capacity, and the turbines are now fitted and adjusted for best economy at 10,000 kw. The highest hour during 1915 was 12,700 kw. and the largest observed load was 13,400 kw. The average load during December, the heaviest month of the year, was 5364 kw., which is 53.64 per cent of the most economical capacity of one generating unit. A serious disadvantage which no large steam plant in Havana can avoid is the high temperature of the condensing water, which averaged 80.7 deg. Fahr., with a maximum of 88 deg. and a minimum of 71 deg. Even this, however, is better than the water of the Gulf Stream, which laves the north shore of this part of Cuba and averages about 83 deg. The harbor water is a little cooler, due to the flow from inland streams.

STATISTICS OF POWER PLANT OPERATION

	1914	1915		
	12 months	First half	Second Half	December 1915
Plants in operation	3-4	3	1	1
Net output, kilowatt-hours	39,688,427	20,536,737	21,649,365	3,970,366
Coal consumed, tons (gross)	74,797	26,870	20,234	3,613
Coal per kilowatt-hours, pounds	4.26	3.026	3.095	2.040
Total number of plant employees	239	229	100	98

The report says that the kilowatt-hour total output during 1914 and the first six months of 1915, shown in the preceding table, is probably too high, because the measuring instruments in the old power plants were antiquated and not nearly as reliable as the new equipment, and the load is known to have increased during the year, due to the growth in both railway and lighting and power demands. Hence the contrast between coal used per kilowatt-hour should be greater than that shown. The coal rate and other costs of operation in the power plants already compare favorably with those of large modern plants in the United States, in spite of the very small proportion of the plant capacity now employed, and as the output increases the company expects that the cost will decrease still further.

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NEWS OF ELECTRIC RAILWAYS

THOMPSON TOUCHES MANY TOPICS

Committee at Work Since Spring of 1915 Concludes Its Sessions—Will Report to Next Legislature

The Thompson legislative investigating committee ended its official existence on July 1 without developing anything in the nature of a sensation. The brief session was devoted almost entirely to the hearing of testimony relative to the illuminating concerns doing business in New York City.

Recent witnesses before the committee have included Comptroller Prendergast of New York City; Walter G. Oakman, formerly a director of the Interborough Rapid Transit Company and a trustee of the estate of the late Andrew Freedman; Daniel L. Turner, assistant chief engineer of the Public Service Commission; Howard Abel, auditor of the Brooklyn Rapid Transit Company; Henry B. Seaman, formerly chief engineer of the Public Service Commission; William H. Allen, head of the Institute of Public Service and formerly with the Bureau of Municipal Research; Col. T. S. Williams, president of the Brooklyn Rapid Transit Company; William Merican, president of the New York Newsdealers Association, and August Belmont.

The session at which Mr. Belmont was examined on June 29 was staged amid unusual surroundings. It had to do for the most part with the exclusion of the *Masses*, a socialist publication, from the newsstands in the subway by Ward & Gow, who hold the contract for the newsstand privileges. There were many well-known persons on hand to listen to the testimony. Among those of national prominence who attended the session were Mrs. Rose Pastor Stokes, Rev. Percy Stickney Grant, Inez Milholland Boissevain, Warden George W. Kirchwey of Sing Sing, Mr. and Mrs. Amos Pinchot, Lincoln Steffens, Prof. John Dewey and Prof. Charles Fagnani. The questions directed at the witness had to do entirely with the reasons of the exclusion of the paper from the newsstands. Previous to the introduction of this testimony, Mr. Oakman refused to permit the committee to examine the private papers of the Freedman estate. He said that he did this on the advice of counsel. Other matters inquired into recently by the committee were the removal of the offices of the Public Service Commission from the Tribune Building to the Equitable Building, the probable returns to the Interborough Rapid Transit Company under the dual subway contracts and the attitude of Comptroller Prendergast with respect to the rapid transit contracts. Artemas Ward explained that the lease originally held by his company for the newsstand privileges in the present subway had been renewed in December, 1915, to run for fifteen years from Jan. 1, 1914. The Interborough Rapid Transit Company received about $900,000 a year for the newsstand rights. Ward & Gow had 1200 stands on the lines, and last year their profit was about $1 a stand. Mr. Ward said that the rental paid under the new contract was about double that on the previous contract and that the privileges were about the same. The hope of the company lay in the prospects for business on the new lines soon to be opened.

The legislative committee, of which Senator George F. Thompson was chairman, was appointed in the early spring of 1915 for the avowed purpose of investigating the Public Service Commissions. The committee held a number of sessions during the first weeks of its existence and examined a score or more witnesses, including the Public Service Commissioners. William Hayward was then counsel to the committee. The committee filed charges against three of the Public Service Commissioners, including Chairman Edward E. McCall, but they were dismissed by Governor Whitman. The committee kept at its investigation in a desultory fashion during the summer of 1915, and then adjourned until September. From the middle of last September until July 1 the committee had been in almost continuous session. The most far-reaching result gained was the removal or resignation of all the Public Service Commissioners who were in office when the committee began its work. Chairman Edward E. McCall was removed by Governor Whitman when charges were filed against him a second time; Commissioner R. C. Wood resigned and later was indicted by the Grand Jury on a charge of soliciting a bribe; Commissioner George V. S. Williams resigned under threat of charges, and Commissioner J. Sergeant Cram was not reappointed when his term expired. The term of office of Commissioner Milo R. Maltbie expired soon after the appointment of the commission, and William Hayward was appointed in his place, Mr. Maltbie accepting the position offered to him by Mayor Mitchel of Chamberlain of New York City. An entirely new set of commissioners came into office with Oscar S. Straus as chairman.

SPRINGFIELD AND WORCESTER WAGES ADJUSTED

A uniform increase of 25½ cents a day has been granted to all conductors, motormen and messengers in the employ of the Springfield (Mass.) Street Railway. The increase represents an advance of 11 per cent for the employees in the minimum grade and an advance of approximately 9 per cent for the employees in the maximum grade of the service. The present day rating, based on nine in eleven hours, has been retained. The agreement reached by the officials of the company and the representatives of the men has been ratified by the men. All employees in the other branches of the service have received material wage increases.

The principal changes in the new agreement relate to wages and conditions. The life of the agreement will be two years instead of one, as heretofore, provision being made for an adjustment of differences that might arise by means of a conference board and as a last means arbitration. The new wage scale provides an increase for the men in the employ of the company during the first six months, from $2.30 a day to $2.55½; for the second six months of service an increase from $2.45 to $2.70½ a day; for the second year men an increase from $2.60 a day to $2.85½ a day; for the third year men, an increase from $2.70 a day to $2.95½ a day; for the fourth year men and thereafter, an increase from $2.85 a day to $3.10½ a day. All messengers, motormen and conductors doing work on the sand cars from midnight till 4.30 o'clock in the morning will be paid time and half-time. This same rating will apply for storm-work. All motormen, conductors and messengers who are called on to instruct new men receive 5 cents an hour additional for this service.

It is provided that all unclassified service employees shall receive an increase of 12½ per cent over their present ratings. This, however, is exceeded in the minimum grades of the service. In such cases common laborers receive a minimum of $2 a day. The section of the agreement pertaining to the minimum schedules provides that where the 12½ per cent does not bring the present wage up to $2, then such wage shall be increased to that amount. If the increase added to the present wage of any employees brings the wage to more than $2 and less than $2.25, then the wages of this class shall be increased to $2.25 a day. The shop, carhouse, track and line employees, who have always worked eight hours on Sundays and holidays, will also receive full pay for eight hours on Saturday. This, however, affects only men who work the full seven-day schedule. These men are now granted time and a half for all overtime instead of straight time, as before. Men called out for emergency work on Sunday are assured pay for a day's work. Where the full day is worked the rate of pay is made on an overtime basis of time an a half.

A similar agreement covering the wages of employees of the Worcester (Mass.) Consolidated Street Railway has been approved by the men on that property. The lines in Springfield and Worcester are controlled by the New England Investment & Security Company.

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CENTRAL'S WEST SIDE IMPROVEMENT PLANS INDORSED

At a special meeting on June 30, the Chamber of Commerce of New York approved, without a dissenting vote, the report of the committee on harbor and shipping, indorsing the proposed contract between the city and the New York Central Railroad, known as the West Side plan, which contemplates the removal of the railroad's freight tracks from grade, their electrification, and the organization of a modern terminal system on the west side of Manhattan. The committee said in part:

"Your committee believes that it is not within the province of a commercial body to pass judgment upon the intricate engineering and financial details necessarily a part of such a contract. Approval or disapproval by this chamber must be based upon broad principles, and the committee accepts the statement of the terminal committee of the Board of Estimate that the financial features of the proposed contract have been carefully safeguarded and the engineering and landscape details have been approved by competent professional judgment. It is natural that a difference of opinion should arise over the merits of many details of a matter of such far-reaching importance, but the committee submits that the views of the city officials who have given long and intimate study to the problem should be upheld, unless a positive and important reason to the contrary be advanced."

The advisory council of real estate interests, which has approved the plans for the New York Central's improvement of the west side of Manhattan, has made public its report of investigations of the several objections raised by civic and property owners' associations to some of the technical details in carrying out the agreement between the city and the railroad company. The report said:

"Mr. Olmsted seems to fear that if the tracks are covered over between Seventy-second and Eighty-second Streets there would result a mound which could not be treated artistically. Mention is also made of contours. The great artist is he who can take conditions as he finds them and produce good results.

"There is no doubt in my mind that Mr. Olmsted is a great artist and could produce a satisfactory park with real good landscape effects if he were given the job after the tracks were all in and covered over as now planned.

"In regard to the second point raised by Mr. Olmsted, namely, the cutting off of the view from Riverside Drive, it does seem as though this is a minor matter, as the part in question is only for about two blocks. I doubt very much if the view of the river would be cut off as much as Mr. Olmsted says would result."

HAITIAN DEVELOPMENT PROPOSED

According to the *Wall Street Journal* plans have just been completed for the creation under New York State laws of the Haitian-American Corporation to acquire existing public utilities in Haiti. These consist of terminal facilities, a railroad, electric light plants and a tramway in the capital city of Port-au-Prince and the adjoining agricultural valleys of Cul de Sac and Leogane and an electric light plant in the city of Cap Haitien. The public utilities to be acquired are owned by Europeans and have been in existence for some years and are operated under concessions from the Haitian Government. The financial structure of the new Haitian-American Corporation will consist of $6,000,000 of 7 per cent cumulative, convertible preferred stock, of which $5,500,000 will be issued and $500,000 will be reserved. This stock will be retirable at 110. Of $12,000,000 of 7 per cent non-cumulative common stock, further participating after payment of both preferred and common stock dividends, $6,000,000 will be issued, of which $250,000 will be held as treasury stock, and $6,000,000 will be reserved. There will be 60,000 founders' common shares, entitled to one-third of the remaining earnings after payment of fixed dividends on both preferred and common stocks.

Financing of Haytian-American Corporation will be undertaken by Chicago and New York banking interests, which include Lawrence Turnure & Company, New York; Breed, Elliott & Harrison, Chicago, and P. W. Chapman & Company, Chicago and New York. Interests associated with the Cuban-American Sugar Company and the South Porto Rico Sugar Company are expected to be in charge of sugar developments. The West India Construction Company, identified with these two sugar companies, will take in hand the Haytian-American Corporation plans.

AGREEMENT REACHED ON CINCINNATI WAGES

By a vote of 1100 to 139, taken on June 29, the employees of the Cincinnati (Ohio) Traction Company accepted the wage agreement formulated by the representatives of the union and of the company during the previous week. Under this agreement the wages are advanced each year for three years. The new scale went into effect on July 1.

For the year 1916-1917 first-year men receive 23 cents an hour; second-year men, 25 cents; third-year men, 26 cents; fourth-year men, 27 cents; fifth-year men, 28 cents; sixth-year men, 29 cents, and seventh-year men, 30 cents. For the year 1917-1918 first-year men will receive 24 cents; second-year men, 26 cents; third-year men, 27 cents; fourth-year men, 28 cents; fifth-year men, 29 cents, and sixth-year men, 30 cents. For 1918-1919 first-year men will receive 24 cents; second-year men, 27 cents; third-year men, 28 cents; fourth-year men, 29 cents and fifth-year men, 30 cents.

During the first year of the agreement men will have to be in the service for six years before they will receive the maximum wages. During the second year they will have to be in the service for five years, and during the third year they will have to be in the service for four years. Under the old agreement men were required to be in the service seven years in order to receive the maximum wage. Overtime is to be paid for as time and one-third.

Men operating the owl car service are not to be asked to do extra work at any time. All straight day runs are runs through a continuous period of not less than nine nor more than nine and a half hours. All day runs are to leave the carhouses not later than 7 a. m. and all afternoon runs of nine hours or more are to be considered late runs. Where it is shown that short runs can be coupled so as to make a full run this is to be done. All substitutes are to be guaranteed a minimum of $52.50 per month.

At divisions where pay-enter cars are operated the company is to supply each conductor change amounting to not less than $10 for each regular run taken out. All grievances are to be submitted to the company and if an agreement cannot be reached, they are then to be submitted to arbitration. The board in each case is to consist of three men, one chosen by the company, one by the union and these two are to choose a third. If the two cannot agree upon a third, the board of arbitration and conciliation is to make the selection.

Among the things asked by the men was the employment of union men only, an increase of the minimum wage from 20 cents to 25 cents and the maximum from 27 cents to 33 cents. The first demand was not granted. The figures for wages noted previously represent a compromise agreeable to the men.

ROCHESTER COMPANY TO MEET RECOMMENDATIONS IN JITNEY CASE

At an informal conference with the Public Service Commission for the Second District of New York at Albany on July 5 officials of the New York State Railways indicated that they will render substantial compliance to all the recommendations imposed by the commission when it dismissed the applications of the Rochester jitneys for permission to compete with the electric railway. The conference on July 5 did not concern subjects such as new lines and rerouting old ones, upon which the Rochester Chamber of Commerce had asked the commission to withhold final action. With regard to rearrangement of the company's present facilities for better service the company indicated that it would do all that was required.

Horace E. Andrews, president of the New York State Railways; Robert M. Searle, vice-president, and E. J. Cook, general manager of the Rochester lines, promised that two new emergency trucks would be put into service immediately; that the equipment of electric switches would be added to and that checks of travel would be made anew. The officers of the company believe that their present telephone system

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is adequate, but will confer with Charles R. Barnes of the commission with a view to possible improvements. Additional seats and a crosstown bus line for the north side will also be the subjects of conference as to details.

The removal of the cause for delays at the State Street carhouse is up to the city, according to Mr. Andrews. All that is needed to enable the company to take the network of tracks out of State Street and to so arrange the carhouse that movements can be made absolutely without delay is the approval of the company's plans by the city authorities. These plans, submitted to the commission on July 5, provide for putting all of the switches within the building line on the company's own property. The additional property needed for this is under option and will be bought as soon as the city approves. Better transfer facilities between the local and interurban cars for Fairport will also be the subject of a conference into which the lines of the Empire United Railways, Inc., will be asked to come. Mr. Andrews told the commission that the company had made no progress toward lines through Chili Avenue, Clarissa and Alexander Streets. He said that a few persons by standing on their rights as property owners, are preventing the proper development of these lines.

In order to accommodate the traffic conditions on the north and east sides, the company evidently, from remarks made at the hearing on July 5, contemplates the establishment of a north side crosstown bus line over the Driving Park Avenue Bridge. The president of the company stated, however, that if the company adopted this plan he could not guarantee a flat rate charge of 5 cents for the service. He believed that the plan could be worked out satisfactorily with an additional charge for the transfer which would have to be used in connection therewith. This matter is to be taken under consideration.

CONDITIONS IN FRENCH ELECTRICAL INDUSTRY SHOULD INTEREST AMERICANS

The issue for June 28 of the Daily Consular and Trade Reports, published by the Bureau of Foreign and Domestic Commerce, Department of Commerce of the United States, was devoted entirely to a review of conditions in France by Consul General A. M. Thackara at Paris. In discussing the electrical industry, Mr. Thackara said:

"There was great activity in the electrical industries of France during 1915. The plants were kept well employed in supplying the heavy demands for electrical material of every kind for the equipment of factories. There were large orders placed for direct-current motors for operating machine tools and other machinery, and important contracts were made for the equipment of hydroelectric plants.

"None of the leading French railway companies contracted for the new electrification of their roads in 1915, and trade in material for electrical railways and tramways was confined almost exclusively to repair work.

"There was a notable increase in the manufacture of metal-filament lamps in France during 1915 and the output would have been much greater had there not been a great scarcity of glass bulbs.

"Prices in the electrical lamp trade, which had been seriously depressed by foreign competition before the war, became much more favorable, notwithstanding the great increase in the cost of production. As a rule all the prices for electrical products have advanced considerably. As most of the output was furnished to plants working on war orders the question of prices was not as important as that of speedy deliveries.

"The prospects for the French electrical industry appear bright. After peace is restored there will be a period of intensive activity. Many of the important industrial plants, especially mining and metallurgical industries, are situated in the invaded districts and probably have been either destroyed or badly crippled, and for the re-establishment of these plants and for the creation of new industries that are projected for manufacturing in France many products that were imported from enemy countries, a great quantity of electrical and other machinery will be required. The situation is of intense interest to American manufacturers, as they will undoubtedly be called upon to supply many of the wants of the French consumers."

ADDITIONAL TAXES CONSIDERED IN TOLEDO

Mayor Milroy and Director of Finance Diemer met with the sub-committee of the Milroy street railway committee at Toledo, Ohio, on June 23 in order to learn the opinion of the members on a plan to assess the Toledo Railways & Light Company for the use of the streets and the interurban companies for the use of the bridges. N. D. Cochran said that when a public utility company was assessed an extra tax for any purpose it simply charged it to operating expense and in one way or another exacted the sum from the patrons of the service. Low fares would come only as the taxes of the company were kept down. Johnson Thurston, president of the commission, expressed the opinion that it was manifestly unfair to raise funds from the company for any purpose other than the purchase of the road. It was important to gather funds as rapidly as possible for the purchase of the property, but the wants of the people had become so great that it seemed necessary to raise money from other sources than the tax duplicate. For this reason he did not oppose the movement at this time. Secretary Usher expressed a similar opinion. All the members agreed that the people would vote in favor of a special bond issue to supply the needs of the city when they were shown the need of it in the right manner. They believed that it was a mistake for the city to make too many special assessments. They also went on record as favoring a more equitable distribution of the tax burden.

Boston Wage Offer Rejected.—The compromise offer of the Boston (Mass.) Elevated Railway of a flat increase of 1 cent an hour for the first year, ½ cent an hour for the second year and 1 cent an hour for the third year was rejected by the union of employees at a meeting on the night of June 30.

Increase for Bristol Employees.—The Bristol & Plainville Tramway, Bristol, Conn., operating 13 miles of line, has increased the pay of its trainmen from a sliding scale ranging from 24 cents to 29 cents an hour to one ranging from 26 cents to 32 cents an hour. Ten cents an hour extra is paid for overtime.

Battery Car Service Between High Point and Thomasville.—The Carolina & Yadkin River Railroad has placed a storage-battery car of the Railway Storage Battery Car Company in regular service on its line between High Point, N. C., and Thomasville, a distance of 7½ miles. There is a thirty-minute service between the terminals. The fare is 15 cents. The car is charged at the station of the railroad in High Point.

Detroit Carhouse Burned.—Service on the Chene Street extension of the Detroit (Mich.) United Railway was interrupted on June 26 due to a fire which destroyed the North Detroit carhouse, two double-truck cars and a single-truck car. Only two cars kept at this house were untouched—a double-truck car and a trailer, which, luckily, were outside of the carhouse and some distance away. The loss is estimated at $35,000.

Richmond Company to Pay Employees With Colors.—The Virginia Railway & Power Company, Richmond, Va., has announced that it will pay all regular employees who are called to the colors an amount which, together with the compensation they receive from the Government, will equal their present salary. This applies to men on the monthly pay rolls. Other employees will be paid an amount which, together with the compensation received from the Government, will equal the average pay received for the three months prior to June 1, 1916. The men will be reinstated in their old positions on their return from military service. Thirteen employees from the Richmond Division and nine from the Norfolk Division have left with their companies. There are nineteen more from the Norfolk Division who are members of military companies that are likely to be called at any time.

Wages of Third Avenue Men Increased.—On June 29 F. W. Whitridge, president of the Third Avenue Railway, New York, N. Y., addressed the following communication to the men in the employ of the Yonkers and Mount Vernon divisions of the company: "Conductors and Motormen.—Beginning with the first week in July, 1916, the rate of wages to be

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paid conductors and motormen, operating other than storage battery cars, will be as follows: 26 cents an hour for first year men; 29 cents an hour for second, third, fourth and fifth year men; 30 cents an hour for all over five years. Inspectors and Starters.—Beginning with the first week in July, 1916, the pay of all inspectors and starters employed upon the system will be increased $1 a week. Storage Battery Cars.—Beginning with the first week in July, 1916, the rate of wages to be paid conductors and motormen, operating storage battery cars in Manhattan, will be as follows: 23 cents an hour for first year conductors; 26 cents an hour for first year motormen; 24 cents an hour for after first year conductors; 27 cents an hour for after first year motormen."

Installation of Railless Trolley Postponed.—On account of the war the Corporation of Bristol, England, has decided to apply to the Board of Trade for an extension of the time allowed in the act for the exercise of powers relating to the proposed railless trolley installation, and for the granting of additional powers in regard to motor omnibuses. The railless trolley powers expire in 1917. The motor omnibus clause permits the operation of such vehicles on the authorized trolley routes pending the construction of the railless undertaking. Under an earlier act of 1903 the Council had also obtained powers to run omnibuses on specified routes, but it has never been exercised. It has now been decided to apply for the amendment of the two acts in order to acquire a general power of running omnibuses without limitation, in accordance with the present practice in the granting of motor omnibus powers. Authority is also to be sought to enable the corporation to lease the right to run omnibuses with the consent of The Board of Trade. A similar provision is contained in the Hove corporation railless trolley act.

Auto Accidents Increase in New York.—According to the report of the National Highways Protective Society on accidents due to vehicular traffic on the streets of New York City for the month of June, thirty-five persons were killed by automobiles, two by electric railways and seven by wagons, as compared with twenty-four by automobiles, eight by electric railways and eight by wagons during the corresponding month last year. For the first six months of 1916, 152 persons were killed by automobiles as against 137 for the corresponding period last year. Deaths due to wagons have decreased in New York State. Outside of New York City twenty-three persons were killed by automobiles, two by electric railways and three by wagons during the month of June. In New Jersey, during the same period, automobiles caused the death of fifteen, and electric railways one. In New York State, including New York City, for the first six months of 1916, 252 people were killed by automobiles, as against 241 for the first six months of 1915. During June this year three persons were killed at highway railroad grade crossings in New York State, and six in the State of New Jersey. All of these were occupants of automobiles.

Twelve Tons of Rubbish Removed from New York's Subway Daily.—The Interborough Rapid Transit Company, New York, N. Y., has published statistics on rubbish accumulation and removal in the subway for the first six months of the year. Here are some of the items: Five tons of newspapers and 7½ tons of dirt were cleaned off the steps and platforms of the subway stations every twenty-four hours. This refuse would have blocked the tracks completely if the cleaners had left off work for any considerable period. Passengers to the number of 728,000,000 tramped 1500 tons of dirt into stations and dropped newspapers sufficient to make 36,000 bundles weighing 15 lb. each in the period for which the records were kept. The services of 100 porters, at an expense of $40,000, were required to keep the stations clean for six months. The porters used 42 doz. corn brooms, 18 doz. hair brooms, 120 cases of polish, 72 doz. mops, 42 doz. scrubbing brushes, 60 cases of ground soap, 1000 lb. of cotton waste, 18 doz. wringers, 36 doz. sponges, 18 doz. huge cans of brass polish, and 180 gal. crude oil. In the various stations 750 rubbish cans were utilized in the period, and every station was cleaned four times a day. The tiling was cleaned four times each week, and each night work trains picked up from 300 to 350 cans of dirt and 300 bundles of newspapers.

Financial and Corporate

ANNUAL REPORTS

United Gas & Electric Corporation

The comparative results of operation of the subsidiaries of the United Gas & Electric Corporation, New York, N. Y., for the calendar years 1914 and 1915 are shown in the following statement:

	1915	1914
Gross earnings	$13,564,410	$13,129,132
Operating expenses	6,836,119	6,912,293
Net income	$6,728,291	$6,216,839
Taxes	821,428	761,050
Gross income	$5,906,863	$5,455,789
Fixed charges	3,419,897	3,344,298
Balance available for renewals, financing and dividends	$2,486,966	$2,111,491

NOTE.—The figures prior to 1915 have been adjusted by elimination of earnings of properties subsequently disposed of, etc.

The operation of the subsidiary properties of the corporation shows that the gross earnings for the year increased $435,277 or 3.3 per cent. The taxes increased $60,378 and operating expenses decreased $76,174, making an increase in net earnings of $451,074 or 8.3 per cent. During the last few months of 1915 a considerable improvement was shown, the gross earnings in the last quarter gaining $273,996 or 8.1 per cent and the net earnings $251,480 or 17.8 per cent.

During 1915 an amount of $1,199,135 was expended and charged to operating expenses by the subsidiary properties for maintenance, and in addition a renewals and replacements reserve of $543,076 was set aside, making a total of $1,742,211 appropriated out of current earnings. The balance in the renewals and replacements reserve on Dec. 31, 1915, was $1,075,303. The current surplus earnings of the subsidiary companies, after paying their preferred stock dividends, amounted to $1,840,767, of which amount $543,076 was transferred to the renewals and replacements reserve, and $534,536 was left for contingencies or investment in betterments and improvements and $763,155 was paid out in common stock dividends. The combined surplus of the subsidiary companies (after all adjustments by the auditors for current and previous years), not declared in dividends, but largely used by them for improvements, betterments and other corporate purposes, was $3,129,260 at the end of the year.

During 1915 $1,168,945 was expended for additions, betterments and extensions, this amount including $102,428 for the Elmira Water, Light & Railroad Company and $382,810 for the International Railway.

Terre Haute, Indianapolis & Eastern Traction Company

The statement of income, profit and loss of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., for the year ended Dec. 31, 1915, is as shown below:

Gross earnings from operation		$2,954,119
Operating expenses		1,762,223
Net earnings		$1,191,895
Taxes		149,322
Operating income		$1,042,573
Other income:		
Dividends on stocks owned, etc.	$131,329	
Sale of power	115,477	
		246,806
Gross income		$1,289,379
Deductions and rentals:		
Bond interest	$778,469	
Dividends	219,500	
Interest on notes	33,798	
Maintenance of organization—leased lines	3,000	
		1,034,766
Surplus		$254,613
Sinking fund		188,224
Balance		$66,389

The total operating expenses of the railway, light and power departments for 1915 were 59.65 per cent of the gross earnings. Operating expenses were reduced from $1,866,-

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001 in 1914 to $1,762,223 in 1915, an amount of $103,778, or 5.56 per cent. There was an increase of $6,377 in taxes paid in 1915. The total expenditures on account of maintenance of owned and leased lines for 1915 amounted to 18.49 per cent of gross earnings. During the year there was expended and charged to capital account for added property the sum of $51,357, of which $32,654 was expended on leased lines and $18,702 on owned lines.

In 1915 the company paid $188 224 to the trustees on account of sinking funds. Up to Dec. 31, 1915, the total amount, par value, of bonds held for sinking funds, including cash in the hands of the trustees for the purchase of additional bonds, was $543,041. No dividends were paid on the company's preferred stock during the year, the surplus being invested for construction purposes. The total amount expended for construction purposes, for which no securities have been issued, to Dec. 31, 1915, amounted to $640,995 on owned lines and $282,177 on leased lines, a total of $923,172.

Since the beginning of 1916 there has been reported a substantial increase in the earnings of all divisions of the company, and also of the Indianapolis Traction & Terminal Company, the stock of which latter railway is owned by the Terre Haute, Indianapolis & Eastern Traction Company.

Miscellaneous traffic and operating statistics of the company for 1915 follow:

Passengers carried—interurban lines	8,007,107
Passengers carried—city lines (Terre Haute and Richmond)	11,729,134
Total passengers carried	19,736,241
Freight handled (tons)	82,030
Express handled, exclusive of Wells-Fargo (tons)	13,482
Car-miles operated—interurban lines	5,739,795
Car-miles operated—city lines	2,127,328
Coal consumed at power stations (tons)	194,808
Power generated, main power stations (kilowatt-hours)	89,069,150

Honolulu Rapid Transit & Land Company

In 1913 the gross revenue from transportation of the Honolulu Rapid Transit & Land Company, Honolulu, T. H., was $613,137, and in 1914 $602,841, while in 1915 it fell to $586,588. This was $26,549 less than in 1913 and $16,253 less than in 1914. The revenue from other sources—that is, from rents, miscellaneous income and the Aquarium—was for 1913, $12,584; for 1914, $12,741, and for 1915, $12,976. The operating expenses, not including taxes and car licenses, were—1913, $371,242; 1914, $367,794, and 1915, $372,411, making the net revenue for 1913, $254,480; 1914, $247,788, and 1915, $227,153. While the operating expenses thus showed very little variation, the falling off in revenue was material. This is attributed almost wholly to the great increase in the number of automobiles in private and public use. In comparison with 1914 the passenger traffic decreased 295,215 fare passengers and 6923 free passengers, while 2,975,395 transfers were issued, as compared to 2,878,719 in 1914.

On the other hand, general business conditions in Hawaii and Honolulu show much improvement over the average condition of the last three years, and a large increase in tourist travel is now noted. Beneficial results in street car traffic are already shown which offset in a measure the severe handicap that has been caused by the growing use of automobiles.

Late in the year four motor buses of special design were procured at a cost of $17,314 to extend the service on free transfers on certain lines. The extended service to military posts has been well patronized, but owing largely to the poor condition of the streets and roads traversed has proved a costly undertaking.

Miscellaneous comparative statistics for this company follow:

	1915	1914
Average fare, revenue passengers	$0.0488	$0.0488
Revenue from transportation per car-mile	.2955	.3072
Revenue from transportation per car-hour	2.748	2.820
Revenue from operations other than transportation per car-mile	.0065	.0064
Revenue from operations other than transportation per car-hour	.0608	.0596
Operating revenue per car-mile	.3020	.3136
Operating revenue per car-hour	2.809	2.879
Operating expenses per car-mile	.1876	.1814
Operating expenses per car-hour	1.745	1.720
Per cent operating expenses to transportation revenue	63.48	61.01
Per cent operating expenses to total operating revenues	62.11	59.76

Washington Water Power Company

The income, profit and loss statement of the Washington Water Power Company, Spokane, Wash., for the calendar year 1915 follows:

Gross operating revenues	$2,743,876
Receipts from interest on current balances	6.609
Total revenues	$2,750,485
Operating expenses, including taxes	1,239,505
Net operating earnings	$1,510,980
Deductions	787,323
Net earnings	$723,657
Surplus from 1914	1,118,688
	$1,842,345
Dividends paid	$851,950
Adjustments prior to 1915	3,450
Surplus Dec. 31, 1915	$986,945

The receipts from the 110 miles of street railway tracks operated by this company decreased 13 per cent during 1915 on account of jitney competition and the increasing number of private automobiles. It is expected that the effect of the former will be less in 1916. The railway expenditures for additions and betterments amounted to $71,562 for the year. No extensions of tracks or additions to equipment are now contemplated. Some street paving may be required by city ordinance, and the separation of grades by the Northern Pacific Railway Company will probably be completed in 1916, requiring some expenditures in connection with placing the street railway tracks at the new grades.

The operating burdens of the railway system may be judged from the following comparative statement for recent years:

Year	Miles of Track	Passengers Carried	Car-Miles Run	Car-Hours Run
1906	82.94	13,915,570	2,914,502	378,263
1907	96.21	17,249,527	3,111,563	398,820
1908	97.55	19,520,942	3,393,479	420,836
1909	100.96	21,842,767	3,624,586	435,541
1910	108.92	24,730,145	3,990,653	465,516
1911	111.85	23,691,820	3,982,362	467,813
1912	112.03	20,726,062	3,698,584	432,213
1913	112.30	19,437,009	3,650,692	423,455
1914	110.18	17,840,796	3,647,640	414,200
1915	110.18	15,714,753	3,612,993	407,157

NOTE—Statistics cover the whole system, excepting passengers carried, which are for city lines only.

TAX ASSESSMENTS IN OHIO

The 1916 valuation of street and interurban railways in Ohio, as assessed by the State Tax Commission, totaled $135,974 190 as compared to $131,768,260 in 1915, an increase of $4,205,930 or about 3.2 per cent. Of the eighty-one companies that were assessed in 1915, forty-one showed increases in 1916, twelve decreases and twenty-six no change, while two as yet have no 1916 valuations. The increases in most cases were not large, but the fact that there was a revision upward in so many cases made the aggregate large. A notable exception was the Cincinnati, Newport & Covington Railway, whose valuation was reduced from $1,020,620 to $500,000. This was done because the company owns a large amount of the stock of a Kentucky corporation of the same name, which is assessed in that State. The two companies operate the line serving Newport and Covington, Ky., and connecting them with Cincinnati. The value of the Lake Shore Electric property remains the same as in 1915, as does that of the Ohio Electric Railway.

Algiers Railway & Lighting Company, New Orleans, La.—D. Emerson, general manager of the New Orleans Southern & Grand Isle Railway, has assumed charge of the Algiers Railway & Light Company properties as receiver, under appointment by Federal Judge Rufus E. Foster.

Boston & Suburban Electric Companies, Boston, Mass.—A quarterly dividend of 50 cents has been declared on the 31,387 shares of preferred stock of the Boston & Suburban Electric Companies. This stock is without par value. The dividend is payable on July 15 to holders of record of July 3. In January and April, 1916, $1 each was paid. There is still $11.50 accumulated.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—The Cleveland Trust Company, Cleveland, Ohio,

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filed suit in the Common Pleas Court at Cincinnati on July 1, asking for a receiver to take charge of the properties of the Cincinnati, Dayton & Toledo Traction Company. This company is trustee under the mortgage securing the bonds of the company. The petition states that the company has defaulted in the payment of interest on the bonds since Jan. 1, 1916. It further stated that holders of more than $2,200,000 of bonds had requested that action be taken to foreclose the mortgage. The trust company claims that in order to preserve the franchises and property rights and continue the road in operation, it is essential to appoint a receiver. Judge Murphy of the Common Pleas Court of Butler County recently announced that he would appoint a receiver for the company, but he has not yet done so. For some time the Ohio Electric Railway, which has been operating the Cincinnati, Dayton & Toledo line underlease, has been turning the earnings over to a bondholders' protective committee.

Cities Service Company, New York, N. Y.—At a meeting of stockholders of Cities Service Company held on June 29 the authorized amount of Cities Service preferred stock was increased to $60,000,000 and the authorized amount of common stock was increased to $40,000,000. This prepares the way for the exchanges of securities of Cities Service Company for the stocks of Electric Bond Deposit Company, Toledo Traction, Light & Power Company, Lincoln Gas & Electric Light Company, and Montgomery Light & Water Company. It is expected that the final determination of the basis for these exchanges will be announced soon.

Columbus Railway, Power & Light Company, Columbus, Ohio.—Kissel, Kinnicutt & Company, New York, N. Y., are offering for subscription at 98 and interest, yielding 5.12 per cent, a block of $100,000 of Columbus Railway, Power & Light Company's first refunding and extension mortgage 5 per cent sinking fund bonds due on Oct. 1, 1940, with interest payable on April 1 and Oct. 1. They are redeemable at 105 and interest. The bonds will be a first mortgage on the electric light and power and the heating properties of the company on the retirement of certain underlying issues, which have been called for payment, and are a mortgage on the street railway subject to prior liens secured by closed mortgages, for the retirement of which certain of the first refunding bonds are reserved.

Fort Wayne & Decatur Traction Company, Decatur, Ind.—The Indiana Public Service Commission on June 23 approved the purchase of the Fort Wayne & Springfield Railway by the Fort Wayne & Decatur Traction Company, and also authorized the issue of $90,000 of ten-year gold bonds and $150,000 of common stock at par to pay for the property which has been taken over.

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Power Company has secured control of the Gainesville Railway & Power Company through the purchase of the holdings of W. A. Carlisle, W. H. Slack and H. H. Dean. The Gainesville property consists of 8 miles of street railway line in the city and 2 miles to the suburbs, the electric lighting system of Gainesville and a hydro-electric plant on the Chestatee River rated at 1500 hp.

Sacramento & Woodland Railroad, Chico, Cal.—The California Railroad Commission has issued a supplemental order authorizing the Sacramento & Woodland Railroad to issue its demand notes for $45,000 to the First National Bank, San Francisco, $20,000 of this amount at 6 per cent and $25,000 at 7 per cent. These notes are to cancel similar amounts to the same bank.

Shore Line Electric Railway, Norwich, Conn.—The directors of the New London & East Lynne Street Railway have voted to recommend the sale of the outstanding stock of the company to the Shore Line Electric Railway, which now operates the road under lease.

Standard Gas & Electric Company, Chicago, Ill.—The entire outstanding balance of the issue of $3,000,000 of 6 per cent collateral trust notes of the Standard Gas & Electric Company dated June 1, 1913, was paid on June 1, 1916. The company's outstanding convertible 6 per cent sinking fund gold bonds, due 1926, are being reduced by $1,911,500 with funds secured from the sale to the Northern States Power Company of its holdings of Northern States subsidiaries' bonds at call figures. This brings the present outstanding bond issue down to $7,040,500, which will be further reduced on July 1 through operation of the $58,800 cash now in sinking fund when tenders will be accepted of convertible 6 per cent bonds.

Topeka (Kan.) Railway.—The stockholders of the Topeka Railway have voted to increase the capital stock from $1,210,000 to $2,250,000, and have filed application for such increase with the Kansas Public Utilities Commission. It is reported that the company is planning to build an interurban line from Topeka to Lawrence.

Union Traction Company, Coffeyville, Kan.—The stockholders of the Union Traction Company, which operates between Parsons and Coffeyville, have approved the purchase of the Kansas-Oklahoma Traction Company, which operates between Coffeyville and Nowata, Okla, subject to the approval of the Corporation Commission of Oklahoma and the Public Service Commission of Kansas.

DIVIDENDS DECLARED

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Bay State Street Railway, Boston, Mass., 3 per cent, first preferred.

Boston (Mass.) Suburban Electric Companies, quarterly, 50 cents, preferred.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Citizens Traction Company, Oil City, Pa., quarterly, 75 cents, preferred.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1¼ per cent, common.

Detroit (Mich.) United Railway, quarterly, 1¾ per cent.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred.

Little Rock Railway & Electric Company, Little Rock, Ark., 2 per cent, common and preferred.

Pacific Gas & Electric Co., San Francisco, Cal., quarterly, 1¼ per cent, common.

South Carolina Light, Power & Railways Company, Spartanburg, S. C., quarterly, 1½ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, 1½ per cent, preferred.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

Youngstown & Ohio Railway, Leetonia, Ohio, 1¼ per cent, preferred; one-fourth of 1 per cent, preferred extra.

ELECTRIC RAILWAY MONTHLY EARNINGS

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., April,		'16	$8,403	*$8,258	$145	$1,096	†$951
1 "	"	'15	7,407	*8,431	†1,024	1,110	†2,134
12 "	"	'16	117,963	*98,444	19,519	13,370	6,149
12 "	"	'15	121,522	*101,198	20,324	13,375	6,949

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., April,		'16	$28,234	*$18,296	$9,938	$6,499	$3,439
1 "	"	'15	25,164	*15,337	9,827	6,449	3,378
12 "	"	'16	374,920	*218,588	156,332	78,830	79,502
12 "	"	'15	342,908	*207,651	135,257	78,145	57,112

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., April,		'16	$54,593	*$34,645	$19,948	$15,439	$4,509
1 "	"	'15	52,075	*36,425	15,650	16,254	†604
12"	"	'16	615,221	*424,264	190,957	179,363	11,594
12 "	"	'15	677,607	*459,907	217,700	160,143	57,557

KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.

1m., April,		'16	$65,564	$34,666	$30,898	$20,574	‡$14,496
1 "	"	'15	63,611	33,152	30,459	19,754	‡15,192
10 "	"	'16	705,579	362,519	343,060	204,133	‡163,848
10 "	"	'15	673,217	358,307	314,910	197,748	‡144,690

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., April,		'16	$24,384	*$15,899	$8,485	$7,137	$1,348
1 "	"	'15	22,193	*14,866	7,327	7,749	†422
12 "	"	'16	296,777	*179,699	117,078	89,444	27,634
12 "	"	'15	297,981	*190,134	107,846	91,767	16,079

*Includes taxes. †Deficits. ‡Includes non-operating income.

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Traffic and Transportation

PITTSBURGH OWL CAR RATE HEARING

Summary of Testimony in Case Involving an Increase in Fare from 5 Cents to 10 Cents

The Public Service Commission of Pennsylvania held a public hearing at Harrisburg on June 30 on the proposed increase of fare from 5 to 10 cents on the owl cars of the Pittsburgh Railways. As a result of the points raised by counsel for W. M. Jacoby, the complainant, and the city of Pittsburgh, co-complainant, against the proposed increase, the Public Service Commission will be compelled to make a new ruling as to what constitutes proper notice to the public of a change of rates. The commission decided to consider only one of the complaints filed—that of whether the public received proper notice of the increased night rate fare by schedules posted as required by law. After hearing witnesses for the complainants and the company, the commission announced it would hand down a decision in the near future.

Counsel for the Pittsburgh Railways contended that all requirements of the law had been met—that the company had notified the commission of the proposed increase, and had placed tariff schedules at the main office of the company and at all stations where tickets were sold thirty days before the proposed increase went into effect. The complainants alleged that it is insufficient notice of a change of rates to place a schedule where only those who inquire may find it, and that actual posting "where all who run may read" is necessary. The hearing of witnesses on this one point consumed all morning and afternoon, and no testimony was taken as to whether the proposed increase is justifiable. The Pittsburgh Railways will be forced to withdraw its schedule and make publication of a proposed increase anew if the commission sustains the complainants. However, if the company is sustained, the complainants will have to proceed with arguments to prove that the rate increase is not justifiable as they contend. Meanwhile the public will receive rebate coupons issued by the company, at the commission's order.

P. N. Jones, general manager; C. S. Mitchell, comptroller; J. M. Loftis, superintendent; W. B. Carson, secretary; J. W. Welsh, James W. W. Ash, traffic agents, and Attorneys A. W. Robertson and David Reed attended the meeting for the company.

Commissioners Ainey, Brecht, Ryan, Magee and Rilling sat to hear the case in the house of the legislature caucus room, but before beginning the hearing of testimony it was announced that Commissioners Magee and Brecht would not participate, and Messrs. Ainey, Ryan and Rilling heard the case. Messrs. Magee and Brecht are residents in the territory in which the Pittsburgh Railways operates.

James W. W. Ash, traffic agent, demonstrated the manner in which copies of the new night rate schedule were filed at stations and other public places in Pittsburgh. He said copies of the new tariff were given to the agents, with instructions that they be placed on file and kept for public reference. This notice to the agents was sent on May 22, and the proposed increase notice was filed at stations, carhouses and waiting rooms.

At Chairman Ainey's request, copies of the agents' instructions were exhibited. It was brought out that the only notice to the public was through the filing of the new schedule and no other notice was posted until the day before the increase was effective, when posters announcing the doubling of the fare were placed in the cars. Witnesses produced a list of places where the new rates were filed, including carhouses and the company waiting rooms and offices. Advertisements were produced from the Pittsburgh papers of the date of June 23 as the first printed concerning the increase. One of the posters placed in the cars on June 21 was also identified by witnesses.

Councilmen and investigators for the complainants then gave testimony relating to their search for the posted rate increase notification, and all declared that no notification could be found in a public place and that at many of the waiting rooms and offices the new tariff schedule was procured with difficulty.

P. S. Joyce of the law department of the city of Pittsburgh said that he visited carhouses and failed to find notices of the advance, and declared the schedules were not accessible. Photographic views of some carhouses were produced as part of his evidence to show the alleged inaccessibility of these places.

Attorney David Reed objected to this testimony, but Chairman Ainey said he "considered it a lack of opportunity for publicity."

Councilman John S. Herron, who was called to testify in regard to excess receipts, stated that he saw a number of passengers who did not get such receipts even when they asked the conductor for them. Notice to the public to ask for receipts issued by the company was read from the poster and made an exhibit. Mr. Reed, for the company, declared that every effort had been made to comply with the commission's order relating to excess receipts, and insisted that there was no attempt to evade or disobey that body's order.

Commissioner Ainey said that a passenger's getting an excess receipt should not depend on whether the passenger asked for that receipt. Passengers were entitled to them and every passenger should get one. The burden rested on the company to see that passengers did receive excess receipts.

Mr. Brown, for the complainant, held that a notice in boldfaced type should have been posted to call the public's attention to the increased night fare, and asked how a patron of the company could have knowledge of the change unless he made inquiry every day where tariffs were on file.

Counsel for the Pittsburgh Railways offered in evidence tariff circulars and other documents, including the original tariff schedule and two supplements, one of them the night rate schedule. David A. Reed, for the company, declared that the 10-cent fare on owl cars was the custom until 1907, when an act was passed, forbidding more than a 5-cent fare in any city in Pennsylvania. This act was later declared unconstitutional by the Supreme Court, and Mr. Reed pointed out that the company was merely going back to its old rates, in effect for forty years before the passing of the act of 1907.

Commissioner Ryan asked what the schedule of rates contained to indicate an increase or decrease. Mr. Reed said:

"It is simply an amended page, and it cannot be interpreted as an increase or decrease. The statement of variation is plain, as it says it 'applies to night fares.'"

Commissioner Ryan asked if it was not a fact that the commission was formed to protect the public in just such matters as this. Mr. Reed said he believed the public sufficiently intelligent to care for itself and insisted that the notice given by the company met all the requirements of the law. After argument on the meaning of the word "posted" the commission adjourned.

INSURANCE PLAN ANNOUNCED FOR BALTIMORE EMPLOYEES

William A. House, president of the United Railways & Electric Company, Baltimore, Md., has announced that the company has completed an insurance plan for the employees. About 4500 employees are affected by it. The plan follows quite naturally the progressive step of the company taken in 1914, when it established a pension plan for the employees who had reached a certain age limit. The letter from Mr. House announcing the terms of the plan as worked out is as follows:

"As a further evidence of this company's interest in the welfare of its employees and their families, the board of directors has authorized the inauguration of an insurance plan, effective on July 1, 1916, under which the family of an employee will receive benefits from the company in the event of his death. Pensioned employees are included in this plan. The employees of the company have been divided for the purpose of the insurance plan, into three classes as follows:

"Class A—Will comprise those not married, having no dependents.

"Class B—Will comprise married employees having no children and those not married having dependents.

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"Class C—Will comprise married employees, with wife and children.

"The following table shows the amounts payable to beneficiaries of employees who have been in the company's service for the periods named, according to the designated classes:

	A	B	C
"After one year of service	$100	$150	$200
"After two years of service	200	300	400
"After three years of service	300	450	600
"After four years of service	400	600	800
"After five years of service	500	750	1,000

"The one year of service provision will be waived with respect to those employees now in the service of the company, who are otherwise eligible to the benefits of this plan. Those entering the employ of the company after July 1, 1916, will become eligible after one year of continuous service.

"The entire expense of this insurance plan will be borne by the company.

"It is believed that those in the company's service will find much comfort in the thought that, in case of death, their families will, to this extent, be provided for, and this action on the part of the company will undoubtedly serve to engender still further that feeling of loyalty which has been so strongly evident in the past.

"The plan in detail will be posted at the headquarters of your department."

HEARINGS CONTINUE ON BAY STATE FARE CASE

A report on the Bay State Street Railway was presented recently in connection with hearings before the Public Service Commission on the pending petition for fare increases, by George W. Bishop, formerly a member of the commission and now head of its inspection department. A special examination of the equipment was made by John W. Ogden and Arthur W. Hodges, inspectors for the commission, and Philip Scott, assistant inspector.

The report criticises the original construction of the constituent roads now making up the Bay State system, and points out that light-weight rails, small ties and insufficient roadbed are typical of portions of outlying lines. The management has in recent years been engaged in correcting this situation, the report says. In the interests of safety, the first available funds should be used to repair and reconstruct parts of the roadbed and track. The amount considered necessary is $1,659,720, about half of which should be expended during the present season. Of the 2,350,000 odd ties in the system, 1,855,834 have been placed during the last thirteen years. Mr. Bishop's estimate of the average life is twelve years; hence he deduces that there is a shortage of nearly 700,000 tie renewals on all Bay State lines. Of the 116,000 tons of rails on the system, about 47 per cent is 90 to 105 lb. girder rail and 53 per cent 40 to 75 lb. T-rail. The average life is estimated at eighteen years, requiring 6500 tons annually for repairs. The company reported 59,658 tons placed during the last fourteen years, of which 11,610 tons were used in construction, 46,384 tons in reconstruction, and 1664 tons in maintenance, a deficiency of more than 30,000 tons on the eighteen-year estimate.

An improved signal system is recommended. About 340 miles of the total 556 miles of single track are protected as follows: 240 miles by 343 blocks of hand-throw signals, eighty-eight miles by 124 blocks of non-counting signals, and twelve miles by thirty-three blocks of counting signals. Owing to the exposure of hand-throw signals to malicious interference, it is recommended that $5,000 be expended to secure them against this depredation. It is estimated that the cost per block of hand-throw signals is $75, and their annual maintenance $10, while figures for both non-counting and counting signals are $600 and $50, respectively. About $280,000 would be required to replace the older types with counting signals, and their annual maintenance would cost about $20,000. About $180,000 more would protect the single track not now supplied with signals. Safety and economical operation favor the installation of a standard type on all lines.

The Bishop report estimates the cost of improved carhouse and shop equipment at $2,120,400; improvements in power stations and feeder lines call for $910,500; the total estimated requirement to bring the property to first-class condition being $5,150,620. This amount should be spent during 1916 and 1917.

Peter Witt, formerly railway commissioner of Cleveland, Ohio, was examined June 26 and 27, on a study made at the request of R. S. Bauer, representing Lynn and Essex County. Mr. Witt recommended the housing of cars in a few large carhouses and storage yards; the speeding up of service generally; the use of one-man cars on a number of city and suburban lines; the scrapping of all open cars and a large number of box cars, and other radical measures. He thought that the installation of fare boxes would result in substantial increases of revenue, perhaps 10 to 15 per cent. The accident hazard of the open car, and the duplication of equipment it involves for all-the-year operation, make that type very uneconomical. Mr. Witt did not consider the argument that open cars encourage summer riding as forceful at the present time. Mr. Witt held that the one-man car would successfully combat jitney competition. Mr. Witt referred to the twenty-two passenger, two-ton-body car adopted by Stone & Webster for certain of their Southern systems. He said that such cars have not been adopted in Cleveland because the headways there are close, and large cars are more advantageous. Instead of the prevailing 15-minute headway in Lynn he would operate one-man cars on 7.5-minute headway and leave the jitney little patronage. Such operation would stimulate noonday riding.

On June 28, Alton D. Adams, consulting engineer employed by the remonstrants, was examined by Albert P. Worthen, counsel for the remonstrants.

TRENTON FARE CASE STILL BEFORE COURTS

The Trenton & Mercer County Traction Corporation is availing itself of every legal course to have its rights defined in the dispute with the city of Trenton over the sale of six tickets for 25 cents. The city claims that the company is obligated by the ordinances under which it is operating, and by the sale of the tickets for so many years, to continue to sell six tickets for 25 cents. The company claims that under its franchise it has the right to demand a straight 5-cent fare. The suit in the federal court is to determine the city's power to interfere with the operation of cars, as the city has threatened to do, should the company discontinue the sale of tickets. The suit in the New Jersey Supreme Court is for a review of the findings of the State Public Utility Commission, which ordered the company to continue the sale of the tickets. Neither court has rendered an opinion in the case. The company's application for an order to the United States District Court to restrain the city from interfering with the operation of cars is now on the calendar for final hearing. It is not likely that the case in the federal court will be moved until the question is determined before the State Supreme Court. The case was carried into the Supreme Court on certiorari proceedings after a decision by the utility board. The Supreme Court, after argument, will hand down its opinion, and then an appeal will probably be taken to the Court of Errors and Appeals.

Booklet Describing Kansas City.—The Kansas City (Mo.) Railways has issued a booklet filled with pictures and descriptions of Kansas City's parks and boulevards—particularly the parks, which are widely scattered. It is somewhat in the form of a railway folder. All the beauty spots of the city, and many outside the city, can be reached for a single 5-cent fare.

Ban on Left-Hand Turns to Be Removed.—Acting on complaints of the Automobile Club the Board of Public Safety of Louisville, Ky., has announced that immediately on installation of semaphores which are planned for several of the important downtown intersections, the rule against the left-hand turn, so as to cross the street, will be lifted for a while at least. The Automobile Club members contend that instead of obviating congestion the system actually increases confusion on the busy streets.

Two-Cent Fare in Grant County to Continue.—Two cents per mile will remain the fare to be charged by the Union Traction Company of Indiana in Grand County, Ind., until the September term of court, as a result of the decision of Judge Paulus not to set the date for the argument on a demurrer in the case of the town of Fairmount, Ind., against

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the Indiana Public Service Company and the Union Traction Company. The order of the commission eliminating the low passenger rates imposed by franchise conditions in Indiana was referred to in the ELECTRIC RAILWAY JOURNAL of April 22, page 799.

New Emergency Ticket in Brooklyn.—The New York Consolidated Railroad (Brooklyn Rapid Transit System) notified the Public Service Commission for the First District of New York that on June 15 the company would put into effect a system of issuing block or emergency tickets on the elevated and subway lines in Brooklyn. In the case of a block on any elevated or subway division, tickets will be issued to passengers who have paid their fare and will be good within forty-eight hours not only on any other elevated or subway line but also on any surface line in the Brooklyn Rapid Transit System.

Excursion from Peoria to Niagara Falls.—The Illinois Traction System, Peoria, Ill., conducted an excursion to Niagara Falls on June 24, tickets being sold via the Toledo, St. Louis & Western Railroad at Ridge Farm, Ill., where connection is made with the Illinois Traction System. The passengers were conveyed from Ridge Farm to Toledo by the Toledo, St. Louis & Western Railroad, thence by the Lake Shore Electric Railway to Cleveland, thence via the lake vessel SeeandBee to Buffalo and over the International Railway to Niagara Falls. Liberal stop-overs were allowed and many side visits of interest were provided.

California Line Reduces Fare.—The Central California Traction Company, Lodi, Cal., with the approval of the Railroad Commission of California has put into effect for the summer a one-way fare of $1 from Sacramento to Stockton and a round-trip fare of $1.50 good only for the date of sale. The old rate was $1.45 for one way and $2.90 for the round trip. The fare between Stockton and Lodi has been cut to 25 cents for the round trip, good for the day of sale only. Heretofore the round trip rate has been 50 cents, and 35 cents for one way. It is stated that the reduction was sought largely on account of the competition offered by the auto bus.

Suit Over a Pig.—Construction of an old agreement, asserted by the plaintiff in the case, will result from a suit filed in the Quarterly Court at Louisville by S. W. Duncan against the Louisville & Interurban Railway, in which the plaintiff claims $4 for the death of a pig. He asserts that when the railway received a right-of-way through his property it was agreed that the promoters would build and maintain a fence which would keep his cattle and hogs off the right-of-way. Mr. Duncan says this agreement has not been lived up to by the company, and that he was refused payment on presentation of his claim for the pig, which got through the fence onto the track and was run down.

Topeka Jitney Ordinance Declared Operative.—The ordinance regulating jitneys in Topeka, Kan., requiring practically prohibitive license on certain streets where street cars operate, will go into effect unchanged. The delay of a month granted by the City Commissioners was not improved by the jitney owners. They established a transfer system, but got into a squabble over the exchange of transfers and the distribution of territory. It seemed that it would be impossible to maintain a permanent agreement on service to all parts of the city, and on the main streets, and that the service itself was subject to the opportunities of the jitney owners to make more money occasionally with special fares.

Burlington County Fare Increase Still Before Commission.—The petition for the Burlington County Traction Company for permission to increase its fare from 20 cents to 30 cents from Moorestown to Burlington, N. J., is still before the Board of Public Utility Commissioners of New Jersey. In the meantime the utility board has directed the company to comply with certain minor directions as to roadbed, equipment and other incidentals. When the company announced that it would ask the commission to allow it to increase its fare the citizens of Burlington County objected and a committee was appointed to prevent the increase. The citizens announced, however, that if the company would provide better equipment, roadbed and service they would sanction the increase.

Louisville Suburban Lines Recover Traffic.—In spite of increased competition the Louisville & Interurban system of electric lines shows a gain in business, according to the figures which have just been compiled for May of this year. The country lines of the Louisville system were the last to feel the effects of the late depression and have been the last to recover. The increase in May was the first gain for a number of months. Competition is now to be contended with on all the lines of the company running out from Louisville, passenger automobile service and freight service by motor trucks both being encountered. The method by which the service of the railway lines is extended by motor truck beyond the terminus of the Shelbyville line is proving up to expectations and recommends itself as one way in which electric railways can off-set the business taken away by the motor trucks.

Hearing Fixed for Order on Turn Backs.—The Public Service Commission for the First District of New York on June 9 last issued an order to all surface railways in Greater New York, forbidding the turning back of cars before reaching the destination for which they started, unless some excellent reason for that procedure could be shown. The companies were directed to make daily reports to the commission, showing the number of cars turned back on the preceding day and for what reason. The Third Avenue Railway wrote to the commission, stating that compliance with the order would upset its traffic arrangements, and that the order was a serious matter and should not be enforced without first giving the corporations a chance to present their side of the case to the commission. The commissioners thought it but fair to accede to the Third Avenue Railway's request and all the companies have been notified to have representatives at a public hearing on the question to be held at the office of the commission on July 11.

Brooklyn Safety Prizes Awarded.—Five hundred children from fifteen public schools which were winners of the district prizes in the 1916 safety essay competition held by the Bureau of Public Safety under the auspices of the Brooklyn Institution for Safety (Brooklyn Rapid Transit System) gathered at the assembly hall of the Central Branch Y. M. C. A. in Brooklyn on the evening of June 22 to witness the award of the district prizes and of the three grand prizes given in this competition. The principals of the schools winning the district prizes and a considerable number of teachers and parents attended with the children. The judges, of the competition, Gen. George W. Wingate, president of the Brooklyn Institute for Safety, and Dr. Gustav Straubenmuller, acting City Superintendent of Schools, found that the essays of Allen Savage of P. S. No. 73 and of Benjamin Brook of P. S. No. 178 tied for first place in the competition and accordingly the first and second grand prizes of $50 and $30 were divided between these schools, $40 for each school. The third grand prize was won by Harry Rankin of P. S. No. 147, whose safety essay brought $20 to his school in addition to the $10 district prize.

McAlester's Jitney Policy Recommended for Emulation.—The Ardmore (Okla.) *Ardmorite* said recently, in the course of an editorial: "McAlester has had some trouble with its system of electric cars and has learned to appreciate what a car line means to the city and has begun a campaign to protect the receipts of the line by making war on the jitney. A high license fee is charged, a $10,000 bond is required, children under five are required to be transferred free and at half price between five and twelve years, and the jitney is required to give continuous service from 6.30 a. m. to 10.30 p. m. The McAlester people are to be congratulated upon the work done in this direction. Jitneys will never build a city, while street cars will settle additions and make living conditions more wholesome. The salaried man can depend upon the street railway to get him to his work on time, while no one can depend on the jitney for continuous service in any kind of weather. A street railway gives the family of small means a chance for recreation and the man of good common sense who has worn the novelty off his automobile will patronize the street car for many of his outings instead of using his car. Ardmore has an opportunity, or will have within a short time, to co-operate with its street railway line, and everything possible should be done to make the system a success."

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I. C. C. Denies Through Routes and Joint Rates.—The Interstate Commerce Commission has refused to compel the Grand Rapids, Holland & Chicago Railway, Holland, Mich., to establish through routes and joint rates with the Indiana Transportation Company. It was held that the evidence failed to show a public necessity for the physical connection between the two carriers. The Grand Rapids, Holland & Chicago Railway operates an interstate electric railway for the transportation of freight and passengers between Holland, Mich., and Grand Rapids and over a branch line between Holland and Saugatuck, connecting at Holland with the Graham & Morton boat line operating between Holland and Chicago. In its finding the commission said: "Through routes between Chicago and these Michigan points now exist to all points which would be reached by the proposed through route, and complainant does not attack the reasonableness of existing joint rates nor does it present any testimony seeking or tending to show that lower joint rates should be made over the proposed route than the existing joint rates over the present route. Defendant shows that the cost of the service to it would be greater over the proposed route than over the existing route. No testimony was offered upon which to base a finding as to the amount of the proportional rates from Saugatuck, and the prayer for proportional rates seems in effect to have been abandoned."

Accident Prevention Effort at Byllesby Railway Properties.—The four street railways of H. M. Byllesby & Company, located at Pueblo, Col.; Ottumwa, Iowa; Fort Smith, Ark., and Fargo, N. D., are making an effort to reduce the number and the seriousness of street railway accidents through the education of school children. Blotters showing accident possibilities to children playing in the streets, jumping on street cars for free rides, etc., have been distributed to every child in the cities where the companies operate street cars. A part of the educational effort includes a moving picture film entitled "Staking Their Lives," which illustrates the dangers of being careless or forgetting the street cars, and shows many kinds of accidents which are likely to follow such carelessness. Five prizes are being offered to school boys and girls in each of the cities involved for the best accident prevention suggestions received up to Jan. 1, 1917. A series of twelve newspaper advertisements will be published, calling attention to the prizes offered and suggesting ways and means for the public, passengers, automobile and vehicle drivers to assist the companies in eliminating accidents. The campaign is based upon the belief that care and watchfulness can best be engendered through inducing the children to give the matter serious consideration, as they will undoubtedly discuss the matter with their elders and in this way direct favorable attention to the newspaper advertising of the various companies.

Messers Ham and Hanna Discuss Proposed Service Standards.—At the hearing in Washington, D. C., on the subject of standard of car loading proposed by the Public Utilities Commission of the District of Columbia the Washington Railway & Electric Company was represented by W. F. Ham, vice-president, and the Capital Traction Company by J. H. Hanna, vice-president. Engineer Commissioner C. W. Kutz as chairman of the body explained in detail the proposed requirements. These were set forth briefly in the ELECTRIC RAILWAY JOURNAL of June 3, page 1063. Mr. Ham said that the public needed to be educated. With the co-operation of the public better conditions would exist on the cars. He declared the subject had been investigated by experts in various cities and that before any standard schedule was fixed by the commission some measure of determining what was adequate service should be taken up. Mr. Hanna said that it did not appear to his company that the establishment of any standard of car service was one of particularly vital necessity. Standards of car service, in order to be of practical use, should be so flexible as to allow variations to meet the different conditions which exist on different lines and at different times of the year. Mr. Hanna said the disagreement of the railway with the commission over the proposed schedule was largely as to details and that the companies believed that continued conferences between the commission and railways would eliminate many of the points at issue.

Personal Mention

J. T. Kemp, formerly with the Aetna Chemical Company, Drummondville, Que., has been appointed general superintendent of the Sherbrooke Railway & Power Company, Sherbrooke, Que.

Charles Johnstone, formerly accountant of the Sherbrooke Railway & Power Company, Sherbrooke, Que., has been appointed acting manager of the company to succeed J. H. Trimingham, who succeeded Maj. N. C. Pilcher, killed in action in France.

J. H. Trimingham, superintendent of power of the Sherbrooke Railway & Power Company, Sherbrooke, Que., who acted as general superintendent of the company during the absence of Maj. N. C. Pilcher in Europe, has been appointed sub-lieutenant in the Royal Naval Motor Boat Patrol Service, and has left Canada for England.

William N. De Neale, who has been in continuous service with the Washington Railway & Electric Company, Washington, D. C., and its predecessors for forty-two years, has been relieved of the duties of superintendent of the eastern division of the company's lines and made special agent of the transportation department. When he completed his forty years' service with the company Mr. De Neale was summoned by the board of directors and presented with $100 in gold in recognition of his faithful and meritorious service.

P. J. Kealy, president of the Kansas City (Mo.) Railways and since last November Lieutenant-Colonel of the Third Regiment, M.N.G., has been elected Colonel of the regiment, succeeding Col. Fred A. Lamb, resigned. The choice was popular in Kansas City, where the citizens appreciate deeply the service of Colonel Kealy in organizing the regiment in good order, and recruiting it to full strength for mustering into the federal service. Colonel Kealy has also secured for the regiment a measure of support locally that it had not enjoyed, obtaining equipment badly needed, his appeals for motor trucks and other things meeting instant response. During Colonel Kealy's temporary absences, or during his long absence in case the troops should go beyond the border, James E. Gibson, general manager, and Chester C. Smith, assistant to the president, will put Mr. Kealy's policies into effect.

E. J. Burdick has been appointed general manager of the Detroit (Mich.) United Lines. Mr. Burdick was born and educated in Wisconsin. He began work with the Brush Electrical Manufacturing Company, Cleveland, and four years later he was employed by the Westinghouse Electric & Manufacturing Company, where he remained until he became associated with the Detroit Electric Railway in May, 1895, in charge of the electric apparatus. At the time of the consolidation of the various properties into the Detroit United Railway, Mr Burdick was placed in charge as superintendent of the power and overhead departments, where he has served up to his recent advancement. Mr. Burdick is a member of the city commission of the Board of Boiler Rules, is past president of the Detroit Engineering Society and has served the American Electric Railway Association and the Central Electric Railway Association in many capacities. Mr. Burdick is thoroughly acquainted with all the properties of the Detroit United lines. His work has brought him in close touch with the details of railway practice. His training and experience are extensive. The appointment is an extremely popular one within the company. Mr. Burdick entered upon his new duties on July 1.

E. J. BURDICK

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Lakeland, Bartow and Winterhaven Interurban Railroad, Winterhaven, Fla.**—Application for a charter will be made by this company to construct a line from Lakeland to Bartow and Winterhaven. Capital stock, $700,000. Officers: J. L. Wilson, Altoona, Pa., president; E. B. Nelson, Baltimore, Md., vice-president and general manager; A. X. Erickson, Lakeland, Fla., secretary, and G. A. Wilson, Phillipsburg, Pa., treasurer.

Akron Belt Line Railroad, Akron, Ohio.—Incorporated to construct an electric railway from Akron to New London. Capital stock, $250,000. Glen Brown, Akron, is interested. [May 13, '16.]

***Pittsburg County Railroad, McAlester, Okla.**—A charter has been granted to the Pittsburg County Railway. Capital stock, $600,000. Incorporators: C. H. Mason, Montclair, N. J.; Ernest B. Osborne, New York; S. M. Beachman, Orange, N. J.; Walter H. Vorce and C. H. King, Jr., McAlester.

FRANCHISES

***Clearwater, Fla.**—Martin Carabello has asked the Council for a franchise to construct a line through Clearwater. It is proposed to construct a line from Tampa to Sutherland, with branches from there to Lake Butler and Tarpon Springs and to Dunedin, Clearwater, Belleair, Largo and St. Petersburg.

Newport, Ky.—By a vote of four to one a new street railway ordinance was passed by the City Commissioners on June 27. It is said to be much the same as the one repealed by the commissioners when referendum petitions were secured some months ago. The ordinance provides that the company operating the street railway lines shall pay the city $6,000 a year as rental for the streets used. Several factions here are dissatisfied with the ordinance and threaten to initiate one to their own liking and bring it before the voters at the November election. The Cincinnati, Newport & Covington Street Railway Company and its Kentucky associated companies will probably be the only bidder for the franchise.

Baltimore, Md.—The United Railways & Electric Company has received a franchise from the Council to construct a double-track line over the new Hanover Street bridge which spans the middle and southwest branches of the Patapsco River.

Kansas City, Mo.—The lower house of the City Council of Kansas City, Mo., has killed an ordinance providing for removal of the Kansas City Railway's tracks on McGee Street from Fifteenth to Nineteenth Streets. The removal of the tracks would probably have obviated the necessity of building certain connecting tracks provided for in the franchise, at Nineteenth Street.

Lancaster, N. Y.—The Buffalo & Depew Railway has received a franchise from the Council to lay track on Central Avenue.

Rochester, N. Y.—The New York State Railways have asked the Council for permission to make a number of track changes in connection with the State Street carhouse. In the petition the company sets forth its desire to lay a single track in Commercial Street from State Street to Plymouth Avenue to connect with the tracks in those two streets; a single track wye from the Commercial Street track to a ladder track running parallel to and 14 ft. from the east line of Frank Street, from which there will be five leading branches into the various tracks of the carhouse; a single track beginning at the Plymouth Avenue end of the Commercial Street track and running on a curve in a southeasterly direction into the carhouse; a single track running in a southeasterly direction from the carhouse to the south-bound track in State Street; permission to abandon all the switches in State Street except three at the northerly end, one of which is to be used for emergency purposes and the other two to remain until a freight and express terminal is located.

Columbus, Ohio.—In order to make its securities saleable, the Columbus, Delaware & Marion Railway Company has asked the commissioners of Franklin County to grant it a twenty-five-year franchise to be effective at the termination of its present grant, which has seven years yet to run. The company had promised to lay new tracks and make other improvements on the county road which is to be paved, and $105,000 in receiver's certificates had been authorized. The company found, however, that because of the short period its franchise has to run it could not sell the securities.

TRACK AND ROADWAY

Northern Electric Railway, Chico, Cal.—It is reported that this company has awarded a contract to the Missouri Valley Bridge Company for the construction of a steel bridge over the American River, also for a bridge over the Feather River near Oroville, which will cost approximately $55,000.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by the City Council of Los Angeles for the construction of a viaduct at Sherman Drive over the tracks of the Pacific Electric Company. The viaduct, according to plans, will cost about $30,000, and it is proposed that the Pacific Electric Railway shall pay one-half of the cost, the other half to be divided equally between the city at large and an assessment district covering the property directly benefited by the crossing.

San Diego (Cal.) Electric Railway.—This company announces that it has three plate girder bridges, aggregating 1020 ft. in length, consisting of fifty plate girders 30 ft. long and 3 ft. deep; forty plate girders 60 ft. long and 5 ft. deep, and steel supporting towers for sale. The bridges were fabricated by Milliken Brothers, Staten Island, under Robert W. Hunt & Company's inspection for mill and shop. The bridges were not erected and the steel is new and in excellent condition. Plans and specifications may be obtained upon application to the purchasing department.

Peoria, Galesburg & Western Railroad, Peoria, Ill.—It is reported that plans are now being made to finance this company's proposed lines from Peoria to Galesburg, via Farmington. [April 17, '15.]

Peoria (Ill.) Railway.—It is reported that this company is considering the construction of an extension out Washington Street to Bloomington Street, East Peoria.

Quincy (Ill.) Railway.—This company will construct a loop at the terminus of its State Street line at Twenty-second and Washington Streets.

***Springfield, Ill.**—Plans are being considered by the Springfield Commercial Association for the construction of an electric railway from Springfield to Hillsboro, 50 miles. The plan proposed contemplates the building of the road from Springfield in a direct southerly route through Pawnee and other towns located south of Springfield to Hillsboro and eventually to Cairo.

Indianapolis, Chicago & Meridian Railway, Indianapolis, Ind.—It is reported that plans are being considered to revive the project of this company to construct a line from Indianapolis to East Chicago, which was abandoned about two years ago because of lack of funds. John A. Shafer, Indianapolis, is reported interested. [Dec. 6, '13.]

Topeka (Kan.) Railway.—This company has asked the Kansas Public Utilities Commission for permission to increase its capital stock from $1,210,000 to $2,250,000. It is reported that the company plans to construct a line from Topeka to Lawrence.

South Covington & Cincinnati Street Railway, Covington, Ky.—It is reported that this company will construct a 1½-mile extension of its Fort Thomas line to Cold Springs.

United Railways & Electric Company, Baltimore, Md.—The Public Service Commission of Maryland has instructed the United Railways & Electric Company to extend its Columbia Avenue line and Orangeville line.

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Moncton Tramways, Electricity & Gas Company, Ltd., Moncton, N. B.—This company will probably remove its track on Main Street between Weldon and High Streets and on High Street between Main and Park Streets and place the same on Weldon Street from Main to Park Streets, thence on Park Street to High Street, about ½ mile.

***Pennsgrove, N. J.**—Plans are being considered for the construction of an electric railway from Pennsgrove to Atlantic City. The Chamber of Commerce of Pennsgrove may give information.

Five-Mile Beach Electric Railway, Wildwood, N. J.—The Board of Public Utility Commissioners has granted permission to the Five-Mile Beach Electric Railway to abandon a portion of its line on Rio Grande Avenue, Wildwood.

Interborough Rapid Transit Company, New York, N. Y.—The contract for the construction of the 180th Street yard on Route No. 18, the White Plains Road elevated extension of the Lenox Avenue branch of the first subway in the Bronx, has been awarded by the Public Service Commission for the First District of New York to the Thomas J. Buckley Construction Company, New York, the lowest bidder, at $269,222.50. The yard is to have capacity for about 275 cars, and must be completed within twelve months from the delivery of the contract. The commission has authorized the chairman and secretary to advertise for bids, to be opened on July 17, for the construction of a railroad duct line for the Lexington Avenue subway. The duct line is to consist of a line of thirty ducts extending through Walton Avenue and East 157th Street from a point near 153d Street to River Avenue, in the Borough of The Bronx. The method of construction will be by trench excavation, and the work must be completed within two months from the delivery of the contract.

Asheville, N. C.—A report from the Kenilworth Development Company states that the company is constructing ½-mile of track on which a gasoline car will be operated. [June 10, '16.]

Carolina & Yadkin River Railway, Greensboro, N. C.—Electric operation has been begun by this company between High Point and Thomasville, 7½ miles, a storage-battery car being used.

Pictou County Electric Company, Stellerton, N. S.—This company has received an extension of time from the Nova Scotia Legislature in which to construct various lines which its predecessor, the Egerton Tramway Company, was authorized to build in 1902 and which have not been built.

Northern Ohio Traction & Light Company, Akron, Ohio.—Dissatisfied with the concession of the Northern Ohio Traction & Light Company to build only $35,000 worth of street car extensions in Canton, a delegation of business men and officials of that city appealed to the Public Utilities Commission of Ohio for extensions amounting to $300,000. After hearing the demands of the delegation, the commission suggested that the Canton people call into conference Charles Currie, general manager of the company, present their needs to him and ask the company to issue additional bonds to make the extensions. Mr. Currie said that such an arrangement was agreeable to him. The city wants six extensions of lines aggregating 9 miles. These are chiefly into sections of the city in which new industrial plants have been built.

Oakwood Street Railway, Dayton, Ohio.—Plans are being considered by this company for the construction of an extension to the Dixie Highway. It is proposed to follow the river to Webster Street, then across the new Webster Street bridge and out the Dixie Highway. The new Webster Street bridge is being constructed with provisions for double-track service.

East Liverpool Traction & Light Company, East Liverpool, Ohio.—This company will re-route one of its lines, which will necessitate the laying of about 1½ miles of track and overhead lines.

Lake Erie & Northern Railway, Brantford, Ont.—Operation on this company's extension from Brantford to Simcoe was begun on May 30. The cars now operate from Galt to Simcoe, 43 miles. The 8-mile extension from Simcoe to Port Dover is expected to be open for traffic about July 15.

Hamilton (Ont.) Street Railway.—Work will be begun at once by this company on the construction of track on Kenilworth Avenue from Barton to Burlington Street.

Toronto (Ont.) Suburban Street Railway.—The Ontario Railway Board has granted permission to the Toronto Suburban Street Railway to deviate its track on Dundas Street near Lambton, in order that it might connect with the Toronto & Western Radial line, which operates a line from the suburbs of Toronto to Brampton and Guelph.

***Medford, Ore.**—The city of Medford has voted $300,000 of bonds for the construction of a 30-mile railroad to the Blue Ledge mining district, subject to the ratification by the voters on July 10 of a contract for the construction of the road with the Southern Oregon Traction Company, Medford.

North Branch Transit Company, Bloomsburg, Pa.—Work will be begun at once by this company repairing its tracks on East Front Street.

Port Jervis & Delaware Valley Railroad, Matamoras, Pa.—It is reported that work will be begun early this month on this company's proposed line from Port Jervis to Matamoras and Milford, about 7½ miles. The work will include 21,000 cu. yd. of earth excavation, 15,000 cu. yd. of embankments, one 60-ft. steel girder bridge and two camel-back trusses, 300 ft. spans to be reinforced. There will also be about 300 lineal feet of trestle and 250 cu. yd. of masonry. Most of the material has been contracted for. J. A. Vandegrift & Company, 149 Broadway, New York City, are to finance and build the line. W. E. Soden, 19 Hubbard Building, Port Jervis, N. Y., treasurer and engineer. [June 17, '16.]

Rhode Island Company, Providence, R. I.—Work will be begun at once by this company on the double tracking of its line on Randall Street from Charles Street to North Main Street.

Carolina Rapid Transit Company, Clinton, S. C.—Preliminary surveys will be begun about July 10 by Reid Tull, Spartanburg, for this company's proposed line to connect Spartanburg, Union, Woodruff, Enoree, Laurens and Clinton, about 85 miles. J. F. Jacobs, Clinton, is interested. [June 17, '16.]

El Paso (Tex.) Electric Railway.—All overhead lighting and power wires of the El Paso Electric Railway in the business district of El Paso will be installed in underground conduits within the next year. Work will be begun in about ninety days. It is estimated that the cost will be about $325,000.

Spokane & Inland Empire Railway, Spokane, Wash.—It is reported that this company has decided to extend the Manito Park car lines from Thirty-third Avenue to Thirty-eighth Avenue, actual work to begin as soon as the paving of Grand Boulevard is begun.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—This company contemplates the construction of a bridge above Boaz Stop.

SHOPS AND BUILDINGS

Detroit (Mich.) United Railway.—This company's carhouse at North Detroit, containing two double-truck cars and a single-truck car, was destroyed by fire on June 26. The loss is estimated at $35,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—It is reported that this company is receiving bids for the construction of an office and terminal building and concourse. The structure will be 84 ft. x 155 ft., of brick, stone, concrete and steel, and will be four stories. Franz C. Warner, Cleveland, architect.

Portland & Oregon City Railway, Portland, Ore.—This company will construct a new station on East Third and East Clay Streets near Hawthorne Avenue, Portland. A station will also be built at Clackamas River, which will be called the Carver Station.

POWER HOUSES AND SUBSTATIONS

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has received a contract from the city of Knoxville for installing a white-way system in the business district at $9,000.

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Manufactures and Supplies

PREDOMINANCE OF SAFETY FEATURES IN CAR DESIGN

An article on page 1148 of the Equipment and Its Maintenance department in the issue of this paper for June 17, describing recent practice in Brooklyn, emphasizes the extent to which safety is the dominating feature of much of the car design of the present day. It does not take a very long memory to reach back to the time when the fender was about the only device used on an electric car in which safety was the primary purpose for its use. Gradually, however, other devices were adopted. Probably one of the first of these was the safety gates used on the platforms of the cars in a few cities, notably in Minneapolis and St. Paul, but the idea that the car platform should be inclosed did not become generally accepted until well along in the history of prepayment design. Finally, the pay-within car was put on the market with a completely inclosed rear platform, and the principle that the passenger should be protected against himself when boarding and alighting became a standard feature in the practice of many American electric railways. Another early device was the protection of the bumper by an oblique shield so as to make it impossible for boys or others to stand on the rear bumper outside the dashboard either as passengers when the car was crowded or to steal a ride.

The purpose of this article is not to establish claims for priority of use for any of the different safety appliances or even to attempt to enumerate all of them but to call attention to the large number which have been put upon the market during the past few years and have become recognized as standards of equipment with many companies. Most of these have been developed during the past few years and have received a great stimulus from the safety-first movement, if indeed they were not largely responsible for the movement itself. It is a notable commentary upon the enterprise of the American electric railway manufacturer and electric railway manager that they should have developed and adopted so many of these devices and thus have helped to make the modern electric car almost "foolproof." To mention some of them, it might be well to begin with the outside of the car.

Here the fender naturally attracts first attention, and while the idea of the fender is twenty years old or more, the fender of the present day bears little resemblance to the crude device which was attached to the front of the early electric cars. A modern fender is not only far more reliable in operation but is also much less liable to cause accidents to the unwary pedestrian on the streets than its predecessor. We have already referred to platform gates and doors, but the modern devices of this kind are also far removed from the original Twin City gates. They are often operated by air power and have so delicate a closure as not to cause injury in case a person should be caught between the closing door and the jamb. Underneath the door on an end-platform car in many cases are folding or disappearing steps, while the steps themselves are usually fitted with non-slipping treads. In the front of the car on the bumper is an anti-climber to prevent cars riding during a collision.

As one boards a car, the first equipment with which he comes in contact is the platform railing which enables him to maintain his balance as the car is starting and is a substitute for the old grab handle on the outside of the car. These platform railings also serve in many cars to divide the stream of ingoing from outgoing passengers, but they are quite as much for safety as to avoid platform congestion. Inside the car there are, of course, the car-seat handle or the sanitary strap to enable the passenger to keep himself erect when the car starts or stops suddenly or is passing around a curve.

These are, of course, only a few of the many devices of a safety pattern used on cars, but we believe that enough have been enumerated to demonstrate the claim made at the beginning of this article that safety has become a primary purpose in the design of many cars which are being built to-day.

ROLLING STOCK

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of June 10 as being in the market for two cars, is considering the purchase of two single-truck all-steel cars, 33 ft. 4 in. over all.

Three Rivers Traction Company, Three Rivers, P. Q., has ordered a single-end combination baggage car and snow plow from the Ottawa Car Manufacturing Company, Ltd., Ottawa, Canada. The car will be of wooden construction with a heavy side-wing plow on one side and a heavy nose plow in front. It will be 30 ft. over all.

TRADE NOTES

Lord Manufacturing Company, New York, N. Y., has received an order for thirty-two Berg folding type fenders for the sixteen cars of the Binghamton (N. Y.) Railway being built by the Cincinnati Car Company.

T. L. Smith Company, Milwaukee, Wis., announces that E. R. Marker, district manager, has moved to 609 Wells Street, Milwaukee, Wis., where he will take charge of the business of the company as Wisconsin representative.

Chattanooga Brass & Machinery Company, Chattanooga, Tenn., composed of W. L. Case, Carl Flatter, John Fort and W. F. Norman and capitalized at $15,000, has been formed for the purpose of manufacturing ball-bearing, self-lubricating trolley wheels.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is reported to have purchased 440 acres of ground in Tinicum Township, Pa., fronting on the Delaware River, on which it may establish a plant, although it has not definitely been decided.

George R. Law, who for some time has been New England representative of the American Brake Shoe & Foundry Company, has severed his connection with them and is now manager of the mechanical department of the Electrical Sales Company, 176 Federal Street, Boston, Mass.

General Electric Company, Schenectady, N. Y., has received an order for double-motor and control equipment for the seventy storage-battery cars being built by the Southern Car Company for the New York (N. Y.) Railways. Bush Terminal Company has ordered a 60-ton electric locomotive from this company.

W. H. Ivers, formerly with Baldwin Locomotive Works, has been appointed Southwestern representative of Gold Car Heating & Lighting Company, with headquarters at St. Louis, Mo., succeeding George F. Ivers, who has resigned to become manager of the railway supply department of Shapleigh Hardware Company, St. Louis, Mo.

Holden & White, Chicago, Ill., announce the appointment of the O. H. Davidson Equipment Company as their representative in Utah, Idaho, Montana, eastern Nevada and western Wyoming. The office of this company, at Salt Lake City, is in charge of L. Brandenburger and will hereafter represent Holden & White in the sale of Wasson bases, Garland ventilators and Perry-Hartman side and center bearings in that territory.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has sold to the Rochester Railway & Light Company, Rochester, N. Y., for its new hydroelectric plant in that city two 12,500-kva., 11,000-volt, three-phase, 60-cycle, 180-rpm, vertical a.c. generators with direct-connected exciters. This company has received an order from the Pennsylvania Lines, West of Pittsburgh, for four 600-amp. electric arc welding equipments. This company also reports the receipt of a number of other important orders.

American Car & Foundry Company, St. Louis, Mo., announces the following changes in officers: J. M. Buick, formerly vice-president, has been elected vice-president and general manager; William M. Hager, formerly secretary, has been elected assistant to the president; H. C. Wick has been elected secretary to fill Mr. Hager's place. Mr. Wick

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has been with the company for the last twelve years, acting as assistant to the secretary and also secretary to F. H. Eaton, the late president of the company. The entire board of directors was re-elected.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, reports that at the present time it has unfilled orders on its books that will take the entire production day and night for fully five months. Not all is for immediate shipment, but it cannot promise better than about ninety days' delivery on most of the orders now being accepted. This abnormal schedule comes about through difficulty in getting raw material and on account of the tremendous amount of business recently placed with this company. Many of its large customers have placed anticipatory orders for delivery the latter part of this year or early next year. These deferred delivery orders now total 2910 gears and 4894 pinions, from such companies as the following: Public Service Railway, Newark, N. J.; New York (N. Y.) Railways; Toledo Railways & Light Company; Chicago Elevated Railways; Cincinnati Traction Company; Colorado Springs & Interurban Railway; Kansas City Railways; Philadelphia Rapid Transit Company; United Railroads of San Francisco; Grand Rapids Railway; Nashville Railway & Light Company; Easton Transit Company; Bay State Street Railway, and American Railways, Altoona and Joliet.

ADVERTISING LITERATURE

Laclede-Christy Clay Products Company, St. Louis, Mo., is distributing a circular on fire brick and other refractory shapes.

Roller-Smith Company, New York, N. Y., has issued Bulletin 200 which describes and illustrates its direct reading bond testers.

MacGovern & Company, New York, N. Y., recently issued an illustrated catalog listing the electrical, hydraulic, steam and gas power machinery they have on hand.

Sprague Electric Works of General Electric Company, New York, N. Y., have issued Bulletin No. 48906 describing and illustrating their ½-ton and 1-ton electric hoists, Type S-1.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin E-41, superseding E-32, which describes and illustrates Duntley portable electric tools for street and interurban railways.

Ohio Brass Company, Mansfield, Ohio, has issued an illustrated circular on Crouse-Hinds Imperial headlights, for which it is general sales agent, as noted on page 44 of the ELECTRIC RAILWAY JOURNAL of July 1.

The Texas Company, New York, N. Y., is circulating an illustrated booklet entitled "About Texaco Crater Compound." The booklet describes the uses of this product by electric railways and other industries, and also gives directions for applying it.

Ohmer Fare Register Company, Dayton, Ohio, has issued a circular containing testimonial letters from C. B. Wells, recently with the Denver Tramway Company, and L. D. Mathes, general superintendent electrical division, Norfolk Southern Railroad. Both speak in high terms of the Ohmer fare register system.

Gurney Ball Bearing Company, Jamestown, N. Y., has just issued a very attractive catalog of forty pages. No attempt is made in it to illustrate the application of the bearings to different forms and parts of machinery, as these applications are taken up in a series of engineering bulletins issued by the company, but the general principles of the bearings are explained and illustrated.

Carnegie Steel Company, Pittsburgh, Pa., has just issued a pamphlet entitled "Axles and Forgings for Steam and Electric Railway Service; Standard Axles, Designs and Specifications." The pamphlet, which has eighty-eight pages, contains a brief introduction explaining the conditions under which Carnegie axles are made and sold. The specifications for axles of the American Society for Testing Materials, the Master Car Builders' and the American Electric Railway Association are then given and are followed by the standard axle designs of the M. C. B. and A. R. M. M. and the American Electric Railway Association. A few convenient calculating tables complete the pamphlet.

NEW PUBLICATIONS

Trolley Wayfinder, Official Street Railway Guide of New England, published by the New England Street Railway Club, Boston, Mass. Price 10 cents.

This is the authority for trolley trips in New England and is a good example of the constructive work which a sectional organization can do in the way of developing electric railway traffic. Of course, in New England, much of the summer traffic is from tourists, so that the "Wayfinder" gives considerable space to the scenic attractions and points of historical interest reached by the different lines, but it should also be of great help to the commercial traveler and others who are traveling for business purposes. The "Wayfinder" contains a good index and many maps as well as timetables showing distance, fare, total elapsed time and headway on all of the principal interurban and suburban lines in New England.

The Engineer in War, by P. S. Bond, Major, Corps of Engineers, U. S. Army, McGraw-Hill Book Company, Inc., New York, 187 pages, illustrated, price $1.50.

The present political situation makes this book, which is made up from a series of articles originally appearing in the *Engineering Record*, of great interest and value. It is intended primarily to teach the non-military engineer the fundamentals of military engineering, and this is done in so clear a way that the book will hold the attention of the reader even if he is not intending immediately to apply the principles laid down. The author believes that no army ever had an excess of engineer troops, and says that the demands made upon the engineers in every army have inevitably been greater than their capacity. Moreover, the tendency of modern warfare is more and more to depend upon the engineer. Under our present military system, the engineer corps as well as the army have to be recruited from volunteers, so that even in peace the civilian engineer should become acquainted with at least the rudiments of military engineering. The book is one which could profitably be read by every engineer, even by those beyond military age.

JITNEY'S EFFECT IN PORTLAND

The Portland (Ore.) *Telegram*, commenting editorially in its issue of May 26 on a request which had been made recently for an extension of the railway facilities of the Portland Railway, Light & Power Company, said in part as follows:

"For the first time since the jitney converted a street railway asset into a liability the Portland Railway, Light & Power Company has been asked to make a new investment here. Request comes from the Franklin Parent-Teacher Association to extend the Richmond line a distance of eleven blocks to the new Franklin High School. A roseate prospectus is presented. One thousand pupils will attend at the opening of the next September term, and after all the units of the new building are completed there will be 2000 pupils.

"This request opens up the important question of intra-city transportation in its larger aspects, and it is pertinent to inquire whether there is a reasonable probability that present corporations in any city will extend existing lines or build new lines so long as jitney competition reduces income to a point below the outgo. Surely no new companies will enter an old field where the jitney offers a menace that has proved to be disastrous. Looking forward two or three decades how are we to increase our home-owning population if present street railway lines are not extended and no new districts developed? Shall the bulk of city population, as in New York, for instance, live in tenements?

Thus far regulation of the jitney has failed. Of course a city could operate street railway systems at a continual loss. This is precisely what the Portland Railway, Light & Power Company has been doing for more than a year. It will be no easy job to induce the corporation to throw good money after bad. We fear the students at Franklin will have to walk part of the way to school. The jitney never ventures away from the car tracks."

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AN ADVOCATE OF FAIR PLAY

Not often does a public service commissioner overcome his reluctance to discuss publicly specific questions that have come or might come formally before him for judgment, and when he does it may be deemed certain that the natural reserve of his quasi-judicial position has been broken through only because of the dictates of fair play and sound equity. A case in point has to do with the recent remarks of Commissioner Campbell, noted elsewhere, in regard to conditions confronting the Portland Railway, Light & Power Company, Portland, Ore. Here is a company, Mr. Campbell says, that is giving service as good as or better than that of any similar railway in the United States, but it has been and is operating at a loss. Of course, the company has suffered from the especially acute business depression in the Northwest, but serious contributing causes to the unfavorable showing have been the continued competition for light and power business, and particularly the unlicensed and unregulated competition of jitneys. Unless these conditions improve, it is said, the company will be compelled to come to the commission for relief. This warning is the result of Mr. Campbell's three-year study of the case, and his words ought to be accepted by the citizens of Portland as authoritative. Some others in the Northwest are alive to the need of stopping utility oppression, as is evident from the recent editorial exhortation of the Portland *Oregonian* that the public silence the demagogues and invite capital to come in by giving it a square deal, but the Northwest needs many more apostles of such a gospel of fairness.

BEARING THE BURDEN OF OBSOLESCENCE

At a recent hearing before a public service commission the statement was made that by replacing obsolescent apparatus and handling its cost through a suspense account, "future generations" are inequitably compelled to pay for the retirement of apparatus used by their ancestors. This is an assertion that hardly finds justification in either engineering or accounting theory. Obsolescence is caused by advances in the art which render certain apparatus uneconomical for use, as compared to other types of later development and of greater efficiency. Hence if a piece of property is replaced because of obsolescence it naturally follows that the use of the new apparatus will save enough money to pay all charges for making the change. Good engineering will not recommend it unless this is so. Outside authorities, of course, may force the replacement of property before it is really obsolete, but then the cost burden cannot be said to fall without fairness upon the patrons who will henceforth enjoy the improvement. But even if the replacement occurs when economically desirable, "future generations" are not harmed by the fact that the property has become obsolete. Rather are they benefited by the more favorable showing possible with the new property than if the old had been kept in operation. Once there might have been a danger to future patrons of a steadily increasing suspense account used simply to defer unduly the proper proportional charges to the annual operating expense, but the present official restrictions upon the creation and use of a suspense account for obsolete property chargeable to operating expenses makes this danger negligible.

THE RAILWAY OFFICIAL AS A CITIZEN

We are pleased to note that Gen. George H. Harries was honored by his fellow citizens in Omaha by being chosen to deliver a public address on Memorial Day and again on Flag Day this year, and that he discussed the very live issue of military preparedness on which he is, of course, an authority. It is not the subject of the addresses nor their treatment to which we wish to call attention at this time, however, in spite of the great popular interest in the subject of preparedness. It is to the opportunity which civic events of this kind offer for men engaged in different kinds of business in the same city to become acquainted and to the probability that if they do so they will learn that they have many similar aims, and in most cases are guided by the same principles and lines of thought. We believe that if more public utility officials took an active part in civic affairs there would be less distrust of the motives of public utility corporations. The public would find by contact that those directing the affairs of the utility are reasonable-minded men who do not want extraordinary profits but only that fair return on their investment which every city should be willing to give every enterprise within its borders an opportunity to earn, and, conversely, we believe that the utility manager would often find by acquaintance that some of the strenuous complainants of his service are men who were animated only with the desire of seeing that the city and the citizens obtained what they considered fair treatment from the utility. If they can be convinced that this is the case, their objections will disappear. We realize that it is not every manager who is able to act as an orator on patriotic occasions, but every official can, or ought to be able to, take an active part in the affairs of citizens' associations, such as boards of trade and chambers of commerce, and their participation in such direction should be of great benefit to all.

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THE BAY STATE CASE

The report of B. J. Arnold to the Massachusetts Public Service Commission, containing the results of his study of the Bay State Street Railway, materially advances the final settlement of this celebrated case. Mr. Arnold's report was summarized in the ELECTRIC RAILWAY JOURNAL for July 1, on page 13 *et seq.* In brief, Mr. Arnold, acting as the transportation expert of the commission, concludes that economies in operation amounting to nearly $700,000 per year can be attained but that when the savings estimated are considered, including an adequate depreciation allowance, the gross revenue of the property is insufficient to return 5 per cent on the investment. He inferentially recommends that this increased revenue be secured through the use of prepayment cars, the adoption of the one-man car for use on short lines in suburban territory during at least the greater part of the day, the attraction of traffic through higher schedule speed, an increase of interurban fares to 1.5 cents or 1.75 cents per mile, a more extended development of express and freight business and a curtailment of service through a rearrangement of schedules on certain portions of the system. Such conclusions, when made by a disinterested expert retained by and reporting to the commission, must have great weight with that body.

Looked at from another angle, Mr. Arnold's findings fully support the position taken by the officials of the Bay State Street Railway in the wage controversy arbitrated in the early part of 1915. The company contended that it could not afford to advance wages unless it were forthwith permitted to increase its earnings. In spite of this contention, wages were advanced by the board of arbitration, as it now appears, to the disadvantage of the stockholders. The position of the street railway was very similar to that of the railroads. Wages were advanced without any provision being made to produce the required additional revenue. The stockholders were obliged to bear the brunt and wait in the hope that tardy relief would be provided.

Fortunately for the Bay State Street Railway, the precedents of decided cases are distinctly in its favor. The Massachusetts Public Service Commission has not heretofore hesitated to advance fares or give proper relief when it had been shown that existing conditions worked a hardship to the investors in public service companies. It may be confidently expected that this enlightened policy will be continued. Even though the commission gives the company the necessary authority to increase its revenues, the stockholders will not have received full and exact justice. There will be at least a year's delay between the time that the wage increase was granted and the time that the increase in revenues was provided for.

It does not appear to be possible as yet to secure recognition of the fact that in passing upon wage questions, the security holders' interests must receive equal consideration with the needs of the workmen. Wages should not be advanced unless a company is, at the same time, enabled to pay the advance and still return a fair profit to its owners. If the earnings of the company do not justify added expenditures, an increase in wages should not be made unless the earning power of the company is concurrently increased by appropriate action. In the present case, as in most disputes of like character, the board of arbitration passing on the wage controversy had no authority over fares. The existence of such a situation is intolerable.

TESTS FOR COLOR BLINDNESS

Railway men, like mariners, have to deal with the ability of employees to distinguish the color of signals, and we wonder whether those whose duty it is to test employees are finding the same trouble which is reported to have been experienced in the testing of men for the navy, that is, the inability on account of the war to get a reliable supply of the colored worsteds or the necessary dyes for the method of testing commonly used. It is reported that the navy authorities are in great need of material. As our readers know, the commonest test for the color vision of employees is the use of the Holmgren worsteds, a set of little skeins of worsted yarn dyed according to a very carefully worked out scheme in colors, the selection of which affords a very convenient index of color vision. These skeins have to be handled and assorted by the men under test, eventually get dirty or faded, and then are liable to cause trouble. In default of either a supply of the wools themselves or of the necessary dyes to prepare them, carrying out of vision tests is a rather difficult proposition as well for railway men as for the navy.

At this juncture it seems particularly pertinent to suggest that a good time has arrived for changing the system of testing from the worsteds, so difficult to obtain, to the well-known lantern tests used by a number of our large railway systems, for instance, the C. B. & Q. The lanterns are made in America, do not get faded or soiled or out of order, and in many respects are much more satisfactory than the older system even more generally used. From the standpoint of psychology the lantern has an enormous advantage, for the man being tested does not feel that he is on a sort of old woman's job of matching colors. Not understanding the significance of his bad matches he sometimes feels seriously aggrieved at being thrown down by reason of what to him is a very trivial matter, although to the examiner it may imply defects which would render the man under test very liable to confuse a green and a red light with disastrous results. In the lantern test the objects seen may be made to simulate exceedingly well the signal lights as they will have to be observed in their natural state, through haze or fog, and at a considerable distance. It looks like a practical man's test even to the most casual observer, and having its own uniform lighting system it is independent of the daylight in which the worsteds are intended to be examined, and is, on the whole, quite as simple and more reliable.

The difference between a clouded day and a bright blue sky may lead, in doubtful cases, to false conclusions with the Holmgren test, while the lantern is re-

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liable, first, last and all the time. In addition, its indications are so definite that they can be seen by any onlooker with normal color vision, and if a man thinks he is being unjustly rejected, any observer knows better. More than once it has happened that a railway man, highly disgruntled, has been accompanied to a second test by some of his union officials who observed his mistakes with the lantern and gave him very cold comfort. It is unfortunate that the supply of well-known testing material has been cut off, but it may be a blessing in disguise both to the railways and to the navy in leading to the adoption of a more satisfactory and practical method.

VISUALIZING ENERGY LOSSES

It is worth quite a mental effort to visualize energy losses; to develop an instinctive feeling of their magnitude and of the practicability of reducing them. Energy is one of the most difficult quantities to grasp concretely. All that one can do is to translate it into terms which come nearest to his every-day life. A unit which is entirely comprehensible to a man engaged in one occupation may be Greek to one in a different line.

In an editorial in the issue of this paper for June 24 a general survey was taken of the losses involved in moving a car in city service. The purpose of this analysis was to render these losses somewhat more tangible. In order to do this the losses were roughly grouped into three approximately equal divisions: "inertia" losses, main friction losses, and electrical and sundry losses. In addition, the total loss in city service, assumed to average 125 watt-hours per ton-mile, was restated in mechanical terms, namely, as 166 ft.-tons. In other words, the amount of energy consumed per ton-mile in all of the above losses, involving an average number of stops per mile, would lift a ton 166 ft. or 166 tons 1 ft. With the energy consumption at the rate assumed, 125 watt-hours per ton-mile, the total energy required for a car-mile would also raise the entire car 166 ft.

In trying to visualize such a quantity of energy as 125 watt-hours per ton-mile one man can see this best in the mechanical form such as that already suggested, 166 ft.-tons, or as about 10 hp.-minutes. To another, the fact that this amount of energy will light a 20-cp. tungsten lamp for five hours will appeal strongly. To still another the fact that it will, barring radiation losses, raise the temperature of a cubic foot of water about 7 deg. Fahr. will make it seem most tangible. The man accustomed to reducing energy to financial terms will say to himself: "At 1 cent per kilowatt-hour that means 1¼ mills", or "At the rate which I pay for residence lighting, say 10 cents per kilowatt-hour, that is the equivalent of 1¼ cents."

Facility in translating energy from electrical into mechanical, thermal, financial or other terms, or vice-versa, requires practice, but such facility is very convenient, not to say necessary, if one is to follow with ease the rapid development of energy-saving devices in car operation and elsewhere.

LINE DEPARTMENT NEEDS SELF-PROPELLED TRUCKS

There are few men in any electric railway organization who cannot get benefit from a careful reading of the leading article in this week's issue, that by J. D. Kent describing the experience of a large railway system with automobile trucks in maintenance work. The executive who has bills for equipment to approve will find reference data of value in checking line truck bills for reasonableness, while the foreman or the superintendent who feels that he could use one or more automobile trucks to advantage can find ammunition here for a purse-string-loosening campaign. The author has set forth very clearly and frankly the salient facts of this subject which the practical man wants but finds it usually very difficult to get.

In comparing the automobile truck with its horse-drawn rival, the considerations are: over-all costs per unit of work done, extent of field of application and general usefulness, degree of interference with street traffic, and reliability. The first two of these items must be considered together, for there is, of course, such a tremendous advantage possessed by the automobile truck in that it can do many things which the horse-drawn vehicle cannot do, or at least cannot do economically, that a dollars-and-cents comparison is only fair when interpreted broadly. The automobile truck can be driven so much faster, can carry loads so much heavier, can produce so much more tractive effort for use on so many jobs, that a broad basis of comparison is necessary in considering the automobile truck from the financial side. Then there is the matter of blocking the streets. By the very nature of its occupation, the line wagon or truck is bound to be more or less of a nuisance; it is a necessary evil on the streets. It is here that the compactness and the speed of the automobile truck greatly favor its use, while its mobility, also, should not be overlooked. In shifting the position of a horse-drawn vehicle, the intelligence of the driver has to act through that of the horse, and much time, nervous energy and space are required for the simplest evolutions.

In reading Mr. Kent's article one is impressed with the applicability of the automobile truck for all kinds of duties. Wherever powerful pulling, pushing or lifting has to be done, it is there with the horsepower behind it. There is no limit to its utility but that set by the ingenuity of the user. But how about reliability? says the manager from Missouri. Will not a few breakdowns under awkward circumstances more than offset the unquestioned advantages enumerated? These pertinent questions can now be answered from experience. Reliability is so essential that unremitting efforts have been exerted by manufacturers to secure it, and these efforts have been entirely successful. The automobile truck is so well established as the most economical device, in general, for the haulage of goods over short distances, and data regarding reliability are so easily secured, that there need be no question on this phase of the subject.

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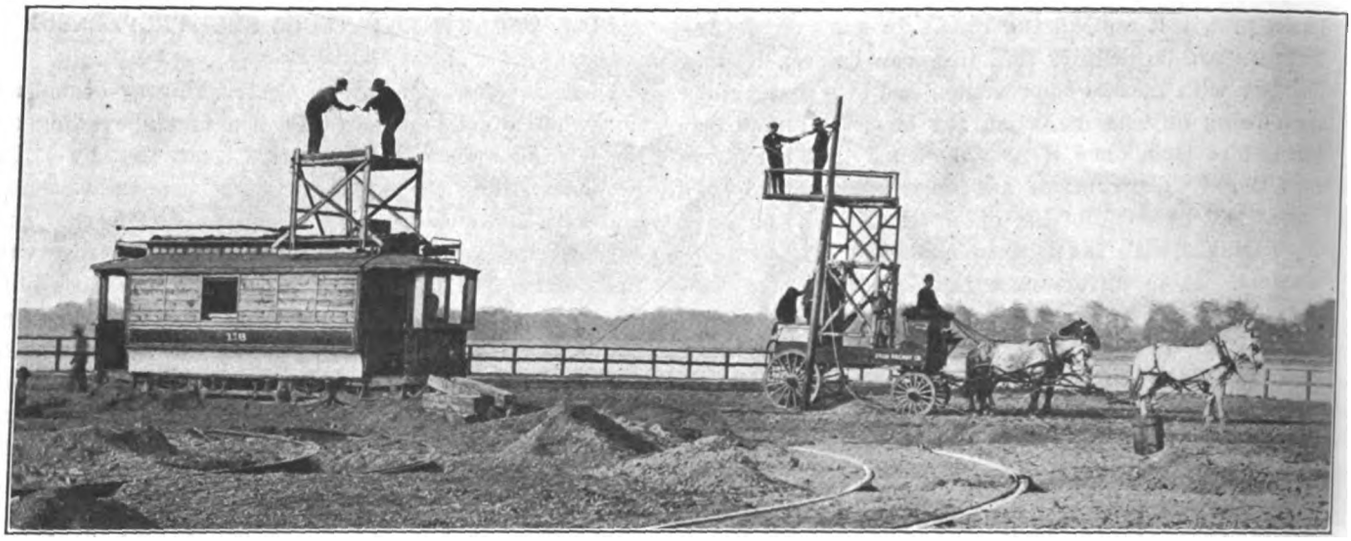


THIRD AVENUE LINE TRUCKS—EQUIPMENT USED ON UNION RAILWAY PREVIOUS TO INSTALLING AUTO TRUCKS

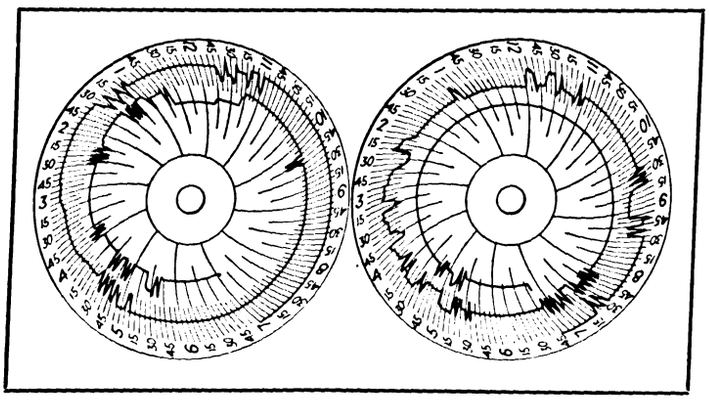
Overhead Line Maintenance Trucks of the Third Avenue System

By JAMES D. KENT
Electrical Engineer Union Railway, New York City

The Writer Describes Various Types and Capacities of Gasoline Motor Trucks, Modifications in Them Developed by Experience, Valuable Special Uses, Means of Checking Operations and Facilities for Maintenance

As the line department of the Union Railway and allied roads in the Borough of the Bronx, New York City and Westchester County, forming part of the Third Avenue Railway system, has been using motor trucks since 1910, our experience in this field of equipment may have something of value to others. Except for one gas-electric truck, our experience has been confined to gasoline-driven trucks.

The trucks start out in the morning to do certain work, or to cover certain territory, and to inspect and repair the overhead where required. They do not report except by telephone nor do they return to the garage until their day's work is done. Each truck carries a complete equipment of tools and necessary material.



THIRD AVENUE LINE TRUCKS—SAMPLE GRAPHIC RECORDS OF TRUCK PERFORMANCE

The tower-equipped trucks comprise the following:

Union Railway, operating 150 miles of single track and 80 miles of street—one 3½-ton gas-electric Couple-Gear, four-wheel drive; 16-ft. 7-in. wheelbase, length over chassis 21 ft. 2 in.; weight loaded, 14,000 lb., including men and tools (1500 lb.); height of tower down, 11 ft. 6 in.; 48-hp. Schlosser four-cylinder engine direct-connected to 12-kw. variable-voltage compound-wound generator of 100 per cent overload continuously and 200 per cent overload capacity momentarily; one 3-hp. motor of the same characteristics in each wheel; used for combination wrecking, emergency, and heavy construction in all overhead and underground cable work.

Four 3-ton T. C. Packards, chain-drive; 12-ft. wheelbase; length 19 ft. over all; height of tower down, 11 ft. 4 in.; width over all, 7 ft. 1 in.; weight, 10,000 lb. loaded, including crew and tools; four-cylinder, 32.4-hp. gasoline engine; in all respects, except body, of standard commercial truck construction; used on overhead work.

One 1500-lb. two-cylinder horizontally-opposed Buick truck, tool and small emergency wagon. This is soon to be replaced by a 1-ton Mack truck equipped with covered body similar to one now operated by the Westchester Electric Railroad.

Westchester Electric Railroad, operating 37 miles of single track in the cities of Mount Vernon and New

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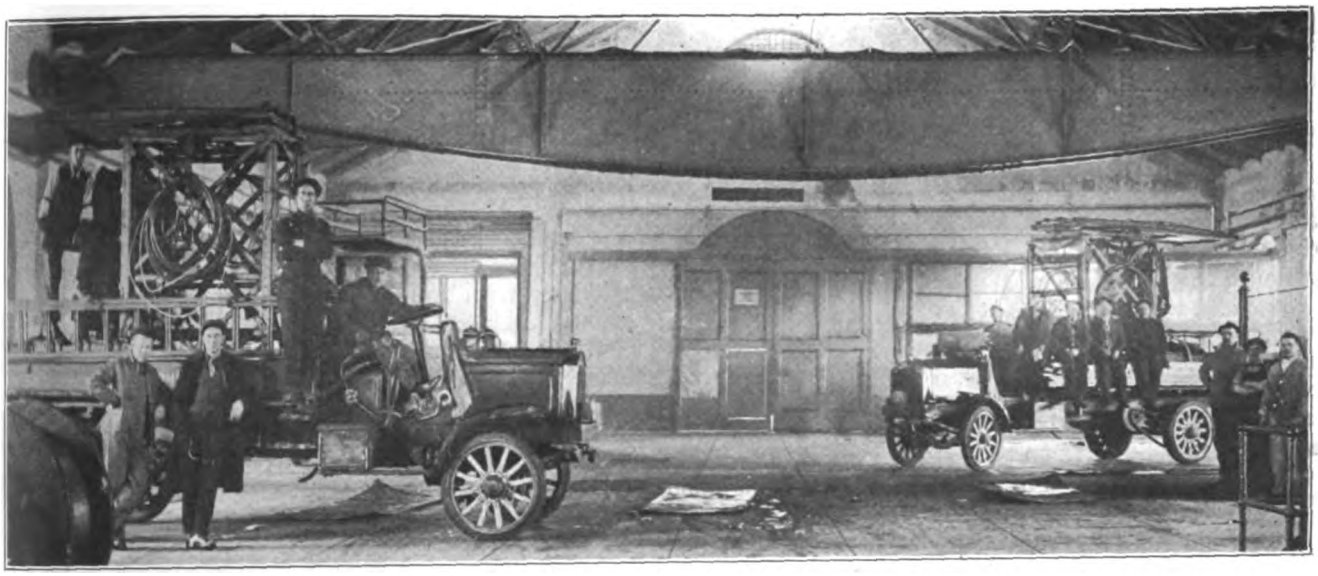


THIRD AVENUE LINE TRUCKS—UNION RAILWAY GARAGE, SHOWING EQUIPMENTS AND CRANE

Rochelle and adjacent villages—One 2-ton chain-drive Packard tower; four-cylinder gasoline engine of 26.4 hp. with Trenton tower; used for line purposes. One 1-ton worm-drive Mack truck with covered body, used for general purposes such as carting material, tools, etc., and for line work not requiring tower equipment.

Yonkers Railroad, operating 42 miles of single track in the city of Yonkers, Westchester County—One 1½-ton chain-drive White, four-cylinder gasoline truck equipped with Trenton tower for line purposes; one 3-ton chain-drive White four-cylinder truck, platform stake body, used originally for hauling material of all description; changed to tower equipment and now in the shop for change to combination tower, platform and reel truck.

Adaptations to Railway Conditions

All trucks are as purchased, with the following exceptions:

The 3½-ton Couple-Gear truck was lengthened to 21 ft. 2 in. over all. Its rear wheels were fastened in line to eliminate the four-wheel steer and increase the tool and material space; a General Vehicle Sprague Type-E16 electric winch was mounted at the left rear of the tower with "nigger-head," no drum, projecting over the left running board for pulling purposes when the truck is standing alongside the track in proper position according to traffic rules. This winch has a capacity of 3000 lb. pull at 50 ft. per minute and has proved ample for severe service.

A 16-ft. 8-in. x 8-in. yellow pine boom, tapered to 5 in. x 5 in., is mounted on the rear end of the truck, supported by an 8-in. channel-iron brace, with ratchet hoisting and lowering device similar to the tower apparatus. The foot of this boom is supported on a roller made of an old pinion, with shrunken band, and is adjustable for height by means of a small screw jack, so that in service practically all the weight of the boom and its load is carried on the pavement. The boom is not lowered when changing positions, for short distances, except when necessary to clear overhead structures. We removed all housing also in reconstructing this truck, partly for the sake of safety and partly for better work-

SUMMARY, INCLUDING HORSE TRUCKS

Union Railway

Four 3-ton Packard towers purchased 1911.
One 3½-ton Couple-Gear, purchased July, 1910.
One 1500-lb. Buick, express body, purchased 1913.

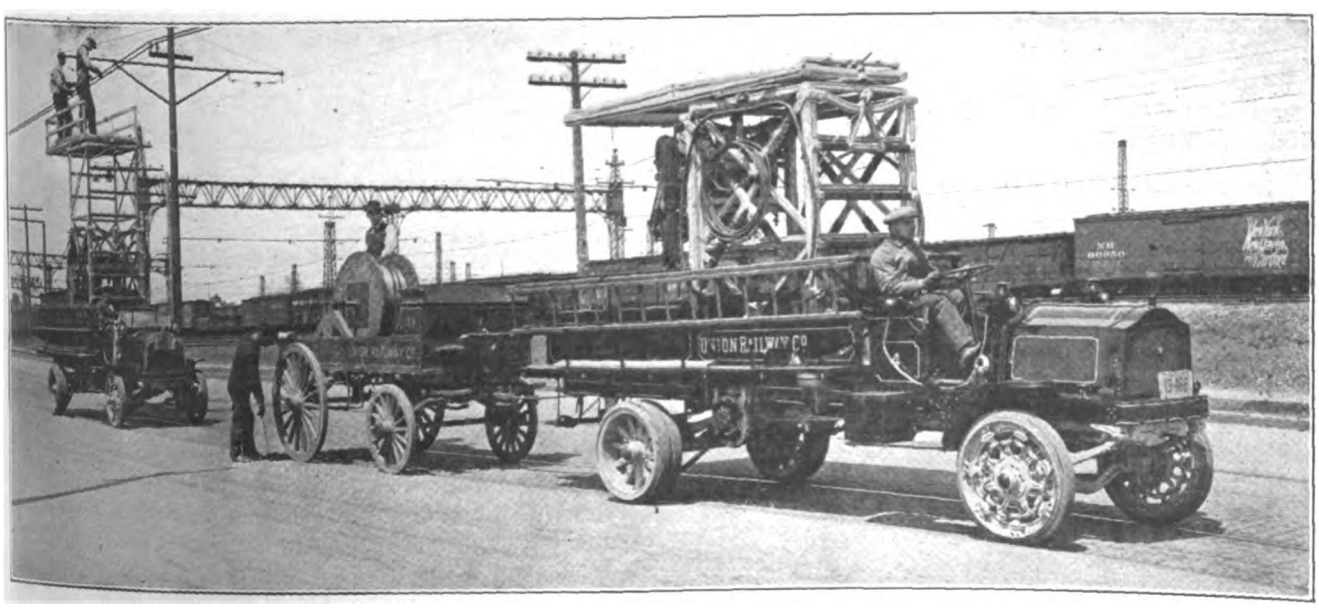
Westchester Electric Railroad

One 1½-ton White tower, purchased October, 1912.
One 3-ton White, stake platform, purchased October, 1912.
One 2-ton 2B Packard tower, purchased January, 1913.
One 1-ton Mack, covered platform, purchased June, 1915.

Horse Trucks

Union Railway

One tower carpenter's wagon.
One 12-ft. reach pole wagon.
One 1500-lb. pole gang tool wagon.
One reel wagon trailer.



THIRD AVENUE LINE TRUCKS—3-TON TRUCKS AND TOWERS, WITH TRAILER REEL WAGON

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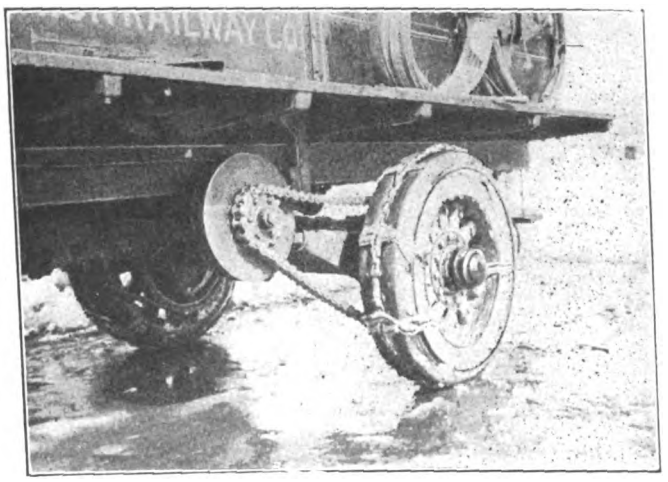
ing conditions, as it was extremely difficult for the driver to hear instructions when the men were working on the tower.

One of the 3-ton Packards was equipped with 37-in. x 5-in. single front and double rear pneumatic tires for the greater allowable speed of 15 m.p.h. as against 12 m.p.h. possible with the Packards equipped with solid tires. Owing to the maintenance cost of this type of tire (although the truck manufacturers called our attention to the decreased wear of the parts on this truck as compared with the others when overhauled by them), the pneumatics have been eliminated and replaced with solid rubber. However, the front wheels have been replaced with Sipe spring wheels to approximate the greater resiliency and greater mileage of pneumatic tires. These solid tires on Sipe spring wheels are guaranteed for 20,000 miles in two years as against 8000 miles in one year on rigid wheels, a ratio of 5 to 1.

The 3-ton Packards cost approximately $4,000 each, delivered. They are thoroughly overhauled about every 10,000 miles. Nearly all are equipped with Goodrich solid rubber wireless tires, which give an average of 7000 miles and a maximum of nearly 16,000 miles on the solid rear wheels, and an average of more than 12,000 miles on the Sipe spring wheels used at the front. We consider our service severe on tires. One reason



THIRD AVENUE LINE TRUCKS—DRIVING WHEELS EQUIPPED WITH NON-SKID DEVICE, REINFORCED WITH SPAN WIRE

is that as we operate the trucks at only one-third of the normal rated load capacity, they are not so flexible on their springs, and the vibration is greater. Hence they do not ride as smoothly as would a lighter truck, or one loaded to capacity.

The 3-ton White truck has been equipped with a tower removed from one of the horse trucks, as it was found that there was not sufficient hauling for a platform truck on a 35-mile division. During its present regular overhaul we are widening the rear platform in order to carry a 1-mile reel of trolley wire between the tool boxes, and also to get more space for tools and allow the hauling of freight that is not too long or too bulky.

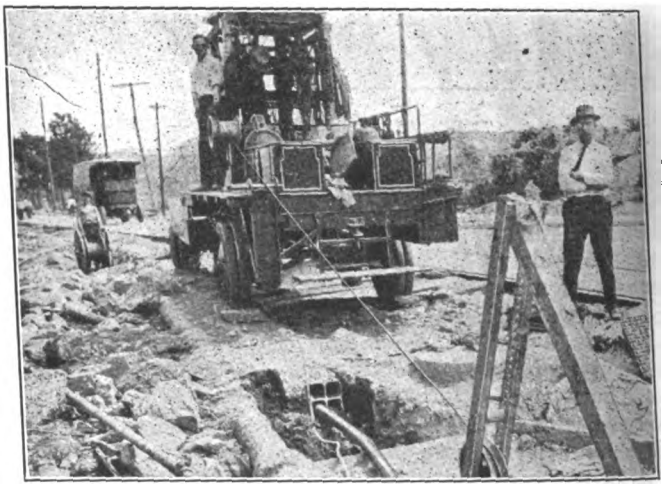
One horse-drawn tower truck is being used for repairs to the overhead trough work where the lines are operated under many miles of elevated structure. The pole (reach) wagon and reel wagon can be drawn by horses or used as trailers with auto trucks, whichever is more convenient.

The Choice of Size in Trucks

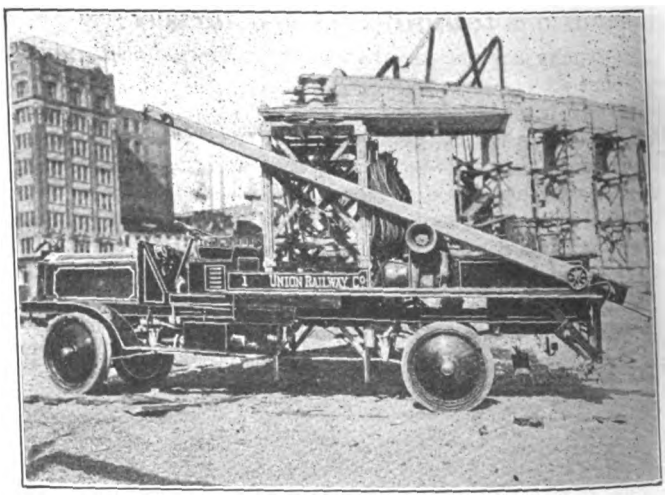
It has been our experience that for straight overhead line work, a capacity of 1½ tons or 2 tons is ample. This capacity permits greater cruising radius, is more economical and provides greater speed. Line department work requires a ruggedly-built truck, due to the twisting and straining received in climbing over high rails. Hence cars of the very best make will eventually prove the cheapest, even at higher first cost. The maintenance costs are also contingent on having a reliable, conscientious mechanic in charge of repairs and on giving him the opportunity to maintain his trucks at high efficiency with due regard to useless or unnecessary expense.

When our trucks were purchased 3 tons was the lowest load capacity we could get. Since then smaller units have been placed on the market.

The question of mechanical starters on trucks for



THIRD AVENUE LINE TRUCKS—REMOVING CABLE IN A STREET LOWERED 3 FT. WITHOUT INTERRUPTING SERVICE



THIRD AVENUE LINE TRUCKS—COUPLE-GEAR TRUCK, PRESENT EQUIPMENT, SHOWING POLE HOIST

this class of service is worth considering, especially on lines of greater headway than is possible in the Bronx, as the men have to be cautioned constantly to shut down their engines whenever possible. This would not be the case if the trucks had a simple and reliable starter.

This is a special problem for electric railway men, due to the low mileage and the frequent starting and stopping. Hence its solution may not appeal to the manufacturers who do not meet this condition in other lines of truck operation, namely the necessity of allowing cars to pass and then to resume position on the tracks until the next car comes. Delays to cars in excess of five minutes, due to tower trucks working on

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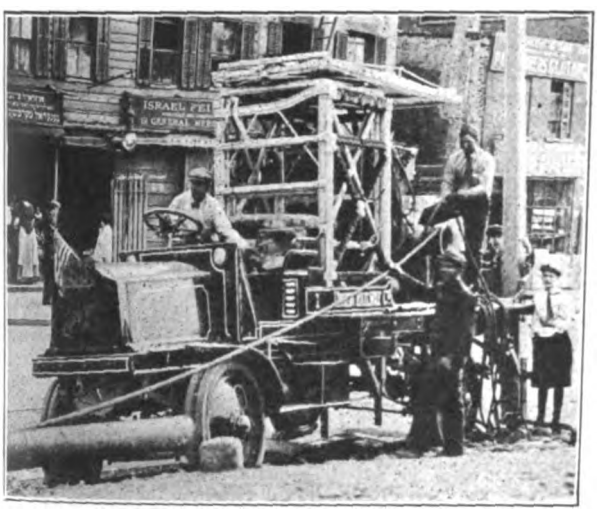
the track, are subject to explanation unless absolutely unavoidable.

Comparison of Auto Trucks with Horses, Winter Service, Etc.

It is rather difficult to compare the performance of auto towers with horse-driven vehicles, whether for mileage, standing time, or costs per mile of overhead line. Yet it is significant that a 40-per cent increase in overhead line mileage has been handled without an increase in equipment. During the time that we had but one unit, we promptly took care of two serious breaks which would have caused much delay to the transportation department if horse equipment only had been available. On that day the recorder registered 75 miles for



THIRD AVENUE LINE TRUCKS—USE OF WINCH IN PULLING OUT AND DRAGGING POLES ABOUT 250 FT.

THIRD AVENUE LINE TRUCKS—DRAWING CABLES OVER ROPE MATTING TO PROTECT LEAD SHEATH AGAINST ABRASION

ten hours' work and a maximum speed of 20 m.p.h. The allowable speed has since been reduced to 15 m.p.h., which is ample in congested districts for a vehicle having a total weight of 7 tons.

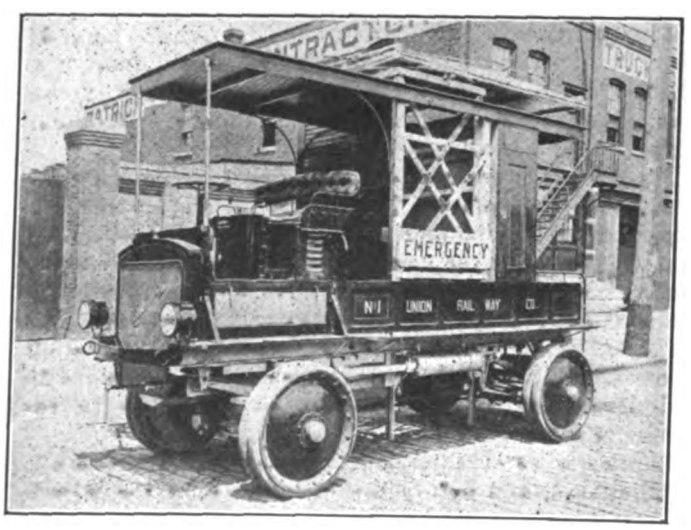
One of the best illustrations of the worth of motor trucks is shown by their records in heavy snowstorms. During the winter of 1913 and 1914 no delays due to truck breakdowns were recorded, except that once, on the night of the heaviest storm, a truck on call got stuck in a snowdrift with a broken driving chain. The driver left a helper on the truck as a watchman, returned to the garage, procured another truck, attended to his call and then returned towing the disabled car to the garage. In another fifteen minutes, the chain was replaced and the truck was ready for service again.

During and after storms in the winter of 1914-1915, practically all the time of our crews was spent in pulling loaded automobile trucks off of the tracks. In one case a Packard truck pulled for ten blocks, a disabled auto truck loaded with 5 tons of coal, before a street was found into which the absence of high snow outside of the railway area would allow it to be placed.

We have tried several kinds of skidding chains but only one, which is built similar to pleasure-car skid chains, has been really successful. Even this shears off very rapidly, due to the weight of the truck and to driving on and off of the car tracks so often. In an emergency, 5/16-in. span wire has been wrapped around the tire as shown. Such an anti-skid is comparatively cheap. Caution must be used to prevent the wire from cutting or wearing off and jamming in the driving chains.

Special Uses of Motor Trucks

A series of four pictures, reproduced on page 94, shows the use of the Couple-Gear truck in pulling wooden poles, (set for temporary use) on Webster Avenue in the Bronx during the construction of a trunk sewer. This was the first time the truck was used for that



THIRD AVENUE LINE TRUCKS—UNION RAILWAY COUPLE-GEAR TRUCK WITH TOWER

purpose. In six hours thirty-nine poles were removed, including one which could be removed by hand only and in much more time. In the same number of hours this truck enabled us to set twelve 900-lb. iron poles on a steel structure, including loading of the poles on the reach trailer, hauling them four blocks, unloading them on a bridge where 150 vehicles were passing per business hour with one roadway torn up, and placing each pole posed for bolting up. One pole was set in place on the stone abutment of the bridge alongside the bridge-tender's house, outside the railing, in less than forty-five minutes. This period included the time for building the runway to get the car on the sidewalk, and maneuvering the truck in a space less than 2 ft. wider and 10 ft. longer than the truck without damage to the bridge gates or the truck. This was really a demonstration of unusually good handling on the part of the truck driver, as he had only the width of one driveway to start with, the track section being torn up, so that he had to climb the curb.

Two other pictures show how the equipment of the same truck is used to draw and pull in 6600-volt three-phase high-tension cable. They also illustrate the con-

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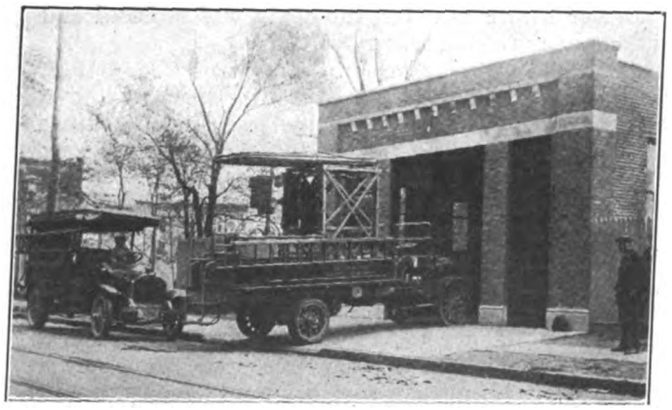
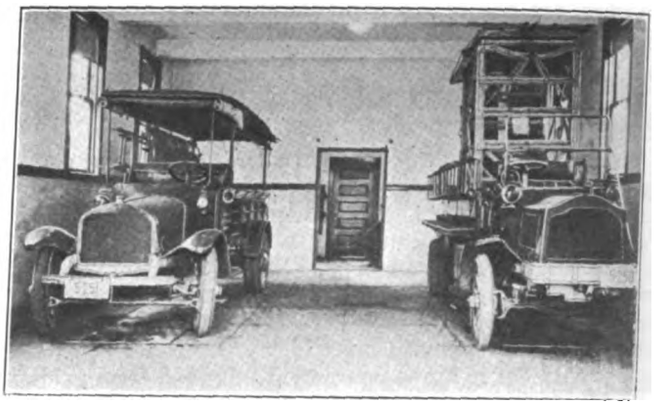


THIRD AVENUE LINE TRUCKS—LINE EQUIPMENT ENTERING GARAGE AT MOUNT VERNON, N. Y.



THIRD AVENUE LINE TRUCKS—INTERIOR OF WESTCHESTER ELECTRIC RAILROAD GARAGE

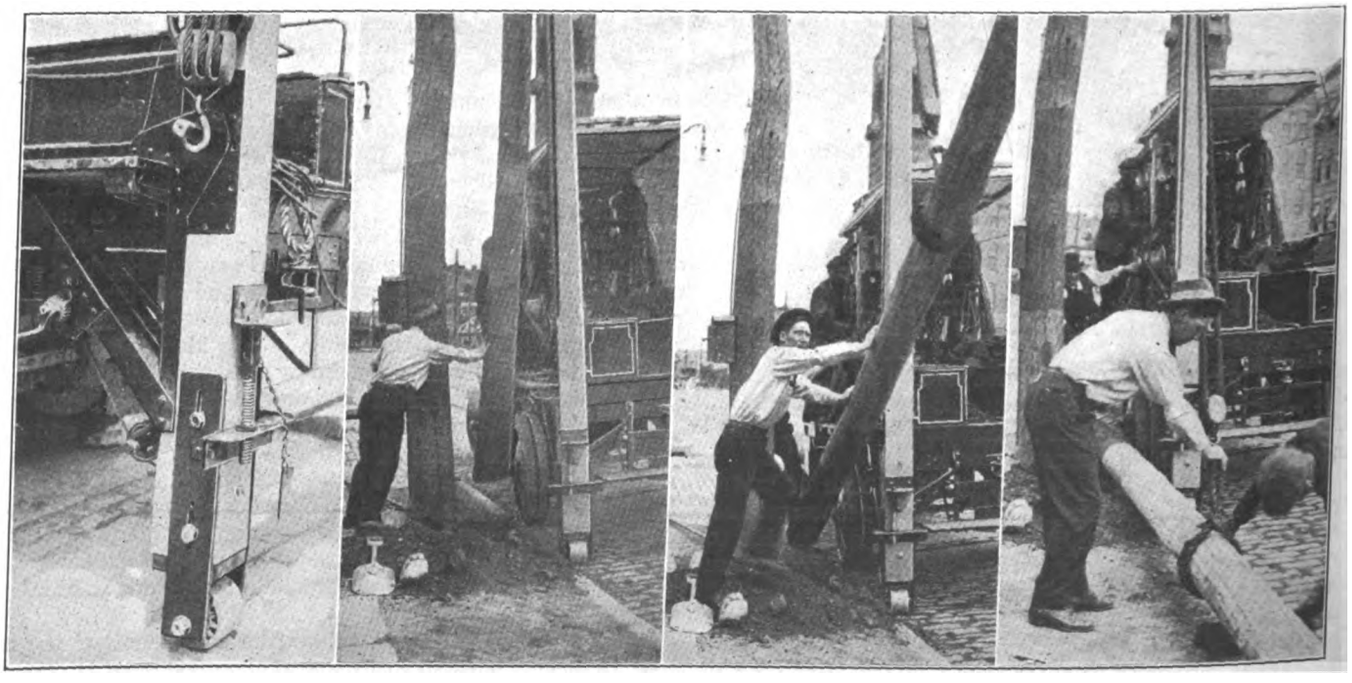
ditions under which most trolley roads operate. At the point in the picture showing the winch in service, the street grade has been lowered nearly 4 ft. in rock excavation. It was necessary to maintain cables in continuous service during drilling, blasting and excavation, and to build a new duct line parallel to and below the old line, also in rock. The truck is shown making changes of cables from the old to the new duct line. The same rope mat used by the contractor to protect his blasts was employed by us to cover the end of the duct line to avoid abrading the lead armor of the cables. These cables for a distance of 600 ft. were changed over one by one with no increase in cable nor any breakdowns to date.

During structural changes at Manhattan Bridge, Manhattan Borough, it was necessary to remove the poles used for temporary purposes on the Manhattan side. Some of these poles were inaccessible owing to construction changes and the truck had to remain in the street more than 250 ft. away. By means of temporary gin poles and a 1½-in. rope used for installing feeder cable, these poles were drawn out in record time and dragged to the street to be loaded on to reach trucks and hauled away.

Shortly after the same gasoline-electric truck was purchased, and before the installation of the winch, it was necessary to remove from the Harlem River some submarine cables 600 ft. long. This truck, and a similar one used as a tractor by a lumber company, were hitched tandem, pulling (by direct pull) the cables which were buried in the mud. The cables were thus withdrawn in a fraction of the time possible by any other method. For pulling purposes, the Couple-Gear truck cannot be excelled by a straight gasoline vehicle.

Checking the Doings of Motor Trucks

Practically all of our trucks are equipped with Jones recorders, Model D, which give an actual twenty-four-hour record of the performance of the truck, showing the speed at which it is operated, the distance traveled and the number and duration of the stops made. These records serve two purposes: They give assurance that the truck will not be abused, and they provide a check against the linemen's report for the distance traveled. When going to breaks, the men are instructed to reach them at the greatest speed for which the governor is set. For inspection, however, we know that a greater speed than 6 m.p.h. is not efficient when the lineman sitting on the front seat endeavors to locate by sight all wire or material likely to cause trouble,



THIRD AVENUE LINE TRUCKS—WOOD POLE REMOVAL: TRUCK IN POSITION READY FOR HOISTING, POLE HOISTED AND CLEAR OF GROUND, LOWERING AWAY AND JOB COMPLETE, ALL AT THE RATE OF FIFTEEN TO TWENTY PER HOUR

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while the helper riding on the rear end of truck is expected to watch materials and keep off intruders.

The 4½-in. diameter chart, on which the Jones device records all movements of a truck, is inserted in an eight-day clock movement every morning by the garage foreman or his helper. This chart shows the speed in miles per hour by the number of swings (of ½ mile each) to each five-minute interval, the time the truck leaves the garage in the morning and its return (by the number of ½-mile changes). the distance traveled, as indicated by a straight line, and the stopping time. For example: The right-hand chart on page 90 was inserted at 6.45 a. m., the truck left the garage at 7.22 a. m., traveled 2 miles in thirteen minutes, speed not constant on account of doing repair work; between 7.35 and 8.35 a. m. it was standing still most of time; it left at 8.35 a. m., traveled about 1¾ miles, made a stop of five minutes and then traveled about ⅝ mile, etc.; it stopped for the lunch hour at 12 o'clock noon; resumed work at 1.05 p. m., and reached the garage at 5.37 p. m. The night crew took the truck out on call at 6.50 p. m., made three stops in 8 miles, and returned to the garage at 7.55, remaining until 4.45 a. m. It then received another call requiring a trip of 4 miles, returning at 5.25 a. m. and remained until relieved by the day crew. It may be added that the night crew simply repairs breaks and returns to the garage to wait for calls.

The only objection to these charts is that on extremely short distances, such as moving the truck to allow a car to pass and then returning to the track, the record is so small that it looks almost like standing time. For their moral effect alone, however, these recorders have paid for themselves many times over.

Costs

The operating and maintenance costs of all our motor trucks follow:

	1914	1915
Total mileage	31,561	34,471
Cost of gasoline per mile	$0.0575	$0.0444
Cost of oil and grease	.0071	.0073
Drivers' labor	.1753	.1573
Garage labor	.0433	.0430
Repair parts	.0717	.0540
Tires	.0618	.0242
Total cost per mile traveled	$0.4167	$0.3302

During the year 1914 we had an extra amount of overhauling work and changes in equipment.

The Union Railway's trucks are housed in what was formerly the West Farms power house. The front of the old 75-ft. x 125-ft. engine room is used for the office, garage and shop, and the rear of the same room is used for storage of material and of trucks not in service. The 20-ton engine-room box crane, which spans the building, is ideally placed for loading trucks with heavy material, lifting up trucks to remove wheels and other work where a crane is of advantage.

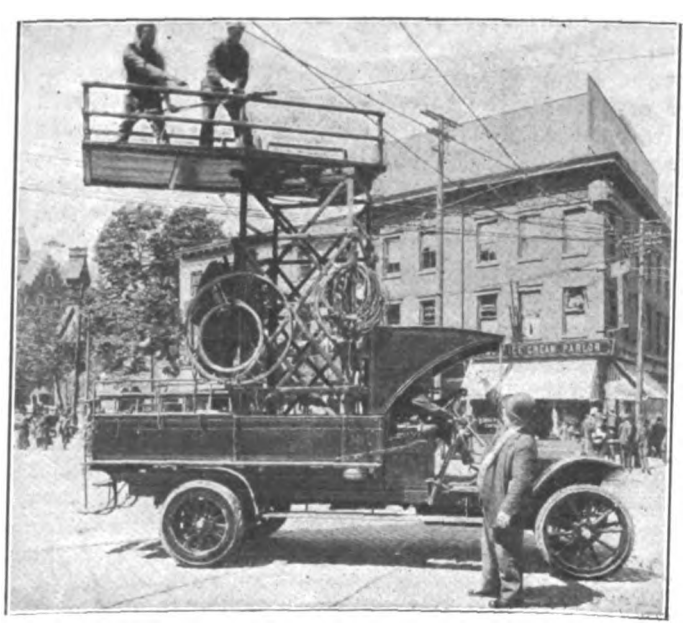
THIRD AVENUE LINE TRUCKS—3-TON TOWER TRUCK IN SERVICE

The shop erected in one corner is partitioned off by wire screening which does not obstruct light or air. The machinery is new and bought for the purpose. It comprises a drill press, a lathe, emery and buffing wheels, work benches, a small Apple generator set for charging sparking batteries, and a spare pulley and belt for revolving motors and bringing bearings into proper working condition before installing them in trucks. All tools are driven by an electric motor which is set on a concrete pedestal 4 ft. high, in accordance with insurance requirements.

The gasoline is stored in a 250-gal. steel tank buried in concrete in front of the building and fitted with a vapor pipe to the roof line. The fluid is drawn through a Geyser gasoline measuring pump.

An old extension to the building has been made into a locker room, furnished with steel clothes lockers, wash basins, toilets, urinal and shower bath with hot

THIRD AVENUE LINE TRUCKS—3-TON TRUCK ON ORIGINAL PNEUMATIC TIRES



THIRD AVENUE LINE TRUCKS—TOWER TRUCK USED BY YONKERS RAILROAD

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and cold water. The shower bath is well patronized in the summer time and is well worth its cost.

The Westchester Electric Railroad houses its two trucks in a new one-story garage. This neat building harmonizes with the office building adjacent to it, and which was erected in 1913. (See article published in the Nov. 1, 1913 issue of the ELECTRIC RAILWAY JOURNAL.) The garage is provided with gasoline storage equipment, wash basins and toilet outfit. Its easterly end is partitioned off for line storeroom facilities. The wainscoting of the interior walls is faced with white enameled brick, capped with hardwood molding, above which it is hard white plaster finish like the ceiling. A novel feature of the cement floor is a raised step or platform carried along the walls, high enough to keep the wheels of trucks from climbing it and wide enough to prevent the hubs from striking and chipping off the enamel brickwork.

The Yonkers Railroad's two trucks are housed in a portion of the carhouse at Buena Vista Avenue and Main Street. Owing to the contour of this property it was possible to partition off a portion of the second floor back of the offices and to enter it from a side street. The brick partition separates it entirely from the rest of the building. The easterly end of the original second floor transfer table was filled up with ashes and then covered with a cement floor, with a runaway inside of the garage to the street. This space was not adaptable for car purposes owing to the encroachment of the offices and association rooms, which have since been moved up from the ground floor for lack of space. This garage does not detract from the rest of the building. It has proved to be a good investment, both as to garage charges and the concentration of all departments in one building.

Denver & South Platte Railway Saved

A Sweeping Decision of Colorado Supreme Court Clearly Defines Powers of State Utilities Commission

BY CHARLES B. WELLS
Recently Assistant to Manager Denver Tramway Company

TO carry passengers over a line 4½ miles long and to receive no revenue for 1 mile of the haul is an experience to which few electric railways are subjected. Yet this is precisely what the Denver & South Platte Railway Company has been forced to do for nine years.

This company operates a line running southerly from a connection with the Denver Tramway Company's terminal at Englewood, to the town of Littleton. Believing that the Tramway Company would allow them a reasonable division of the fare, the promoters of the South Platte road entered into a contract with the town of Englewood to carry passengers between the Denver central loop and Cherrelyn, a point 1 mile south of Englewood, for a fare of 5 cents. On the ground that it was already losing money by carrying passengers from the center of the city to Englewood, a distance of 6.84 miles, for 5 cents, the Tramway Company refused to accede to any such arrangement. But notwithstanding that the South Platte Company was struggling for its very existence, the town of Englewood insisted that it continue to carry passengers between Englewood and Cherrelyn free of charge. Many of the suburbanites living in the South Platte Company's revenue territory have made it a practice to walk long distances to Cherrelyn, and thus get the benefit of a free ride to Englewood. And so for nine years the owners of this property have faced the commercial shambles.

When Manager R. C. Larkin took hold of its destinies, he realized that only by a solution of the fare problem could the South Platte investment be saved. Legal advisers whom he sought gave him little hope, on account of the fact that the company's contract with the town of Englewood was embodied in its franchise. Upon his own initiative, however, Mr. Larkin appealed to the Colorado Utilities Commission. This board immediately recognized the injustice of the company's contract and ordered that fare be collected between Englewood and Cherrelyn. The town of Englewood then took the case before Judge Class of the district court. They secured a ruling to the effect that it was not within the province of the utilities commission to abrogate any part of a contract existing between Englewood and the company.

This action of the district court, affecting as it did every rate decision made by the commission up to that time, enlisted on behalf of Larkin and his company the services of Attorney General Fred Farrar, Frank C. West, his assistant, and H. M. Aylesworth, attorney for the Public Utilities Commission. These gentlemen appealed the case to the Colorado Supreme Court, and on Monday, July 3, this tribunal rendered a sweeping decision reversing the finding of the lower court and defining the powers of the utilities board. The supreme court says in part:

"It fully appears that the Legislature intended to delegate to the Public Utilities Commission the administration, supervision and regulation of all service rendered to the public throughout the State, including municipalities. Rates and regulations fixed by contract are specifically included within the powers of the commission.

"From what has been said, it will be seen that the town of Englewood had no express authority to fix a rate of fare, so as to limit or prohibit the assumption of such power by the Legislature."

While the rate of fare between Englewood and Cherrelyn has not yet been fixed, it is probable that the consent of the utilities commission will be asked to sell fare tickets at ten for a quarter.

The Public Utilities Commission of Colorado has from the beginning of its administration shown a disposition to co-operate in absolute fairness with the utilities of the State. It is to the enterprise of this body and to the spirit of men like Manager Larkin, who never know when they are whipped, that the South Platte Railway owes its future existence.

Production of Pig Iron in 1915

The production of pig iron, including ferroalloys, in the United States was 29,916,213 gross tons in 1915, compared with 23,332,244 gross tons in 1914, an increase of 28 per cent, according to figures published by the American Iron & Steel Institute on Feb. 26, 1916. The pig iron, exclusive of ferroalloys, sold or used in 1915, according to reports of producers to the United States Geological Survey, was 30,384,486 gross tons, valued at $401,409,604, a gain of 36 per cent in quantity and 34 per cent in value. The average price per ton at furnaces in 1915 as reported to the survey was $13.21, compared with $13.42 in 1914. At the close of the year, however, prices of pig iron had advanced 35 to 40 per cent.

The Pennsylvania Railroad conducts correspondence courses of instruction in which nearly 10,000 of its employees are enrolled as students. Upward of 2300 of these are Italians who are studying the English language by mail and so are fitting themselves to be citizens and better workmen. The remainder of the students are enrolled in the courses in mathematics and practical electricity.

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How to Appraise Public Utility Property

Some Important Points to Be Borne in Mind About Planning Appraisals, Co-operating with the Employees of the Appraised Company, Handling Company Records and Designing Forms

By GEORGE W. KUHN, M. E.

THE object of the appraisal is fundamental in determining the nature and scope of the inventory. A variation in methods and in items considered will occur, dependent on whether the property is to be appraised on a basis of original cost, cost to reproduce new, reproduction cost less depreciation or any other basis. Such matters as the use of the appraisal in connection with rate-making, sale of property, control of security issues, taxation or rentals, joint operation, etc., will also affect the procedure to be followed in making the inventory.

PLANNING THE APPRAISAL

The inventory will, in general, be required to show the property in such detail as to distinguish used property from unused property; to divide used property into that in public use and that not in public use; to give data regarding age and condition of property, etc. As to the amount of detail necessary, it is evident that, where the purpose is to approximate roughly the value of the property, much less detail will be required than where the appraisal is to be subject to criticism or close examination or where it is to form the basis for a perpetual valuation of the property. In the last case mentioned, the detail required will probably be greatest in amount.

Description of property should, in all cases, specify a definite date as of which the inventory is made. It should also refer to location, type, size, method of operation, date of installation, estimated condition and whatever other matters may be needed to identify the property absolutely for the information of the appraiser. In short, the description should be so detailed that it will be possible to check the inventory against the company's books and accounting records and to identify and allow for new additions and late retirements of property.

It is a fact to be borne well in mind that an inventory or appraisal having the lowest first cost is not necessarily the most economically prepared. There must also be considered such matters as the total allowable expenditure of time and money to complete the entire work; the probable amount of extra information which will be required by the regulating commission; the amount and arrangement of information available at the company's office, and the probable amount of co-operation which may be expected from the company. The cost of developing and expanding the organization and performing the work should also be weighed against the cost of engaging outside specialists to handle part or all of it. All of these things and more should be kept in view during the drafting of the general plan of procedure, so that it may be made possible to keep the expense as low as possible while at the same time providing an amount of carefully detailed information capable of being used as a reliable foundation for any conclusions which may have to be based on it.

The plan of procedure should, of course, be as complete as possible before the work is started. It will be found to be the almost invariable rule, however, that changes in and additions to the original plan will be necessary because of unforeseen conditions and happenings. Such changes and additions, when incorporated into the plan of work, should be made to apply to the past as well as to the present and future work, so that the results of the modified plan will form a complete and consistent whole.

THE FILING SYSTEM

Probably the most important feature to be considered in recording an inventory is the arrangement of its subdivisions. While many schemes may suggest themselves as convenient and economical means of recording the various items of property, the ultimate uses to which the results will necessarily or probably be applied, should be listed and used as the basis of choice. The groups of property should be segregated according to some standard logical system which will definitely assign each item of property to one of the groups. The particular uniform system of accounts in use by the company being examined is recommended as the best basis, for the reason that the results of the appraisal so obtained may be most readily compared and checked against the bookkeeping records of the company. Such arrangement will make possible the comparison of the groups with similar groups belonging to various other companies whose accounts are kept according to the same uniform system.

When finally chosen, the filing scheme, based on the general classification used, should cause the data gathered to be classified automatically as recorded and to be readily accessible during and after completion of the work. It should necessarily afford complete flexibility and expansibility to allow the inventory to be prepared in an orderly and systematic manner. A system of filing as outlined above has been evolved by the writer and will be explained in a second section of this paper.

THE APPRAISAL FORCE

The engineer in immediate charge of the work and his assistants should be men of experience in construction and appraisal work. They should also have a working knowledge of accounting methods and should make themselves familiar with the particular accounting procedure followed by the company being investigated. They should be thoroughly familiar with the object and the scope of the appraisal and the general policy according to which the same is to be made. The subordinate force should be composed preferably of men having experience in appraisal work and a thorough technical knowledge of the kinds of property being appraised. It is evident that men having such qualifications can most intelligently interpret records and cover in the notes of their field inspections such data referring to type, physical conditions, etc., as are necessary. Intelligent working knowledge of results desired and of the property being examined serves very often to eliminate errors and inconsistencies in the records of the company.

In so far as time and convenience will allow, the men in charge should endeavor to instruct all the men in the various branches of the work. This may be accomplished by means of personal talks, written instructions and

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shifting of men from one kind of work to another. If office record transcription work be interspersed with examination of actual construction work in the field, the results will be an increased ability and interest in the work, greater familiarity with detail and a greater amount of work done. Another most important result will be the possibility of using the men as instructors for new men in case it may be necessary to expand the force quickly or to any marked extent.

To obtain the greatest efficiency in carrying on the work, the man directly in charge of the appraisal should assign to each of his principal assistants the responsibility for obtaining desired data on specified classes of property, arranged preferably by accounts. By constant and close supervision of the work of such assistants and by conferences with them the engineer in charge eliminates practically all possibility of duplication of work and inconsistency in applying methods. By transmitting all general instructions in writing, the matter in hand is made more clear both to the man in charge and to the men instructed, the responsibility is placed definitely and possible future misunderstandings are largely avoided.

PRICES OBTAINED FROM RECORDS

The first step in the determination of prices is the fixing of the basis on which they are to be considered. The general instructions should specify the information which is to be gathered, and written notice of the same should be given to the men in charge of the work.

Prices have at least as important an effect as have quantities in the appraisal of property. They are dependent more on judgment and are subject to more extended examination and criticism than are the quantities, which are almost entirely dependent on fact. Price study usually involves considerable work on the premises of the company, especially as regards unit-labor costs. It is recommended that the work of pricing should be carried forward along with the preparation of the inventory and that, in so far as possible, the men in charge of the inventory of particular groups of property should confer frequently with the men in charge of the work of pricing these groups.

In the work of pricing it should be remembered that certain classes of property consisting of similar units varying in type, price, etc., may have total values of comparatively small consequence in determining the total value of the plant. Care must be exercised to keep the expenditure for the study of such classes as nearly proportionate as possible to their effect on the final result. The cost of failure to exercise such care will emphasize too late the necessity of determining in advance the amount of detail required and may have a serious effect upon the possibility of obtaining much more important information about other groups of property examined later on in the work.

CO-OPERATION WITH APPRAISED COMPANY

As part of the general preliminary work, conferences should be held with the officers of the company, the character and the extent of the records ascertained, the company's consent obtained for the use of such records by the appraisers, arrangements made for the assignment of office space, and general provision made for co-operation between the company's employees and the appraisal force.

Attempts should be made to secure the co-operation of the company by affording an opportunity for its representatives to be present to observe in detail the methods used in the inventory of the property. This is especially valuable in the case of engineering representatives, because questions of fact can be settled at once and at first hand. The work of the inventory is facilitated if certain groups of the property are listed by the employees in charge of such groups and familiar with them. This applies particularly to groups of property made up of many items of small importance or low cost, since the inventory by the company's employees may be quickly checked by the appraisers, and the double examination eliminates errors which might creep into a single inventory made by the appraisers.

Instructions should be issued by the company's officials to all employees in charge to pass the appraisers into the several premises of the company, and passes should be issued to the appraisers so that unnecessary telephone communication may be avoided and the intrusion of strangers may be prevented.

In addition to the examination of the graphic and written records of the company's property, the opportunity should be sought constantly to confer with officials, foremen and other employees of the company who are familiar with past and present practices regarding methods, costs and records. Information obtained from such sources will often prove of exceptional and unique value in solving problems that arise.

The forces of the examining or regulating body should also see to it that they co-operate among themselves to the fullest possible extent. Thus the engineering, legal and accounting bodies interested in the work of carrying on a given appraisal should all recognize their interdependence upon one another and should confer as frequently as may be necessary to keep the basic policy to be pursued clearly outlined before all and to prevent divergence from such plan. There should be no hesitation in recognizing the particular ability of each department to carry on the part of the work assigned to it, and information useful to a given department should be freely asked and received from another department when it can best be obtained by the latter.

EXAMINING OFFICE RECORDS

In the handling of office records of the company's property it will be found advisable to examine them on the premises of the company, because such records are more or less in constant demand by the company's employees and much time would be wasted if it were necessary to go any considerable distance to consult them. Besides this, the records are often very valuable and rather perishable, and serious damage might result to them if they were moved.

The company's consent should be obtained for the placing of special check marks by the appraisers on items listed in the company's records as such items are included in the inventory. The advantages here are that men listing items will be warned against listing an item a second time by the sight of the check mark and, by a quick examination of the entire original record later, omissions will be evident because of the absence of such check marks. Moreover, such marking is necessary because the original records are subject to constant use and daily change by employees in accordance with current construction work while still under examination by the appraisers. To avoid interference with the work of the appraiser or delay in the current work of the company, the work should be so divided that several sets of records may be used by the appraiser at the convenience of the company. This may be readily done without confusion, by requiring that progress records showing degree of completion of work on the several files be kept by those engaged in the work of listing.

The preparation of the inventory is generally started before and may not be completed until after the date as of which the appraisal is to be made. In case the transcript of the record of the different classes of property should be practically completed before that date

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(and also in connection with the examination, which is not completed until subsequent to the date of the appraisal), careful provision and arrangement must be made for obtaining a record of changes in groups of property effected between the date of completion of the record and the date of the appraisal. These changes may be additions or retirements in both the groups whose inventory is completed before and the groups whose inventory is not completed until after the date of the appraisal. The company record may not show construction, even though extensive, which is in progress only, because it has been but recently constructed and is not yet reported and incorporated into the record.

By careful study the appraiser should so familiarize himself with the record-keeping routine of the company that he will be able to make intelligent allowance for such conditions as are mentioned above. During the examination of records, it happens frequently that the record of a given item or property group lacks some of the detail required. Where such detail cannot be obtained by reference or from some other source, the matter should be disposed of at once by estimate assumption of type, date of installation or other fact in question. Such assumption should be made only occasionally and in matters of relatively small import, and it should never be made without the knowledge and approval of the one in charge. In considering the advisability of making the assumption, the man in charge should give due regard to the probability in the case, should base his act on knowledge of the construction and recording practices of the company and the time order in which they were instituted. He should have all such estimated items indicated clearly by means of remarks or conventional symbols and should keep a record of the same so that uniformity may be obtained and possible later revision or checking may be facilitated.

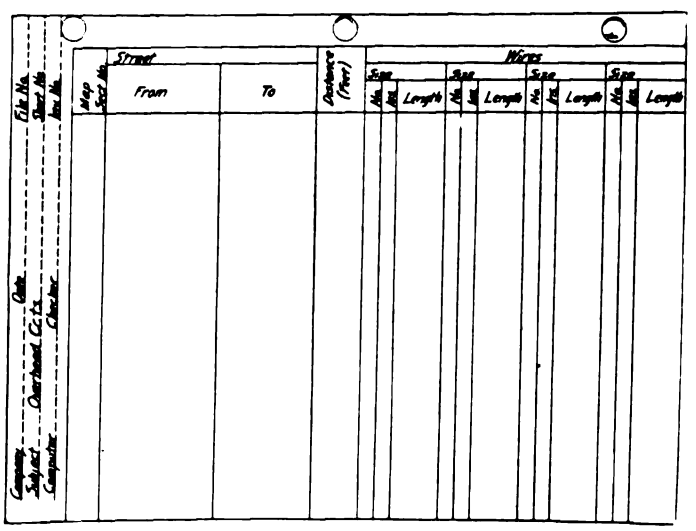
Where the company keeps, for the convenience of the separate departments, two or more sets of records covering the same class of property, such multiple records are usually on at least slightly different bases. They are often found to be very valuable as cross checks, and their use makes for greater accuracy in the inventory.

FORMS TO BE USED

The matter of forms to be used is probably second in importance to no characteristic of the record, except its accuracy. A set of forms intelligently designed after some amount of study will make possible and convenient the gathering of information in such arrangement of detail that much time and expense will be saved afterward in the preparation of information from the data listed. In designing forms to be used, provision should be made for recording the date, the geographical or corporate divisions in which the property is appraised, the age, the condition, type, extent of ownership and matters of like nature. Reference space should be allowed in which to record the authority or source of information and, if possible, some spare space should be left for future use, although the need for such space may not be very apparent at the time of laying out the forms.

To economize time and space, symbols, abbreviations, etc., should be used provided clearness can be preserved and complexity avoided. Flexibility is obtained by listing on one sheet or group of sheets only such property as is included in one division, whether that division be an account, age-group, location by street, or like matter. Where ready reference is desired, it will often prove very convenient to have information grouped in alphabetical, numerical or other order depending on sequence, although such systems should be carefully compared with systems depending on location. ownership, use and other like matters, before choice is made. The general rule which has been found to give the best results calls for the listing of property so as to gather into groups the items having as many similar characteristics as possible, while at the same time the items are left free for redistribution. It is of vital importance that the record of the property be taken in sufficient detail to enable the regulating body to identify any portion of the property at any time in the future in connection with the examination of additions and retirements, petitions for issue of securities, etc. Such detail greatly facilitates the checking of the inventory by inspection of the property and usually is worth the cost of preparation many times over.

The flexibility obtained by correct form-designing is illustrated by Form I (10⅜ in. x 8½ in.). By the use of this form it is possible so to list overhead circuits from the map sections on which they are laid out, that a systematic and convenient record may be obtained showing the street, the limits of the run on the street, the street distance occupied, the size of the wires, the number of wires, the insulation, and the wire length for each size. When the street is completely listed, the sheets for that street are ready to be handed to the man



APPRAISAL WORK—FORM I—FORM FOR LISTING OVERHEAD CIRCUITS SHOWING FLEXIBILITY OBTAINED BY CORRECT DESIGNING

making the field check. When checked by him in the field, it is possible to show the totals for the various wires listed, either by sheets, by streets, by circuits or by sizes without regard to circuits, as may be most convenient. It is to be noted that the items are in such shape that totals on any or all of the bases mentioned may be obtained conveniently and without the least interference.

By careful advance consideration a general form may often be prepared which will serve equally well, after slight adaptations, for several classes of property. The reduction in the number of forms to be prepared will result in reduction of cost of printing and a saving of time due to supplies being available. In so far as possible, the original listing forms should be so arranged that summations may be made without regrouping or further tabulations.

In the case of property recorded graphically on maps and charts or listed on card files, care must be used to prevent duplication or omission of items which might result from error on the part of the appraiser or because of incomplete or duplicate data on the records of the company. Such duplication occurs very frequently where graphic records of the company show intersections of streets for each of the streets involved, where the two sides of a street are shown in separate places in

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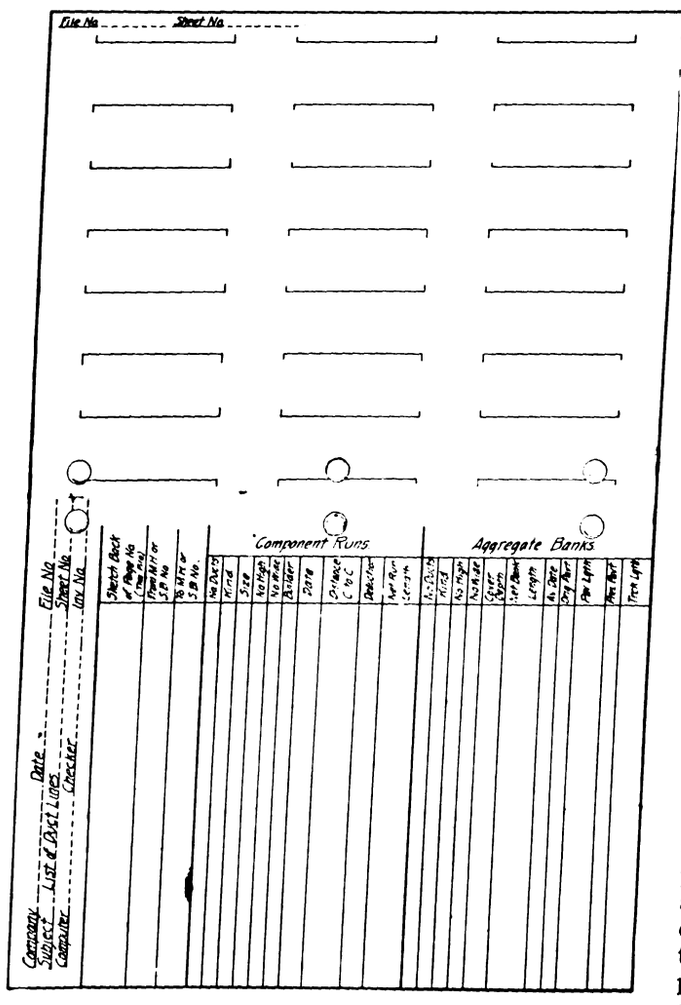
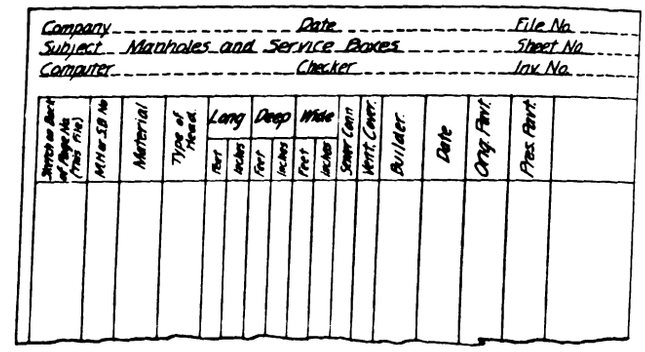
the record, and under similar circumstances. An accurate and non-overlapping record may be obtained most conveniently by showing the structures and property involved, such as duct lines, manholes, pole lines, transformers, etc., diagrammatically and in some specified sequence on forms arranged to accommodate sketches as well as lists. When complete, such records are valuable, not only because they eliminate duplications and omissions but also because they permit reference to the location of individual structures by pages and item numbers instead of requiring lengthy and less specific written description. At the same time they afford the fullest detail description of the structures mentioned. In the absence of an extensive field check to verify the written records, such sketch records serve to show the property as a consistent whole, furnishing a valuable check on the reasonableness of the inventory. When used in conjunction with field verification, either random or complete, their advantages as bases for comparison are readily apparent.

The use of sketches to accompany lists of property is shown by Form II (double, 10⅞ in. x 8½ in.). This form is so printed that the face of one sheet (shown as the lower part of the illustration) gives a detail description of the component runs making up the duct banks, while the back of the preceding sheet (upper part of the illustration) affords space for sketches of the various runs spoken of in the lists. It is obvious that such sketches may be made to show information as to the location of duct lines with respect to intersecting streets and adjacent structures, which could not be incorporated into the lists without excessive written description. These sketches may also be used in connection with records of other groups of property, as is shown by the headings on Form III (8½ in. x 10⅞ in.), where the reference to the "sketch on the back of page No. ..." identifies the location absolutely when the manhole or service box number is known. In a recent appraisal this same sketch space on Form II was used to portray the location and graphic description of the Edison tube system efficiently and very conveniently.



APPRAISAL WORK—FORM II—DOUBLE FORM ILLUSTRATING THE USE OF SKETCHES TO ACCOMPANY LISTS OF PROPERTY



APPRAISAL WORK—FORM III—LOOSELEAF SPECIMEN RECORD FOR MANHOLES AND SERVICE BOXES

It is frequently the case in card records of meters, transformers, poles, etc., that each item is given an identifying number which is recorded on the card, although the cards themselves are grouped and filed according to some other characteristic such as street location, type of equipment, etc. By making use of a form on which all the identifying numbers in use by the company at the time of examination are shown in regular sequence, the card record may be transcribed in the order found, while the actual entries of the appraiser appear opposite the identifying numbers in their proper order. In addition to preventing duplications, pointing out omissions and showing actual error, an inventory list so prepared often indicates ways to solve problems connected with age of items, size and growth of the company, etc.

The second portion of this paper, dealing with the field check, summation of data, labor costs and presentation of appraisal data in evidence, will be published in a subsequent issue.

Manila Company Offers Pulmotor to City

C. Nesbitt Duffy, general manager of the Manila Electric Railroad & Light Company, Manila, P. I., has offered the Manila public, through the police department, the free use of one of its two pulmotors. In making his offer Mr. Duffy stated that, in line with its safety-first policy, the company had purchased in the United States two pulmotors, the latest and most efficient apparatus of its kind on the market. One of these had been installed at the power plant, and the other at the general offices. Mr. Duffy suggested that one of these be installed for the use of the public at the Meisic police station where the Philippine Health Service has a station. The board accepted the offer with thanks.

The Champagnie Française de Tramways (Indo-China) reports receipts in 1915 of Fr. 848,247 as compared with Fr. 872,662 in 1914. Part of the decrease is attributed to the war, which was also the cause of the delay in the completion of the electrical equipment. At the annual meeting held in Paris on May 11 a vote was passed declaring a dividend of Fr. 50 per share on the capital stock and Fr. 20 on each participating certificate. The company owns a tramway at Saigon in Indo-China.

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Storehouse Methods That Reduce Labor

A Description of a Unique System of Arranging Stock and Keeping Storehouse and Accounting Records Which Have Greatly Increased Efficiency

By W. V. C. BULKELEY

Purchasing Agent Columbus Railway, Power & Light Company, Columbus, Ohio

A STUDY and an investigation of storekeeping and store department accounting methods, covering a period of more than two years, developed the fact that most of the systems in general use provided for a more or less unsatisfactory arrangement of stock in the storerooms from both the distributing and inventory standpoints. Entirely too much clerical labor was required for the results obtained, both in the storeroom and in the accounting department, and serious inaccuracies in records of prices and quantities of materials frequently occurred. With these points in mind, I endeavored to develop a system for the Columbus Railway, Power & Light Company whereby the storekeepers would be brought into closer touch with their stocks and eliminate as far as possible the clerical labor of keeping records as well as keep the prices approximately correct. At the beginning of this development work, I received very valuable assistance from H. C. Pearce, purchasing agent and general storekeeper of the Seaboard Air Line.

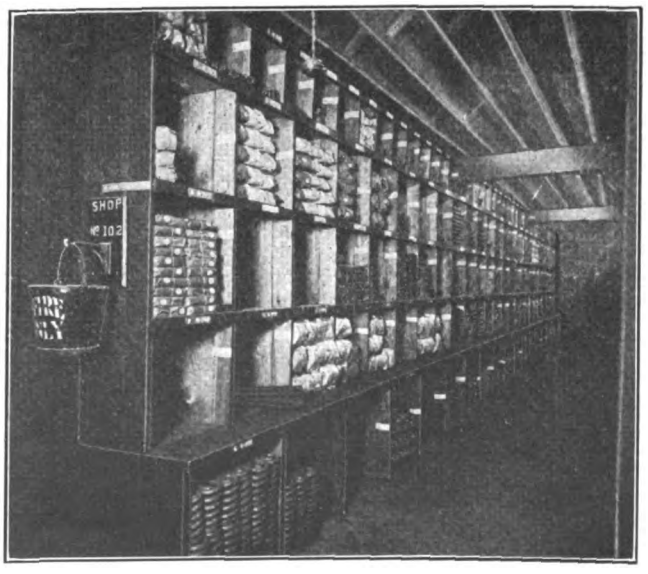
First of all, the materials carried in stock were divided into twenty classifications which were indicated by the letters of the alphabet. The purpose of this is to indicate at any time, just how much money is invested in the different classes of stock, so that any excess stock may be located and that particular classification checked. For convenience these twenty classifications were made logical divisions of the materials generally carried in the stock of a railway and lighting property. For instance, classification *A* indicates electric motor and control apparatus, generators, incandescent lamps, arc lamps and parts; *B* indicates in general, overhead and underground line material; *C* includes material generally classified as station hardware; *D* includes chemicals, paints and oils; *H* includes all wire; *J* all kinds of tools; *N* all metals, including structural steel and pipes, etc. These natural divisions of material readily fix the classification in the minds of those making requisitions on the storehouse. Furthermore, when an inventory is taken of any particular classification the discrepancies found are confined to that class of material, and do not affect the remainder of the storeroom records.

When materials are requisitioned from the purchasing agent by the classification method, all the requirements for any one class of materials are indicated at one time by all the storehouses on the system, thus reducing routine work in the matter of purchasing. Each item in each classification has a number, according to its location in the storeroom bins. It is not necessary to have classification *A* at the beginning of the storeroom and then follow out the alphabetical arrangement. On the contrary, the stocks are arranged in the manner most convenient for receipt and distribution and, with bins properly marked, the greatest flexibility is obtained. It is, however, highly important that a place be provided for every item of stock and that stock located in its proper place, so that if it is not there, that item of stock is exhausted.

STANDARD ARRANGEMENT OF STOCK

Standards of arranging stock were then adopted, so that when inventories are taken the stock is not touched, it being possible to see at a glance just how many items there are in each compartment or pile. This arrangement is clearly shown in the accompanying illustrations. For instance, note the compartment marked 5 L-177 at the left of the view in the opposite column. This compartment contains 1½-in., No. 6, round-head, brass wood-screws. The figure 5 shows the depth arrangement, the L-177 is the stock classification and number. We have adopted a standard pile of five or less, ten, twenty-five, fifty or 100. Five or less can be observed at a glance, and in this case the

COLUMBUS STOREHOUSE SYSTEM—VIEW OF STOCK BINS SHOWING METHOD OF MARKING



COLUMBUS STOREHOUSE SYSTEM—VIEW SHOWING STYLE OF BINS AND STANDARD PACKAGES

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boxes are piled five high and five deep, therefore, there are twenty-five boxes of the screws in each full pile. Again referring to the particular bin, it will be noted that there are two full piles, and the third pile is short two boxes on the front row. This stock, therefore, shows immediately that there are seventy-three boxes of these screws in stock.

In the second view will be noted another example of how time can be saved in taking an inventory. The end compartment in the third row from the bottom, marked "3 G-227," contains a certain kind of brake-hanger spring. In each of the packages there are twenty-five of these springs, and the packages are stacked ten high and three deep, therefore, there are 750 of these springs in each full stack. Two full stacks can be noted in the illustration, therefore, these contain 1500 springs. There are also seven packages which can be observed when one stands directly in front of

COLUMBUS STOREHOUSE SYSTEM—VIEW SHOWING METHOD OF MARKING ON ENDS OF BINS

the bin or in the position occupied when an inventory is taken. These contain 175 more springs, and three springs are shown in the photograph, these being less than a standard package. Taken all together, 1678 of these springs can be counted almost at a glance.

ADVANTAGES OF STANDARD ARRANGEMENT

After all the different items of stock had been classified and numbered, an alphabetical index of the stock was prepared in loose-leaf form, so that it can be corrected from time to time and kept up to date and distributed to each of the operating department heads. I will not enumerate the forms that we use, as these necessarily must differ for various locations and conditions, I will simply state that when any materials are required from stock it is only necessary to indicate the quantity and the stock number, the latter being obtained from the catalog of stock. The requisition thus prepared, upon being presented to the storekeeper, indicates automatically just where that stock is located, so that the storekeeper or his helpers can go immediately to the compartment and withdraw the material required without any doubt or delay. This system furthermore guarantees that the operating department is charged for just the material it obtains, and not what the accounting department must guess was obtained in cases where improper names are used to indicate a material taken from the storeroom.

It will further be noted that the only marking on the bins is the depth number and stock number, which show in bold letters and figures, and greatly facilitate the location of stock. For instance, referring again to the first view, suppose that stock number L-185 should be desired. By a glance at the numbers on the end of the bin section, it will be noted that the marking on the top row is L-133, on the next row, L-155, then L-177, then L-199, L-221 and L-243. Now, inasmuch as L-185 must be in the row commencing with L-177, the eye follows along this until L-185 is reached.

The third view gives a general idea of how the bins are arranged, their form of construction and the index tags which appear on the ends of the bins toward the main aisles. It will also be noted that the bins are constructed on the stair principle. This eliminates the use of step ladders with their resultant danger and lack of efficiency. Furthermore, there are no retaining strips or other obstructions at the bottoms of the compartments, and the numbering strips are placed at the top of each bin. In the first illustration, it will be observed that at the compartment to the right of L-203 there is no back wall to the bin. All bins are built double so that the storekeeper can see at a glance when a compartment is entirely empty or nearly so. In addition, this style of construction facilitates cleaning of the bins.

STOREHOUSE RECORDS SIMPLIFIED

The only record that the storekeeper has to keep is the stock ledger, which simply shows the quantity consumed for the previous year (this being a yearly record), the average monthly consumption, and, of course, the stock number and a brief description. The results of the monthly inventories, referred to later, receipts of materials and open orders are also shown in his record. It will be noted that the issuances of materials are not recorded, and as this constitutes the bulk of the clerical work in the storeroom where the card system is used, considerable work is saved. The entire stock is inventoried every month so that it may be replenished. This taking of inventories is divided into eight periods, requisitions being received in the purchasing department on the four Tuesdays and the four Fridays in each month. In like manner, the annual inventory is dispensed with, this being distributed over a period of eight months in the year, and once in each month the inventory, which is taken for the purpose of replenishing stock, is forwarded to the accounting department where it is priced.

This plan eliminates any duplication of work and further obviates the prodigious task incident to the pricing and adjusting of a complete inventory. Inasmuch as the time required for making the inventory has been reduced in the storeroom illustrated from approximately 600 hours for one man to forty-two hours for one man, it will be seen that this monthly inventory consumes very little time. Moreover, considerable time is saved in requisitioning and ordering supplies under the new plan. By this method the storekeeper must see just how his stock actually stands in each item twelve times each year, and there is no excuse for a storekeeper running out of stock on account of the errors on the cards. Then, there being twenty-five items to a page, by referring to the stock ledger it is possible to check at a glance just how much twenty-five different items have moved in a period of two years.

The operating departments, in preparing estimates for work to be done, are now furnished with the prices at which they will be charged for materials taken from stock. These prices are kept up to date by supplements issued by the purchasing department on the first of

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each month. These supplements also cover cancellations from or additions to the stock. Inasmuch as all department heads have a complete, up-to-date list of all materials in stock, this helps in a large measure to keep the obsolete stock at a minimum.

ADVANTAGES TO ACCOUNTING DEPARTMENT

In the accounting department where the stock ledgers were formerly carried, by far the larger part of the clerical labor has been eliminated by the use of the classification accounts. It is no longer necessary to open a separate account for each item of stock and to enter all receipts of materials, total price, unit price, etc., as well as all issuances with the necessary subtractions, etc. This is entirely taken care of now by what is termed regular and supplemental classification accounts. In an article of this kind it is impossible to describe in detail just how these accounts are operated, except to say that the regular account is credited and charged for all materials issued and received at the unit prices as shown in the catalog of stock and catalog of prices. These catalogs, of course, are the same, the former having an alphabetical and the latter a numerical arrangement.

In the event that materials are purchased at prices in excess of those shown in the catalog, the regular classification account is charged at the catalog price and the excess takes the form of a debit in the supplemental classification account. If materials are purchased at less than the catalog prices, the regular classification account is charged at the catalog prices, and the difference becomes a credit in the supplemental classification account. Of course, all materials are issued at the catalog prices, therefore the supplemental classification account is only used by the accounting department. If it is necessary to increase the catalog prices a credit requisition is issued, on which the quantity of material affected on hand at the time of adjustment is shown. In the event of a decrease in the catalog prices, the same procedure is followed except that a debit requisition is used. These differences are then either credited or charged to the supplemental classification account, as the case may be. Therefore, the regular classification indicates at all times the value of material in stock, as the units multiplied by the unit prices should equal this amount, and the supplemental classification indicates fluctuations in prices of materials.

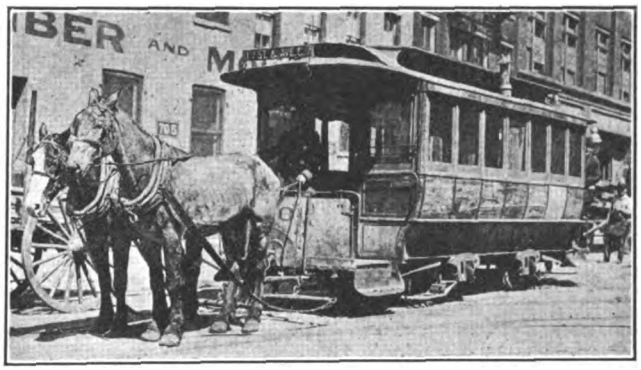
In this way the supplemental classification has no bearing on the amount of material in stock but constantly indicates whether materials are being charged out at the proper values. At the same time the total of the regular and supplemental classifications indicates the current market values of the materials in stock. In actual operation this system, so far, has met and even exceeded our expectations. It has also developed many desirable features that were not apparent when the work, preliminary to the installation of this system, was being laid out.

Manganese-Tread Wheel

In an article describing the new Davis cast-steel wheel with manganese tread recently put upon the market by the American Steel Foundries of Chicago, and printed on page 69 of last week's issue, through a typographical error a misleading statement appears in the third sentence. This should read "Its wear life is more than twice that of a cast-iron wheel because of the toughness given to both the wheel treads and flanges by manufacturing them of manganese steel."

The Last New York Horse Car

The accompanying illustration is reproduced as an appropriate valedictory to the closing era of transportation in New York City. While agreeing heartily with any timely sentiment that may attend the departure of this form of locomotion, one cannot suppress a



THE LAST NEW YORK HORSE CAR

little exultation at the thought that the storage-battery car has supplanted the horse car in New York. It will not be so common now to pass through moments of nervous panic when time is scarce and the passenger endeavors to "make" the Fall River boat via a cross-town horse car line.

Steam Railroad Statistics for 1915

The Interstate Commerce Commission has issued an abstract based upon its compilation of steam railroad statistics for the twenty-eighth annual statistical report covering the fiscal year ended June 30, 1915. The advance figures given in this abstract may be slightly modified by revision before final publication. On June 30, 1915, the roads represented 257,569.32 miles of line operated, including 11,279.64 miles used under trackage right. The aggregate mileage of railroad tracks of all kinds was 391,151.51 miles.

The total steam railroad capital actually outstanding on the above-mentioned date was $19,719,893,944, consisting of $8,635,319,368 of stock and $11,084,574,576 of funded debt. The total amount of railroad capital, including the securities held by the companies concerned, was $21,127,959,078, divided $8,994,894,721 for stock and $12,133,064,357 for funded debt. Of the total capital stock actually outstanding $3,415,472,806, or 39.55 per cent, paid no dividends. The amount of dividends declared during the year was $328,477,938, being equivalent to 6.29 per cent on dividend-paying stock. The average rate of dividends paid on all stocks actually outstanding, was 3.80. The investment in road and equipment as of June 30, 1915, for companies with annual operating revenues of more than $100,000 was $17,247,101,881, this being an increase of $263,155,774 over the preceding year.

The operating revenues of all railroads for the year ended June 30, 1915, were $2,956,193,202, or $11,538 per mile of line operated. Operating expenses were $2,088,682,956, or $8,152 per line of mile operated. For companies with annual revenues of more than $100,000, the number of passengers carried in 1915 was 976,303,602 as compared to 1,053,138,718 in 1914, while the number of tons of revenue freight carried, including freight received from connections, was 1,802,018,177 in 1915 as compared to 1,976,138,155 in 1914. The operating ratio showed a decrease from 72.22 per cent in 1914 to 70.52 per cent in 1915.

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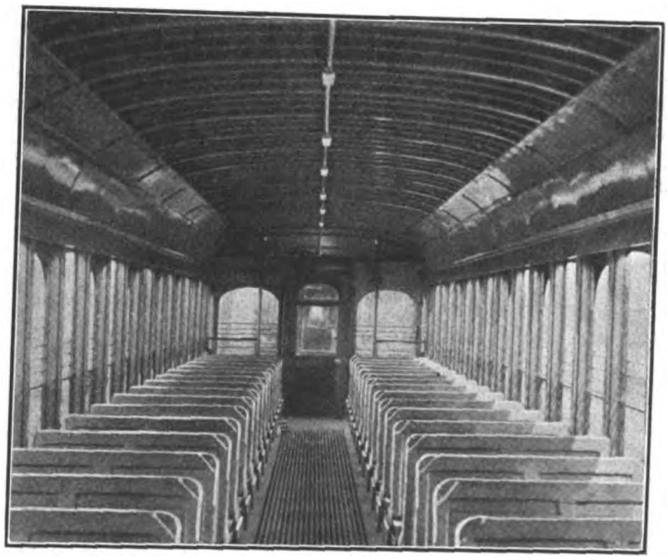


INTERIOR OF LARGE STEEL TRAIL CAR ON SALT LAKE & OGDEN RAILROAD

Large Steel Trail Cars in Operation on Salt Lake & Ogden Railroad

IN connection with the inauguration of its summer schedule, the Salt Lake & Ogden Railroad recently placed in operation six new excursion-type trail cars, the order for which was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 18, 1915. These cars are especially designed for accommodating the railroad company's heavy traffic to Lagoon, a pleasure resort situated about half-way between Salt Lake City and Ogden, Utah.

As shown in an accompanying illustration, the car is very large, having a seating capacity of eighty passengers. It is 61 ft. 6¾ in. long, 9 ft. 6 in. wide, 12 ft. 7 in. high and weighs 56,000 lb. The body framing is entirely of steel, the posts are of composite construction, with T-iron and wood fillers and the letterboards are of steel. The roof is of wood, covered with canvas, and the floor is of wood, double thickness. The seats are Hale & Kilburn No. 300A in quarter-sawed oak. Sliding duck curtains are provided in the window openings. The vestibules are arranged for through train operation with a swinging door in the center at each end.

The car is equipped with both seven-wire General Electric and eleven-wire Westinghouse control cable so as to operate in trains with other cars equipped with either type. The Orem line and the Ogden, Logan & Idaho Railway with which the Bamberger line has connection, are also equipped with Westinghouse control apparatus.

The underframing of this car is of heavy steel. The center sill is of 8-in. I-beam, 18 lb. per foot, while the side sills are of 8-in. channel bars, 13¾ lb. per foot. The intermediate sills are of 6-in. channel bars. The distance between truck centers is 39 ft. 2 in. and the trucks have a 6-ft. 6-in. wheelbase. They are equipped with standard 36-in. steel wheels with 6-in. axles and 5-in. x 9-in. journals. The cars are furnished with Westinghouse complete trailer brake equipments including the American slack adjuster. Each end of the car has a Janney radial M.C.B. coupler and is also fitted with a cast-steel spring buffer. The trucks were made by the Baldwin Locomotive Works, while the cars were built by the Jewett Car Company of Newark, N. J.

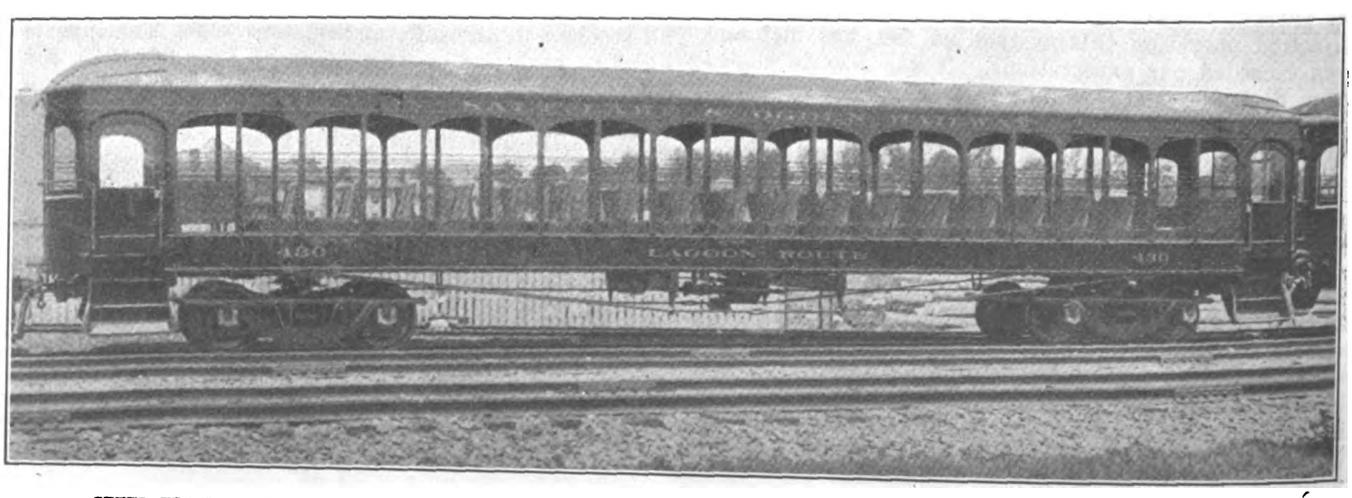
Safety-First Work of Pittsburgh Railways

IN a feature section published in connection with the Pittsburgh Safety Exhibit held the week of June 19, the Pittsburgh *Post* of that date had this to say of the safety-first work of the Pittsburgh Railways and other public utility companies:

"Officials of the Pittsburgh Railways, Duquesne Light Company and Equitable Gas Company have for years been active in their efforts to prevent accidents not only among their patrons but among their employees. Every possible safeguard against accident has been installed and campaigns of education have been conducted with a view to teaching employees how to spread the gospel of safety throughout the Pittsburgh district.

"Pulmotor stations have been established in every portion of Allegheny County by the Equitable Gas Company, Duquesne Light Company and Pittsburgh Railways to assist in saving the lives of persons overcome by gas, smoke, drowning or electric shock. Employees were instructed how to use these pulmotors and physicians were made familiar with their use through free lectures and motion pictures and demonstrations of the apparatus.

"Officials of the Pittsburgh Railways have been persistent in their efforts to teach their employees how to take care of themselves and how to safeguard the public. Every possible safeguard has been installed in shops and power houses, and motormen and conductors have been instructed in safety-first schools what to do in any emergency and how to do it. Emergency stations in various parts of the city have proved of immense value in the general campaign of safeguarding



STEEL TRAIL CARS WITH CAPACITY OF EIGHTY PERSONS NOW OPERATING ON THE SALT LAKE & OGDEN RAILROAD

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lives. Here are a few of the things which make the Pittsburgh Railways stand out as one of the foremost exponents of safety always:

"First city railway to adopt steel cars for surface line.

"All shop machinery equipped with safety guards for employees.

"Eighty men always sanding track and keeping rails in safe condition on steep grades.

"Cards with 'dont's' for teachers and children placed in every school room in Allegheny County and the co-operation of principals and teacher secured to caution their pupils how to avoid accidents.

"For the safety of children all cars are stopped at all school buildings during school hours.

"A second guard rail placed on all summer cars.

"Window guards placed on all double truck closed cars.

"Established free pulmotor service at many stations in Pittsburgh district.

"Developed first practical low-step car.

"Developed quick-acting safety car door. Five hundred cars equipped.

"All double-truck cars equipped with automatic safety air brakes.

"Steep grades and railroad crossings equipped with safety switches and safety trolley guards.

"Proportionate share of expense in elimination of grade crossings.

"First to adopt near-side stop."

COMMUNICATIONS

Moral Obligation of Witnesses

FIFTH AVENUE COACH COMPANY

NEW YORK, July 10, 1916.

To the Editors:

After reading the article partly dealing with the work of claim agents, which appeared in the June issue of *Good Housekeeping*, aptly criticised in your editorial of July 1, I am disposed not to say anything more harsh than that the author does not know—as we claim agents and others connected with transportation companies as well as a large portion of the general public know—about the methods used in the handling of accidents and the claims arising therefrom.

In regard to the advice given in the magazine article that witnesses to accidents should decline to give their names to conductors, it should be said that while it is true that there is no law requiring witnesses to furnish such information, anyone who will stop to give the matter a little consideration cannot fail to realize that in the interests of justice and a square deal to all concerned, a strong moral obligation rests upon all witnesses to furnish their names. On blank cards furnished to conductors by the company I represent is printed the following, but nearly all transportation lines use similar forms: "The management respectfully requests your assistance that fair treatment may be given to all concerned, proper discipline imposed, and accidents and discourtesies to the public prevented." This, of course, means just what it says—that the company desires the co-operation of witnesses so that exact justice may be rendered to all parties, the injured person, the employees and the company itself.

It would be most erroneous to suppose that the refusal of witnesses to give their names could result to the detriment and inconvenience of the railway only. Many times accidents occur in which the transportation line is in no way concerned, but since they happen near the cars, the employees report them and often secure the names of the only witnesses obtainable. I have thus furnished many witnesses to injured persons or their attorneys when no other witnesses could be found, and their absence would have resulted in serious loss and injustice to honest injured persons.

If the situation were reversed, how would injured parties feel if witnesses refused to come forward and aid them, when such witnesses were of the greatest importance in the interests of justice? But such a point need not be discussed. As before stated, a strong moral obligation rests on witnesses to furnish their names, and I know from long experience that the public as a whole recognizes this obligation and most people freely give their names when requested to do so. Indeed, many persons voluntarily sent their names to the interested parties, feeling that, in so doing, they are acting in the interest of fair dealing. Hence, while the magazine article referred to may do some harm for a short time, its bad effect will soon vanish, and the public at large will continue to aid in bringing about justice and right.

In regard to the advice to shun the adjuster and consult a lawyer, I again repeat that the writer of the article does not know. I frankly admit that the offering of such advice twenty-five or thirty years ago would have had some justification, but there is none at this time. In this connection I quote from my paper before the fourth annual convention of the Pacific Claim Agents' Association: "In those early days the claim agent who could boast about the number of settlements he made in cases of exceedingly serious injuries for very small sums of money regarded himself as the only person fit to act in the capacity of claim agent. This kind of claim agent, however, could not, should not and did not last. Such men were gradually forced out of business as claim agents."

Such methods of conducting claim department work could not fail to result in a short time in harm not only to the claim department but also to the company as a whole. As I stated in the paper before mentioned, the successful claim agent of to-day is the man who can look everybody squarely in the eye, who is regarded as a good citizen and fit to mingle with the best people in his community. The confidence of the public in his integrity is one of his strongest and best assets in handling the business of his department, and such confidence can be established only by fair dealing.

I know personally nearly every man forming the American Electric Railway Claims Association and also personally many of the claim agents of the steam railroads, and can truthfully say that they are just the stamp of man described above. They all aim to deal fairly with claimants injured by their companies and are not men to be shunned by injured persons. This the writer of the magazine article does not know. There may be claim agents who resort to sharp practices in handling their business. If there are such, I do not know them. The men who compose the Claims Association have no time for such claim agents, and there is no place for such men in the association. The proceedings of this association for many years past contain numerous papers and discussions advocating square dealing with claimants as being the best and only safe policy to follow in the handling of claim work, apart entirely from the moral phase of the situation. That such a policy is pursued by claim

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agents, there is no question. In my opinion, unfair claim agents, if there are any, are as scarce as the "white crows" mentioned in the article.

As to the advice about referring the claim agent to the claimant's lawyer, my views are entirely similar to those expressed in your editorial. No claim agent objects to any claimant being represented by a reputable attorney, and in many cases welcomes such representation. I would be the last to say a word against an honorable profession of which I am proud to be a member. Unfortunately, however, as in all other professions there are those in the legal profession who are not to be depended upon, and many persons injured in accidents have cause to regret bitterly ever having employed an attorney to represent them. I could cite from personal knowledge numerous cases of this kind in which large sums of money were paid to attorneys and only a small portion ever reached the claimant. In one case, in which $5,000 was paid in settlement, the injured person received nothing. Hence in advising the employment of attorneys, it should be emphasized that the greatest care should be exercised in their selection.

GEORGE CARSON, Claim Agent.

Efficiency in Military and Industrial Preparedness

J. G. WHITE & COMPANY, INC.
NEW YORK, July 5, 1916.

To the Editors:

Inclosed find copy of a letter which I am sending to several United States senators and congressmen. This letter deals with a subject of most vital importance to the American people, and I believe that this general subject should receive earnest and continued attention from yourself and all other editors who have a sensible view of what really contributes to the welfare of the American people of all classes, including members of labor unions.

If now or later you can in any way contribute toward helping to build up a sentiment among your readers in favor of efficiency in all directions, whether in government departments or manufacturing establishments, you certainly will be performing a patriotic service to the country.

In the long run this subject is one which ranks practically on the same plane with the broad question of national military preparedness for adequate, effective defense. In season and out of season efficiency should be preached both as relating to military preparedness and industrial preparedness.

In every state in the Union advisory boards to the Naval Consulting Board are giving freely of their time and money to assist in procuring information which would help the Army and Navy Departments quickly and effectively to utilize the industrial resources of the country in case of war.

Patriotic citizens generally are most anxious to assist in any efforts which will increase the military and economical preparedness of the country. It seems improbable that, at such a time, legislation should be urged (and have serious prospect of passing) which encourages inefficiency during a period when all patriotic citizens should be working toward efficiency.

J. G. WHITE.

[LETTER OF MR. WHITE]

New York, July 5, 1916.

Dear Sir:

My attention has been called to the Tavenner bill (H.R. 8665), prohibiting time studies and other methods looking toward efficiency of those engaged in government work, also to the Van Dyke bill (H.R. 8677), the object of which apparently is similarly to discourage possible increased efficiency in the Post-office Department. I understand that similar legislation in the way of riders, or otherwise, may be attached to the post-office appropriation bill, the naval appropriation bill, army appropriation bill and fortifications appropriation bill. I earnestly hope you will do all that you possibly can to defeat any such pernicious and foolish legislation.

As the active head of a large engineering and construction organization in this country, and also of another organization which we have built up, with headquarters in London, to do foreign work (the head men of which are Americans, but most of the staff being British, French, Swiss, Dutch, etc.), I have some appreciation of the importance of this general subject.

At the present time the United States is enjoying exceptional prosperity, due largely to our exports of munitions, together with other exports which are made possible, or at least largely helped, by the fact that the nations at war are unable to compete for this foreign business in many lines. After the war is finished there are many evidences to indicate a probable prolonged struggle for export business. On the part of the nations at war, the maximum exports will be of the utmost importance to enable them to take care of their huge debts and rehabilitate their financial systems. Before and during the war Germany had, and has, shown wonderful efficiency, particularly in all lines of manufacture. This has been due largely to the remarkable encouragements which were from time to time given by the Kaiser and the German government generally to increased efficiency in all lines of German endeavor, particularly those which would increase German exports.

I am sure that you earnestly desire the continued prosperity of the United States. While our unparalleled natural resources tend to assure us prosperity, irrespective of our own efforts and efficiency, yet this will carry us only to a certain extent, and beyond that the nation must prove its efficiency or its prosperity will be largely curtailed.

Considering all of these and other conditions which might easily be mentioned, it would seem to be extremely important that our government should, in all reasonable ways, encourage efficiency in all directions. The legislation herein referred to has absolutely the opposite effect. If efficiency in government departments is discouraged or prohibited, certainly this must reflect on efficiency in private establishments and tend to interfere with the prosperity of the United States.

A good example of the pernicious effects of legislation inspired by such forces as are apparently back of the Tavenner bill, may be seen in the La Follette, or seamen's bill, the effect of which has been to hand over to the Japanese practically the entire control of the shipping of the Pacific Ocean and almost the entire carrying of the Oriental imports and exports of the United States. If the government, by the passage of the Tavenner bill, or other similar legislation, is to discourage or prevent efficiency or the development of American industries, it must inevitably materially increase the seriousness of the economic situation which will confront us after the close of the European war.

You, of course, know that exports on a large scale have been possible, in spite of the extraordinarily high wages paid in this country, only because of the high efficiency of our highly-paid labor. The urgent demand for munitions has led to careful time studies in connection with munitions manufacturing in practically all European countries, and this tends largely to decrease the difference in efficiency which formerly existed as between American and European labor. This is another reason why efficiency at home should be encouraged in every direction.

Considering the above and other facts which might be referred to, I earnestly hope that you will do everything possible not only to avoid discouraging, but on the other hand, actually to encourage in all legitimate ways, efficiency, both in government and private industrial departments of enterprises.

Very respectfully yours,
[Signed] J. G. WHITE.

[NOTE.—The attention of the readers of this paper was called to the evils of the Tavenner bill and of the Van Dyke bill in an editorial entitled "Stupidity in Legislation," published on the first page of the issue of this paper for April 1, 1916. We indorse anything that Mr. White has to say about them, as well as his remarks about the necessity for the introduction by manufacturers during the war of efficiency methods if they are to compete with European manufacturers after the war is over. This point was emphasized in an editorial on "Preparedness for Peace Conditions," in the issue of this paper for June 24, 1916.—EDS.]

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EQUIPMENT AND ITS MAINTENANCE

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.

Car-Lighting Improvements and Costs on the Los Angeles Railway

BY J. L. CLARKE
Superintendent of Electrical Repairs, Los Angeles Railway

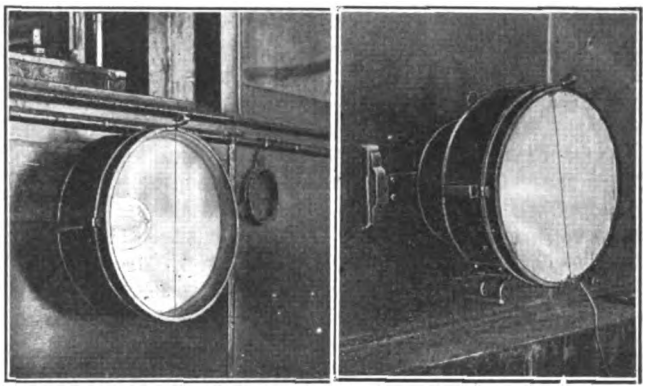
A study of the cost of Mazda as compared with carbon incandescent lighting on the cars of the Los Angeles Railway has been made for several years, the results of which show a saving on the Mazda over the carbon lamps of $18 per car-year.

Heretofore the operating and maintenance cost of twenty-five 16-cp. carbon incandescent lamps per car, based on three hours lighting per day, including the maintenance cost of the carbon-arc headlights, has been $32 per car-year. The headlight, of course, is operated in series with the incandescent lamps.

The cost of changing the lighting circuits for a uniform distribution of nine Mazda 56-watt lamps, and equipping them with safety shade-holding sockets and glass reflector shades, but not including the cost of the Mazda lamps, was $26, while the cost of changing the arc headlight to the Mazda incandescent style, including the credit on the material scrapped, but not including the cost of the 56-watt Mazda lamp, was $1. The total, therefore, was $27.

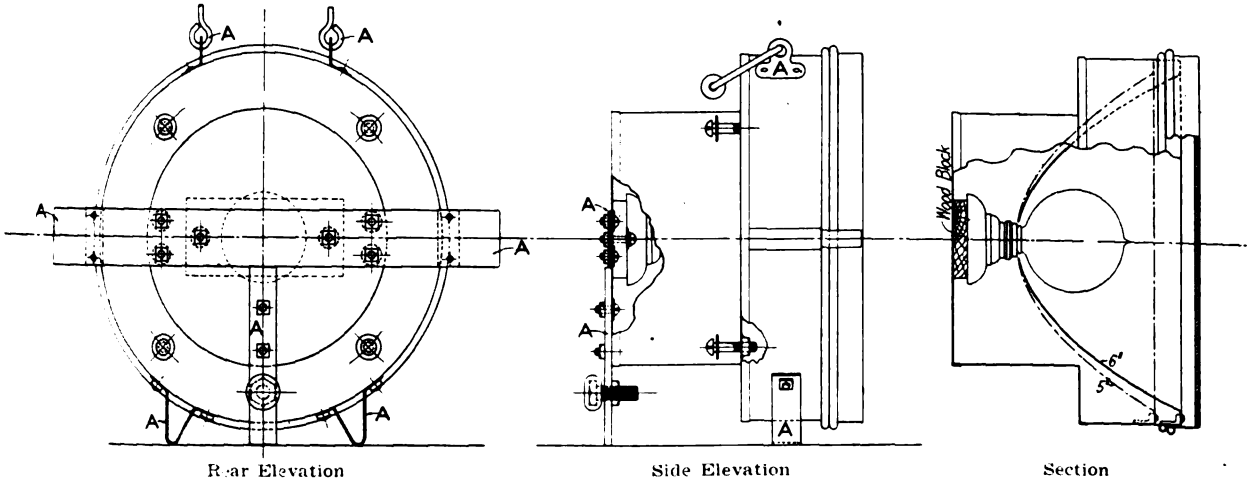
The operating and maintenance cost of the nine 56-watt Mazda lamps and the one 56-watt Mazda headlight, based on three hours lighting per day, is $14 per car-year. This provides for supplying twenty-four lamps per year to cover replacement of defective and stolen lamps, and includes 5 per cent replacement of reflector shades and periodical cleaning of the shades. Hence the saving on Mazda over carbon incandescent lighting is $18 per car-year, which covers the entire cost of new lighting installation expense in eighteen months, and after that time effects a net saving of $18 per car-year.

The above cost data do not include car-sign illumination and step lighting, as we have made no changes in these. In the near future we intend to replace the ten 16-cp. carbon incandescent lamps used for these purposes with 23-watt Mazda lamps, which should result in an additional saving of approximately $2.50 per car-year.



HEADLIGHT SUPPORT INSERTED IN CAR DASH AND HELD IN PLACE BY SUSPENSION BRACKETS

In changing from the carbon-arc headlights to Mazda headlights, no changes were necessary in the exterior of the case or frame, except to cover the hole formerly required for the ventilating cap. When replacements are necessary on account of badly-damaged headlight frames, they are made as shown in the accompanying illustration so that they may ultimately be recessed or inserted in the car dash whenever it may be decided to use two headlights per car, but in the meantime they can be used with our old method of support at the suspension brackets on the car dash. This new recessed headlight frame, which was suggested some time ago by C. A. Henderson, assistant general manager of the company, costs only 35 cents more than the old one, and is obviously more useful.



Rear Elevation — Side Elevation — Section

Note—All parts marked "A" to be removed when headlight is inserted in dash

Headlight arranged for a 5-in. and 6-in. reflector

SECTION, SIDE AND REAR ELEVATION OF HEADLIGHTS ON LOS ANGELES RAILWAY REBUILT AT SMALL COST FOR USE AS EITHER INSERTED OR SUSPENDED TYPE

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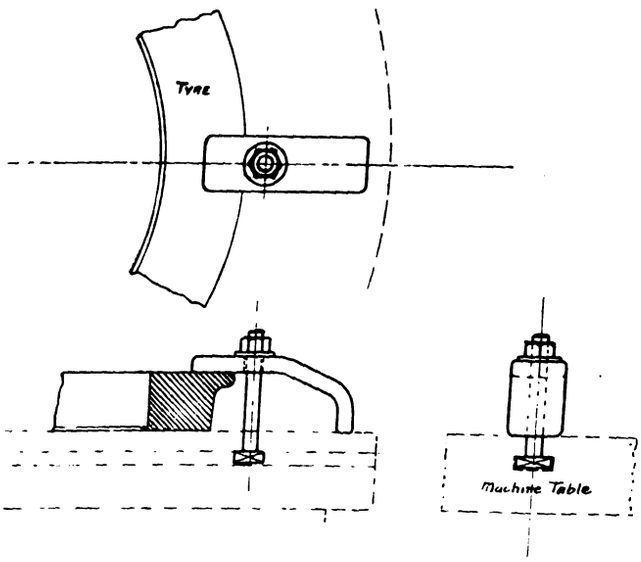
Machining Tires

BY "VULCAN"
A.M.I.C.E., A.M.I.E.E., England

The vertical boring mill is now almost universally preferred for boring out the tires for electric tramway cars, and on the larger systems it is generally used. As compared with the wheel lathe, the chief point in its favor is, of course, the ease and saving of time in putting into and removing the tires from the machine. The best plan for holding the work is to have the machine table constructed as a chuck with the four jaws shaped to suit the tread of the tire, and arranged both for universal and independent operation.

By this means tramway tires in large numbers can be turned out at low cost, but on the smaller systems where there is not sufficient work to keep a man solely employed on this work, tire boring is commonly carried out in the wheel lathe. In such cases this method often proves to be the more economical in the end, because only one operator may be needed to deal with the



CLAMPING RIG FOR USE IN MACHINING TIRES IN VERTICAL BORING MILL

whole of the wheel work, *i.e.*, retreading tire and centerboring, etc., and where this obtains there is no justification for installing an expensive vertical boring mill which will stand idle most of the time. If one were installed, the increase in the capital charges would probably be more than the small saving in working costs that its adoption might be expected to effect.

In many shops where the vertical boring mill is used, there are no chuck jaws with the machine, the tires or wheel centers in such cases being attached to the work table by bolts in the tee slots and common straddle clamps. The latter require supporting at the back end, and as it is often thought that any old bit of scrap will suit the purpose, one sometimes sees the required height being made up by the use of two or three packings for each clamp. When a tire is put on or taken from the machine table, it becomes necessary on each occasion to handle a number of separate parts, made up of bolts, straddle clamps and packings, and this results in much waste of time due entirely to the multiplicity of these fittings.

An improvement devised and used by the author for such cases consists in making new clamps of flat bar with a hole in the upper portion, through which the bolt passes that holds the bolt down. The rear ends are bent downward, forming a heel to take the place of the ordinary packings. The arrangement is shown in the sketch and is self-explanatory. To remove the clamping rig the nut is loosened and the bolt with clamp attached can then be withdrawn from the tee slot. On many repetition jobs on other machines such clamps have been found useful time savers, and by their use the annoyance of lost or misplaced packings is avoided.

Oxy-Acetylene Cutting Practice

BY B. P. LEGARE
Engineer Maintenance of Way and Construction United Railroads of San Francisco

An apparatus which has proved to be a very valuable addition to our engineering equipment is an oxy-acetylene outfit which has been in service for sixteen months. The principal shop work for which this outfit is used is in cutting rails in irregular shapes for built-up frogs, crossings, etc., and in cutting irregular shape steel plates and building up broken cast-iron gear teeth. These are applications where the use of the electric welding outfit is not practicable.

In street work the oxy-acetylene is employed only where the electric welding outfit cannot be used, in work such as building up depressions and cuts in cable tracks where power is not accessible, and where there is cutting of rails or other material. All cutting is done by the oxy-acetylene outfit. There are a great many old cable tracks where the conduits were filled in many years ago and electric rails installed, leaving the yokes under the pavement. These yokes from time to time stick up in places where the pavement has worn down, and it is necessary to have them removed. Instead of sawing them off the oxy-acetylene apparatus is used to cut off the ends.

Where there are electric lines crossing the cable lines, the slot tends to close up on account of expansion in the heavy electric rails. Heretofore it has been necessary first to take out the pavement in order to cut off the rail at the arm of the crossing, and then to shove back the crossing in order to open up the slot. Instead of the above process we now cut a thin strip off one side of the slot rail, as shown in an accompanying illustration. This has been done on a heavy manganese double crossing, making a cut of 46 ft. at a cost of $19. If the slot had been widened in the usual manner by taking up the crossing and forcing it back into position, the cost would have been approximately $150 to accomplish the same result. The yokes mentioned above and also the rails were cut off at about

WIDENING CABLE SLOT IN SAN FRANCISCO WITH OXY-ACETYLENE FLAME

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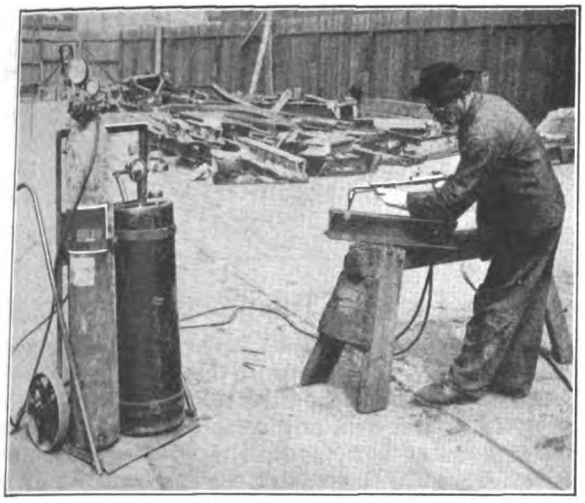


CUTTING RAILS IN IRREGULAR SHAPES WITH OXY-ACETYLENE FLAME

one-half what the work would have cost if done in the usual way with hacksaws.

When breaking in an operator at first, we procured the assistance of an expert employed by the sellers of the apparatus. It was necessary to call upon him repeatedly for the first six or eight months, as considerable trouble was experienced with the apparatus such as leaks, dirt in torch and valves, torch getting out of order, etc. At times, the trouble was a serious delay to the work. Now when a new operator is being used in the welding work he is kept continually in close touch with the foreman and expert, and gradually obtains the knowledge necessary to eliminate these difficulties and delays.

Reinforcing Tubular Poles Internally

BY S. L. FOSTER
Chief Electrician United Railroads of San Francisco

Of the various types of poles, tubular steel ones are generally admitted to be preferable for side-pole trolley work in urban districts. They are equally strong in all directions, are as unobtrusive as possible, can be kept painted cheaply, and are easily repaired when broken, etc. Situations are met with, however, where it is desirable to have greater strength without increasing the size of the pole or detracting from its slender appearance. Guying or external strengthening not being approved, there is nothing left but increasing the strength by adding the reinforcing inside the pole before it is set.

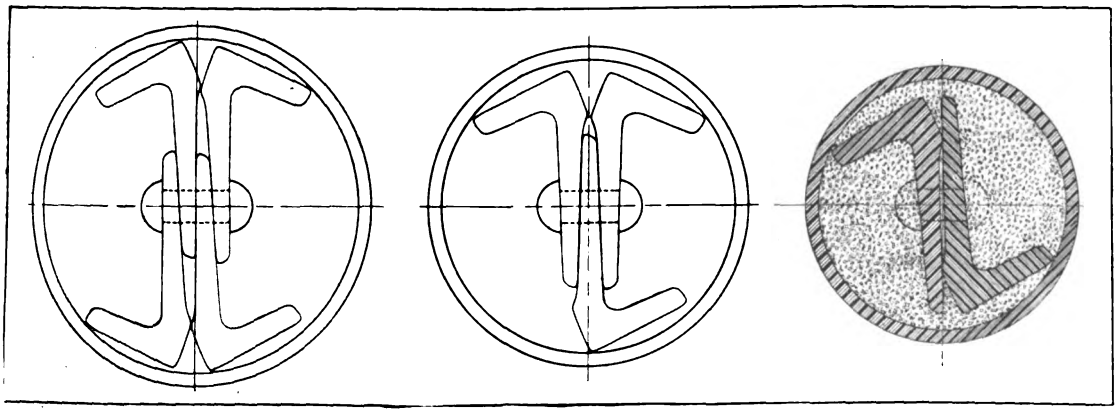
The ideal design for this internal reinforcing is an I-beam shape. There is at once, then, presented a problem in higher mathematics to solve, namely, to design an I-beam section of minimum weight and maximum moment of inertia to go inside a given circle. Even that does not settle the matter, for, with a three-section tapering pole, a tapering I-beam is called for which in the present state of the art cannot be produced in a rolling mill except possibly in the shape of an expanded web-beam.

Reinforcing has been done in some cases in a rough and ready way by inserting a piece of old girder or T-rail large enough to fill the lowest section of the pole. An objection to this method is that it increases the strength of the lowest section only, the pole being left unsymmetrically strong and as liable to fail at the first or second joint insertion as before the rail was added. Another way has been to use a rail only large enough to fill the top section of the tubular pole but equal in length to the full length of the pole. This plan is better, but, while increasing the strength of the top section to a reasonable limit, it does not increase that of the other sections proportionally nor as much as was possible and the pole is still unsymmetrically strong.

The United Railroads of San Francisco solved this problem in an unusual way along I-beam lines many years ago. They devised and constructed an economically built beam of moment of inertia larger than that of the pole, made it tapering and used condemned scrap metal for the purpose. By the addition of 151 per cent of metal at an increased cost of 50 per cent a pole is produced whose strength is 126 per cent greater than before without any increase in external diameter or change in external appearance. This result is accomplished by building a beam of 38 lb. per yard slot rail or, more correctly speaking, slot angle steel rejected as practically unsaleable from old cable railway lines that had been rebuilt as electric. The construction in the cuts show how four of these angles are used for the bottom section of the pole, three for the middle and two for the top section. The angles are riveted together and distorted a little by forging at the two steps in the number of shapes corresponding to the joint insertions in the pole. This provides a symmetrically strong pole that has been used as standard for all unusual strains up to 5000 lb. For 10,000 lb. and 15,000 lb. corner feeder-cable strains special box-girder poles are used.

After this built beam is inserted in the pole, the voids between beam and tubular envelope are filled with Portland cement concrete to fix the beam permanently in the pole and to protect all the metal surfaces inside from corrosion.

The result is what is called a 'filled" pole that has its



LOWER, MIDDLE AND TOP SECTIONS OF STANDARD PIPE POLE OF 8-IN. 7-IN. AND 6-IN. DIAMETERS, REINFORCED WITH FOUR, THREE AND TWO SLOT ANGLES RESPECTIVELY

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maximum strength along a line through the web of the built beam. The concrete used inside the pole, beside serving to preserve the iron from oxidation, adds strength to the compression side of the "shape" and gives stiffness to the whole.

The standard size of pole so filled locally and used for heavy dead-ends, curve pull-off strains, feeder turns, guy poles, etc., is a 30-ft. 6-in., 7-in., 8-in. standard pipe pole. The moment of inertia of the unfilled pole is 71.98 and of the built beam alone 90.53. Such a pole unfilled is good for about a 1045 lb. pull at a point 24 ft. from the 6-ft. setting with a fiber strain of 18,000 lb. per square inch, or a factor of safety of about three. Filled with the built beam described it is good for a safe load of 2400 lb. (without considering the strength added by the concrete)—an increased strength from the presence of the beam of 126 per cent. One corner pole so filled was unavoidably loaded for some time with feeder cables to 5900 lb. without failure.

The unfilled pole formerly cost, at 3.15 cents per pound, $26. The beam filling cost in 1916 in place $13.17, or 51½ per cent additional. To-day such a pole unfilled will cost more nearly 4½ cents per pound, or $37.

The original pole weighs 825 lb., the beam 1250 lb. and the completed pole with concrete and all, 3100 lb.

This innocent looking 6-in., 7-in., 8-in. filled pole is the sort of a pole that defies wild automobiles and auto-trucks. Heavy runaway, double-truck passenger cars also have so far come out second best after colliding with one of them. Altogether the idea has proved a most excellent one for furthering the construction and maintenance of permanent, sturdy, guyless urban overhead trolley lines. There are several hundred of these in service, and none has ever failed, though many of them have been in continuous service for the past nineteen years at the ferry terminus.

This slot rail-beam idea is also applicable, and has been utilized locally in strengthening several other sizes of tubular poles as, for example, 4-in., 5-in., 6-in. and 5-in., 6-in., 7-in. standard pipe and 6-in., 7-in., 8-in. extra strong pipe in times of shortage of suitable sizes in stock and insufficient time available for delivery from the Eastern factories.

Where cheap slot rail is not procurable from which to construct built beams for such internal reinforcing, another, though much more expensive way of doing this strengthening, would be to construct a three-joint tubular pole of smaller diameters especially designed to fit inside the 6-in., 7-in., 8-in. pole as closely as possible—in this case one of "standard" or "extra strong" 5-in., 6-in., 7-in. pipe—and fill the annular space between the two poles with a mixture of cement and sand.

Such a pole for internal use and made of extra strong pipe (double extra strong would be too large) would weigh 16 per cent less than the slot rail beam, would cost (at 4.5 cents per pound for pole filling only) 359 per cent more than the beam filling in place, and would make the combination pole only 82 per cent as strong as the slot rail beam makes it. It would, however, have the advantage of being equally resistant in whichever direction the strain might be applied, whereas the beam-filled pole has only one line of maximum strength, namely, parallel to the web of the built beam.

The 6-in., 7-in., 8-in. extra strong and the double extra strong pipe poles cost to-day respectively 14 and 63 per cent more than the built beam filled pole and have but 65 and 99.7 per cent as large moment of inertia respectively.

From its uniqueness of design and smallness of cost the United Railroads idea seems to offer the most efficient method of internal reinforcing to date and the cheapest pole for the heavy unidirectional or resultant pulls to be anticipated. Obviously the composite pole is most resistant when the side by side angles in the middle section are in tension.

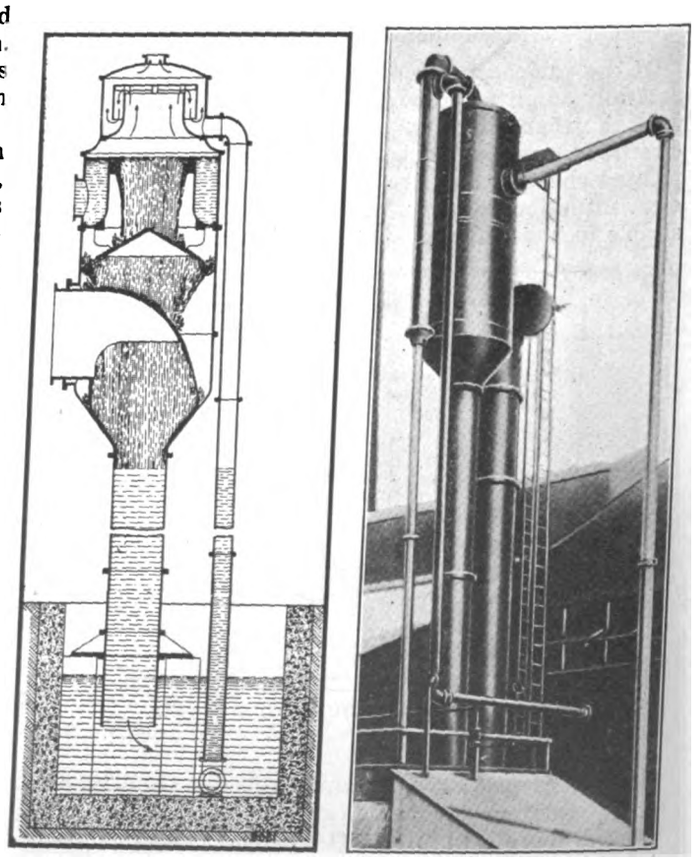
As the coefficients of expansion of cement and iron are nearly the same, and as cement exerts an inhibitive action on the oxidation of iron there has been no tendency for the outer tubular envelop to be strained or ruptured by internal stresses of expansion.

New Type of Barometric Condenser

The illustrations shown herewith are of the Beyer barometric condenser which has been placed on the market recently by the Ingersoll-Rand Company.

It is of the counter-current type, in which air and cooling water flow in opposite directions. The steam inlet is at the bottom of the condensing vessel, the water inlet above and the air removal opening at the top. The sheets of cooling water overflowing the pool at the inlet point meet the entering steam. The two are brought into intimate contact by conical baffle plates assisting the water to absorb to its full capacity the latent heat of the steam. The non-condensable air liberated in the condensing action rises through the falling water to the removal point at the top, being cooled to practically the temperature of the incoming water. Ample opportunity is given for the removal of the air content of the water before it mixes with the steam. This not only facilitates the mixing process but permits the removal of air and vapor at a comparatively low temperature, a distinct advantage, as the reduced volume saves in vacuum pumpage horsepower.

The steam inlet is of large diameter to secure low velocity, and is hooded to discharge the steam into the center of the condensing vessel. The air removal opening is also of ample area and is protected by a self-draining baffle and trap. This, it is said, positively



NEW TYPE OF BAROMETRIC CONDENSER

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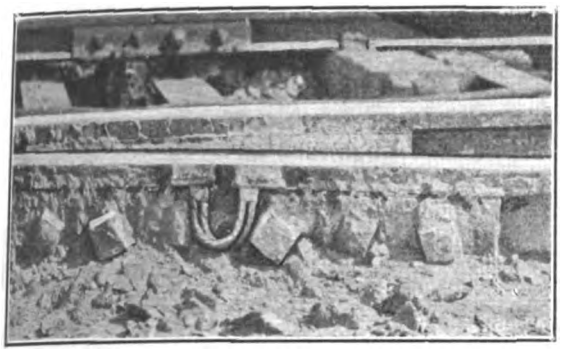
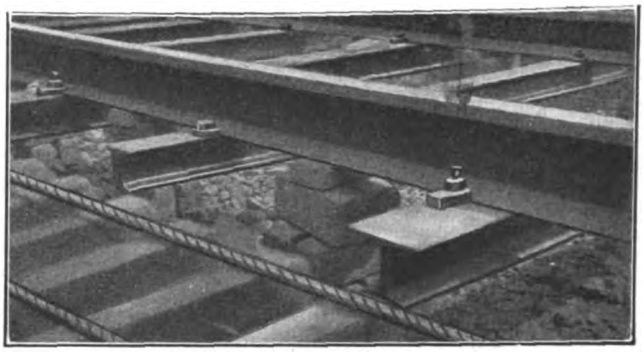


CONCRETING TRACK—VIEW OF OXY-ACETYLENE WELD BOND



CONCRETING TRACK—TRACK BLOCKED UP FOR CONCRETING

prevents water being carried over into the vacuum pump.

The hot waste water is discharged through the self-draining tail pipe. This pipe straddles the hot well and rigidly supports the condenser.

Concreting Track in Fort Smith, Ark.

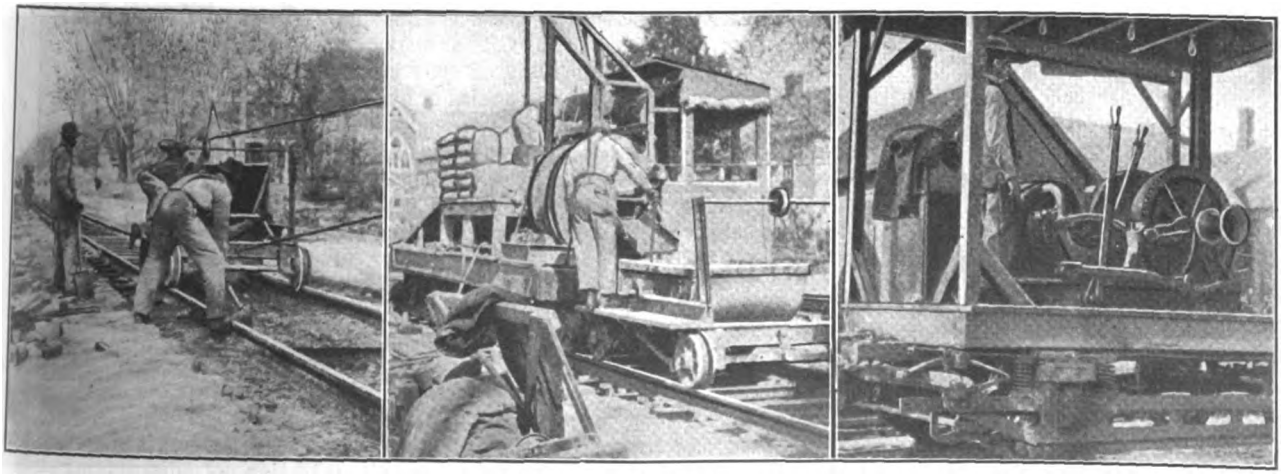
Decreased track construction costs and increased efficiency have been obtained by the track department of the Fort Smith Light & Traction Company, Fort Smith, Ark., through the introduction of labor-saving concrete-handling equipment. The particular piece of track construction on which this equipment was used was 3 miles long. This track was built with 6-in., 72-lb. plain girder rails laid on Carnegie steel ties placed at 5-ft. intervals, with inverted sections of 60-lb. standard-section rails spaced at 2½-ft. centers with the Carnegie ties. This structure is supported on a concrete foundation extending 12 in. below the base of the rails, and the track subgrade is drained with 6-in. jointless vitrified tile laid along the track center line. A 60-lb. standard-section rail was removed from the old track and this was cut into tie lengths with an oxy-acetylene cutting torch and drilled for rail clips in the repair shops of the company.

After the track structure was completely assembled it was jacked up to surface, lined and blocked in position on brick piers placed midway between the ties. The manner of blocking is shown in one of the accompanying illustrations. During the assembling of the track structure, concrete material, consisting of sand purchased from a local company and crushed stone obtained from a local quarry and crushed at the railway company's plant, was delivered beside the track trench. The sand was delivered by teams to a single pile at one end of each block. The crushed stone was delivered on flat cars, from which it was wheeled in wheelbarrows across a short platform to the mixer. The sand was also wheeled to the mixer over a narrow incline leading from the street pavement to a platform on the charging side of the mixer. Cement was delivered to the concrete mixer as it was required and a 1:3:5 mixture was used in the track foundation.

The assembled concrete-mixing outfit is shown in one of the accompanying illustrations. It consists of a Koehring ½-yd. batch mixer operated by a 15-hp. continuous-current General Electric motor, and a 1-yd. dump car which is moved the length of the block by cable attached to a winch car which is placed at the other end of the block from that occupied by the concrete mixer.

Special features of the concrete-mixing plant are the 1-yd. dump car and the winch car, which moves the dump car back and forth over the track being concreted. The dump car is placed beside the mixer where it is loaded with two ½-yd. batches. Upon signal to the operator of the winch car at the opposite end of the block the dump car is moved to the point where the concrete is to be deposited in the track. The design of the dump car is unusual in that it consists of a steel frame supporting the steel body, mounted on two pairs of wheels. The concrete is dumped at right angles to the track by the car operator, and the concrete is spread to the level of the tops of the ties by one of the hinged sections of the drop bottom.

The movement of the car along the track is quite rapid, and the round trips between the mixer and the point where the concrete is dumped are practically continuous. As soon as the car reaches the desired spot the operator gives the signal for the return trip and dumps the car simultaneously. In other words, at the time the car is dumped the winch operator reverses the cable and the car is returned to the mixer. In so



CONCRETING TRACK—DUMPING THE CONCRETE; CONCRETE MIXING PLANT; VIEW OF WINCH CAR

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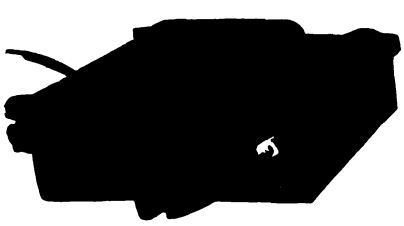
CONCRETING TRACK—BONDING RAILS WITH OXY-ACETYLENE

doing the concrete is spread along the center of the track, and the only delay in the operation is that necessary for the car to receive the two batches of mixed concrete. Including the foreman, the full crew necessary with this concrete mixing and placing plant comprises eighteen men. The concrete is distributed by two men and the rest of the crew is engaged in delivering crushed stone, sand and cement to the mixer and the mixer operating crew. An average of 115 cu. yd. of concrete per ten-hour day is the capacity of this plant when it is operated continuously.

After the concrete foundation had set the Ohio Brass Company's oxy-acetylene welded bonds were installed. One of the accompanying illustrations shows the operator in the act of welding one of these bonds. Following this a mortar cushion 1 in. thick and of a 1:9 mixture was spread over the foundation and thereafter a vitrified brick pavement was laid and grout-filled as promptly as possible. Special brick were not employed to form the wheel flangeways, but the brick were laid with a considerable crown between the rails, and the courses adjoining the rail were set under the head.

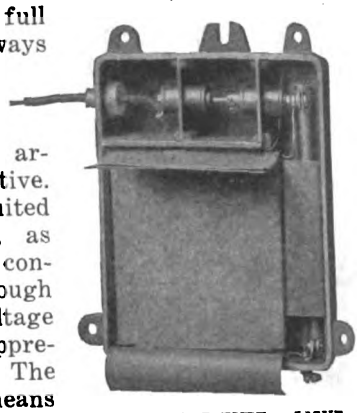
New Types of Lightning Arresters

The first illustrations shown herewith are of the condenser type of d.c. lightning arrester, designated K-3, which has recently been placed on the market by the Westinghouse Electric & Manufacturing Company. This arrester was designed for use on voltages from 100 to 1500 either in d.c. generating stations or on railway equipment. It is made in two forms, one for car and station service, the other for line mounting. The first consists of a condenser in parallel with a resistor and both in series with a spark gap between line and ground. The second consists of the condenser alone without series gap or shunt resistance. The condenser is of the flatplate form, but has been modified and improved from the ordinary type by the use of a new insulating wax of much higher dielectric strength than paraffin. For the protection of station apparatus and railway equipments up to 1500 volts, a condenser of 1 mf. capacity is used, while for line mounting the capacity is only 0.3 mf.



CONDENSER-TYPE LIGHTNING ARRESTER READY FOR MOUNTING

In the first form, the resistance in parallel with the condenser is high, and serves to keep the condenser discharged so that its full capacity may eb always available. The spark gap, which is adjustable, can be set very close, thus making the arrester extremely sensitive. It can be even short-circuited without causing harm, as the resistance of the condenser shunt is high enough to stand the line voltage without wasting any appreciable amount of power. The spark gap provides a means of noting the discharge of the arrester by placing a test paper in the gap.



CONDENSER-TYPE LIGHTNING ARRESTER WITH COVER REMOVED

In the line arrester without gap or resistance the condenser is charged up to line voltage, but having no gap is ready to discharge all static formed at any voltage. A resistance is not necessary in this form of arrester.

Both forms of arrester are mounted in rectangular cast-iron boxes with waterproof covers. The spark-gap chamber is accessible by removing a small separate cover. They are easily mounted underneath or on the roof of a car and in any position on a wall or pole.

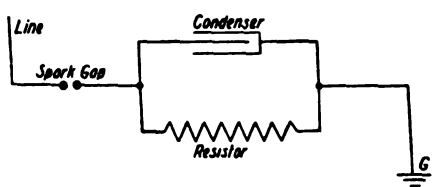


DIAGRAM OF CONDENSER-TYPE LIGHTNING ARRESTER CONNECTIONS

Another type of arrester for use on a.c. circuits of any commercial frequency and on voltages from 1000 to 2500 and of a wide range of capacity is the Type CR lightning arrester illustrated herewith. This arrester is for pole mounting and is similar in many respects to the Type C arrester, which consists of six spark gaps between knurled non-arcing metal cylinders, but which has no resistance in series with the gaps. The new Type CR arrester, however, consists of four knurled, non-arcing metal cylinders mounted on a porcelain base with a series resistor held by fuse clips, the whole being mounted in a cast-iron box. The arrester unit is mounted on the inside front cover of the box so that it is automatically disconnected from the circuit when the box is opened. This safety-first feature eliminates all danger of accidental shocks to linemen when making inspections and repairs. Like the Type C unit, the Type CR arrester is designed particularly for the protection of distributing transformers, and is unlimited in application, the maker points out.

LIGHTNING ARRESTER WITH RESISTOR

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NEWS OF ELECTRIC RAILWAYS

CLEVELAND INTERESTS TAKE OVER THE NICKEL PLATE

Electrification Considered Likely, Although Nothing Definite Has Been Announced—Relation of Road to Present Lines Entering the City

O. P. and M. J. Van Sweringen, Cleveland, and their associates who purchased the New York, Chicago & St. Louis (Nickel Plate) Railroad, have made no definite statement regarding the reported electrification of the road, but the election of directors to take the place of the New York Central Railroad representatives on the board would indicate that electric railways in and about Cleveland will be interested in the developments. J. R. Nutt, in addition to his connection with the Citizens Savings & Trust Company, Cleveland, is a member of the board of directors and treasurer of the Northern Ohio Traction & Light Company, which enters Cleveland from the south. E. W. Moore is president of the Lake Shore Electric Railway, which enters Cleveland from the West, and is also vice-president of the Northern Ohio Traction & Light Company. F. E. Myers, Ashland, Ohio, is president of the Cleveland, Southwestern & Columbus Railway, which enters the city from the southwest. The other directors are O. P. Van Sweringen, M. J. Van Sweringen, Warren S. Hayden, M. B. Johnson and Charles L. Bradley, all of Cleveland; E. R. Tinker, vice-president of the Chase National Bank, New York; G. M-P. Murphy, vice-president of the Guaranty Trust Company, New York; William H. Canniff, president of the company, and Chauncey M. Depew.

As stated previously no announcement has been made by those interested as to whether any part of the Nickel Plate road is to be electrified, but rumors have been plentiful. One of them is that the road will be electrified east of Cleveland as far as Painesville and west as far as Lorain, and that it will ultimately carry the interurban cars from both east and west to the terminal station which the Cleveland & Youngstown Railway, also a Van Sweringen proposition, is to construct on Ontario Street, near the Public Square. The Cleveland & Youngstown Railway has already been built on the hill southeast of the main part of the city and through a growing residence district. The Nickel Plate is so situated that it could be utilized to carry cars of the Cleveland & Youngstown Railway to the downtown terminal without the inconvenience of running on any city streets. While the Cleveland & Youngstown Railway has the right to operate by steam power under its charter it is believed that electricity will be used.

The general opinion is that the Van Sweringen interests purchased control of the Nickel Plate primarily to assist them to complete their plans for a terminal in Cleveland. As has already been stated in the ELECTRIC RAILWAY JOURNAL, they have a franchise for a freight yard in the valley south of the location for the passenger terminal and it has been their intention to build a system of rapid transit tracks along Kingsbury run, where they own the land, for the purpose of bringing in both steam and electric roads to the freight and passenger terminals. The Erie, the Wheeling & Lake Erie and the Baltimore & Ohio roads could all use these terminals, but whatever is done it is not expected that this will interfere with plans for a new passenger station on the lake front that will be used by the New York Central, Pennsylvania and Big Four roads.

The original plans of bringing the interurban electric railways into the terminal presented some difficult problems so far as those operating east and west were concerned, but the Nickel Plate is in position to bring them in very conveniently and it is felt that this is a part of the general terminal idea. These roads are the Cleveland, Painesville & Eastern and the Cleveland & Eastern on the east and the Lake Shore Electric and the Cleveland, Southwestern & Columbus on the west. The Northern Ohio Traction & Light Company could come in over the Kingsbury run route from the south. All the roads would have the advantage of making fast time through the city.

The Van Sweringens are operating extensively in real estate on what is known as the heights to the southeast of the city, through which the original rapid transit line runs, although it has not been completed to any downtown point. It is said that these interests will be extended to the Chagrin Valley, where many of Cleveland's wealthy families now reside. This will necessitate the extension of the road to that section, but whether it is the intention of the owners to extend the Cleveland & Youngstown line to Youngstown or any point east of the Van Sweringen real estate holdings is not yet clear.

Efforts made in New York to secure confirmation of the rumor in regard to the electrification of the road were unavailing. At the office of Mr. Murphy in New York his secretary said that Mr. Murphy's election to the board was so recent that he was not prepared to discuss the future of the road at this time. Mr. Tinker, another director, who is connected with the Chase National Bank, said that there was no present authority for the statement that the road would be electrified. The matter of improvements and the future plans had not been definitely decided and any statement in regard to the company would probably be made public through the headquarters in Cleveland.

The announcement of the sale of the road as made in New York on July 8 was as follows:

"The New York Central Railroad Company on July 7 sold all of the stock owned by it in the New York, Chicago & St. Louis Railroad Company to Cleveland interests represented by O. P. and M. J. Van Sweringen for $8,500,000, of which $2,000,000 has been paid in cash and $6,500,000 in notes secured by pledge of the stock.

"Ten notes of $650,000 each were given. The first note is payable in five years and the others thereafter at intervals of one year each. The notes bear interest at 4 per cent for the first five years and 5 per cent thereafter.

"The board of directors representing the New York Central interests have resigned and the new owners have elected successors representing their interests.

"The Nickel Plate road was organized in 1881 and operation of the road was begun in October of the following year. It was a period of competitive railroad building and at about the same time that the Nickel Plate was started the West Shore was built to parallel the New York Central lines from New York to Buffalo, where it was to connect with the new road to run from Buffalo to Chicago and St. Louis in competition with both the Lake Shore and the 'Big Four.'"

STRIKE RESULTS IN EFFORT TO REMOVE RECEIVER

Frank Bret Thorn and Louis Wiard of the New York State Industrial Commission at Albany, who have been investigating the strike of platform men on the Buffalo Southern Railway have threatened to conduct an official inquiry into the trouble by a court action unless a settlement is reached between representatives of the strikers and Nathan A Bundy, receiver and general manager.

An action has been brought against Nathan A. Bundy as receiver of the company by Charles M. Gaffney, attorney for Henry C. Lein, West Seneca, and other stockholders in the line, ordering him to show cause why he should not be removed as receiver of the road. The proceedings are brought as a means of ending the strike. At a preliminary hearing before Justice Marcus in the Supreme Court of Erie County, stockholders said the men were willing to return to work without a wage increase but demanded recognition of the union. The stockholders said they had no objection to this. Mr. Bundy said he thought he was acting for the best interests of the majority of the stockholders by refusing to renew the union agreement. Hearings will be held later on the order to show cause.

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NEW WAGES PROPOSED AT INDIANAPOLIS

A new wage scale for increasing the pay of motormen and conductors was announced by the Indianapolis Traction & Terminal Company, Indianapolis, Ind., on June 6. The advance figures approximately 8 per cent, and will increase the payroll for the car service men about $100,000 the first year. The present rate of wages, as established in 1914 by the Public Service Commission of Indiana, acting as an arbitration board, ranges from 21 cents an hour for the first year of service to 27 cents an hour for trainmen in continuous service five years and over. The new scale proposed for motormen and conductors, in continuous service, is as follows: One year or less, 22 cents an hour; one year and less than two years, 24 cents an hour; two years and less than three years, 25 cents; three years and less than four years, 26 cents; four years and less than five years, 27 cents; five years and less than six years, 28 cents; six years and less than seven years, 29 cents; seven years and over, 30 cents.

These rates of pay are to become effective on Jan. 1, 1917, but all car service men signing the individual working agreement of the company are to receive a bonus of 1 cent an hour from July 1 to Nov. 8 (the date of expiration of the present working agreement) and a bonus of the difference between the old rate and the new wage scale from Nov. 8 to Dec. 31, 1916, is to be given. The bonus agreement attached to the new wage scale agreement presented to the employees reads as follows:

"The Indianapolis Traction & Terminal Company will set aside and on Dec. 31, 1916, pay to each conductor and motorman then in its regular service, a bonus of 1 cent for each hour worked to Nov. 8, 1916, and thereafter to Jan. 1, 1917, the difference between the present rate and the new rate, which begins at said date; such payment to be made only to employees who have complied with the conditions prescribed in Sec. (a) below, and to begin as to each employee who has so complied at the time specified in Sec. (b) below.

"(a) A motorman or conductor, to be entitled to such bonus, shall have signed the working agreement, and shall after this time well and truly have opposed and used his influence to oppose any strike or attempt to strike, and, in the event of a strike, have faithfully reported for duty at his usual time and place each day, and operated his car as his superior officer directed.

"(b) For men signing such agreements on or before July 8, 1916, such bonus shall begin to accrue on July 1, 1916, and for those signing after July 8, 1916, and before Aug. 1, 1916, it shall begin to accrue at the date of signing.

"In the case of new employees, entering the service before Jan. 1, 1917, the bonus shall begin to accrue at the date of signing."

Robert I. Todd, president of the Indianapolis Traction & Terminal Company, made the following statement in connection with the new wage scale:

"For more than three months the company has had under discussion with its representative motormen and conductors the question of a new wage scale. These men were signers of the working agreement with car service men, which has now been signed by all except about 100 of the car service employees, and represented the great majority of the men in this class of service. The new scale was proposed by them and we have every reason to believe that it will be favorably received by all those who are parties to the working agreement, and which cannot help but be acceptable to all. Outside of the increase in wages provided for, there are no changes in the working conditions as provided in the individual working agreement with the car service men, which has proved so acceptable to the great majority of the trainmen. Arbitration is fully provided for."

Within a few hours of the announcement of the new schedule, more than one-half of the car service men had signed the individual working contracts, and before July 8 most of the men had accepted the new scale and a continuance of the working agreement. The contract gives the period of the new wage agreement from Jan. 1, 1917, to Dec. 31, 1921.

In commenting editorially on the new wage scale, the Indianapolis *Star* on July 7 contained the following:

"The startling increase in wages announced by the street railway must be regarded as a very important move for the obtainment of settled labor conditions in Indianapolis and indirectly for a noteworthy addition to the prosperity of the whole city.

"The naked truth appears to be that the company has paid something like $100,000 as an investment for the sake of insuring against a strike; and it is perfectly clear that a street car strike falls nothing short of a public calamity. We are all interested in its prevention.

"Obviously the ratification or rejection of this proffered contract and bonus must now face the ordeal of acceptance by the employees. They will have to balance the vague benefits or losses of the strike weapon against this handsome concession in the interest of peace and steady employment at higher pay.

"Every good citizen must join in the hope that the contract may be speedily ratified. Its importance goes far beyond the immediate circumstances of the case, for it carries an earnest of what wise employers may do in the way of forestalling strikes through fair and even generous terms of wages and working conditions. Riotous agitators sometimes find in greedy employers their most effective allies."

COMMISSIONER MAKES PLEA FOR PORTLAND COMPANY

The Public Service Commission of Oregon has recently completed an exhaustive investigation into the affairs of the Portland Railway, Light & Power Company. Among its studies was an appraisal of the property of the commission. The conclusions reached on this phase of its study were published recently in the ELECTRIC RAILWAY JOURNAL. That the efforts which the company is making to meet the requirements of the territory which it serves and the adverse conditions under which it is working are appreciated by the commission is instanced by remarks made by Thomas K. Campbell not speaking formally as a member of the commission, but telling the results of information gained from a three-year study of the situation. Commissioner Campbell is quoted by the Portland *Journal* as follows:

"The Portland Railway, Light & Power Company, if conditions do not change for the better, will be compelled in a short time to come to the Public Service Commission for relief. I hold no brief for the company. I am simply stating conditions as they exist. The company is giving as good or better, service, than any other similar company in the United States.

"You can ride 18 miles for a nickel and the people of Portland have been getting that service for the last year or more, furnished to them at a loss by the company. Jitney competition is costing the company $1,500 a day, taken from the cream of the company's business. Light and power competition is taking the cream of that classification of the company's service out of the downtown district. Twenty cents out of every dollar of gross revenue earned by the company is paid to the city and county governments for bridge tolls, street improvement assessments and similar charges.

"The city either cannot or will not, regulate the jitney operation, with the result that the cream of the close-in traffic is handled by the jitney, which pays no tolls for bridge or street use, and gives no revenue to the city.

"The result of this is that the company is, and has been operating at a loss, even figured on the basis of valuations allowed by the commission. The outcome will be, in my opinion, that the company will be forced to come to the commission for relief. I do not know whether that will mean a readjustment of transportation charges by the establishment of zone rates, or some other change. That is a question for the future, and a serious one. It would be a serious step to charge more than 5 cents for street car fare from the suburban districts of the city. It would mean a serious depreciation of property values outside the 5-cent zone and great loss to the people who have purchased property in those districts.

"I do not want to hazard a statement of what may come in the future. I am only stating what appears to me to be the facts, from knowledge gained from the investigations that have just been concluded."

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COST OF DUAL SYSTEM IN NEW YORK WILL EXCEED ESTIMATES

The Public Service Commission for the First District of New York has sent to the Mayor and the Board of Estimate of New York City a report prepared by Commissioner Whitney and Chief of Rapid Transit Harkness, which shows that the total cost of city-owned lines in the dual system will exceed by some $22,000,000 the cost as estimated in March, 1913, when the dual system contracts were signed. The appropriations made in March, 1913, indicated a total cost of municipal lines to be operated by the Interborough at $101,602,000, to which the company was to contribute $58,000,000. The estimates as of March 1, 1916, however, put the total cost at $125,902,000, of which more than $10,271,000 is estimated. It is pointed out, however, that the actual construction work is $1,309,000 less than the original estimate and it is expected that the resale of surplus property will show a balance in favor of the city of over $500,000. The interest charges, however, have run way ahead of the original estimates partly because interest was not estimated for the full period and because work could not be completed in the time anticipated. The excess will amount to some $6,250,000. The additional amount required for the Interborough Rapid Transit Company municipal lines will be in the neighborhood of $4,350,000.

In the case of contract No. 4 for the Brooklyn Rapid Transit system, the total cost of municipal lines was put at $114,002,000, of which the company was to contribute only $13,500,000. The construction cost for these lines will probably exceed the estimated cost by $8,298,000 and the item of excess interest will be $4,109,000 and excess real estate cost $5,128,000. It is pointed out in the report that the excess cost is due largely to the increased prices of material and labor since the European war.

Including the amount to be expended while third-tracking the Second, Third and Ninth Avenue lines and building certain extensions, the Interborough Rapid Transit Company was to expend some $47,000,000 and a similar amount was to be supplied by the Brooklyn Rapid Transit Company, making a grand total, as estimated in March, 1913, of some $330,000,000. It is said now that if the Interborough Rapid Transit Company and Brooklyn Rapid Transit Company have kept within their original estimates for company-owned lines, the grand total of the cost of the dual system will still be in excess $350,000,000.

HEARINGS ON PROPOSED NORFOLK FRANCHISE

The Councils of Norfolk, Va., met on July 6 as a committee of the whole to consider the proposed franchise to the Virginia Railway & Power Company. Several persons spoke in opposition to the franchises as they now stand. The principal objections were to the abrogation of the 2½-cent labor tickets, the fact that tickets are not to be sold on the cars for three years, the placing of electric lighting rates in the franchise, the clause limiting the operation of another company over the tracks of this company to 500 yards, the clause providing for conditions under which extensions of track into new territory should be made and the provisions allowing the city to receive taxes on total gross earnings, both in the county and the city. It was also urged that a provision be inserted in the franchise to regulate the issuance of securities. The question of a reduction in gas rates is also involved, and the committee appointed some time ago to go into this matter will meet some time next week. The paragraph regarding extensions of track, to which objection is made, is in substance as follows:

"That the parties desiring such extension of lines shall guarantee that the earnings thereof shall be sufficient to pay the operating expenses through the term of the franchise under which it is built and shall agree to pay to the company annually the difference between the revenue and the operating expenses, if said extension does not earn its expenses. It is further provided that in the event it shall be necessary to construct a bridge or viaduct or to make a fill or cut in excess of 3 ft. in depth, the parties desiring the extension shall agree to guarantee the operating expenses and the interest at the rate of 6 per cent on the cost of such bridge, viaduct, fill or cut. The parties desiring the extension are required to execute a bond to make g their guarantee."

A resolution was finally passed appropriating $2,500 which to employ an expert to advise Councils on all ma involved in the franchises.

POWER AND NEW CAR QUESTIONS CONSIDERED AT CLEVELAND

At a meeting of the Council committee on street railways at Cleveland on July 10, Commissioner of Light and Heat Davis urged that the municipal electric plant be extended sufficiently to furnish the additional power needed by the Cleveland Electric Railway. J. J. Stanley, president of the railway, and the engineers of the company expressed the opinion that it would be more economical to spend $250,000 for enlarging the company's Cedar Avenue power plant. Mr. Davis had estimated that it would require an expenditure of $1,750,000 to enlarge the municipal plant to take care of this business. He insisted that the city be allowed to quote a rate to the company based upon the switchboard cost. Mr. Stanley said the additional power would be needed within six months and it will be impossible to make the necessary addition to the municipal plant within that time.

The committee authorized the purchase of fifty additional trail cars. Half of them will be made in the railway's own shops and the others are to be made by a private company. They will cost about $3,000 each. Mayor Harry L. Davis suggested that the company make all of its own cars, but Engineer Joseph Alexander stated that the capacity of the shops was not sufficient to make deliveries in time, as the cars were needed at once.

At a conference on the East Cleveland franchise matter on July 5, A. L. Graham, director of public service of that suburb, demanded three-minute service to Windermere and six-minute service to points beyond on both Euclid and Hayden Avenues. President Stanley agreed with him, but Street Railway Commissioner Sanders said that four- and eight-minute service, the same as at present, would be the best that could be done. It is improbable that East Cleveland will agree to a 5-cent fare without an improvement in the service.

QUEENS LINES TO OPEN IN DECEMBER

Dec. 15 next has been set by the Public Service Commission for the First District of New York as the probable date for the opening of the new Queens rapid transit lines, consisting of two elevated routes to be jointly operated by the Interborough Rapid Transit Company and the New York Municipal Railway Corporation. One line terminates at Ditmars Avenue, Astoria, and the other at Alburtis Avenue in Corona. They will furnish rapid transit service to the whole northern section of Queens Borough. The decision to open the Queens lines on Dec. 15 was made at a conference held on July 5 at the offices of the commission, and attended by members of the commission, Mayor Mitchel and members of the transit committee of the Board of Estimate and Apportionment, and officers and other representatives of the Chamber of Commerce of the Borough of Queens. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, was one of the conferees. It was also agreed at the conference that it may be possible to open the extension of the Queensboro subway from the Hunter's Point Avenue station, its present eastern terminus, through to the Queensboro Bridge Plaza station by Nov. 1 next. It was also stated that the connection between the Queensboro subway and the Grand Central station will be ready for use by the end of August. This latter fact means that the walk of some 900 ft. now necessary between the Grand Central subway station at Forty-second Street and Park Avenue and the present western terminus of the Queensboro subway between Lexington and Third Avenues on Forty-second Street will be obviated. It was pointed out at the conference that it might have been possible to open the Queens lines this fall except for the delays arising through the difficulty of obtaining various materials both for construction and equipment. These delays have largely been due to the freight embargo and shipping difficulties caused by the European war.

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Strike Declared in El Paso.—The trainmen in the employ of the El Paso (Tex.) Electric Railway, which operates in El Paso and in Juarez, Tex., went on strike on June 29. The men are demanding higher wages, with shorter hours and other changes in conditions under which they work.

Strike in Portland.—Conductors, motormen and linemen to the number of 350 employed by the Cumberland County Power & Light Company, Portland, Me., went on strike on July 12. The strike was precipitated by the company ignoring a written demand for the reinstatement of men who had been discharged for cause.

Companies Must Pay for Ludlow Viaduct, Cincinnati.—The Court of Appeals at Cincinnati, Ohio, has affirmed the decisions of the lower courts to the effect that the Cincinnati Traction Company and the Cincinnati Street Railway must pay to the city of Cincinnati $61,220 as their portion of the cost of the Ludlow Avenue viaduct.

United Railroads' Injunction Hearing Postponed.—The hearing on the application of the United Railroads for a permanent injunction to prevent the city of San Francisco from laying car tracks of the municipal line on Market Street at Van Ness Avenue has been postponed, and it is expected that either Aug. 15 or Aug. 22 will be set by Judge Van Fleet as the date of the hearing.

Progress of Trenton Arbitration. — Clifton Reeves, the third arbitrator selected by the Trenton & Mercer County Traction Corporation, Trenton, N. J., and the union of employees, has announced that all cases of the men discharged by the company for alleged sniping of fares will be settled within a few days and that he will publicly announce the decision. On July 12 it was said that nearly all of the testimony was in and that only a few details were to be completed before the result is known.

Electrification of Short Pennsylvania Line Reported Proposed.—The Quakertown & Delaware River Railroad, running from Quakertown to Riegelsville and passing through the towns of Springtown, Richlandtown, Pleasant Valley, Durham, Durham Furnace, Wittee, Passer and Pullen, Pa., for a distance of 15 miles, has been sold at auction to John M. Buckland, Allentown. The railroad has a 60-ft. right-of-way all along its route. Gasoline cars have been in use on the road, but it is reported that the line will now be electrified.

Auto Companies Protest Against Proposed Railways.—Protests were heard on July 11 by the Pennsylvania Public Service Commission against the incorporation of the Womelsdorf, Richland & Myerstown Street Railway and the Newmanstown & Sheridan Street Railway, which seek to operate in Berks and Lebanon Counties in territory covered by certain auto bus companies. The auto companies allege that the granting of the franchises will injure their business and fail to improve public service in the territory named.

West Virginia Company to Purchase Power.—The Charleston (W. Va.) Interurban Railroad has closed a contract under which the Virginian Power Company will furnish it power for a period of ten years, amounting to about 15,000 kw.-hr. per day. This will add a load of about 1000 kw. at the Virginian Power Company's central station at Cabin Creek Junction, W. Va. The railway operates 38 miles of line, including interurban lines to St. Albans and Cabin Creek Junction, where the power company's plant is located.

Toledo Franchise Plan Nearly Completed.—Henry L. Doherty was asked the latter part of the week ended July 8 to meet with Mayor Milroy's committee on July 12 and 13 to consider the final details of the community plan. Three plans have been prepared so far by Judge Ralph D. Emery in collaboration with Chairman Johnsson Thurston of the committee, Secretary E. P. Usher and Mr. Doherty. At a meeting on July 7 these plans were discussed by the full committee and it was then believed that matters were in such shape that the final detail could be taken up during the week ended July 15.

40,000 Men in Atlanta Preparedness Parade.—Practically every man that the Georgia Railway & Power Company, Atlanta, Ga., could spare marched in the preparedness parade at Atlanta on July 4. In all about 1000 men from the company participated. Technical societies of Atlanta composed one section of the parade with more than 200 men participating, including electrical, chemical, civil and architectural engineers. More than 100 employees of electrical dealers and contractors also took part. The number in the Atlanta parade approximated 40,000. It is said to have been the largest preparedness parade in the South.

United Railroads Offers $5,000 Reward for Dynamiters.—Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., has announced that a reward of $5,000 will be paid for information leading to the arrest and conviction of the person who dynamited two towers on the line which brings power to San Francisco for operating the United Railroads. About two weeks ago two towers on the Sierra & San Francisco transmission line which traverses San Mateo County were dynamited during the night. The damage was promptly discovered and the steam auxiliary stand-by station in San Francisco was started up in time to prevent any interruption to service in San Francisco.

Philadelphia Transit Appropriation Bills Signed.—Mayor Smith of Philadelphia, Pa., has signed the loan appropriation ordinances for the rapid transit subway and elevated roads and also the ordinances for the letting of contracts for building the new transportation facilities. The Mayor said that work on the Broad Street subway and the Frankford elevated will be continued, but that there might be some delay in beginning work on any other section of the system. A conference of the representatives of the city on the board of directors of the Philadelphia Rapid Transit Company and of the officers of the company will be called to discuss further the negotiations for the leasing by that company of the new lines as they are constructed.

Reasons for Non-Construction Discussed in Seattle.—To discuss ways and means of effectively breaking the existing deadlock between the city of Seattle, Wash., and the Puget Sound Traction, Light & Power Company over the issue of construction of new lines in districts where additional trackage is needed, a general city meeting was called for July 17 by all civic improvement clubs of the city. A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, has offered committees from the various civic improvement clubs free access to the corporation's records to prove that the earnings of the company are unremunerative under the unregulated jitney transportation, and that the earnings do not warrant further expenditure of capital. The company has placed before the committees the flat issue of more street car lines under regulation of jitney traffic, or a continuance of the no-building policy of the company under the present unrestricted and unregulated operation of competing jitney lines.

PROGRAMS OF ASSOCIATION MEETINGS

New England Street Railway Club

The outing committee of the New England Street Railway Club decided to hold the annual ladies' day at Lake Pearl, Wrentham, Mass., one of the most beautiful spots in New England, on July 14. The park covers 25 acres of splendid pine groves, hills and valleys and borders a lake 2 miles in length with picturesque bays and inlets, and dotted with wooded islands. Every opportunity was presented for one of the most satisfactory outings in the history of the club.

Railway Signal Association

This year's meeting, the twentieth of the Railway Signal Association and the eleventh of the Signal Appliance Association, will be held at the Grand Hotel, Mackinac Island, Mich., on Sept. 12, 13 and 14. Hotel reservations may be made to C. C. Rosenberg, secretary Railway Signal Association, Bethlehem, Pa. There will be no official exhibit, but if any manufacturer wishes to show some device in his room or other place the committee will aid him as much as possible. The arrangement committee has provided for a special train from New York, over the New York Central and the Michigan Central Railroad, to Mackinaw City, and a special train from Chicago, over the Michigan Central and Grand Rapids & Indiana Railroad, to Mackinaw City.

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Financial and Corporate

ANNUAL REPORT

Portland Railway, Light & Power Company

The comparative income statement of the Portland Railway, Light & Power Company, Portland, Ore., for the calendar years 1914 and 1915 follows:

	1915		1914	
	Amount	Per cent	Amount	Per cent
Gross earnings	$5,511,345	100.00	$6,273,171	100.00
Operating expenses	2,542,278	46.13	2,695,356	42.97
Net earnings	$2,969,067	53.87	$3,577,815	57.03
Taxes	$531,351	9.64	$568,527	9.07
Bridge rentals	47,752	0.87	45,198	0.71
Interest	2,160,603	39.20	2,127,480	33.91
Total fixed charges	$2,739,706	48.71	$2,741,205	43.69
Surplus	$229,361	4.16	$836,610	13.34

During 1915 the gross earnings of the company showed a decrease of $761,826 or 12.1 per cent as compared to the 1914 results. The operating expenses, however, dropped off only $153,078 or 5.7 per cent, so that the net earnings decreased $608,748 or 17 per cent. The tax payments showed a decrease of $37,176 or 6.5 per cent, but this was almost offset by increases of $2,554 or 5.07 per cent in bridge rentals and $33,123 or 1.5 per cent in interest charges. The net income, therefore, suffered a loss of $607,249 or 72.6 per cent.

The showing noted above was indicative of the distressing conditions under which the property was operated during the year. These conditions in the order of their importance were as follows: (*a*) General business depression prevailing in Oregon and Washington, especially acute in the western half of these States, covering the territory in which the company operates. (*b*) Unlicensed and unregulated jitney competition beginning immediately after Jan. 1, 1915, and continuing throughout the year without restrictions or regulation of any kind. (*c*) Continued electric light and power competition from the Northwestern Electric Company.

The general depression in business in the Pacific Northwest was more pronounced during almost the entire year than in any other portion of the United States, this condition being strikingly in contrast with the sharp renewal of activity in the Eastern and Middle States. The lumber business suffered not only from lack of business due to small demands of railroads and to decreased building activity, but also from the inability of mills to secure ocean tonnage for coastwise or foreign shipment, owing to the withdrawal of ships from the Pacific to meet more urgent demands elsewhere. Since Jan. 1, however, demands from railroads for ties and car-building lumber have been received freely, and lumber orders and inquiries from the interior and California points have also steadily increased. The improving conditions in lumber will directly benefit the company through increased freight tonnage on its interurban lines and through the general business improvement naturally following a revival of this chief industry.

The effects of the jitney competition are shown by the decrease in gross earnings of the railway department of $492,000, and the net earnings of $419,000, a very large part of which was due to the jitneys. The number of passengers carried in 1915 was 78,704,913 as compared with 89,934,644 in 1914. Commencing with Feb. 1, 1916, jitneys were required to secure licenses from the city, but the enforcement of the ordinance up to date has not materially reduced the number of jitneys. There has been, however, a reduction of approximately 25 per cent in their number since November, 1915, which is attributed to lack of patronage, possibility of securing other employment and a gradual realization on the part of the jitney drivers that the business is unprofitable even without effective regulation.

During January and the first week of February, 1916, Portland suffered from a succession of snow and sleet storms and floods, which seriously affected the earnings of the company, and added greatly to the operating expenses. Since Feb. 8, however, there has been a steady improvement in street railway earnings, averaging about 6 per cent above the previous year, and it is believed that the stockholders may reasonably expect each of the following months of 1916 to show increases of street railway earnings over the corresponding months of 1915.

In the light and power department the competition of the Northwestern Electric Company continued throughout the year at somewhat lower rates. The loss in gross earnings from light and power business was due entirely to this competition, but attention may be called to the fact that the decrease amounted to $229,500 in the first six months of 1915 as compared to 1914, and to only $21,500 during the last six months of 1915. In November and December, 1915, there were small increases in gross earnings as compared to 1914.

The capital expenditures for 1915 were the smallest in the history of the company. Aside from the payment of $8,500 for railway rights-of-way on the river line, settlement for which had been held up for several years, expenditures were confined to construction necessary to serve new customers and to betterment work required by city ordinances. Expenditures chargeable to property accounts during the year totaled $212,371, divided as follows: Railway extensions and improvements, $65,046; power plants, substations, etc., $21,995; customers' installations, $72,740; gas generating plant, $6,573; real estate and buildings, $45,543, and miscellaneous, $471. There were no additions to rolling stock. Railway trackage was slightly increased, the mileage owned and operated now being 299.2 on a single-track basis. In addition the company operates 11.8 miles of track owned by other interests.

NEW COMPANY INCORPORATED CONSOLIDATING STRICKLAND LINES

The charter of the Texas Electric Railway, with a capital stock of $10,500,000, has been filed with the Secretary of State of Texas. The Texas Electric Railway consolidates under one head the Texas Traction Company, with an authorized capital stock of $3,000,000, and the Southern Traction Company, with an authorized capital stock of $7,500,000. Stock to the amount of $10,000,000 had previously been issued by the companies.

The Texas Electric Railway takes over the lines of the companies mentioned, from Denison in Ellis County, through Sherman in Grayson County, McKinney in Collin County, Dallas in Dallas County, southeasterly to Ferris in Ellis County, Corsicana in Navarco County, southwesterly to Lancaster in Dallas County, Waxahachie in Ellis County, Hillsboro in Hill County and Waco in McLennan County. It further provides for the construction of such lines as necessary to connect the route from Dallas to Waco with the lines from Dallas to Corsicana. Extensions provided for are from Waco, in McLennan County, to Houston in Harris County, and from Waco to San Antonio in Bexar County through Austin, the State capitol. The company will also operate the local lines in McKinney, Bonham, Paris, Denison, Sherman, Waxahachie, Corsicana and Waco.

The new stock consists of 105,000 shares at $100 each. Fifteen thousand shares are first preferred, 30,000 are second preferred and 60,000 are common stock. It is stipulated in the charter that first preferred stock shall bear 7 per cent yearly dividends as a maximum allowance. The dividends are cumulative. Similarly, second preferred stock will bear a 7 per cent maximum dividend. First and second preferred stocks are subject to redemption at the option of the company upon any dividend date at 115 per cent of par plus any dividend accruing at that date. In case of dissolution the first preferred is paid par value plus apportionment of dividends, and then second preferred is paid par value plus dividend if any, and the balance is apportioned among the holders of the common stock.

There are twenty-one directors in the company: J. F. Strickland, A. A. Jackson, R. B. Stichter, Osce Goodwin, and H. B. Templeton, Dallas; George W. Bowman, Plano; W. R. Brentz and C. B. Dorchester, Sherman; J. L. Lovejoy, McKinney; S. D. Moore, Van Alstyne; W. B. Munson, Denison; R. L. Waddell, McKinney; W. W. Batchler, Ferris; F. L.

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Drane, Corsicana; W. D. Lacy, W. J. Neale and W. W. Sealey, Waco; J. L. Penn, Waxahachie; A. L. Smith, Hillsboro, and S. N. Powell, New York.

A meeting of the directors and stockholders of the Southern Traction Company and the Texas Traction Company has been called for July 18 in Dallas, when the merger will be formally and finally ratified.

REPORT TO MEXICO BONDHOLDERS

Review of Report of Messrs. Phippen and Trowbridge, Who Visited Mexican Properties

Copies of the report of F. H. Phippen, Toronto, Ont., and E. D. Trowbridge, Detroit, Mich., to the National Trust Company, Ltd., London, England, trustee for the holders of the bonds of the Mexico Tramways, Mexican Light & Power Company, Ltd., Mexican Electric Light Company, Ltd., and the Pachuta Light & Power Company have been received in the United States. Messrs. Phippen and Trowbridge visited Mexico recently in the interest of the bondholders of the company at the request of the trust company. On their return they made a report on the properties, with important recommendations. As a result a joint meeting of the holders of the bonds of the companies previously mentioned was called to be held in London on July 14 to consider and decide upon the policy to be adopted for the protection of the interests of the bondholders until conditions in Mexico improve. The enterprises covered by the report are commonly known as the Pearson Mexican electrical enterprises. They are all inter-related, and in a large measure are interdependent.

After a review of early history the report says:

"The business continued in a flourishing state until 1913, when it was somewhat affected by a fall in exchange rates due to the disturbed political conditions of the country. In 1914 there was a further collapse in exchange, which badly affected the company's finances and since then the history of the business has been involved in the general turmoil.

"Following a strike in September, 1914, the tramways were seized by the Mexican Government. Since seizure the tramways system has been operated by the factions from time to time in power. The authorities have had three acting managers of the system. Under the first two much of the rolling stock went out of commission through neglect in making repairs, but of late there has been considerable improvement in this respect, not only in keeping up the rolling stock used but also in repairing stock whch had been placed out of condition. Recently, moreover, considerable track repair work has been done.

"In August, 1915, the military authorities operating the tramways made an increase in fares amounting to about 60 per cent of the concession tariffs. This increase afforded some surplus above payrolls and ordinary working expenses (power excluded). The surplus has been largely applied to repairs of cars and tracks. The minimum under the increased tariffs was 10 centavos, which—at the time the tariff was put in effect—was equivalent to 0.6 of 1 cent gold or 0.3 of 1d. Due to the fall in exchange, however, this minimum fare, which covers practically all the purely urban traffic, had fallen, at the time we left Mexico City, to the equivalent of 0.2 of 1 cent gold, or 0.1 of 1d.

"While it would appear ridiculous to attempt the operation of tramways on any such fares, it must be remembered that payrolls are on a correspondingly low scale. The average pay of 3000 employees—motormen, conductors, etc.—is at present 3.30 pesos (6.6 cents gold) a day. Another vital factor in the low relative operating cost is the frightful overcrowding of cars. This is best shown by the fact that the income from passenger service in December, 1913, was 567,000 pesos, with 233 cars operated. Assuming that the average fare had been increased 60 per cent, the revenue would in the same month have been 907,000 pesos. It was in fact 828,000 pesos with 111 cars operated. In other words more than 90 per cent of the normal fares were collected, with less than one-half of the number of cars operated.

"Since September, 1914, nothing has been paid for power. The Mexican Light & Power Company's contract to supply power is on a gold basis. Without doubt, the Mexican Light & Power Company was fully justified in supplying this power without receiving present payment. Insistence on payment would have suspended the tramway service. This would have meant demoralization of working conditions in Mexico City and might possibly have resulted in the Government taking over and operating the power plant as it did the tramways. Besides there was no other available market for the power."

In regard to general conditions the report says in part:

"When we left Toronto we were of the opinion that great damage had been done to the physical properties of the companies, particularly to those of the tramways. We were pleased to find, however, that these reports were much exaggerated. The most serious part of the situation, so far as the companies are concerned, is the fall which has taken place in the value of the peso. In the normal times a peso was approximately worth an ounce of silver or 50 cents. As a peso was 100 centavos this value was usually spoken of as a 2 to 1 basis. At the time we visited Mexico the value of the peso had depreciated so that $1 would buy 27 pesos. When we left Mexico three weeks later, it had further depreciated until more than 50 pesos could be obtained in exchange for one American dollar. As the principal part of the companies' supplies must be purchased on a gold basis, the result has been disastrous to their enterprises. Naturally, it has been impossible to advance wages so as to take care of the decreasing value of the currency. The prices of commodities have gone up almost to a gold basis. This has resulted in a disorganized condition of affairs and has been disastrous to net earnings.

"In spite of the conditions which have prevailed, the legal status of the companies has not been affected. The obligations imposed by the concessions have been carried out, all taxes have been duly paid, and as a whole the record in this respect is clear. It appears reasonably certain, however, that the Mexican peso will not for many years go back to anything like its former value. If this assumption be correct, it may become essential to negotiate modifications of the various concessions. At the moment, however, it is obviously unwise to attempt anything of this kind."

As explained before, the lines and other property of the Mexico Tramways were seized in 1914, and have since been operated by the military authorities of the Federal District. On different occasions the Mexican authorities demanded that the company appoint a representative to take back its property. Part of the mission of the representatives of the bondholders was to meet the authorities and ascertain what terms and guarantees could be negotiated, protecting the company, if the property was accepted. On their arrival in Mexico City Messrs. Phippen and Trowbridge notified General Pablo Gonzalez, the Military Governor of the Federal District, that they were prepared to discuss matters with the authorities. In regard to their conference with Messrs. Sarabia and Fuentes, the appointees of the government, Messrs. Phippen and Trowbridge say in part:

"We made it clear that in taking back the property several essential points should be settled. The first and most important was that the return must be made under conditions which would permit the company to operate without any violation of the conditions imposed by its concessions. As the minimum rate of fare in the concessions is 6 centavos, the charging of a 10-centavo fare (established last August by the Government authorities) would be in excess of the legal rate. Moreover, we pointed out, it was quite apparent that even the 10-centavo rate would be insufficient, partly because of the fall in exchange and partly because of the need of some considerable surplus with which to buy necessary materials for repairs. Furthermore, inasmuch as a considerable part of the rolling stock was not serviceable (due to lack of materials for repairs), it was clear that it would be impossible for the company to furnish a full service at once. We urged that it would be necessary:

"1. To raise the fare sufficiently to enable the company to increase the wages of its employees, to pay for necessary equipment and track repairs, to place the property in normal condition, to pay the interest on the underlying securities, and to pay a portion at least of its bill for power.

"2. To accept the property on the condition that the proper Government authorities would give the company a waiver against any violation of the franchise or concession terms as to rates of fare, etc., and a further agreement that the company would not be held responsible for any deficiency or service until normal conditions were restored.

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"3. To provide that nothing done under the agreement should in any way affect the company's concession rights.

"4. To provide for the return of all surplus moneys resulting from operation which the Government authorities might have on hand at the time of the return.

"5. To reserve to the company all of its rights for indemnity, whether due to destruction of property or to losses in earnings or otherwise due to faulty administration by the Government or to the forced acceptance of worthless paper currency issued by previous administrations."

The commission seemed disposed to treat the whole question in a fair spirit, and as the result of several conferences the points were agreed to with several exceptions.

In conclusion Messrs. Phippen and Trowbridge say:

"The net result of the negotiations as to the return of the tramway properties is therefore, briefly, that general bases for such return can be continued by the company at any time; that on the whole very friendly relations have been established with the Government authorities, and that for the moment the tramway properties continue to be operated by the military authorities, a condition which, in view of all existing circumstances, we consider at present safer and better for the property."

APRIL EARNINGS KEEP UP

Comparison of Electric Railway Returns Indicates Improvement in Gross and Net Over 1914 Results

A comparison of electric railway statistics for April, 1916, with figures for the corresponding month of 1915, made by the information bureau of the American Electric Railway Association, indicates a considerable improvement in the electric railway business in the United States. Returns for April, representing 5,536.38 miles of line of companies scattered throughout the country, show an increase in operating revenue of 10.36 per cent, in operating expenses of 6.49 per cent, and in net earnings of 17.01 per cent, while returns representing 3,877.07 miles of line indicate an increase in taxes of 6.53 per cent and in operating income of 16.79 per cent.

Of the three groups shown in the accompanying table the Eastern, represented by 2,996.91 miles of line, or about 50 per cent of the total mileage, shows an increase in operating revenue of 14.26 per cent, in operating expenses of 9.98 per cent and in net earnings of 20.62 per cent. Returns representing 58 per cent of the mileage show an increase of 4.42 per cent in the amount of taxes paid and of 21.47 per cent in operating income.

The Southern group, represented by 409.07 miles of line, had an increase in operating revenue of 15.67 per cent, in operating expenses of 4.93 per cent, and in net earnings of 39.54 per cent. Returns for about 60 per cent of this mileage show a very slight decrease in operating expenses, an increase in the amount of taxes paid of 7.07 per cent, and an increase in net income of 49.22 per cent. It must be borne in mind in this connection that the apparent large increase in net earnings and operating income is but a percentage one and does not exceed $40,000 in the first case and about $20.000 in the second. This is probably due to the small number of miles represented and is partly borne out by a comparison with similar figures for March.

Data for the Western group, represented by 2,130.40 miles of line, or about 38 per cent of the total mileage, indicate an increase in operating revenue of 4.88 per cent, in operating expenses of 2.68 per cent, and in net earnings of 9.38 per cent. Returns representing 90 per cent of this mileage show an increase in the amount of taxes paid of 8.10 per cent and in operating income of 10.81 per cent. The large percentage increase in the operating income of all three groups is probably not due so much to the improved business conditions of the current year as to the poor conditions of the past year and a comparison with figures for 1914, which are not available. might show poorer results.

All districts had a decrease in the operating ratio, that for the United States as a whole decreasing from 63.22 in 1915 to 61.01 in 1916. Of the three districts the Eastern had the lowest operating ratio and the Western the highest. In general the returns show almost no improvement over the preceding month and but slight improvement over the three months ended March 31, 1916, though, of course, they are not strictly comparable because of the difference in miles of line represented.

REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR APRIL, 1...

Amount	Companies Not Reporting Taxes: Amount in 1916	Companies Not Reporting Taxes: Per Cent Increase Over 1915	Companies Reporting Taxes: Amount in 1913	Companies Reporting Taxes: Per Cent Increase Over 1915
*United States**				
Operating revenues	$10,275,046	10.36	$7,004,145	8.88
Operating expenses	6,269,005	6.49	4,399,482	5.75
Net earnings	4,006,041	17.01	2,604,663	14.61
Taxes	.....	....	514,376	16.79
Operating income	.....	....	2,090,287	16.79
Operating ratio, per cent { 1915	63.22	....	64.67	....
Operating ratio, per cent { 1916	61.01	....	62.81	....
Miles of line represented	5,536.38	....	3,877.07	....
*Eastern District**				
Operating revenues	$5,724,627	14.26	$3,035,046	14.00
Operating expenses	3,292,643	9.98	1,802,302	11.29
Net earnings	2,431,984	20.62	1,232,744	18.17
Taxes	.....	....	210,578	4.42
Operating income	.....	....	1,022,166	21.47
Operating ratio, per cent { 1915	59.75	....	60.82	....
Operating ratio, per cent { 1916	57.51	....	59.38	....
Miles of line represented	2,996.91	....	1,751.24	....
*Southern District**				
Operating revenues	$428,053	15.67	$208,830	12.06
Operating expenses	267,854	4.93	124,284	*d*0.71
Net earnings	160,199	39.54	84,546	38.19
Taxes	.....	....	17,145	7.07
Operating income	.....	....	67,401	49.22
Operating ratio, per cent { 1915	68.97	....	67.16	....
Operating ratio, per cent { 1916	62.57	....	59.51	....
Miles of line represented	409.07	....	229.94	....
*Western District**				
Operating revenues	$4,122,366	4.88	$3,760,269	4.92
Operating expenses	2,708,508	2.68	2,472,896	2.36
Net earnings	1,413,858	9.38	1,287,373	10.20
Taxes	.....	....	286,653	8.10
Operating income	.....	....	1,000,720	10.81
Operating ratio, per cent { 1915	67.11	....	67.40	....
Operating ratio, per cent { 1916	65.70	....	65.76	....
Miles of line represented	2,130.40	....	1,895.89	....

NOTE.—Letter *d* denotes a decrease.

*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River, exclusive of Greater New York. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

CANADIAN STATISTICS FOR 1915

The annual report of the comptroller of statistics in regard to railway operation in Canada for the year ended June 30, 1915, reveals on the whole a year of growth for electric railways in the dominion, but a decline in gross and net earnings. During the statistical year 50.51 miles were added to the single-track mileage, bringing the total up to 2102.95 miles. The capitalization was increased from $147,585,342 in 1914 to $150.344,002 in 1915, an amount of $2,758,660.

Several electric railways did not send in reports for the year, and it was therefore necessary to use certain figures for the preceding year in order to complete the statistical statement. The following figures in regard to operation must be considered in the light of these omissions. For the last fiscal year the gross operating revenues amounted to $26,-922 899 as compared to $29,691,007 for the preceding year, a loss of $2,768,108 or 9.3 per cent. The greatest losses arose in passenger revenue, which fell off $2,301,639 or 10.9 per cent, and in freight revenue, which decreased $141,869 or 12.6 per cent. The operating expenses showed a much smaller decrease than did the gross revenues, the decrease being from $19,107,817 in 1914 to $18,131,842 in 1915, an amount of $975,975 or 5.1 per cent. Maintenance of way and buildings decreased $106,637 or 9.1 per cent, operation of cars $214,437 or 2.9 per cent and general expenses $207,132 or 10.1 per cent, but these decreases were partly offset by an increase of $110,794 or 4.0 per cent in cost of motive power. The operating ratio in 1915 was 67.40 per cent, this comparing with 64.36 per cent in the preceding year. For a number of years, it is said, the ratio of operating expenses to gross revenues has been increasing.

There were 562,302,373 passengers carried by electric railways in Canada in 1915 as compared to 614,709,819 in 1914. The freight traffic reached 1,433,602 tons as compared to 1,845,923 in 1914. The total passenger traffic was the lowest since 1912 while the freight total was the smallest since 1911. During 1915 the companies had 14.795 employees or 1556 less than for the preceding year. The salaries and wages bill for the year amounted to $10,781 199 as compared to $11,845,463 for the year preceding, the percentage of operating expenses in the two years being 59.6 per cent and 61.9 per cent respectively.

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SEPARATE RECEIVERS PROPOSED FOR SYRACUSE, LAKE SHORE & NORTHERN RAILROAD

Papers have been served by the lawyers representing the Columbia Trust Company, New York, N. Y., in the foreclosure proceedings under the mortgage of the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y. An order for permission to foreclose the mortgage was signed by Justice Leonard C. Crouch on June 24 on application of Davies, Auerbach & Cornell, attorneys for the Columbia Trust Company, which is trustee under the mortgage. The application was made by the Trust Company at the request of the bondholders' protective committee, of which James M. Gilbert is chairman.

An application for receivers to be appointed for the Syracuse, Lake Shore & Northern Railroad will be made on July 15. It is understood that the bondholders' protective committee will ask that C. Loomis Allen and Hendricks S. Holden, now co-receivers of the Empire United Railways, Inc., and the Rochester, Syracuse & Eastern Railway, be made receivers. The foreclosure and appointment of receivers will take the Lake Shore out of the Empire United receivership and it will be operated hereafter by the receivers for the benefit of the bondholders. The three properties will then be operated in three receiverships.

Bay State Street Railway, Boston, Mass.—William A. Read & Company, New York, N. Y., are offering for subscription at 81½ and interest $75,000 of Old Colony Street Railway 4 per cent first mortgage refunding gold bonds and at the same price $100,000 of Boston & Northern Street Railway 4 per cent first mortgage refunding gold bonds. Both issues are direct obligations of the Bay State Street Railway.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—Former Judge Benton S. Oppenheimer was appointed receiver of the Cincinnati, Dayton & Toledo Traction Company by Judge W. A. Geoghegan of the Common Pleas Court of Hamilton County at Cincinnati on July 6. This action was taken in the suit of the Cleveland Trust Company, Cleveland, Ohio, trustee for the bondholders. The bond was fixed at $10,000. The receiver is to be in charge as the representative of the court, receive all funds and make an effort to collect the rentals alleged to be due from the Ohio Electric Railway, lessee of the company's property.

Cincinnati & Columbus Traction Company, Cincinnati, Ohio.—Judge W. A. Geoghegan of the Common Pleas Court of Hamilton County, on July 6, appointed Attorney Richard C. Swing as special commissioner to sell the property of the Cincinnati & Columbus Traction Company under foreclosure and entry of sale made on July 5, when an agreement was reached by all parties concerned. The upset price had not been agreed upon at that time, but it will probably be between $850,000 and $950,000. The company's property was so badly damaged by the flood of 1913 that it was compelled to go into the hands of the Union Savings Bank & Trust company as receiver. While the road has more than paid operating expenses since then, the receiver found it impossible to pay the interest on the $750,000 of bonds or the dividends on the $1,500,000 of stock.

Grand Rapids (Mich.) Railway.—Harris, Forbes & Company, New York, N. Y.; Hodenpyl, Hardy & Company, Inc., New York, N. Y., and E. W. Clark & Company, Philadelphia, Pa., are offering for subscription at 99¾ and accrued interest $3,500,000 of Grand Rapids Railway first mortgage three-year 5 per cent gold bonds authorized by the Michigan Railroad Commission. The bonds are dated June 1, 1916, and are due June 1, 1919, but are redeemable as a whole at 101½ per cent and interest on Dec. 1, 1916, 101 per cent and interest on June 1 or Dec. 1, 1917, and 100½ per cent and interest on June 1 or Dec. 1, 1918. The bankers offering the bonds say that they are followed by $2,000,000 of 5 per cent cumulative preferred stock and $2,000,000 of common stock. Dividends have been paid on the preferred stock since the organization of the company in 1900 and on the common stock since 1906. The company is a constituent of the Commonwealth Power, Railway & Light Company, and is under the direction, supervision and management of Hodenpyl, Hardy & Company, Inc., and E. W. Clark & Company.

Kansas City (Mo.) Railways.—The last steps in closing the receivership of the Metropolitan Street Railway and the turning over of the property to the Kansas City Railways involved paying the receivers, attorneys and others who participated in the proceedings. The amounts of these payments are not to be made public. The city members of the board of directors of the Kansas City Railways were asked to secure the information. They responded that the city's interest began with the new company, and did not extend back to the proceedings under which the receivers and attorneys were paid.

Northern Electric Railway, Chico, Cal.—The California Railroad Commission has authorized the Northern Electric Railway, Marysville and Colusa Branch, to issue its demand notes for $25,000 at 6 per cent to take up similar notes to the First National Bank, San Francisco.

Shore Line Electric Railway, Norwich, Conn.—On June 29 stockholders' meetings of the various properties owned and operated by the Shore Line Electric Railway were held and in the case of the Shore Line votes were passed authorizing the purchase of the Norwich & Westerly Traction Company, the Groton & Stonington Street Railway and the New London & East Lyme Street Railway, and the stockholders of these companies voted to sell, the Norwich & Westerly Traction Company first having voted to buy the Ashaway & Westerly, which is now operated by the Norwich & Westerly Traction Company under lease. This means that when the transaction is confirmed by the Public Utilities Commission of the State of Connecticut, and the details of the transfer are completed, all the properties now operated from the office of the Shore Line Electric Railway will be owned and operated by the Shore Line Electric Railway.

Union Traction Company of Indiana, Indianapolis, Ind.—The Public Service Commission of Indiana on July 5 handed down a decision approving and authorizing the lease of the Muncie & Portland Traction Company to the Union Traction Company of Indiana. The petition setting forth the terms of the lease was filed about two weeks ago, as noted in the ELECTRIC RAILWAY JOURNAL of July 1, page 38. Under the terms of the lease as set out in the order of the commission, the Union Traction Company will pay 4 per cent on $1,389,500, with a further contingent sum equal to 2 per cent on that amount, such contingent sum to be dependent on the income of the entire system of the Union Traction Company of Indiana. The commission, in its ruling, orders the Muncie & Portland Traction Company to issue $500,000 par value of its preferred stock, bearing 4 per cent cumulative dividends, and when such stock is issued the company is directed to cancel an equal amount of its common stock. The order of the commission sets out that it finds the construction cost of the Muncie & Portland Traction Company to be $804,400, and the reproduction cost $1,000,000. The lessee, the Union Traction Company of Indiana, is directed by the commission to pay the interest on the outstanding indebtedness of the Muncie & Portland Traction Company.

Utah Securities Corporation, New York, N. Y.—The aggregate gross earnings of the operating subsidiaries of the Utah Securities Corporation increased 9 per cent and the net earnings 22 per cent during the year ended March 31, 1916, despite the unfavorable business conditions prevailing during the first three months of the period. Of the year's total gross increase of $426,160, all but $81,720 was made in the last six months of the year, and of the year's total net increase of $482,135 all but $151,280 was made in the last six months. The gross earnings of the Utah Light & Traction Company, which operates the street railway property in Salt Lake City and vicinity, were $1,420,887 for the year, with operating expenses and taxes at $945,163, so that the net earnings amounted to $475,724. The total income was $837,541 and deductions were $812,165, leaving a balance of $25,376.

Virginia Railway & Power Company, Richmond, Va.—At the annual meeting of the Virginia Railway & Power Company on July 20, the stockholders will be asked to approve an increase in the authorized amount of preferred stock from $8,000,000 to $9,000,000, the additional stock to be issued as required for improvements, extensions and betterments. The Virginia Railway & Power Company now has $7,698,400 of preferred stock outstanding.

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DIVIDENDS DECLARED

Chicago (Ill.) Railways, $8, series No. 1 participating certificates.

Cumberland County Power & Light Company, Portland, Me., quarterly, 1½ per cent, preferred.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-quarters of 1 per cent, preferred.

Green & Coates Street Passenger Railway, Philadelphia, Pa., quarterly, $1.50.

Holyoke (Mass.) Street Railway, 3 per cent.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

Public Service Investment Company, Boston, Mass., quarterly, 1½ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 75 cents, preferred.

Railway & Light Securities Corporation, Boston, Mass., 3 per cent, preferred; 3 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., May,		'16	$84,466	*$68,658	$15,808	$27,850	‡†$11,809
1 "	"	'15	77,502	*64,276	13,226	17,123	‡†3,763
11 "	"	'16	874,055	*736,374	137,681	229,695	‡†89,963
11 "	"	'15	872,665	*779,974	92,691	189,461	‡†95,235

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., May,		'16	$277,688	*$164,737	$112,951	$42,875	$70,076
1 "	"	'15	245,947	*151,170	94,777	37,821	56,956
12 "	"	'16	3,270,766	*1,923,814	1,346,952	498,200	848,752
12 "	"	'15	3,065,554	*1,846,344	1,219,210	467,975	751,235

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., May,		'16	$800,058	*$528,341	$271,717	$98,009	‡$196,284
1 "	"	'15	687,527	*455,724	231,803	104,963	‡163,237
11 "	"	'16	8,131,033	*5,552,890	2,578,143	1,082,657	‡1,748,165
11 "	"	'15	7,274,970	*5,265,413	2,009,557	1,087,674	‡1,174,493

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., May,		'16	$130,172	*$85,774	$44,398	$36,197	$8,201
1 "	"	'15	114,031	*74,255	39,776	36,055	3,721
5 "	"	'16	583,317	*397,598	185,719	181,576	4,143
5 "	"	'15	505,338	*356,429	148,909	179,918	†31,009

NEW YORK (N. Y.) RAILWAYS

1m., May,		'16	$1,192,035	$718,402	$473,633	$384,095	‡$134,426
1 "	"	'15	1,138,652	713,876	424,776	359,843	‡107,747
11 "	"	'16	12,543,455	7,658,356	4,885,099	4,094,829	‡1,304,603
11 "	"	'15	12,265,626	7,837,292	4,428,334	4,106,707	‡801,917

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m., May,		'16	$33,099	*$25,542	$7,557	$7,979	‡†$376
1 "	"	'15	32,228	*25,953	6,275	7,991	‡†1,676
11 "	"	'16	341,964	*277,338	64,626	87,919	‡†22,738
11 "	"	'15	340,795	*281,902	58,893	87,051	‡†27,746

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., May,		'16	$48,450	*$43,845	$4,605	$5,589	‡$348
1 "	"	'15	43,000	*41,199	1,801	$5,976	‡†2,641
11 "	"	'16	468,438	*513,318	44,880	$68,520	‡†96,012
11 "	"	'15	409,508	*476,640	†67,132	$69,584	‡†118,885

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., May,		'16	$422,045	*$256,154	$165,891	$49,690	$116,201
1 "	"	'15	323,323	*191,317	132,006	51,524	80,482
5 "	"	'16	1,940,627	*1,164,526	776,101	257,022	519,079
5 "	"	'15	1,424,674	*900,767	523,907	255,962	267,945

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., May,		'16	$445,223	*$256,694	$188,529	$181,925	$6,604
1 "	"	'15	446,149	*253,728	192,421	188,440	3,981
12 "	"	'16	5,457,872	*3,068,941	2,388,931	2,196,617	192,314
12 "	"	'15	5,794,271	*3,149,446	2,644,825	2,207,287	437,538

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., May,		'16	$493,296	*$354,687	$138,609	$118,579	‡$21,120
1 "	"	'15	404,576	*321,294	83,282	117,558	‡†33,435
11 "	"	'16	4,984,767	$3,755,615	1,229,152	1,279,909	‡41,624
11 "	"	'15	4,668,385	*3,629,383	1,039,002	1,296,807	‡†163,107

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m., May,		'16	$22,964	*$22,413	$551	$1,798	‡†$1,219
1 "	"	'15	22,644	*22,036	608	1,464	‡†836
11 "	"	'16	229,396	*234,514	†5,118	18,590	‡†23,399
11 "	"	'15	235,700	*246,828	†11,128	14,632	‡†25,635

*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad under guarantee, also interest on notes held by the New York, New Haven & Hartford Railroad, not credited to income of that company.

Traffic and Transportation

PRESIDENT SULLIVAN TESTIFIES

Bay State Fare Hearing Concluded—Fifty-six Days Presenting Testimony—Briefs to Go in Soon

Serious problems which the street railway industry is facing were clearly set forth by P. F. Sullivan, president of the Bay State Street Railway, at a hearing on July 5 on its petition to the Massachusetts Public Service Commission for approval of general fare increases. The competition of the private automobile, as well as the jitney, the growth of moving-picture shows, which draw their patronage mainly from local sources, and the greatly increased expenditures for taxes and for all materials, were described as hindering materially a return on investment.

Mr. Sullivan was under direct examination by James F. Jackson, senior counsel for the petitioners. After describing the advantage gained by the consolidation of the various roads which constitute the Bay State system, among which were the reduction of friction in communities where more than one company operated under the same stock control, with no transfer interchange, and the saving in accounting where formerly thirty sets of accounts were kept, Mr. Sullivan pointed out the competitive factors that have lately entered the field, notably the automobile and the "movies."

The company last fall made a census of its territory and found 26,054 automobiles registered therein, outside of Boston. Estimating the revenue diverted to privately owned automobiles at 10 cents a day, about $1,000,000 is accounted for per annum. This new element was first noted in 1906 or 1907. The company had been reckoning on a normal yearly increase of revenue of 5 or 6 per cent. It was found that 4 per cent was nearer the fact.

Jitneys came into the territory about April, 1915, and spread rapidly. Competition from this source amounts to $300,000 to $350,000 a year, ranging from about $500 a day in winter to $1,000 a day in summer. Regarding the future of the jitney, Mr. Sullivan said: "It is problematical. I feel that jitneys in some form or other will stay. All such matters are naturally progressive, and they will fluctuate from place to place. We now have more in the territory than we formerly had, whereas on the other hand, Fall River has fewer than it had a year ago. It looks as if any change would be from a small car operating in a 5-cent territory to a bus, which is a more serious competitor." Mr. Sullivan expressed the opinion that private automobile competition would increase.

In turning to the subject of the "movies," the witness pointed out that in suburban towns people who formerly patronized theaters now go to local picture shows. Much of the money formerly expended for park riding is thus diverted. People walk to the picture shows.

Taxation is a heavy burden on the street railways in the State. During Mr. Sullivan's service with the Bay State this item has increased from 2.5 per cent gross revenue to 7 per cent, the difference amounting to $400,000. Mr. Sullivan said:

"The cost of substantially every item that enters into the construction, maintenance and operation of the railway has increased."

On the subject of one-man operation, Mr. Sullivan pointed out that if the plan was adopted of operating one-man cars during the dull periods of the day and two-men cars in rush hours, little platform expense would be saved, as the company would have to have almost as large a list in reserve, and is now obliged to guarantee six hours' pay.

Mr. Sullivan considered the Arnold proposal to eliminate local carhouses and store the cars at a few centers to be impracticable, owing to the large amount of dead mileage which this would necessitate.

In referring to a proposed reduction in general expenses, Mr. Sullivan said three of the company's most valuable general officers had refused higher salaries from other corporations. The total amount of salaries of general officers, eliminating that of the president, is $74,600.

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The presentation of testimony was closed on July 7. The members of the board and opposing counsel were to confer on July 10 for the purpose of deciding when the arguments will be made and the order of the presentation.

Just before the hearing closed, Robert M. Feustel, expert for the company, submitted a number of new exhibits, bringing the total up to 102. The hearings have consumed fifty-six days, six of these being taken up by the company and the remainder by the remonstrants.

CHICAGO ELEVATED PROUD OF SAFETY RECORD

In the current issue of *The Elevated News* the Chicago Elevated Railroads calls the attention of the public to its unparalleled record of operation. This road has handled 1,200,000,000 passengers during the past eight years without a single fatal accident to a passenger on a train. Every week-day the elevated system handles upward of 500,000 passengers, and this record of safe operation is a source of gratification to the management and to the employees, and furnishes an incentive to try, with the co-operation of the public, to eliminate all minor accidents. Regarding this remarkable record, the Chicago *Herald* recently published the following editorial under the title "A Remarkable Achievement":

"The managers and employees of the Chicago Elevated Railroads are certainly entitled not only to feel some pride, but also to advertise the pride they feel, in the results of their efforts to carry safely all who use these transportation facilities. What these results are cannot be told better than in the words used in the advertisement:

"Eight years without one fatal accident! One billion two hundred millions of passengers—equivalent nearly to the entire population of the world—have been carried by the Chicago Elevated Railroads during the past eight years without a single fatal accident while on their trains.

"Such an achievement not only justifies pride, and the recognition it has received from safety organizations, but also should strongly impress upon the public mind the accompanying appeal for co-operation in the prevention and elimination of even minor accidents.

"Here is something which every user of the elevated trains can help to do for his own and his family's welfare, and for his fellow citizens' welfare, and for humanity, by just using reasonable caution and constant care. With the help of the public Chicago should win this year the Brady medal for electric railroad safety. But the managers and employees cannot do it without that help."

GEORGIA COURT REFUSES TO PREVENT RAILROAD COMMISSION FROM PROMULGATING JITNEY RULES

In its decision under the injunction proceedings brought by O. C. Long and others before Judge Ellis in the Superior Court at Atlanta, Ga., against the Railroad Commission to restrain that body from regulating the operation of jitneys the Superior Court of Georgia has refused to grant the injunction sought, and has affirmed the judgment. All judges concurred. The opinion was by Justice Beck. In the pleadings it was alleged by the plaintiffs that the Georgia Railway, Light & Power Company had filed a petition with the commission seeking to have it regulate the jitneys. In the answer of the commission it was set out that it had not prescribed rules and regulations, but was preparing a set of rules. Justice Beck says:

"We are of the opinion the court properly refused to grant an injunction in this case. No evidence was submitted at the hearing, but the sworn answer of the defendants showed that no rules or regulations affecting the business of petitioners had been passed or promulgated or were about to be enforced.

"The court properly refused to enjoin the commission from considering the rules and regulations set out in the exhibit to the petition. A court will not undertake in advance to enjoin one from considering whether or not he will perform a certain act.

"Should the Railroad Commission actually promulgate the rules which it proposes to consider and thereafter to enforce them or put them in form to be enforced, the question as to the power of the commission under the laws and the constitution to do this may be raised and revised."

The Railroad Commission has been awaiting the decision of the Supreme Court before proceeding further with the work of passing rules and regulations.

EXTRAORDINARY TRAFFIC INCREASES IN NEW YORK

The subway and elevated lines of the Interborough Rapid Transit Company and the surface lines of the New York Railways carried in June a total of 79,931,794 passengers—more than 2,664,393 a day. This represented an increase of 5,259,645 passengers for the month over June, 1915. The subway alone in June carried 30,202,401 passengers, receipts from whom were $1,508,130, an increase of 2,753,940 in passengers and $137,520 in revenue over June, 1915. The elevated lines carried 26,241,280 passengers with receipts of $1,310,973, an increase of 1,729,330 passengers and $86,290 in revenue. The increase in receipts from passengers for the elevated and subway combined was $223,810, or 9 per cent. These lines altogether carried 56,473,681 passengers, nearly 2,000,000 a day. To carry these 56,473,681 passengers in June the Interborough Rapid Transit Company operated on its different lines a total of 180,000 trains, or 6000 every day. Of the number of passengers carried, 1,250,000, approximately two-thirds, traveled between 7 a. m. and 10 a. m., and 4 p. m. and 7 p. m. During those periods trains were often run forty seconds apart. The New York Railways surface lines carried 23,488,113 passengers in June, an increase of 776,375. Receipts from passengers were $1,143,083, as compared with $1,106,615 for June, 1915. The subway and elevated lines in June used 2919 cars, and to man the trains, platforms, ticket agencies and switches, utilized the service of 4000 men. The surface lines had in service 1308 cars handled by 3200 motormen and conductors. Together all these transportation facilities gave employment in June to 7200 men. The total of wages for the 7200 men amounted to $680,000.

A MISDEMEANOR TO GIVE OR ACCEPT FREE TRANSPORTATION IN COLORADO

On July 3 the Public Utilities Commission of Colorado issued the following general order:

"Any person, public utility or corporation, or person acting as an officer, agent or employee of a corporation or utility, who furnishes or accepts free or reduced-rate transportation over or upon any line of railway of any public utility operating within the State of Colorado, in violation of subdivision A of Sec. 17 of the public utilities law of the State of Colorado, shall be deemed guilty of a misdemeanor and shall be punishable by a fine not exceeding $1,000 or by imprisonment in a county jail not exceeding one year, or by both such fine and imprisonment, in accordance with the provisions of Secs. 62, 63, 64 and 65 of the public utilities act of the State of Colorado.

"It is further ordered, that every person, public utility or corporation, or any person acting as an officer, agent or employee of a corporation or utility, who shall violate this order, shall be deemed to be in contempt of the commission, according to Sec. 66 of the public utilities act of the State of Colorado, and shall be punishable by the commission in the same manner and to the same extent as contempt is punished by courts of record."

Jitney Bus Increase in Los Angeles.—For the quarter ended June 30, 1916, the report of the license clerk shows a total of 517 jitney buses operating in Los Angeles, Cal. The total on April 1 was 489.

B. T. R. Aids War on Paralysis.—Through Miss Hester Jenkins of the department of social betterment of the Brooklyn Bureau of Charities arrangements were made for the distribution of more than 100,000 leaflets on infantile paralysis through the services of the Brooklyn Rapid Transit Company. The leaflets are printed in Yiddish, Italian and English.

Safety Committees in Norfolk and Richmond.—The Virginia Railway & Power Company, operating in Norfolk and

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Richmond, Va., has organized a general safety committee to investigate and make recommendations on all matters pertaining to the safety of the public and the employees of the company. The first meeting of the committee was held at Richmond on June 28.

Jersey City Jitney Bill Passed.—The City Commissioners of Jersey City, N. J., have passed an ordinance, based on the Kates law, requiring jitney men to file a $5,000 indemnity bond and pay a tax of 5 per cent of their gross earnings. It is said that certiorari proceedings to test the validity of the law will be commenced by George L. Record, counsel for the jitney men.

Head-on Collision at Youngstown.—An interurban car on the Youngstown & Sharon Street Railway, Youngstown, Ohio, carrying approximately forty passengers, and a work train bearing a dozen men met in a head-on collision on the afternoon of July 8 in a cut on the eastern outskirts of Youngstown. Thirteen persons, including three women, were injured; five seriously.

Safety Posters Carried on St. Louis Cars.—In connection with the safety campaign now being conducted by the United Railways, St. Louis, Mo., large posters, printed in white lettering on a green background, are carried on the dashboards of all cars. These posters are prepared and furnished to the railway by the safety committee of the St. Louis Business Men's League and they read as follows: "Make St. Louis the safest city. Safety first is thinking first."

More One-Man Car Permits.—The Puget Sound Traction, Light & Power Company, Seattle, Wash., has received permission from the City Council to operate one-man cars on the Summit and Twelfth Avenue lines. The Council has also granted the petition of the Western Washington Power Company to operate one-man cars on condition that two men be employed on the cars during rush hours, and the headway increased during other hours of the day. The Western Washington Power Company operates cars in Ballard.

San Diego Suburban Service Discontinued Owing to Jitneys.—The San Diego (Cal.) Electric Railway discontinued the operation of its cars over the San Diego & Southeastern Railway on June 26 between San Diego and National City, owing to a lack of jitney regulation by the board of trustees of National City. The San Diego & Southeastern Railway will operate the line on a reduced schedule. Construction work on the San Diego & Southeastern Railway across Sweetwater Valley to Chula Vista has also been suspended for the same reason, it is reported.

Right to Operate One-Man Cars Sustained.—The East St. Louis & Suburban Railroad, East St. Louis, Ill., has won its suit in the higher court for the right to operate one-man cars through the streets of Belleville, Ill. Circuit Judge Crow upheld the decision of L. E. Wangelin, a justice of the peace, and ruled that a recent ordinance could not supersede a franchise in which the one-man system was stipulated. Judge Crow ruled also that the power of legislating against corporations is now restricted by the public utilities act and is not vested in local authorities in a case of this kind.

Railway Folder of St. Louis.—The United Railways, St. Louis, Mo., has recently issued an attractive descriptive folder entitled "Trolley Trips In and Out of St. Louis," printed in black, green and orange. The folder opens so that at the center there is available for ready reference a tourists' trolley map of the city and its environs. This map is 16 in. wide by 13 in. high. At the time of the Democratic national convention in St. Louis the company inserted in the folder a map of the downtown section showing the relative locations of the convention hall and the leading downtown hotels.

Jitneys to Go on Franchise Basis.—Commissioner of Police Daly of Portland, Ore., has received from City Attorney LaRoche the first draft of a proposed ordinance to force all jitneys to operate on a franchise basis, doing away with the present system of independent operation on licenses. The measure as it stands sets forth that it is impracticable and impossible to regulate the jitneys under the present system so that they will give reliable or reasonable service and that for that reason they shall after a date to be fixed obtain franchises conditioned on assurances of a schedule of service to be kept up over routes to be specified by the City Council.

Working on Rearrangement of Spokane Owl Service.—H. L. Bleecker, vice-president of the Washington Water Power Company, Spokane, Wash., reports that R. A. Willson, general superintendent of the railway lines of the company, and E. E. Lillie, superintendent of the Spokane Traction Company, controlled by the Spokane & Inland Empire Railroad, have been assigned the work of rearranging owl car schedules on the parallel lines of the companies. Mr. Bleecker stated that nothing along the line of merging or eliminating parallel lines of the two companies was being considered at this time. The matter of joint action has gone no further than the consideration of owl car service.

Ruling on Muskogee Jitney Ordinance.—Operators of jitney busses in Muskogee won in part and lost in part in their contest of the ordinance recently passed by the City Council fixing a tax of $25 a month on each jitney in operation on the streets of Muskogee, limiting operation to certain prescribed streets and requiring a bond of $2,500 for each jitney operated. Suit for injunction against the city was filed by the jitney drivers, and Judge C. G. Watts of the District Court granted a permanent injunction against the city, restraining its officers from collecting the monthly tax of $25 on the ground that it was confiscatory, but upheld other features of the ordinance. Pending the time when they could make the required bond of $2,500 for each jitney operated, the drivers placed signs "Jitney Service Free," and operated on the donation plan.

Seattle Company Publication Quotes "Electric Railway Journal" Editorial.—Several company publications were quick to realize the availability and timeliness of the editorial which was published in the ELECTRIC RAILWAY JOURNAL of May 13 entitled "Strap Hangers Do Not Pay Dividends." One of the papers which made use of the information contained in the editorial was the Puget Sound Traction, Light & Power Company, Seattle, Wash. As *Electrogram*, the company publication, points out, one of the most common and reckless statements about the street railway business is that "dividends are in the straps." *Electrogram* tabulated in an effective way the cost of operating one extra car for one extra trip during the rush hour and the revenue from that extra trip on a route 7 miles long as given in the ELECTRIC RAILWAY JOURNAL.

Seattle Cars Must Be Heated.—The Public Service Commission of the State of Washington has entered an order stating that after Dec. 1 the thirty-eight cars of the Puget Sound Traction, Light & Power Company, operated on the Alki, Ballard Beach and Fauntleroy Park lines in Seattle, must be heated. On other cars of the system open places are to be provided with sash and glass, so that they can be closed. The commission has also directed that heating apparatus now installed in forty-seven cars operated by the company be removed and relocated so as to provide proper distribution of heat throughout the conveyance. Included among the orders of the commission are the following provisions: Not less than six heaters be installed in single-truck cars; not less than ten heaters in double-truck cars; glass windows to inclose open ends of cars during winter months; cars on long-haul lines, which include Alki Point, Ballard Beach and Fauntleroy, to maintain a temperature not lower than 40 deg. Fahr.

Skip-Stop Trial in Detroit.—The Council of Detroit, Mich., has consented to a trial of the skip-stop plan of operating cars of the Detroit United Railway on Woodward and Jefferson Avenues under the direction of the police authorities. The company has issued a statement in which it said: "At the outset we urge that the test be thorough and convincing. This means that it should be fair and without prejudice. We announce now, with all the positiveness at our command, that if it does not work out to the benefit of the public we do not want the plan continued. There has been no ulterior motive back of our long and urgent advocacy of the plan. We do know that the skip-stop plan is a time saver for the public where used in other cities; we do know that during the very brief trial of some months ago on Woodward

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Avenue, done at the request of the police department, it was a time saver in Detroit. If a more extensive trial does not make clear that the benefits greatly outweigh the objections we will be the first to throw up our hands and state that this, as one plan for alleviating transportation troubles in Detroit, is a failure. We have faith in it; but we may be wrong."

Louisville Traffic Rule Upheld.—In his instructions to the jury in a case against the Louisville (Ky.) Railway, Judge Thomas R. Gordon in the Jefferson Circuit Court, at Louisville, upheld the validity of a city ordinance which gives right of way at street intersections to vehicles crossing east and west. The case had to do with an accident at Third and Walnut Streets, and the court ruled that it was the duty of the man driving the automobile with which the street car collided "to give timely warning of the approach of his automobile by sounding his horn and to exercise ordinary care to permit the street car to pass across the intersection in front of him if he saw, or by the exercise of ordinary care could have seen, the approach of the car in time to have given it such opportunity" and that his failure to do so favored the defendant. The judge said that the time was fast approaching when the courts must act in an endeavor to require vehicle traffic to observe traffic regulations for the benefit not only of those who operate vehicles, but for the great mass of people who travel on foot. For that reason he felt it was his duty to do everything in his power to assist the city authorities in enforcing the ordinance.

Writ of Supersedeas in New Orleans Jitney Case.—The United States Circuit Court of Appeals has granted to the jitney men of New Orleans, La., a writ of supersedeas, which carries practical restraining force against the immediate enforcement by the city of the ordinance under which the jitneys went out of operation several weeks ago. Following this formality, the jitneys will operate until the three judges of the United States Circuit Court of Appeals for the New Orleans district meet and render a decision on the legality of the ordinance passed by the city. During the interim the jitneys will have the right of operation. The writ of supersedeas was issued by the judge whose residence is Huntsville, Ala. The procedure upon which the writ was based was somewhat similar in character to that upon which appeal was made to Judge Foster of the United States District Court at New Orleans. It was recited that the rights of one F. Lutze, a jitney operator, had been infringed upon, since he is a native of Germany and a subject of the Kaiser. The attorneys claimed in behalf of Lutze violation of treaty rights between the United States and Germany, said rights supposedly guaranteeing to every German subject resident in the United States the free and unhampered use of his property. The writ of supersedeas is only applicable to Lutze and several co-appellants.

Service Reduced in Seattle.—On June 26 the Puget Sound Traction Light & Power Company, Seattle, Wash., adopted a new schedule involving material reductions in service on the Capitol Hill line. *Electrogram*, published by the company, in commenting on the change in schedule said: "For two years past the receipts on the Capitol Hill line have been declining. During that time the service has been increased. It finally became evident that the service was much greater than the patronage of the line warranted. The necessary reduction of service was therefore effected. The following figures speak for themselves. The receipts of the Capitol Hill line in May, 1914, were $11,384; in May, 1915, $7,747, and in May, 1916, $7,411. The receipts of May, 1916, were 35 per cent less than for the same month two years ago. At the same time the service had been increased 11.7 per cent. The company could not continue operating under those conditions, hence the reduction of service. The reduced receipts are apparently the result of a preference by many persons living along that line for the service furnished by the jitneys. There has of course been a loss of revenue on other street railway lines, but that on Capitol Hill is the only instance where the loss has been so great as absolutely to necessitate a reduction of street railway service. The reduction which has been made in the service on that line is proportionate to the reduction of receipts."

Personal Mention

Charles Barrington, Jr., auditor of the Los Angeles (Cal.) Railway Corporation, has been transferred to the post of purchasing agent of the company and will have full charge of all materials and supplies.

Thomas Bulpin, assistant chief engineer of the Los Angeles (Cal.) Railway Corporation, has been appointed chief engineer of the company to succeed George Kuhrts, who has become assistant general manager.

George Kuhrts, chief engineer of the Los Angeles (Cal.) Railway Corporation, has been appointed assistant general manager of the company to succeed C. A. Henderson, who will hereafter devote all his time to the financial operations of the company.

J. W. Tipton, former superintendent of the interurban line between Dallas, Tex., and Waxahachie, operated by the Strickland interests, has been appointed superintendent of the Oklahoma, New Mexico & Pacific Railroad, succeeding R. W. Patterson, resigned.

Henry G. Stott, superintendent of motive power, Interborough Rapid Transit Company, New York, underwent a serious operation on July 7. According to the latest reports he is rapidly recovering from its effects, although at first grave doubts as to his recovery were entertained.

Charles F. Smollin, who has been correspondence clerk of the Public Service Commission of the First District of New York for most of the time since 1910 when he joined the commission's staff, has been promoted to the position of chief clerk to succeed George F. Daggett.

C. A. Henderson, director, secretary, treasurer, assistant general manager and purchasing agent of the Los Angeles (Cal.) Railway Corporation, has relinquished the position of purchasing agent and assistant general manager so that he may assume entire charge of the finances of the corporation.

E. J. Burdick has been appointed assistant general manager of the Detroit (Mich.) United Railway and not general manager, as was announced in the ELECTRIC RAILWAY JOURNAL of July 8. The mistake in the announcement as printed was made by the compositor in putting the item into type and it was not discovered until most of the edition for July 8 had been printed.

R. G. Carroll, who has been assistant treasurer of the Northern Texas Traction Company, Fort Worth, Tex., for a number of years, will be transferred to Beaumont, Tex., where he will become acting manager of the Beaumont Street Railway, the Beaumont Lighting Company, the Beaumont-Port Arthur Interurban Railway and the Port Arthur Lighting Company.

George F. Daggett, who has been connected with the Public Service Commission for First District of New York practically since its creation in 1907, and most of the time as its chief clerk, has been promoted from that position to become an assistant secretary. Mr. Daggett has entire charge of the work of handling informal complaints against transportation companies filed with the commission.

M. F. M. Werth has been appointed assistant superintendent of power of the Detroit United Lines with headquarters in Detroit, Mich. Mr. Werth is a native of Richmond, Va., and was graduated from the Virginia Military Institute, electrical engineering course, at Lexington, Va. He was later employed in Schenectady, Baltimore and New York. He entered the electric railway field with the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, and was later associated with the British Columbia Electric Railway, Ltd., Vancouver, B. C.

W. L. Davis has been appointed traveling auditor for the American Power & Light Company, New York, N. Y. Mr. Davis has for the past year been connected with the firm of Ernst & Ernst, certified public accountants, Cincinnati, Ohio. Mr. Davis began his work in the railway field in 1906 with the Ohio Electric Railway and was appointed statistician of the company in 1909, serving in this work

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until 1912, when he joined the organization of the Texas Power & Light Company, Dallas, Tex., first as traveling auditor and later as assistant secretary-treasurer. From 1914 to 1915 Mr. Davis was auditor for the Southern Traction Company and the Texas Traction Company, both of Dallas.

W. D. Seeley has been appointed master mechanic of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., to succeed J. M. Pneuman, resigned. In 1905 Mr. Seeley entered the service of the New York Central Railroad at its East Buffalo shops as an air-brake inspector's helper and gradually advanced in this class of work until 1909, when he was appointed airbrake instructor on the New York Central Lines, east of Buffalo. During his occupancy of the latter position he had charge of experimental work in connection with the use of airbrakes in handling mountain trains on the Montpelier & Wells River Railroad. Later Mr. Seeley entered Syracuse University, from which he was graduated in 1915 with the degree of mechanical engineer. During his college course he was connected with considerable of the experimental work in the airbrake department of the Westinghouse Traction Brake Company. Since his graduation he has been engaged in miscellaneous engineering work on the Syracuse & Suburban Railroad, and just previous to becoming connected with the Buffalo, Lockport & Rochester Railway was in charge of the installation of signals on the Syracuse & Suburban Railroad. His experience of more than ten years with different steam roads in the section of the country near Buffalo and his thorough study of the question of airbrakes, particularly adapt him for the position to which he has just been appointed on the Buffalo, Lockport & Rochester Railway.

F. I. Hardy, the newly appointed general manager of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has been actively engaged in steam and electric electric railway operation for the last nineteen years. During that time he served the Southern Pacific Railroad, the New York Central & Hudson River Railroad, the Indiana Union Traction and the Fort Wayne & Northern Indiana Traction in various capacities. Mr. Hardy became connected with the Fort Wayne & Northern Indiana Traction Company in 1905 and resigned in 1911. During this connection with the company he served as division superintendent and superintendent of transportation. In July, 1911, he was made superintendent of transportation of the Chicago, South Bend & Northern Indiana Railway, where he had full charge of operation and traffic matters up to the time of his recent appointment as general manager of the company to succeed C. D. Emmons, who has become second vice-president and general manager of the Boston & Worcester Street Railway.

F. I. HARDY

OBITUARY

Raymond H. Harrison, executive clerk to H. A. Benedict, mechanical engineer of the Public Service Railway, Newark, N. J., died on July 11 from typhoid fever. Mr. Harrison was born in August, 1889, and was graduated from Cornell in 1910. On April 17, 1911, he entered the employ of the Public Service Railway as a cadet engineer. He is survived by his father, mother and two sisters.

M. W. Savage, president and treasurer of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., died in that city on July 12 after a brief illness. Mr. Savage was fifty-five years old and had lived in Minneapolis since 1886. He was the owner of several of the most celebrated racing and trotting horses in the country, one of them, Dan Patch, by which name the Minneapolis, St. Paul, Rochester & Dubuque Traction Company was generally known locally in Minneapolis and throughout Minnesota.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Thomasville (N. C.) Terminal Company.**—Incorporated to construct and operate an electric railway in Thomasville and maintain interurban lines to neighboring points. Capital stock, $125,000 authorized and $5,000 subscribed. Among those interested are T. J. Finch, J. W. Lambeth, E. V. Crutchfield, Frank S. Lambeth and R. L. Lambeth.

Tulsa (Okla.) Interurban Railroad.—Incorporated to build a combination electric and steam railroad from Tulsa to Wagoner, 37 miles, in order to permit an entrance into Tulsa of the Missouri, Oklahoma & Gulf and the Iron Mountain railroads. The interurban will parallel the Missouri, Kansas & Texas Railroad from Tulsa to Broken Arrow, and from Broken Arrow will run due east to Wagoner. Estimates of construction and equipment place the cost at $480,000.

Texas Electric Railway, Dallas, Tex.—Incorporated to take over the Texas Traction Company, which operates an interurban line from Denison to Dallas, and the Southern Traction Company, which operates from Dallas to Waco, also from Dallas to Corsicana. The company also acquires and takes over the street car systems of Denison, Sherman, McKinney, Waxahachie, Corsicana and Waco. The new corporation is also authorized to extend southwest from Waco to San Antonio via Austin, also south to Houston. Capital stock, $10,500,000. This is the consolidation of the so-called Strickland lines mentioned previously in this paper and referred to at length on page 117 of this issue. Incorporators: M. J. Templeton, J. F. Strickland and Osce Goodwin, all of Dallas, and others.

FRANCHISES

Whittier, Cal.—The Pacific Electric Railway has asked the Council for a franchise in Whittier. Bids for the franchise will be received at the office of the City Clerk until July 31.

Cleveland, Ohio.—The Cleveland Railway has asked the County Commisioners for a franchise to construct an extension on Pearl Road from the southerly limits of Cleveland to Ridge Road in Parma Township.

Elyria, Ohio.—The Cleveland, Southwestern & Columbus Railway has received a new twenty-five-year franchise from the City Council of Elyria. The company agreed to sell six tickets for 25 cents, put on half-hour cars in addition to the hourly interurban cars and extend the track east to the manufacturing district.

Portland, Ore.—The Council has acted favorably on the request of the Portland & Oregon City Railway for an extension of three years' time in which to extend its proposed interurban line to Portland's west side business district. According to present plans, the company purposes making its terminal at East Third and Morrison Streets, carrying passengers from the west side to the terminal by means of a free bus service.

***San Angelo, Tex.**—The Interstate Electric Corporation of New York has been granted a franchise from the City Commissioners to construct and operate a street railway system in San Angelo. It is agreed by the company that improvements representing an outlay of $108,000 will be made immediately. Officials of the Interstate Electric Corporation are now negotiating with the County Commissioners of Tom Green County for trackage rights across the county viaduct that spans the Concho River. If trackage rights are not granted over the viaduct, the company will build its own bridge over the river.

Tumwater, Wash.—The Olympia, Tumwater & Brighton Park Railway has received a franchise from the Council to construct a street railway from the corner of Reserve and Des Chutes Streets to the Olympia city limits.

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TRACK AND ROADWAY

Arkansas Northwestern Railroad, Bentonville, Ark.—It is announced that service will soon be resumed on the Bentonville-Rogers interurban line. Service on this line was discontinued several weeks ago when the St. Louis & San Francisco Railway Company increased the rental on a portion of its track which was used by the interurban company. It is announced that the company will build its own track, thus eliminating the necessity of renting or leasing trackage rights from any other railway company.

Visalia Electric Railway, Exeter, Cal.—It is reported that an extension of this company's line will be built from Exeter southerly along the foothills to the Lindsey and El Mirador country.

Pacific Electric Railway, Los Angeles, Cal.—This company will lower its grade through the Garden Grove section for about 2800 ft. The track will be lowered 3 ft. 4 in., and culverts will be placed where needed to carry flood waters.

Florida East Coast Railway, Jacksonville, Fla.—Announcement has been made that the electric train heretofore operated on the Mayport branch of the Florida East Coast Railway will be placed in service between West Palm Beach and Miami.

Atlanta & Anderson Electric Railway, Atlanta, Ga.—It is reported that this company, which proposes to begin construction of an electric railway from Atlanta to Anderson about Sept. 1, will connect with the Piedmont & Northern Railway at Anderson. J. L. Murphy, Atlanta, is interested. [June 17, '16.]

Georgia Railway & Power Company, Atlanta, Ga.—It is reported that the Georgia Railway & Power Company will purchase the Gainesville Midland Railroad, equip it for electrical operation and extend the line into Athens. A further extension will be the construction of a line connecting Atlanta and Macon, and later a link between Macon and Athens.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—Work will soon be begun by this company on the extension of its King Street line to Moanalua Hill Boundary, past Fort Shafter military reservation.

Pocatello Traction & Interurban Company, Pocatello, Idaho.—This company announces that work will be begun about Oct. 1 on the construction of an extension from Preston, Idaho, or Petersburg, Utah, to Ashton, Idaho. [May 6, '16.]

Aurora, Mendota & Western Railroad, Aurora, Ill.—Preliminary surveys have been begun at Aurora for the Aurora, Mendota & Western Railroad. After the survey has been completed an outline of the route will be presented to the Public Utilities Commission.

Rock Island Southern Railway, Rock Island, Ill.—About $25,000 will be spent by this company on improvements to its system and its rolling stock. The roadbed will be improved from Rock Island to Galesburg.

Tri-City Railway Company of Illinois, Rock Island, Ill.—This company plans to double-track its line from Sears to Center Station.

Southern Iowa Railway, Light & Power Company, Albia, Iowa.—Improvements are being planned by this company in Albia amounting to about $50,000.

Iowa Railway & Light Company, Cedar Rapids, Iowa.—The Town Council of Earlville has entered into a contract with the Iowa Railway & Light Company to supply electricity to operate the municipal electric light system.

Kansas City, Kaw Valley & Western, Bonner Springs, Kan.—It is reported that construction will be begun this summer on this company's proposed extenslon to Topeka, and it is expected that the line will be in operation about June 1, 1917.

***Transcona, Man.**—Negotiations are now under way for the construction of an electric railway between Transcona and Winnipeg, and it is expected that the line will be completed this summer. J. W. Hull, Winnipeg, may give further information.

***Boston & Western Street Railway, Marlboro, Mass.**—A committee of the Marlboro Board of Trade is co-operating with a committee of Waltham citizens to secure the construction of an electric railway between Marlboro and Waltham, about 15 miles, making a direct route from Boston.

Kansas City (Mo.) Railways.—Within the next month work on the extension of three car lines will be begun by the Kansas City Railways. These include the Paseo extension on the old Marlborough line, from Forty-eighth Street to Seventy-first Street; the Brooklyn Avenue extension, from Thirty-ninth Street to Forty-fourth Street, and the Troost Avenue line, from Forty-eighth Street to Fifty-third Street.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—Among the improvements included in the application for $12,000,000 bonds by this company is the construction of an extension of its Prospect Avenue line.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company is building a half mile of double track and overhead lines as an extension to existing lines, and it now has under way the rehabilitation of 25,550 ft. of single track. This latter work includes all new rail, ties and repaving.

Reno (Nev.) Traction Company.—This company plans to relocate its line in Sparks from B Street to D Street from Miller's Curve to Thirteenth Street.

Public Service Railway, Newark, N. J.—The work of laying tracks on this company's Central Avenue line through Orange has been completed to Scotland Street and it is expected that operation will soon be begun. For the present the line west of Scotland Street cannot be completed, as the tracks would have to cross the Lackawanna Railroad at grade. Until the railroad's elevation work is completed and the tracks are carried over Central Avenue on a bridge, the extension will end at Scotland Street.

Rahway Valley Railroad, Summit, N. J.—It is reported that this company, which operates a railroad from Summit to Aldene, plans to equip its line for electrical operation. J. S. Caldwell, Kenilworth, N. J., general manager.

Interborough Rapid Transit Company, New York, N. Y.—Bids were received by the Public Service Commission for the First District of New York on July 6 for the supply of eighteen portions of special work to be used in the Seventh Avenue subway. The only bids received were Pennsylvania Steel Company, New York, at $65,316 and Ramapo Iron Works, New York, at $66,740. The commission has announced that the extension of the Queensboro Subway—the Steinway Tunnel—will be open for operation to the Queensboro Bridge Plaza station by Nov. 1, and that by Dec. 15 the service will have been extended to the new lines extending to Astoria and Corona. In making this announcement the Public Service Commission asserted that the new connecting link between the Queensboro subway and the Grand Central Station would be ready for use by the end of August. Elevators are now being built at the eastern end of the Grand Central Station platform to extend down to the level of the Queensboro line. When these elevators are in operation it will be possible to run Queensboro subway trains west to a new station on the lower level at Park Avenue and Forty-second Street.

New York & Queens County Railway, New York, N. Y.—Application has been made by this company to the Public Service Commission for the First District of New York for one year's extension of time to discontinue the operation of cars across the meadows between Corona and Flushing.

Dayton, Xenia & Southern Railway, Dayton, Ohio.—This company plans to construct an extension of its lines in Dayton.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—R. P. Stevens, president of the Mahoning & Shenango Railway & Light Company, a subsidiary of the Republic Railway & Light Company, has announced that the company will build an extension of its lines in Sharon covering the eastern section of the city and to Buhl Farm. The best delivery for rails which it has been possible to secure is in the first quarter of 1917. It is expected that the line to Buhl Farm may be in operation by July 4, 1917.

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Toronto (Ont.) Civic Railway.—New track is being built by the Toronto Civic Railway from Bathurst and Front Streets to Exhibition Park. The total length of the line is approximately 10,900 ft. of single track, and it is for the most part double-track construction with 60-lb. A.S.C.E. rails on cedar ties and gravel ballast. The overhead construction is span work and No. 00 round trolley wire will be used. Orders have been placed for material for track and overhead work.

Willamette Valley Southern Railway, Oregon City, Ore.—It is reported that this company will construct an extension to Silverton this fall.

***Silverton, Ore.**—It is reported that the Silver Falls Timber Company will electrify its railroad from Silverton to its logging camps.

Memphis (Tenn.) Street Railway.—This company will reconstruct its tracks on Main Street from Linden to Calhoun Streets, preparatory to improving that section of the street.

***San Angelo, Tex.**—The A. Fitkin Company of New York City, through C. W. Hobbs of San Angelo, has agreed to build and equip a modern street car line in San Angelo and to build 1¼ miles of track south of the North Concho River, if given a franchise for eighty years. The proposed line will cost $180,000, according to the estimate furnished by Engineer Clifford of the Stone & Webster interests, and the city has accepted the proposition. The county commissioners' court, however, is holding the matter up by demanding that the company pay $200 per annum for the privilege of crossing the viaduct over the North Concho River. The city commissioners and Mr. Hobbs went before the county commissioners but could not induce them to recede from the stand.

Virginia Railway & Power Company, Richmond, Va.—At the annual meeting of the Virginia Railway & Power Company, to be held on July 20, the stockholders will be asked to approve an increase in capital stock from $8,000,000 to $9,000,000, the proceeds to be used for improvements and extensions to the system.

Monongahela Valley Traction Company, Fairmont, W. Va.—This company has asked the Public Service Commission of West Virginia for permission to construct an extension from Morgantown to Adamson. Work has been begun by the company on the construction of an extension from O'Neil to Wolf Summit.

SHOPS AND BUILDINGS

Southern Pacific Company, San Francisco, Cal.—Plans have been completed by the Southern Pacific Company for the construction of an office building at Market, Steuart and Spear Streets. The structure will be 275 ft. x 210 ft., ten stories. The steel has already been ordered and it is expected that construction will soon be under way.

Worcester (Mass.) Consolidated Street Railway.—A contract has been awarded to James Miles & Son Company, Worcester, by the Worcester Consolidated Street Railway, for the construction of an addition to its express station at Green Street to be used for the storage of freight. The extension will be 97 ft. x 35 ft., one story high, of brick with a tar and gravel roof.

Salem & Pennsgrove Traction Company, Salem, N. J.—This company has awarded a contract to Charles D. Burns, Philadelphia, for the construction of car shops and offices. The structure will be one story, of brick and concrete.

POWER HOUSES AND SUBSTATIONS

Columbus Railway, Power & Light Company, Columbus, Ohio.—This company will construct a new transmission line about 6 miles long in order to supply additional power to the southeast section of the city. The line will extend on Front Street to Ambos, thence along the old canal bed to Frank Road and from there to Smoky Road. The line will be of both underground and overhead construction. It is estimated that the cost will be about $80,000.

Portland Railway, Light & Power Company, Portland, Ore.—It is reported that this company plans to construct a large transformer station near the interstate bridge, across the Columbia River, between Vancouver, Wash., and Portland, Ore.

Manufactures and Supplies

COPPER AND STEEL PRICES STILL HIGH

The Copper Market Has Resolved Itself Into a Waiting Proposition and Steel Business Continues to Be Brisk

Conditions in the copper market have changed considerably in the last three months. At the beginning of April total transactions were on an unusually large scale, large orders coming from both domestic and foreign sources, and sales being made to the end of the year. During the first three weeks of April over 400,000,000 lb. of copper were sold to England and France. At the present time business is on a much more moderate scale, all quotations are nominal and the enthusiasm which attended the buying movement of a few months ago has evaporated, although England and France are reported to be making inquiries on a large scale for delivery in 1917.

Prices increased from 26 cents in the latter part of March to 31 cents during the first week in May. Since that time the price of copper has decreased to the present nominal quotation of 25¾ cents.

Total sales of copper since the beginning of the year far outstrip all previous records in the history of the industry. With considerable uncertainty existing as to the question of values likely to prevail within the next two or three months, market operations have dropped to a restricted scale. The leading producers and dealers, being well sold, are not quoting for immediate delivery, and it is understood that, in anticipation of an increase in market price, no large orders for future delivery have been taken. Consumers, as a rule, have provided for several months. In influential circles, the impression is that the price advance has been overdone and that a more normal market is necessary to impart confidence.

During the year 1915 a total of 1,624,204,448 lb. of refined copper were produced by the regular refining plants, according to estimates made by government authorities. If business resumes its activity of the first part of April it will be necessary to carry out plans that will place the annual output on a 50 per cent higher basis.

Looking into the situation of the steel market, we find a recent statement by E. H. Gary, chairman of the United States Steel Corporation, which says: "The steel business in the United States for domestic use and for export is better than ever before. The production is larger, the profits greater and the workmen are receiving higher wages. The unfilled orders for the various products of the subsidiary companies of the corporation aggregate nearly 10,000,000 tons, and about 6,000,000 tons of this total have already been specified for actual deliveries. Besides the present daily bookings are about 80 per cent of full producing capacity. We are producing at the rate of 51,000 to 52,000 tons per day."

With this condition general in the trade, there is no strong expectation of any material change in prices. The stability of the present high price is causing little or no concern. The consensus of opinion in the steel market is that the outcome of the Mexican crisis will help rather than hurt the market.

At the present time there are very few domestic orders being placed, and although orders for export have slackened somewhat, new export business is sustaining the market.

ROLLING STOCK

Macon Railway & Light Company, Macon, Ga., is reported to be building new cars in its own shops and beginning with the last week in July expects to place one new car in operation weekly.

Pittsburgh (Pa.) Railways has received the first delivery on its order for 240 all-steel cars which were ordered during the latter part of 1915. The remainder of the deliveries will be made during the summer.

Cleveland (Ohio) Railway has been authorized by the Council Committee to add fifty trail cars to its equipment. Twenty-five of these will be purchased and the remainder will be built in the company shops.

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Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of July 8 as considering the purchase of two single-truck, all-steel cars, 33 ft. 4 in. overall, has ordered this equipment from the Niles Car & Manufacturing Company.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, has ordered from the Cincinnati Car Company six 50-ft. trailer freight cars, of 50,000 lb. capacity, to be equipped at each end with Tomlinson M. C. B. couplers. Wide doors are arranged at each side and at one end to facilitate readily loading the freight to be carried. These are the six interurban cars referred to in the ELECTRIC RAILWAY JOURNAL of June 17.

Boston (Mass.) Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of June 10 as making informal inquiries regarding 100 center-entrance motor cars and forty-two elevated cars, has placed the following orders: Forty-two center-entrance elevated cars, 46 ft. 7¼ in. over platforms with Brill trucks from the Pressed Steel Car Company. The center door is to be 45 in. wide and the end doors are to be 43 in. wide, instead of 40 in. and 33 in., the widths of the doors on the present cars. Fifty center-entrance surface cars have also been ordered from The J. G. Brill Company and fifty from the Laconia Car Company. No motors have been purchased as yet, nor trucks for the surface cars. A contract for fifty articulated center-sections will be awarded soon.

TRADE NOTES

R. L. Brown has been appointed a special representative of the Curtain Supply Company, Chicago, Ill.

General Electric Company, Schenectady, N. Y., has received an order from the International Railway Buffalo, N. Y., for sixteen four-motor equipments, GE 203 type, with PC control.

Railway Improvement Company, New York, N. Y., has received an order for 6400 straps for the 200 cars recently ordered from the Laconia Car Company by the Bay State Street Railway, Boston, Mass.

Curtain Supply Company, Chicago, Ill., has received an order to equip with ring 88 fixtures and Rex rollers, the twelve cars recently ordered from the Osgood-Bradley Car Company by the Union Street Railway of New Bedford, Mass.

Lord Manufacturing Company, New York, N. Y., reports the receipt of an order for air cleaners for the cars of the Conestoga Traction Company, being built by The J. G. Brill Company, and an order for 100 hydrogrounds from the Union Railway, New York, N. Y.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, reports that on July 1 the factory employees requested the privilege of a mass meeting with the officials of the company. At this meeting, one of their number delivered a carefully prepared speech, at the end of which a signal was given and a large American flag came gracefully down from its hiding place behind one of the beams. This was voluntarily presented to the company as a sign of good-will. This is particularly significant at this time, since for the past six months this has been one of the very few machine shops in Cincinnati that has not been affected by the machinists' strike. The men also asked the privilege of erecting a steel flag-pole in the front yard.

Sturtevant Engineering Company, London, has been issuing from time to time since the beginning of the war a series of "War Letters" or copies of letters received at the offices of the company and of its associated companies from members of their staffs now serving under the colors. These "letters" are issued partly to enable those at the front to hear the experiences of their comrades and partly to create interest in a fund from subscriptions to assist the families of the men in the service. The twelfth number in this series has just been issued, and contains, besides several letters, a number of illustrations relating particularly to the work of the American Ambulance Organization at Neuilly-Paris. The letters are largely personal in character, and for this reason give a very good insight into the life in the trenches and in the hospitals.

Drew Electric & Manufacturing Company, Indianapolis, Ind., reports recent additional orders for Drew motorman's safety mirrors from the following companies: Public Service Company, Newark, N. J.; Lake Shore Electric Railway, Sandusky, Ohio; San Francisco-Oakland Terminal Railway, Oakland, Cal.; Indianapolis & Cincinnati Traction, Rushville, Ind.; Toledo Railways & Light, Toledo, Ohio; Empire United Railways, Syracuse, N. Y.; Union Traction Company of Indiana, Anderson, Ind.; Butte (Mont.) Electric Railway; Terre Haute, Indianapolis & Eastern Traction, Indianapolis and Terre Haute, Ind.; Southwest Missouri Railroad, Webb City, Mo.; Muskegon Traction & Lighting Company, Muskegon, Mich.; Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.; Boston (Mass.) Elevated Railway; New York State Railways, Syracuse, N. Y.; Youngstown & Ohio Railway, Youngstown, Ohio; Augusta-Aiken Railway, Augusta, Ga.; Kentucky Traction & Terminal Company, Lexington, Ky.; Easton Transit Company, Allentown, Pa.; Norfolk & Southern Railway, Norfolk, Va., and the Quebec Railway, Light, Heat & Power Company, Quebec.

ADVERTISING LITERATURE

Stone & Webster Engineering Corporation, Boston, Mass., has issued two illustrated folders, one on an installation at the power plant of the Remington Arms-Union Metallic Cartridge Company at Bridgeport and the other featuring the construction of the Midland Warehouse at Chicago.

Vulcan Soot Cleaner Company, Du Bois, Pa., has issued an illustrated catalog which describes the Vulcan soot cleaner, its application to various types of boilers and economizers, and tells what soot really is. A frontispiece reproduces in actual colors nine specimens of soot formed with hard and soft coal.

Day & Zimmerman, Inc., Philadelphia, Pa., are circulating the first issue of "Development," a booklet which they describe as "a journal to disperse ideas, advice and information for use in the proper development of industries and public utilities." This issue contains several illustrations showing some of the work done by this firm.

Gold Car Heating & Lighting Company, New York, N. Y., has issued their 1916 catalog on heating and ventilating apparatus for railway cars. The numerous illustrations, many of which are in two colors, show the various parts of the apparatus made by this company. This catalog also contains a number of inserts printed in three colors.

J. G. White Companies, New York, N. Y., and London, Eng., have issued a booklet entitled "Engineering in Foreign Fields," which gives a list of some of the more important work carried out abroad by them. A large number of excellent illustrations shows the diversity of experience of these companies. A short description of the various departments of these companies is also given.

Pratt & Lambert, Inc., Buffalo, N. Y., have issued a booklet describing their Vitralite railway enamel system for cars whereby labor and material are appreciably decreased over the old paint and varnish system. It is said that the time of stopping cars is reduced, the durability of the finish increased 50 per cent, cleaning made easier, the original color retained and refinishing simplified. Equipment men will appreciate the revolutionary character of the Vitralite system when it is stated that only four coats are required for the exterior finish of new steel cars. New work on steel cars is handled in eight days from the metal primer to the striping. Similar specifications, except for the use of surfacing compounds instead of Vitralite coatings, apply to wooden cars.

HEATER ORDERS IN BROOKLYN

Owing to the fact that several articles have appeared in this paper on the orders for car heaters in the New York Municipal Railway cars, and to remove any possible misunderstanding, the following résumé will be made:

The order for panel heaters for the first 100 cars was given to the Gold Car Heating & Lighting Company in the spring of 1914. The second and third orders were for 100 cars each, and were placed during the summers of 1914 and 1915 with the Consolidated Car Heating Company. The fourth and latest order, placed early in 1916, for 200 cars, was given to the Peter Smith Heater Company, and was for its new panel gravity type of electric heater.

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Electric Railway Journal

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ANNUAL REPORT AS PUBLICITY MATERIAL

Practically all electric railway companies recognize the necessity of keeping the public informed on matters of interest on their lines, but many of them are often at a loss to know what to give out. At this season of the year most companies are completing their annual reports for the state public service commissions, and this fact gives them a splendid opportunity to make good newspaper "copy" out of material which otherwise very few people would see in the commission reports, and then probably not for six months or more. We do not mean that all of the statistics required by a public service commission necessarily make interesting reading matter for the daily papers. But the principal statistics undoubtedly would, and they could be accompanied by an explanatory note pointing out the important features of the year's work. Of course, a few companies now issue regular annual reports to their stockholders, and these reports, as well as the monthly reports of those companies which give out figures of this kind, usually receive attention in the local press, but only the larger companies issue such reports. The plan suggested applies therefore more to the smaller companies which do not issue printed reports to their stockholders. We believe that matter of this kind would be welcomed as "news" by nearly any paper serving the same territory as a railway, but if not, it could be published in the form of an advertisement as an evidence of good faith to the public on the part of the railway company.

CAR FAMINES AND FREIGHT INTERCHANGE

When an electric railway starts interchanging freight traffic with steam roads one of the first lessons it learns is that it is a better freight gatherer than it is a distributor. The steam road partners in the interchange agreement are, of course, glad to take of the carload freight handed over to them by the electric road, but because most steam road organizations are not prone to do things out of the old and beaten paths, they do not usually try to do their share in building up a traffic in which the distribution will occur on the electric road. Freight interchange between a big steam system and a small electric road is not so vital to the life of the steam system as it is to the electric, and, therefore, the steam operators do not try as vigorously to make use of the advantages of interchange as do the electric. The result is that the balance in rolling stock is soon in favor of the steam road, and the electric road finds itself without cars to handle the traffic it has so arduously labored to build up. This point was well emphasized in the article, "Developing Carload Freight Traffic on the Illinois Traction System," published in the Electric Railway Journal for July 8, 1916, page 48.

The fault is not all with the steam roads, however, because there has been a tendency for the traffic departments of electric roads to spend more time and thought on the subject of freight origination than on that of freight distribution. In order to maintain the proper balance in rolling stock, it is absolutely essential that the electric road pay at least as much attention to the latter subject as the former. In the article above referred to the value of belt lines and industrial tracks as freight accelerators was pointed out. Quite aside from the revenue resulting from freight handled for them, industries, located along such lines, requiring carload material originated on steam roads are essential if the proper balance in rolling stock is to be maintained.

MEETING THE INDIVIDUAL PATRON

Utilities have often, through placards, newspapers and company publications, asked their patrons for suggestions and criticisms, and such efforts have undoubtedly proved profitable. In such work, however, the companies have been handicapped by the lack of an individualistic appeal to their patrons. In other words, general and impersonal advertising is not quite so successful in overcoming the scoffer, removing grounds for misunderstanding and inspiring honest, well-meaning criticisms as a direct personal approach to individuals would be. A good example of such an approach is that of the City Light & Traction Company, which under the Doherty management recently opened a house-to-house canvass in Sedalia, as described in this week's issue, to find out how the car schedules and other operating conditions did not meet the views of the patrons. The company also endeavored to increase its ticket sales through newspaper advertising and personal solicitation, and to a praiseworthy degree succeeded, but on account of the essentially non-saleable aspect of electric railway transportation as compared to light and power service, we are not so much interested in the new-business feature of the campaign as in its public relations side. Even an approach to individuals for the purpose of bettering general relations would, of course, be increasingly difficult in proportion to the utility's size, but we are of the opinion that electric railways in small cities and towns should be able to derive almost as much good from this publicity method as would a utility with a definitely listed patronage. If a railway is desirous of criticism and is prepared to remove the causes of complaint, wherever such procedure is warranted and possible, then a campaign like the Sedalia one should prove of great benefit in creating better public relations.

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MUNICIPAL RAILWAY OPERATION

Elsewhere in this issue we are publishing income figures for the Municipal Railways of San Francisco that should be of interest to electric railway operators, for they present the first authoritative picture of the municipal lines without exposition traffic. For the first four months of 1916 the lines showed a deficit of $80,216 after making charges for depreciation, taxes, and legal and clerical services. It would, of course, be unjustifiable for anyone to jump to the conclusion that the deficit for 1916 will be a directly proportional amount, for the contributing conditions may not remain the same throughout the year. In fact, city officials state that in the first part of the four-month period there was unprecedented bad weather, that the percentage of casual riders is normally low in this period, and also that the municipal lines could reduce only gradually the service they had been giving in 1915. Nevertheless, we are of the opinion that the showing made will only increase the desire of electric railway officials to see returns of the municipal lines for a full year's operation without the inflated traffic due to exposition travel. Roughly speaking and comparing the figures for the first four months of 1916 with one-third of the total figures for 1915, we may state that the operating revenues have decreased 12 per cent, the operating expenses have increased 6 per cent, the net operating revenue has decreased 69 per cent and the interest on funded debt has increased 28 per cent. These figures are quoted, of course, not to show a comparison between similar periods but to indicate generally the relation between the figures of the first four months of this year and all of those of last year.

It is noteworthy that practically the entire reduction in revenues in the 1916 months was on the exposition lines. We are now told that the extensions built with the 1913 bond issue were constructed because of civic pride in order to give exposition service as well as to develop districts with a light population. Probably civic pride did have much to do with securing the bond votes of a number of citizens, but it would be a safe wager that the average man was less actuated by civic pride than by a desire to secure transportation for favored districts or by a craze for municipal ownership. Moreover, although civic pride is a most commendable attribute it is doubtful whether that variety of it which commits a city to a most doubtful experiment as well as to unfair competition with an existing private utility is the best thing for the municipality.

As regards the desire to build up unprofitable territory, we believe that one of the serious objections to municipal ownership of electric railways is the pressure that is certain to be brought to have the municipal system extended through light-traffic districts with the view of developing real estate. The judicial control of private railway extensions by regulatory bodies is much more likely to bring systematic development of the city as well as satisfactory financial results than the wire-pulling, political bickering and sectional disputes which almost invariably accompany extensions to municipal plants. In the latter case the sane viewpoint of the traffic expert in regard to the business wisdom of the extensions is neglected, with the result that the interests of a few speculative real estate owners become paramount over the interests of the general riding public.

Accepting as true, therefore, the assertion that the unprofitableness of some of the San Francisco municipal lines was foreseen, we are glad to recognize the fact that the city officials went into the matter with their eyes open. It is not at all certain, however, that the general public in San Francisco had clearly explained to it the inevitable unprofitableness of certain lines at least for a few years. When the municipal railway has stood on its own feet for a time and showed the true earnings from its tributary districts and a proposition is then made to the citizens for further unprofitable extensions, the real test of the system will come.

The list of municipal electric railway enterprises in this country is not a long one, and it is also not a cheerful one for the advocate of municipal ownership to contemplate. By a coincidence it is less than a month ago that we had occasion in our news columns to publish a special official report on the Seattle Municipal Street Railway, the only other large municipal electric railway in this country, and a property which has not succeeded since it has been in operation in earning, by a considerable percentage, even its operating expenses. It may be, of course, that time will improve the financial outlook of both the Seattle and San Francisco properties and that each will prove to be an exception to the general rule that American municipalities are not organized to conduct commercial undertakings successfully, but this remains to be proved.

ADVANCE IN THE SETTLEMENT OF WAGE PROBLEMS

By the terms of the new wage agreement which has just been made between the Boston Elevated Railway and its employees, there is, perhaps for the first time in such a settlement, a definite recognition of the street railway company's financial condition and necessities. This agreement, which dates for three years from May 1, 1916, provides certain specific increases for practically every employee during the course of the next three years, but also for additional increases in the final year, provisional upon the ability of the company to pay them. More specifically, the arrangement is that if the company receives some form of relief from its present financial difficulties so that it is enabled to pay its former standard dividend of 6 per cent for either of the two fiscal years ending June 30, 1918, or June 30, 1919, then an additional advance in wages of ½ cent per hour during the last year of the agreement is to be granted to all employees affected by the present agreement. Nearly 10,000 employees are included in the settlement.

All the signs of the times seem to be pointing to a more general understanding and appreciation of the fact that a street railway cannot go on forever meeting increased expenses with a fixed and limited source of

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income. It was a little more than a year ago that Prof. Irving Fisher, the well-known Yale economist, testified to this effect in the Bay State Street Railway wage arbitration proceedings. Professor Fisher, who appeared for the employees, frankly stated that when a street railway company was unable, financially, to pay what he considered a fair standard of wages, the situation should be remedied as in ordinary business by increasing the rates charged the consumers, in this case the fares of the street car riders.

It is unnecessary to discuss here the merits of the case of either the Bay State Street Railway or the Boston Elevated Railway for increased revenue. These matters are being taken up by the proper public authorities or soon will be, and we believe that public opinion will support any fair decision that may be made by the Massachusetts Public Service Commission. The present discussion may be confined to commenting upon the encouraging signs exhibited in this recognition by a large body of railway employees of their share in the company's financial problems. The knowledge that an increase in pay depends to some extent at least upon the prosperity of the company should spur them on, not only to help create a favorable public opinion toward the Boston Elevated Railway but also to strive both individually and collectively for greater economy and efficiency of operation.

CONSTRUING WORKMEN'S COMPENSATION AND LIABILITY LAWS

Thanks to the compilation of decisions of the courts affecting labor, issued by the Bureau of Labor Statistics, it is possible for laymen to follow the adjudication of cases arising out of the federal employer's liability act and the workmen's compensation laws of the various states. The federal law seems likely to be broadened in scope, if we may judge of the future by the decisions so far rendered. This tendency will, of course, increase the extent to which the law will apply to electric railway companies which may deem themselves, as intrastate institutions, immune from its provisions.

To make this clear it is only necessary to refer to a few decisions in which the question as to what is and what is not interstate commerce was involved. In a Missouri case (Harrington *vs.* C., B. & Q. R.R.) it was held that a switchman who was injured while handling coal cars to a storage track for the use of locomotives engaged in both intrastate and interstate service did not come under the federal act because "the coal has not yet taken on any definite interstate character." How easy it is for coal to acquire an interstate character is shown in a New York case (Barlow *vs.* Lehigh Valley R.R.), involving the status of a switchman who was also engaged in placing cars on a trestle for the use of engines engaged in interstate as well as intrastate traffic. The cars had come from another state, and had been standing on a siding for several days. The court upheld the contention that "the act of placing the cars on the trestle . . . was so closely connected with and related to interstate commerce as to be a part of it." This decision is in line with another (Kamboris *vs.* Oregon-Washington R. & N. Co.), in which it was decided that the federal act applied to the case of a workman engaged in shoveling coal to be used by engines in interstate service, while in a California case it was held that injuries incident to the repair of engines in a roundhouse came within the federal statute.

The interesting and important fact to be observed in connection with these decisions is, of course, the very broad view taken by the courts as to what acts and employments are a part of interstate commerce. This tendency is also maintained as to things, it being held in a Pennsylvania case that the non-use of a car for three days in any form of transportation did not destroy its interstate character if its last use was in interstate traffic, and that, therefore, an employee injured while the car was being shifted was entitled to recover under the provisions of the federal employers' liability law.

Aside from another class of cases involving injuries due to violations of the safety appliance laws, there are one or two which emphasize the fact that liability is a word of ever-widening meaning and scope. From one of these cases it appears that the circumstance that a public authority had approved the height and condition of a piece of equipment is not a good defense against charges of negligence in connection with the injury of an employee due to the use of an unusually high car. As to the definition of "equipment," it was held to cover ordinary tools in the case of a railroad employee who was hurt by the breaking of an adz.

The broadening meaning of the phrase "injuries arising out of and in course of employment" is observed in many cases arising under state workmen's compensation laws. About the only case that does not seem to stretch the meaning of this phrase out of its ordinary meaning is that of an employee of an electric railway who, after working hours, was taking his watch to be tested and was killed by an automobile. A lower New York Court awarded the widow compensation, but the Appellate Division reversed this finding and held that the workman was not killed in the course of employment.

There are decisions from the courts of seven States upholding the constitutionality of compensation laws, and it is plain that they have not only come to stay, but that their scope will be extended not so much by change in existing laws as by liberal interpretations based upon the ground, as stated in a New York decision, that "An opinion has gradually developed which almost universally favors a more just and economical system of providing compensation for accidental injuries to employees as a substitute for wasteful and protracted damage suits, usually unjust in their results either to the employer or to the employee, and sometimes to both. Surely it is competent for the state in the promotion of the general welfare to require both employer and employee to yield something toward the establishment of a principle and plan of compensation for their mutual protection and advantage."

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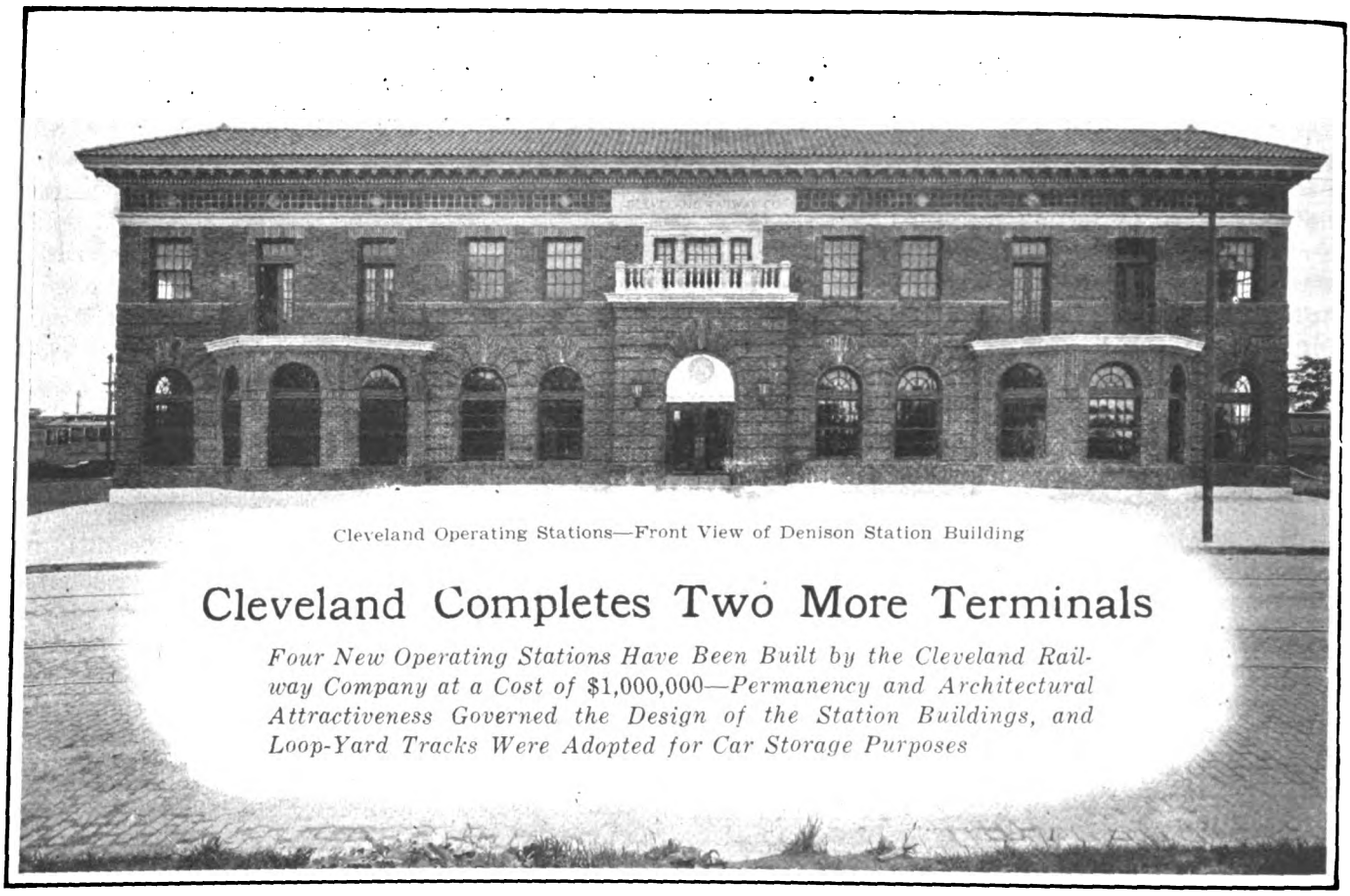


Cleveland Operating Stations—Front View of Denison Station Building

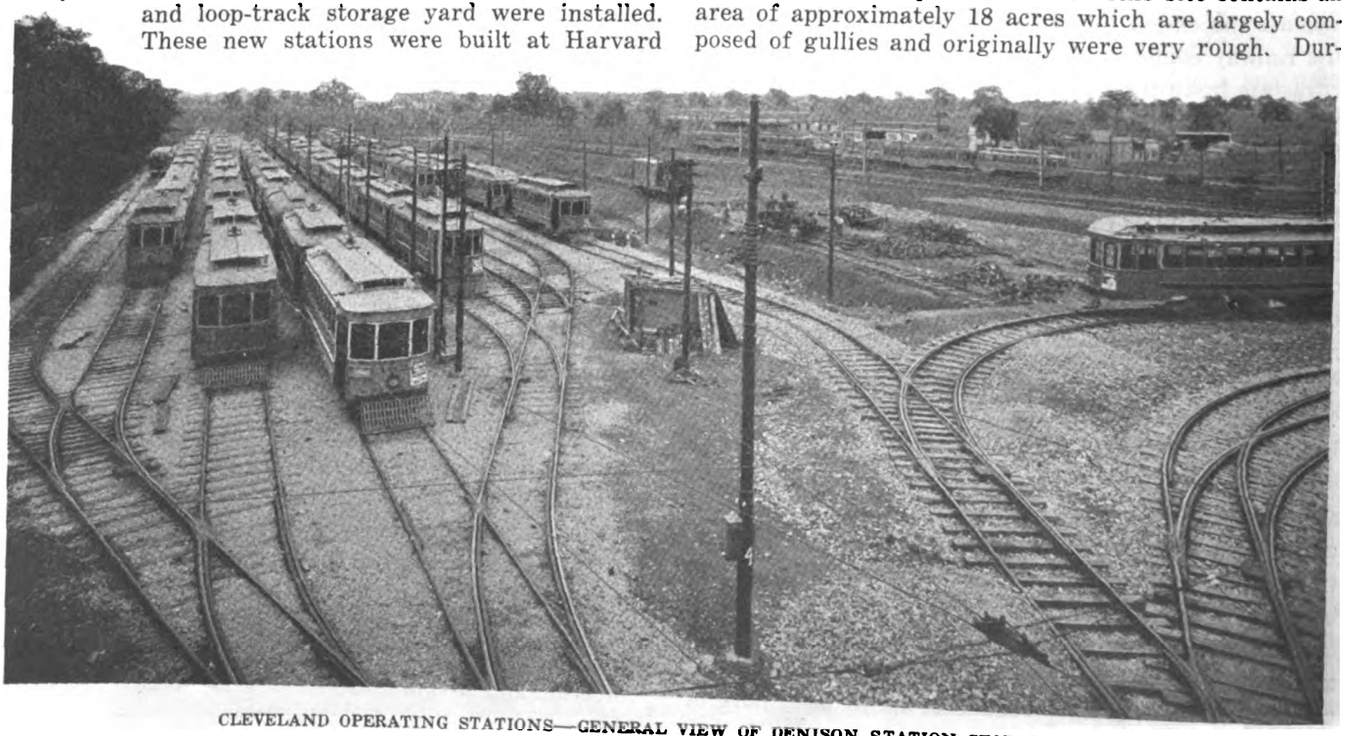
Cleveland Completes Two More Terminals

Four New Operating Stations Have Been Built by the Cleveland Railway Company at a Cost of $1,000,000—Permanency and Architectural Attractiveness Governed the Design of the Station Buildings, and Loop-Yard Tracks Were Adopted for Car Storage Purposes

TWO more operating terminals have just been finished by the Cleveland (Ohio) Railway and put in operation. These complete, at least for the present, the operating station rehabilitation program which included four stations of this character. The general features of these station layouts were described on page 356 of the ELECTRIC RAILWAY JOURNAL of Aug. 28, 1915. In the two new stations just completed the original plan has been adhered to, namely, that of providing a permanent and attractive operating station building at the front of the terminal site, and immediately back of these the running repair shop, washroom and loop-track storage yard were installed. These new stations were built at Harvard Avenue and Fifty-fifth Street and at Denison Avenue and Seventy-third Street, both of which sites are located near the southern limits of the city. The Harvard Avenue station site is a new one, whereas the Denison station simply replaces an old layout with the storage yard enlarged by the purchase of additional land.

PREPARING DENISON TERMINAL SITE

The Denison Terminal, as shown on the accompanying layout plan, is a rectangular piece of property fronting on Denison Avenue, having a width of approximately 510 ft. and a depth of 755 ft. This site contains an area of approximately 18 acres which are largely composed of gullies and originally were very rough. Dur-



CLEVELAND OPERATING STATIONS—GENERAL VIEW OF DENISON STATION STORAGE YARD

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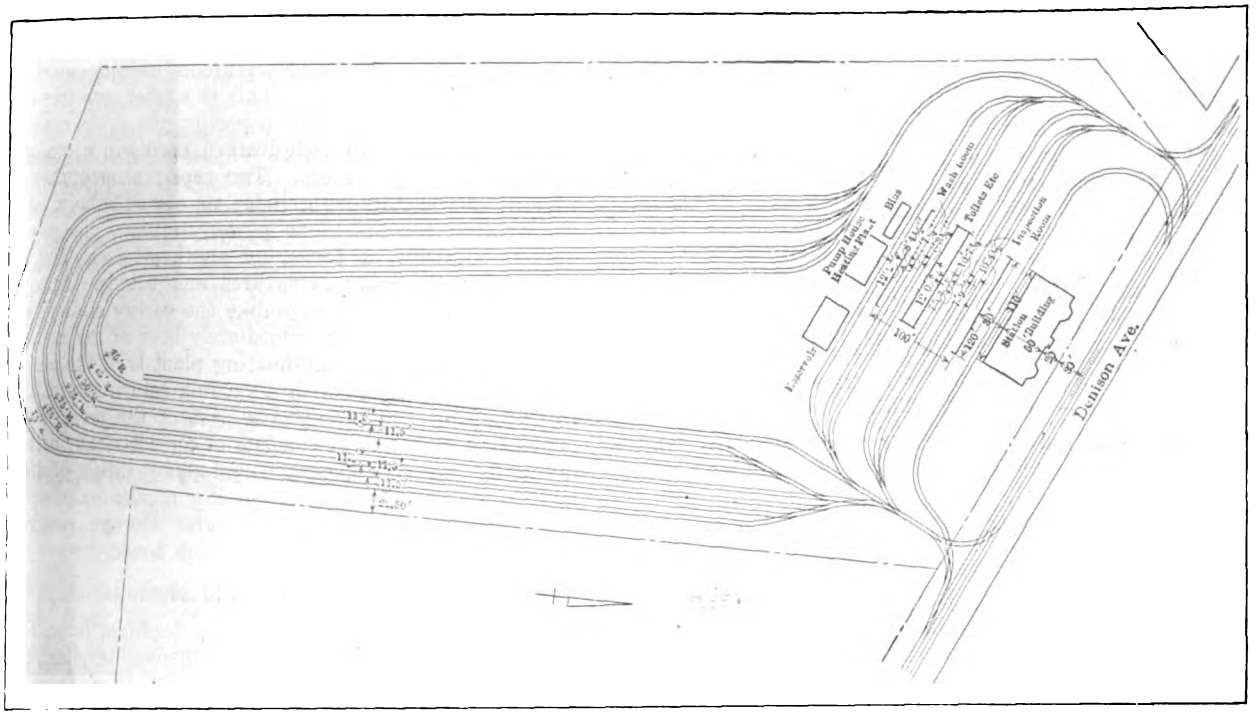
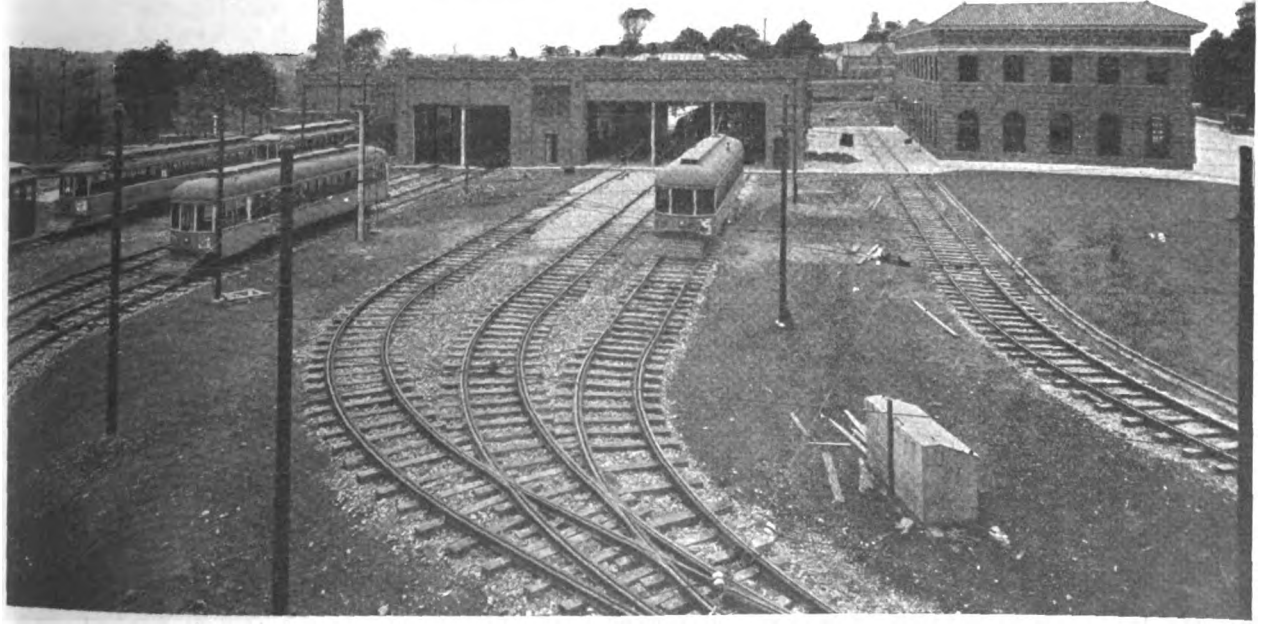


CLEVELAND OPERATING STATIONS—PLAN OF DENISON AVENUE OPERATING TERMINAL

ing the past two construction seasons, however, the track department has been dumping material excavated from the street into the depressions and the property is now practically all up to a uniform level. The cost of filling these gullies was practically neglected in the cost of the station, because they served as a convenient point to dump this waste material. Present and perhaps future car storage requirements will not make it necessary to utilize the entire tract, and with this in mind the management decided to leave vacant a strip of 146 ft. in depth, fronting on Ridge Avenue, a street running parallel to the open storage tracks. In accordance with the experience at other operating stations, an increase in the value of the real estate surrounding the operating station is expected. In that case the railway intends to take advantage of a portion of this unearned increment by dividing the vacant strip into building lots and selling them if they are not required by the railway company for other purposes.

As also shown on the accompanying plan of the yards, there is one Y-track entrance and exit to the repair shop and washroom tracks, and the storage yard proper. A separate loop track for turning back cars also leads from Denison Avenue around the operating station building. The loop yard is composed of seven tracks in two groups of three and four tracks respectively, spaced at 11½-ft. centers with approximately 19-ft. centers between the two inside tracks in the groups. This forms a 15-ft. aisle which was provided to give ample clearance for the monitor fire extinguisher system, the tubular steel poles supporting the overhead, the standard sand houses and trash bins. A general view of these features in the storage yard is shown in the illustration on the opposite page.

It is also of interest to note that all the yard special



CLEVELAND OPERATING STATIONS—SIDE VIEW OF DENISON STATION BUILDINGS AND TRACKAGE

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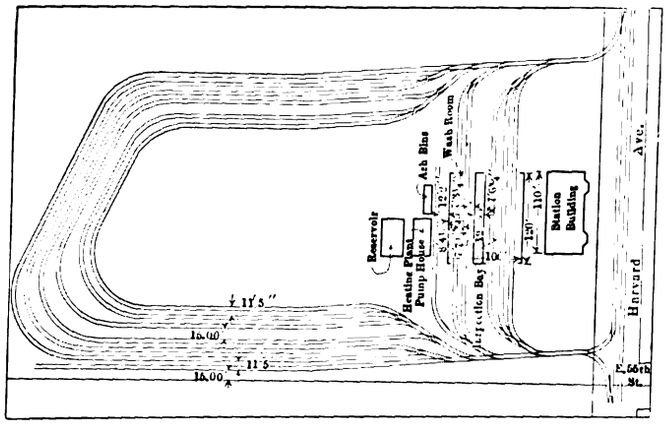


CLEVELAND OPERATING STATIONS—PLAN OF HARVARD AVENUE OPERATING TERMINAL

work is of the manganese-steel, rail-bound type, including the switches and mates. The tracks are all laid with 80-lb. A. S. C. E. rail and, in fact, the track construction is first quality in every respect. The track department was of the opinion that there was no economy in laying poor special work and track in car storage yards. As may also be observed in the illustrations, the track is all laid on crushed stone ballast, surfaced with screenings to make it easy for the trainmen to walk about the cars in the yard. The Denison yard has storage capacity for 320 cars, but at the present time only 136 cars are being operated out of this station.

PLAN OF STATION BUILDINGS

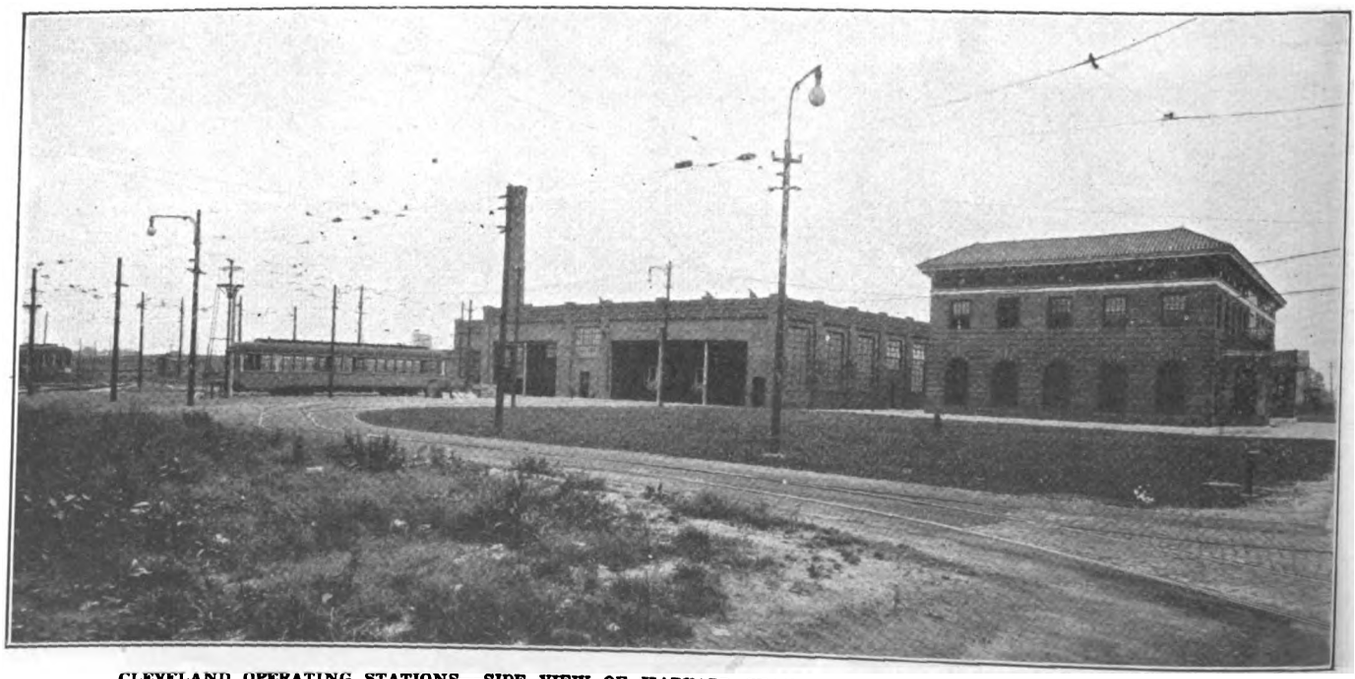
The station building is 50 ft. x 110 ft. in plan, which is exactly the same size as the Superior Avenue station building which was described in the ELECTRIC RAILWAY JOURNAL of Aug. 28, 1915. Like the Superior Avenue station, this one is also two stories in height and built of a cherry-red brick laid with white mortar and trimmed with white terra cotta, and has a red tile roof. The interior arrangement and furnishings are also essentially the same as the Superior Avenue station and include red tile floors and wainscoting with all metal furniture in both the offices and the trainmen's quarters. The attractive appearance of this station is illustrated in the views on page 133.

Immediately back of the office building, and separated from it by a 30-ft. space paved with concrete, is the running repair shop and washroom building which is 100 ft. x 120 ft. in plan. This is a brick, concrete and steel structure with three inspection pits in the running repair bay and two well-drained tracks in a concrete floor in the wash room. The repair shop equipment includes a wet and dry grinder, an engine lathe, a vertical drilling machine, one power hacksaw, one power-driven bandsaw, a forge, an anvil, pit jacks and air hoists for changing armatures and wheels. A pump house and heating plant unlike the earlier stations are in a separate building immediately back of the running repair shop. The steam-heating plant is of the central boiler type equipped with a vacuum return system, and the pumping equipment is a part of the monitor fire protection system. It consists of an electrically driven, manually controlled, centrifugal pump which provides additional pressure at the monitor nozzles by pumping water from the submerged water storage reservoir which is installed beside the pump house.

HARVARD OPERATING STATION

The Harvard Avenue operating terminal is built on essentially the same plan as the Denison terminal, and the initial layout occupies a tract 450 ft. wide by approximately 840 ft. deep. A deep ravine traverses the rear portion of this tract, and the creek in the ravine has been confined in a concrete arch so that the ravine may be filled with waste track excavation and the area which it occupied utilized for additional storage tracks. The track layout at the Harvard station did not provide for a loop around the operating station building, and only one Y entrance and exit gives ingress and egress to the storage yard and the running repair shop tracks. In the present layout six storage tracks make the complete loop. The present capacity of this yard is sufficient for 146 cars but only ninety-eight are being operated out of this station at the present time.

Like the Denison Avenue terminal, the station building fronts on Harvard Avenue and is 50 ft. x 110 ft. in plan. Immediately back of this, and with a 30-ft. paved area intervening, is the running repair shop building which is 100 ft. x 120 ft. in plan. The station building proper is built of cherry-red brick laid in white mortar trimmed with terra cotta, and has an



CLEVELAND OPERATING STATIONS—SIDE VIEW OF HARVARD STATION BUILDINGS AND YARD OUTLET TRACK

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ornamental tile roof. The running repair shop is of plain construction, but is also built of red brick laid in white mortar with a reinforced concrete roof on structura lstel supporting beams. The area between the entrance and exit Y-tracks and the station building has been sodded and the lawn is carefully kept so that the appearance of the station layout from Harvard Avenue is quite pleasing. Other construction details are essentially the same as the Denison Station.

The construction of these terminal stations was under the general supervision of Terance Scullin, master mechanic, who also has charge of the running repair shops. Station operation, in so far as it affects the trainmen, is under the direction of the division superintendent, who makes his headquarters in the station building. The track layout was designed and installed under the direction of C. H. Clark, engineer maintenance of way, and the overhead lines and lighting system by L. P. Crecelius, electrical engineer. David W. Morrow, of the firm of Morrow & Cross, was the civil and architectural engineer who designed the buildings and supervised their construction.

"How to Treat the Public"

During the Past Year a Special Series of Heart-to-Heart Talks on the Duties of Trainmen to Passengers Has Been Given in the Twin City Carhouses—Excerpts from a Recent Address Are Published

WHILE the Twin City Lines of Minneapolis and St. Paul, like all other companies, have always endeavored to teach their trainmen how to handle passengers most efficiently, nevertheless during the past year J. J. Caufield, general superintendent, and A. W. Warnock, general passenger agent of the company, together have worked out a plan for effectively training conductors and motormen, which has brought forth most gratifying results.

Under this plan all complaints of whatever nature are referred to the general passenger agent, who thus acts as a buffer between the public and the company. The general superintendent co-operates closely by helping to remove the causes for complaints as soon as the general passenger agent refers the complaints to him, as well as by checking the employees against whom the complaints have been made. At intervals of about a month the general superintendent arranges to have as many men as can be spared from their work called into the various station clubrooms to listen to a heart-to-heart talk by the general passenger agent. Every employee about whom any complaint has been received since the last talk is obliged to attend these meetings, as well as all the extra men and as many regular men as possible. In these talks Mr. Warnock begins by referring specifically to each of the complaints entered against that station, although he does not mention the badge numbers or names of the offenders, and as each complaint is mentioned he offers friendly suggestions as to how the trouble with the passenger might have been avoided and how the trainmen should have acted under the circumstances so as to have avoided any dispute. After these specific cases have been taken up, Mr. Warnock gives a general talk of about twenty minutes on how to meet all the inevitable troubles that are bound to arise with passengers. These talks are always received enthusiastically by the men, and when a notice is put on the bulletin board a few days in advance of the meeting, it is sure to bring out a large attendance.

The Twin City Lines have six stations, and the attendance at the meetings at each station averages about 200 men. No less than fifty-four of these addresses have been given during the past year. Every effort is made to have the talks entertaining as well as practical, the thought being closely followed that if a man is to be taught anything he should be entertained as well. The following excerpts from a talk by Mr. Warnock will give the readers of this paper an idea of his mode of treatment.

"Rules can be made to cover every situation, but, after all is said and done, you must use common-sense in following them. And we expect you always to use common-sense. By using common-sense you can do much to make our service more attractive and avoid cause for complaint as to your conduct.

"The company expects you to be careful and zealous to protect its property and interests, to take a just pride in the service in which you are engaged, and urges you to bear in mind that in any public service, whether street railway work or any other employment where you come in contact with the public, you are constantly called upon to exercise care, patience, forbearance and self-control.

COURTESY TO PASSENGERS

"First, last and all the time, always be civil and courteous, no matter what the provocation. Trying situations may arise, when it is difficult to follow that rule, but strict adherence to the rule of politeness to every passenger under all circumstances will save complaints being made against you. You will also make friends for yourself and for the company by which you are employed. It is often difficult to be courteous to people who are not courteous to you. But you must learn to take such difficulties in good temper; it is a part of your job. You must treat passengers courteously, no matter how they may treat you.

"Common courtesy is the duty of every man who meets the public, in any capacity. In handling the public we must all take the public as it is and not as it should be. Those of us who come in contact with the public can do much toward educating it by our example. The good-will and friendship of the communities served by this company are greatly desired. The strongest recommendation for promotion which an employee in any department can have is the fact that by uniform courtesy and accommodation to patrons he has secured for himself and for the company the good-will and friendship of the public he serves each day. For this reason all employees of the Twin City Lines are earnestly urged to extend to patrons of the road every courtesy and to bear in mind the fact that our sole purpose is to furnish the public the highest class of service and that the character of the service—its acceptability to the public—depends in a great measure upon the spirit in which it is rendered.

"If every conductor and motorman will treat every passenger in the same way that he would like to have his mother, wife, daughter or sister treated under similar circumstances by some other trainman, we are sure the resulting good service will cause all our passengers to feel kindly toward us.

"Kindness is one of the manliest of qualities. Be

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kind and considerate even though the weather is disagreeable and your passengers are irritable. Make it a habit to be kind. Kindness is the greatest friend-maker and friend-keeper in the world. People won't stop riding on your car because they do not like you, but they will judge our whole service by your conduct. It is up to the company to give the public satisfactory service, not only in cars and equipment, but in men, and that is the reason why we strongly emphasize the necessity of being kind and courteous as well as careful at all times.

"And be courteous not merely most of the time to most of our patrons, but all of the time to all of our patrons.

COLLECTING FARES AND MAKING CHANGE

"Sometimes a dispute arises between a passenger and a conductor as to whether fare has been paid or not, the passenger contending that he has already paid it. A conductor may also make the mistake of asking for a second fare from a passenger, particularly if the passenger has changed his seat after paying his fare. In both of these cases the conductor should accept the passenger's word without any comment whatever, and not demand another fare. The same rule applies when a parent in charge of a child says that the child is under six years of age, and therefore should ride free. Conductors must not question such statements from parents. The parent certainly knows how old the child is. Even though the conductor has good reason to doubt the parent's word, he must not say so.

"If a passenger pays fares for other passengers on a car and points out where the passengers are sitting or standing, the conductor must take pains to see that the second fares are not collected from such passengers. If he should make such a mistake and a demand is made for refund, the conductor must not refuse the passenger in a rough or uncivil manner. The conductor should explain that when once he has rung up fares on his register he is not permitted to make refund of same under any circumstances, or fail to ring up the next fares collected. He should say: 'I am sorry I made this mistake and that you are put to any trouble, but if you will please drop a postcard to the general passenger agent, he will make the matter right with you.'

"There is no definite rule as to how large a bill you are obliged to change. We want you to change any piece of money that you can. A good way to check yourself as to what you have received from a passenger is to name the denomination when you receive the coin or bill. If a passenger hands you a 50-cent piece, say to him, 'Fifty cents,' as you take the coin, or 'Five dollars,' as you take a five-dollar bill or gold piece. Such a check will not leave any room for doubt as to what the passenger gave you. It will save you from giving wrong change.

"Be sure, absolutely sure, you give every passenger his proper change. Let there be no mistake about that. Every passenger must get what is coming to him. While you can accept Canadian coins for fare, nevertheless, if passengers object to receiving Canadian coins in change from you, give them United States coins.

"Conductors must not show annoyance when passengers give them large pieces of money to change, nor should they take out their feelings on passengers by returning them a lot of bulky change. If a passenger asks for any particular kind of change, whether bills or large silver pieces, instead of small change, try to accommodate him and give him what he wants. If you cannot give him what he desires or are obliged to hand him small coins, say: 'I am sorry I cannot give you anything better than this.' Change must always be returned to a passenger in a civil manner. Never throw change on the lap of a woman, but hand it to her in the same decent way you would like to have change handed to you.

"Conductors must never make comments as to money they receive from passengers, so long as it is good money. Do not tell passengers that they should provide themselves with smaller change before getting on your car, or threaten that you will not change any more money for them, if they offer you large coins or bills in the future.

"If, when you hand money to a passenger, any of it is dropped on the floor, pick it up and hand it to the passenger, even though the accident was the passenger's fault. Such a little service is a courtesy sure to make a friend. The more little courteous things we do for those with whom we come in contact, the more friends we shall make for ourselves. If a passenger hands you a bad coin or a foreign coin of such a kind that you cannot accept, explain to him quietly and politely why you cannot accept his money. By handling such a situation in a gentlemanly manner you will avoid another cause for complaint.

ISSUING ENVELOPES

"We believe this is the only company in the United States that issues envelopes to passengers when they find themselves on our cars either without any money or with bills or coins of such size that conductors are not able to make change. While this practice is abused considerably, nevertheless we are glad to continue it, not as an obligation on our part, but as an accommodation. Unless a bulletin is posted directing you not to issue an envelop to any particular passenger and he tells you that he has no money with him to pay his fare, you must issue him an envelop promptly without talking to him discourteously or lecturing him for not having money with him.

ISSUING AND COLLECTING TRANSFERS

"Let there be no doubt whatever that you have offered a transfer to each passenger when he pays his fare. Sometimes a passenger will complain that a transfer was not offered to him. He may not know our general rule, which is the same as in all large cities and designed particularly for the benefit of passengers, that transfers are issued only when fare is paid. See that the passenger gets a chance to take a transfer by asking him distinctly if he wants one, and to what line he desires to transfer so that you may punch same correctly. If care is taken in this regard, many other complaints will be avoided.

"Keep thoroughly informed as to all our transfer rules, know and understand how to punch your transfers properly, and be careful to do so. Also understand what transfers are good on your line, and how they should be punched. Be careful that you do not refuse a good transfer, and be absolutely sure when you do refuse a transfer, for any reason, that you are in the right and following your rules intelligently.

"If a passenger gets on a car with a transfer that has been mispunched in any way by the issuing conductor, or if he gets on a car away from the proper transfer point, or if he presents a mutilated or torn transfer, it is necessary to collect a second fare from him. But be sure that you do so civilly. Explain to the passenger politely why the transfer is not good and why you are not able to accept it. If the passenger says that the transfer was given to him mispunched or torn, or that he was told to get on the car at the wrong place and that he took the first car, in other words that he was not to blame, we are sure you will have no trouble with him if you will say to him: 'I am sorry that

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our rules do not allow me to take your transfer' (explaining the reason). Please pay me another fare and mail your transfer to the general passenger agent, and he will reimburse you for the transfer, as well as for the postage you spend in sending the transfer to him.' Such a civil explanation is sure to satisfy the passenger in such cases.

"If a passenger finds a misplaced transfer and asks for a return of his cash fare after you have rung it up, tell him that you are not allowed to refund a fare after you have rung it up, but that it is not necessary for him to be out of pocket by reason of his mistake. Tell him to mail the transfer to the general passenger agent, who will promptly refund, as already mentioned.

"If a passenger takes a transfer when he pays his fare, and later on decides that he wants a transfer to another line, you should exchange it for him on his request, without any comment on your part, such as telling him in the future to make up his mind what he wants.

No Nuisances on Cars

"In order to give our patrons the best service, all nuisances on our cars must be stopped. This includes passengers who act in a disorderly manner, who use profane, vulgar or obscene language, who mutilate the company's property, such as cutting car seats, who spit anywhere on the car, and who smoke in the car except on the platform, as well as those who are intoxicated to the extent that they are offensive or frighten other passengers. Handle all such cases with good judgment without getting angry or losing your self-control.

"If a passenger gets on your car thinking it is the car he wants and almost immediately afterward finds that he has made a mistake, let him get off at once on his explanation to you that he made a mistake. Do not insist on collecting his fare and issuing him a transfer, unless you know positively that such a transfer will be accepted on the car he wants. If you cannot issue him a transfer to his proper car, let him off without collecting any fare. Do not tell him to keep his eyes open next time or make any uncivil remarks. We all make mistakes.

"Keep your car seats and floor free from paper and other rubbish and thus have your car neat and tidy at all times.

Serving Passengers

"We want all conductors to comply readily with the reasonable little requests made by passengers that contribute to good service. As far as possible help on and off your cars women and children, the aged, the weak and the helpless, and open and shut the doors for them, as well as shut the doors after all passengers who do not do so themselves. Shut the doors promptly when a passenger asks you to do so. Do not say: 'Shut it yourself,' or anything of that sort.

"If you see a passenger trying to open or close a window and you can take the time to do so, step up and open or close it for him. The passenger probably does not know how to do it as quickly as you do. Do not tell him you haven't time. Take time. If a passenger asks you to open a ventilator, do so even though it is best to close it after the passenger gets off. Ventilating a car is a serious problem, which we are studying, and our cars are not all equipped with the same sort of ventilators.

"If a passenger raises a front curtain when the lights are turned on, do not pull it down angrily and tell him to mind his own business, that you are running the car, or anything of that kind. He may have raised the curtain unthinkingly. Simply pull it down and say: 'Please do not raise the curtain. The motorman cannot see to do his work properly with the curtain up while the lights are on in the car.' Such a suggestion is sure to be received in good spirit, and you will avoid unnecessary trouble. When it is necessary to ask passengers to move up in front on account of blockade in the rear part of the car, do not say, 'Move up in front, there,' in a surly tone. Put a smile in your voice and say, 'Please move up in front.' Here again courtesy will do the work best.

"If a passenger gives the signal for a car to stop and for any reason the car does not stop, the conductor must give the overhead signal promptly to let the passenger off. If a passenger gives the overhead signal himself, the conductor must not resent the action in any way, as a passenger has a right to do so under the circumstances.

"While we do not believe it is good policy to permit conductors to give information to passengers relative to articles claimed to have been lost on our cars, nevertheless that does not mean that conductors should mislead passengers by telling them that they have not found any articles, when they have. Simply say: 'I cannot give out any information as to lost articles. Please call at the general office and inquire at the lost article department.'

Personal Appearance

"All trainmen are urged to present a neat personal appearance at all times. A man's appearance has much to do with his success or failure in any work involving contact with the public. A man of slovenly appearance is often taken for a man with a slovenly brain, and hence is overlooked when chances for promotion come up. Keep well-washed, well-shaved, well-brushed. Get the clean, well-groomed habit.

Answer Questions Promptly

"Questions must be answered carefully and correctly and with a cheerfulness that does not offend or discourage the questioner. It should be remembered that questions which on their face appear to be foolish to those familiar with our business are not foolish to the person asking them and should be answered promptly and kindly. You, with your experience and training, are thoroughly familiar with many things that strangers in the city, and even local people, do not know, and you should bear that fact in mind, and, in replying to questions, always give the information fully and plainly in as few words as possible and without any suggestion of superiority born of greater knowledge. It is true that the manner in which a statement is made or question answered by any person serving the public is frequently more aggravating and offensive than the words that are used. A kind and gracious manner is the mark of a self-respecting man—and a man who respects himself rarely fails to command the respect of others.

"The efficient trainman, or man in any walk of life, does not discriminate between rich and poor, men, women or children—or between a well-dressed person and a poorly-dressed one. He treats everybody with equal consideration. Keep posted as to location of streets or public buildings and points of interest along your line and all other lines, so as to give the public accurate information. Every employee has many opportunities to increase the value of his services by a little personal effort that costs him nothing, and wins smiles of approval that are more desirable than frowns.

Finally—Never Get Angry

"Do not get angry under any circumstances. Remember, if you are in the wrong, you can't afford to get angry; if you are in the right, you don't need to get

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angry. When a man gets angry, he discounts his ability heavily.

"For his own personal good and the strengthening of his character, every street railway employee should cultivate the art of smoothing things out—truly more satisfactory than to end the run of a day with some useless altercation with a patron rankling in his mind and filling his hours off duty with worry. A prominent street railway man has wisely said: 'There is no place in which the golden rule can be so effectually employed or will pay such large dividends as on our modern street cars.' And the application of the golden rule with Twin City trainmen simply means this:

"'Treat every passenger with whom you come in contact exactly as you would like to be treated if you were the passenger.'

"Every victory over discourtesy is well worth the effort and makes the man bigger and stronger and a better employee. It brings him nearer promotion and raises him in the esteem of his family. It pays to be good-humored. It pays to control yourself.

"We feel confident that our trainmen will all join in the effort to be watchful and considerate of our passengers' safety and comfort. Let us all check ourselves and resolve that as far as we are each concerned, no patron can ever complain justly against us for failure to do our work honestly, cheerfully and properly."

San Francisco Municipal System Without Exposition Traffic

Comparison of Figures for Fiscal Year 1915 with Those of First Four Months of 1916—Comment and Criticism Thereon

ELECTRIC railway officials throughout the United States may be interested in up-to-date figures for the Municipal Railways of San Francisco. The accompanying income statement is made up from the official report of the municipal lines for the year ended June 30, 1915, and from figures on file with the public authorities in San Francisco for the first four months in the calendar year 1916. The statement, therefore, involves a comparison between an abnormal period, which included four and one-third months of exposition travel, and four months of the post-exposition period. Comparison on this basis shows a deficit of $80,216 for the first four months of 1916. There is some difference of opinion in San Francisco as to how these figures should be interpreted, and points on both sides of the question are presented below.

INCOME STATEMENTS OF MUNICIPAL RAILWAYS OF SAN FRANCISCO FOR FISCAL YEAR ENDED JUNE 30, 1915, AND FOUR MONTHS ENDED APRIL 30, 1916

	Year Ended June 30, 1915	Four Months Ended April 30, 1916
Operating revenues:		
Passenger revenues	$1,630,778	$475,787
Miscellaneous revenues	7,886	†2,628
Total	$1,638,664	$478,415
Operating expenses:		
Ways and structures	$40,716	$17,689
Equipment	64,787	27,194
Power	201,098	75,708
Conducting transportation	564,186	211,604
Traffic	308	79
General and miscellaneous	52,293	15,182
General and miscellaneous (comparison charges required by charter)	7,768	†2,590
Depreciation, 18 per cent of gross revenue*	294,959	85,642
Total	$1,226,115	$435,688
Net operating revenue	$412,549	$42,727
Miscellaneous income	10,407	†3,500
Gross income	$422,956	$46,227
Deductions from income:		
Taxes (comparison charges required by charter):		
State franchise, 5¼ per cent on gross operating revenue	$86,030	$25,116
Municipal franchise, 3 per cent on passenger revenue	48,923	14,274
Municipal car license	2,471	610
Federal income, 1 per cent on net income	830	.....
Total taxes	$138,254	$40,000
Interest on funded debt	202,567	86,443
	$340,821	$126,443
Net profit or deficit	$82,135	‡$80,216

NOTE: The Municipal Railways pay no taxes, nor is any payment made for services rendered to the railway by other departments of the municipal government. The above income statement includes the comparison charges required by the charter.

Taking the profit shown above for year ended June 30, 1915		$82,135
And adding comparison charges for legal and clerical services	$7,768	
And comparison charges for taxes	138,254	
		146,022
Produces the true net profit for the year		$228,157
Taking the deficit shown above for first four months of 1916		‡$80,216
And deducting comparison charges for legal and clerical services	$2,590	
And comparison charges for taxes	40,000	
		42,590
Produces the true net deficit for the four months		‡$37,626

†Estimated on the basis of one-third of the 1915 figures. ‡Deficit.

*The reserve for depreciation and renewals is computed at 14 per cent of the gross operating revenues, instead of on annual percentages of physical value of the property. The rate of 14 per cent is arbitrary, being based on Chicago experience as reported by Bion J. Arnold (12 per cent) and the opinion of Delos F. Wilcox as expressed in a paper on "Elements of a Constructive Franchise Policy." There is added 4 per cent on the gross revenue for injuries and accidents, this percentage being based on the experience of United Railroads of San Francisco. This method is simple and direct and if subsequent actual experience shows the rate to be too high, adjustment may easily be made.

PRESENT STATUS AS CITY OFFICIALS SEE IT

City officials in close touch with the situation point out that it is unfair to take as an indication of future conditions any figures compiled for the months following the exposition period or to make a comparison between these figures and the earnings during the heavy travel of 1915. In San Francisco the first four months of the year always contain a low percentage of the casual or occasional riding element. This year, in addition to the reaction from the exposition, this period included unprecedented inclement weather—twenty-six rainy days in January and fifteen in February. The extremely heavy service last year required of the municipal railway system (which carried 50 per cent of the exposition attendance, totaling almost 19,000,000) could not be consistently cut down in a day to meet the adverse January conditions. The average car mileage operated at present is approximately 18 per cent less than the average for the year 1915, and naturally this reduction in service has of necessity been gradual and readjustments are still being made.

Practically the entire reduction in revenue in the 1916 months under that of 1915 is on what may be considered primarily the exposition lines. The municipal railway extensions constructed under the bond issue of 1913, subsequent to the original Geary Street municipal line, were built with the view of giving necessary and immediate service to the exposition and at the same time forming a nucleus of a comprehensive municipal railway system. In order to serve the exposition considerable mileage of these extensions was built through districts with a very light population density. This naturally meant that, with the passing of the exposition, the revenues on these lines were bound to fall off materially, necessitating operating them at a loss until, owing to the transportation facilities, the population density and the riding habit would be developed. As an instance of this, it is pointed out that passengers carried on the "C" line this year will be in excess of the total number carried on this line during the exposition year, if the record of the

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half year just ended is continued. This is owing to the development of the district which this line serves. Traffic on one or two other lines into sparsely settled areas is rapidly developing in the same way.

It must be realized further that in order to accommodate the exposition crowds the municipal railway provided car capacity approximately 75 per cent in excess of the actual maximum requirements for the conditions following the exposition. These cars will be required for extensions of the municipal railway system now under construction or contemplated, but the interest charges on these cars and the carhouse, together with $500,000 of construction in progress and not operating, appear as a charge against operation.

"To consider the city's interest from a broader point of view," said M. M. O'Shaughnessy, city engineer, "it is almost axiomatic that the railway extensions should precede population rather than follow it in these new districts. The exposition lines of the municipal railway system are serving to develop permanently those districts through which they pass, and it will be but a short time until their growth will respond to the railway service. It cannot be too strongly emphasized that while the tabulation of operating revenues and costs sets forth all of the results in which a privately owned railway system is interested, to a municipality there is the large, unseen, but nevertheless real, return caused by the increase in the taxable value of the property served by the railway."

AN OPPOSITE VIEW OF THE SITUATION

A glance at the accompanying statement will show that all of the figures for 1916 are actual with the exception of the relatively small amounts for miscellaneous revenues, miscellaneous income and the comparison charges required by charter, these being liberally estimated on the basis of one-third of the 1915 figures. The primary cause for the present deficit seems to be the large increase in operating expenses and interest, combined with a material decrease in passenger revenues. For a period 33.3 per cent as long, the passenger revenues for the four months of 1916 amounted to only 29 per cent as much as those in the fiscal year 1915, while the operating expenses were 35 per cent and the interest on funded debt 42 per cent as large. This showing in operating expenses arose from the fact that, as compared to the fiscal year, maintenance of way and structures for the four months was 43 per cent, maintenance of equipment 42 per cent, power 37 per cent and conducting transportation 37 per cent as great, while the amounts for traffic, general and miscellaneous and the charge for depreciation and injuries and accidents were relatively lower.

In the note given at the bottom of the statement it is said that the true profit or the true deficit for the year should be the amount shown on the statement, exclusive of taxes and comparison charges for legal and clerical services. While figures compiled on this basis certainly would not show the true earning capacity of the property under municipal ownership as compared to private ownership, it is interesting to observe that on this assumption the deficit of $37,626 for the four months would be turned into a deficit of about $110,000 for the full year 1916.

At the present time there are two municipal railway sinking funds in operation: (1) the Geary bond redemption fund, amounting to $95,000 per annum, and (2) the Market Street redemption fund, amounting to $6,000 per annum, making a total of $101,000 per annum. The proportion of this $101,000 per annum for the four months ended April 30, 1916, would amount to $33,667. Payments on account of sinking funds do not technically constitute charges against income, for which reason this stated amount does not directly affect the income figures previously given. To meet these payments, however, in the face of the existing deficit it would be necessary to draw upon the assets represented by the preceding surplus or by the comparison charges for the four months. The net result of either course would really be to leave the depreciation reserve practically unsupported by any assets except those representing the old surplus, which condition, if maintained through annual deficits, would probably in time render the reserve meaningless. In this connection it should be mentioned that in addition to the two sinking funds already in operation there is one for the municipal street railway bond issue, amounting to $3,500,000, which begins on Dec. 1, 1918, at the rate of $100,000 per annum.

Recent Jitney Data from Los Angeles

THE accompanying illustration shows one of the new sixteen-passenger bodies of the "pay-as-you-leave" type, as used in Los Angeles, Cal. This type of jitney is increasingly popular, a local factory stating recently that it has been doing a thriving business in these bodies as a side line at $500 per car. Late in June more than twenty such buses were reported operating on a single Los Angeles route. It is notable that passengers are willing to enter these buses when all seats are taken, and as a result many of the buses are now provided with straps suspended from the top whereby standing passengers may steady themselves.

SIXTEEN-PASSENGER JITNEY NOW POPULAR IN LOS ANGELES, CAL.

The following statistics were compiled by the Los Angeles Railway in a recent check on the jitney situation in that city:

COUNTS OF LOS ANGELES JITNEYS MADE BETWEEN 6 A. M. AND 12 MIDNIGHT.

	1916		
	March 27	April 24	May 25
Number of automobiles found operating at various times during the day	330	364	367
Number of automobiles operating ten hours, computing from the total time of all autos	306.59	314.98	343.77
Average number of round trips per car	11.89	11.12	11.96
Average number of round trips per ten hours	12.80	12.23	12.77
Average mileage per car	112.85	110.70	119.34
Average mileage per car for ten hours	121.47	127.92	127.40
Total mileage of all cars	37,242	40,296	43,799
Total passengers (by checkers)	32,778	34,189	34,949
Total passengers (plus 20 per cent)	39,334	41,026	41,938
Total receipts at 5 cents each	$1,966.00	$2,051.30	$2,096.90
Round trips	3,924	4,050	4,390
Passengers per car-mile	1.06	0.982	0.95
Earnings per car mile	$0.053	$0.051	$0.047
Earnings per ten-hour car	$6.42	$6.51	$6.09

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Advertising for Increased Business

House-to-House Canvass and Newspaper Advertising of City Light & Traction Company, Sedalia, Mo., Secured Traffic Increase for Company

THE City Light & Traction Company, Sedalia, Mo., one of the Doherty properties, recently started a novel movement in soliciting railway business by means of a house-to-house canvass and newspaper advertisements. This practice has long been used by gas and electric companies for the purpose of securing both good-will and additional business, but this is the first case of its kind—as far as is known—where it has been used by an electric railway. According to Harry D. Frueauff, general manager of the company, the publicity methods are bearing fruit in the form of traffic increases, it being his opinion that the house-to-house canvass has accomplished much toward this end in supplementing the newspaper advertisements.

REASONS FOR METHOD USED

In the summer of 1915 many electric railways which were attacked by the jitney pest appealed to the people of their communities through newspaper publicity, and it was generally conceded that these campaigns greatly strengthened the companies through the better understanding of their problems by the public. Mr. Frueauff was greatly impressed with the merits of such a publicity plan over the one more generally used, that of using political influence and legal restrictions to control such unfair competition, it being his belief that the publicity plan left the public with some good sound arguments in the railway's favor instead of the old suspicions of the power of special privilege and the misuse of influence. Having become interested in the publicity plan used, Mr. Frueauff went one step farther and asked, if at a time of special burden like the foregoing, business could be saved for an electric railway through publicity, why new business could not be gained by the same means. The Doherty gas and electric business and almost every other modern business had been made to grow by proper advertising and publicity methods, and he wondered why it would not be wise to endeavor to inculcate a street car riding habit by advertising and personal solicitation.

NEWSPAPER CAMPAIGN

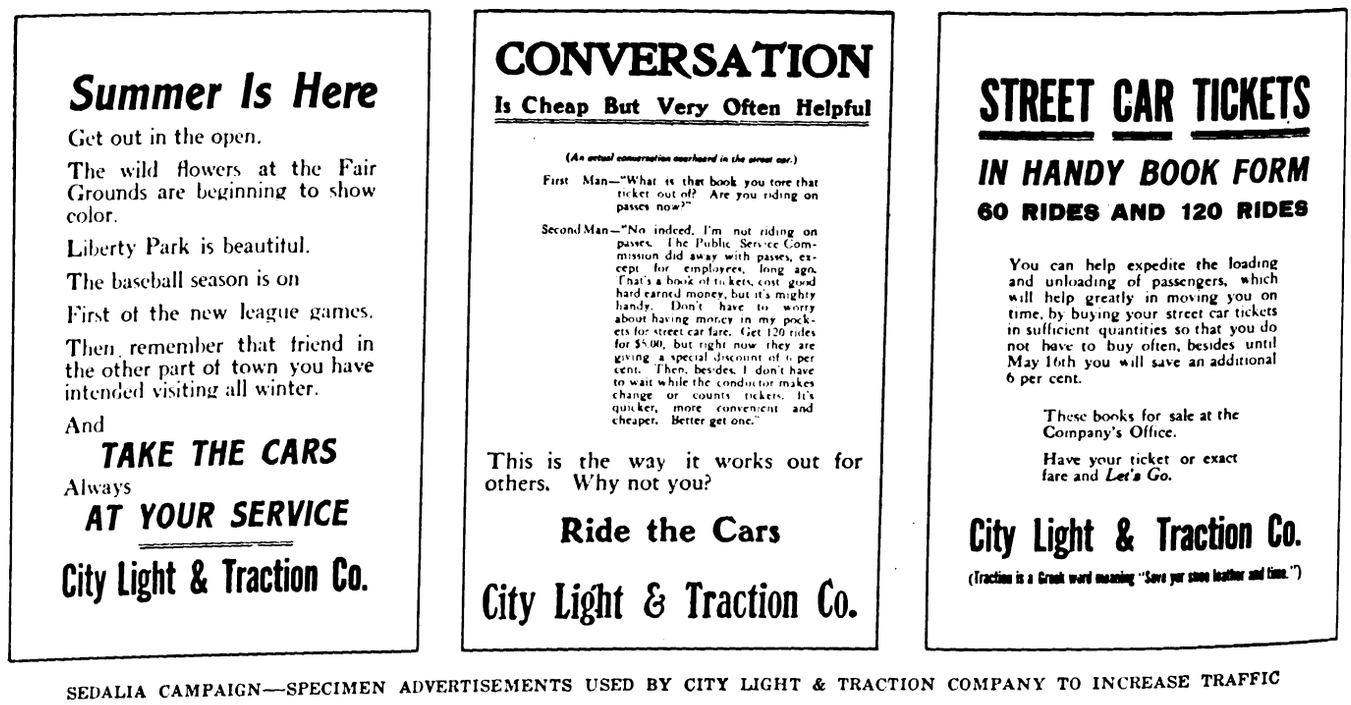
The City Light & Traction Company finally decided to begin a business campaign for its traction department in January, 1916. Since that time the company has been running in the Wednesday and Sunday issues of the daily papers advertisements telling the public of the value to the community of the street car system and of some of its problems, openly and honestly showing the figures involved, and telling of the company's desire to get new cars and of their cost. The accompanying illustrations show some of the different kinds of advertisements used.

In one advertisement, not reproduced, the company emphasized the fact that 109,938 fewer passengers rode in 1915 than in 1914, and asked the public how long it could continue to make improvements in the face of such a decrease in patronage. The company put it squarely up to its patrons that improvements as well as the solution of problems could only be accomplished through their help, and it at all times dealt with them on the basis of a mutuality of interest in the railway service.

Other advertisements, aimed to reach the casual rider, contained the following:

"Now why, if street cars are a convenience to you in stormy weather when it is cold or sloppy, or in warm weather when the sun is too hot to bear, isn't it reasonable that they should have enough support at other times to warrant their existence?

"In order to keep our cars running to-day we have fifteen men working on the track with shovels, picks, brooms and salt. We do not object to this extra expense which we incur in order to give you service, but



SEDALIA CAMPAIGN—SPECIMEN ADVERTISEMENTS USED BY CITY LIGHT & TRACTION COMPANY TO INCREASE TRAFFIC

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This Coupon Good For

15c } **in payment on $2.50 (60 rides) book of** Street Car Tickets if presented by May 15th, 1916.

30c } **in payment on $5.00 (120 rides) book of** Street Car Tickets if presented by May 15th, 1916.

These are for your convenience. Many have requested books of tickets so that they would not be bothered by having to buy so often. They are transferrable. With your ordinary riding and the Park season opening soon, get one of these Books now. Easily carried in the pocket. Take up very little room. Lay out this amount pay-day and make this saving:

60 rides at 5c, $3.00; Cost by using coupons, $2.35; saving on investment 27 per cent. 120 rides at 5c, $6.00; Cost by using coupons, $4.70. saving on investment 27 per cent. Tickets good any time. Bring this coupon to our office and $2.35 for a 60 ride book. Bring this coupon to our office and $4.70 for a 120 ride book.

Sign here: Name.....

Address.....

City Light and Traction Co.

404 South Ohio St. NOT GOOD AFTER MAY 15, 1916

SEDALIA CAMPAIGN—ADVERTISEMENT SHOWING SPECIAL TICKET OFFER AND SAVING THEREFROM

we do want to suggest right here that this is made possible not by the occasional rider but by the regular rider, the one who uses the cars morning, noon and night, in sunshine and snowstorm."

Still other advertisements played up these points:

"If you see a gang of men cutting up the pavement near the street car tracks or some new ties going in, and if you occasionally have to transfer around a piece of work, please observe with a smile on your face. We are doing this to improve our tracks and your streets. With your help and support we can give you about the 'niftiest' street car service you'll find anywhere. All we need is riders. Be one."

"Please remember that if the car is a little late some rainy night, it is because the number of starts and stops have increased, owing to the number taking advantage of the comforts of a ride under cover. Be a regular rider."

One of the accompanying illustrations describes the company's special offer of $2.50 and $5 books of street car tickets (good for sixty and 120 rides) at a discount of 6 per cent up to May 15. The company made a special endeavor to explain the advantage of using the tickets, both through the newspapers and through the house-to-house campaign, inasmuch as it was confident that if it could get tickets into the pockets of patrons there would be more frequent and more regular riding.

In order to further its newspaper work for increased business, the company also, between Jan. 20 and March 1, had a contest among the operators on the cars, offering prizes and commissions to the men selling the most tickets. This caused them to urge the purchase of tickets by many who did not ride on the cars regularly. During part of this period the weather was bad, and this gave the company a good chance to talk business to many spasmodic riders. Under the original plan for the contest, a prize of $5 was offered to the man selling the most tickets, $3 for the second and $1 for the third, the standing being posted each week. At the end of the second week, however, three of the men were so far in advance that the company found the others had about given up hope and were taking no interest in the contest. The company, therefore, posted a supplementary notice offering 3 per cent of whatever the sales were up to a certain figure, and 5 per cent if this figure was exceeded. This had the desired effect, and every one of the car men worked aggressively during the remainder of the contest. About 11 per cent more tickets were sold than the amount necessary to entitle the men to the 5 per cent commission.

SEDALIA CAMPAIGN — BILL HOOK DISTRIBUTED TO HOUSEWIVES BY CANVASSER

HOUSE-TO-HOUSE CANVASS

To back up all the preceding endeavors, the company arranged for a house-to-house canvass of the districts from which it ought to get riders. For this purpose it used one man of pleasing personality, an extra man off the street car at 20 cents per hour. On his first visit this canvasser left a blotter on which was printed a time-table for the cars on the various lines of the company. This was very well received and the company had an additional edition printed. On the second trip around the man left a little souvenir for the lady of the house to hang on her kitchen wall to facilitate the keeping of grocery bills, etc. This consisted of a hook having at its top a circular celluloid plate, as shown in the accompanying illustration, plainly emphasizing the importance of buying street car tickets on pay days and the saving therefrom.

Shoe Leather vs. Traction Service

Some time ago we felt it would be interesting information to know just how many people living contiguous to street car lines walked instead of rode.

To secure this information we stationed men at Second, Third and Fourth and Grand Avenue; at Lamine, Ohio and Osage and Thirteenth Street and Katy Tracks and Third and Fifth Streets. We asked them to count the people walking from 6:30 to 9:30 a. m., from 11:30 a. m. to 1:30 p. m. and from 5:30 p. m. to 7:30 p. m., a total of 6 hours. We did this for three consecutive days. These figures show that every day between these hours there are nearly 3200 people walking instead of riding. Did you know that that is more than ride our cars, all of them, from 5:30 a. m. to 11:30 p. m.?

If 10% of those people rode the cars we would have shown progress last year instead of a loss in passengers carried of 109,938.

Be One Who Will

Buy Tickets - 6 for 25c

City Light & Traction Co.

Street Car Tickets Save Over 20%

IF the operator hasn't tickets to sell please report it at the office. We are making special efforts now that all may take advantage of this saving. We have arranged a competition among the men to see who can sell the most tickets. We want everyone to know and take advantage of this saving.

During the bad weather some few people are using the cars who do not regularly. Have you ever stopped to think who makes it possible to have cars running in bad weather, in good weather, or at all? It is the *regular* rider. He it is who makes it possible for you to have these conveniences when walking overhead or underfoot is bad. He it is who makes extensions possible, who helps procure new cars, who keeps up the track and paving.

Become a Regular Rider.

Buy Tickets 6 for 25c of the Operator or at the Company's Offices, 404 South Ohio St.

City Light & Traction Co.

"There Are Lots of Chaps Who Are Willing to Grunt While You Lift"

Be one who is willing to help.

We realize that our street car system is not all you would like. It's far from what we would like to have it. It takes car riders and **regular car riders** to produce what you and we both want.

Now, today get one of those time tables out of the cars. Find out when your car is due at your corner and see just how often it's there and when it should be. Every man in our employ is especially extending himself to be on time and give you service, and so are the employees of the Katy. They seldom ever block us and then only when absolutely necessary.

Wet tracks delay some but know this, 'we are trying'

Be One of the 300 Necessary Per Day

BUY TICKETS - 6 FOR 25c

City Light & Traction Co.

SEDALIA CAMPAIGN—SPECIMEN ADVERTISEMENTS USED BY CITY LIGHT & TRACTION COMPANY TO INCREASE TRAFFIC

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The main talking point of the canvasser was, "How does the railway service suit the public, and in what way can it be improved to fit their requirements more exactly?" He endeavored to find out any complaints that the street car patrons might have, and made a special point of emphasizing to them how with a single-track system and railroad crossings the cars would not always be on time. Along this line he explained the efforts of the company to give good service and keep the cars on time, and showed specifically the problems with which the company had to contend. This work was all done in the day time, inasmuch as the company believed that the lady of the house was really the one first to approach.

After straightening out any complaints found and making note of any suggestions offered, the canvasser explained the desirability of purchasing the street car tickets. If there were children in the home, he told of the half-fare tickets. He emphasized the percentage saving in the purchase of tickets, and made a special effort among the laboring classes to have them lay aside a certain amount each pay day so as to purchase enough tickets to last from one pay day to the next.

RESULTS OF CAMPAIGN

The canvasser has made many friends for the company, for he was a practical street railway man and could explain many things which the public should know and about which they had not thought at all. The company has received a great deal of favorable comment from the people called upon in regard to how the canvasser explained certain of the company's problems. Moreover, commendation has been heard on every side for the efforts of the company to find out the view of the people on how their requirements could be better met.

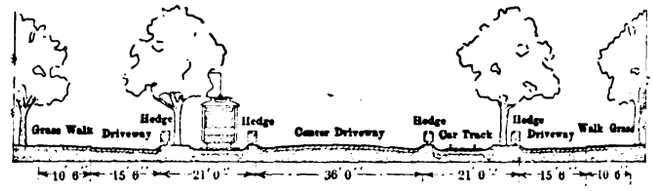
The efforts of the canvasser to get the public interested in the using of the cars and the advertisements to this same end have borne fruit in the matter of increased traffic. In January the company had the best traction earnings for this month in its history, and February lacked only $3 of the same record. Each of the first four months of 1916 has shown an increase over the corresponding month in 1915. The traffic increase over last year in February was 12.2 per cent, while the increase in March was 7 per cent. Mr. Frueauff believes that the house-to-house canvass accomplished much toward the traffic increase as an aid to the newspaper advertisements, although the latter have attracted national attention.

In general, the campaign has educated the public to a better understanding of the company's problems, some of which have before seemed insignificant to them but which in reality have much to do with service and especially with time-tables. The public also knows more about the cost to equip, maintain and operate a street railway system, and they are less inclined to take things for granted and realize that such a system requires support in order to fulfill its purpose. In Mr. Frueauff's opinion billboards could be used very effectively to supplement the efforts made in the Sedalia campaign, and in general publicity work of this character will grow. As it produces it should, in moderation at least, be made a permanent traffic expense.

One other feature that might be noted in regard to this publicity campaign is the fact that in Sedalia it is looked upon as being of service to the city as well as to the company. Local newspapers and quite a number of the citizens, who have found out that the story of this campaign has been spread far and wide as a mark of Sedalia progressiveness, have felt that the town has been benefited thereby. In other words, the town has profited by the publicity of the achievement just as the company has been helped by the traffic increase and better public understanding of its problems.

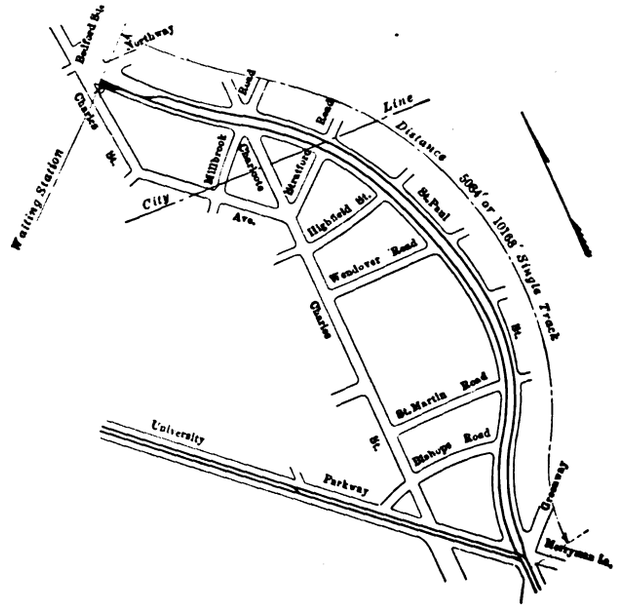
Guilford Extension in Baltimore

AN example of the way in which electric railways are assisting in the development of residential districts is furnished by the extension of service by the United Railways & Electric Company of Baltimore into the new section of that city known as Guilford. This is a high-class residential section which is being developed by a local company. Included in it is an extension of St. Paul Street, which is laid out as a handsome boulevard, as shown in the accompanying cross-section. The street is about 130 ft. wide with three driveways, a broad central roadway for through traffic and two nar-



CROSS-SECTION OF ST. PAUL STREET IN GUILFORD, BALTIMORE, MD.

row driveways for local travel. Provision has been made for the planting of trees and hedges, for underground conduits to carry all the heavy feed wires, and for slender iron poles with brackets to carry the light trolley wires. By these means the tracks and poles will be so placed and screened that they will cause no disfigurement. The railway company has extended its line on St. Paul Street for a distance of about 5100 ft., as shown in the accompanying map. The company's



MAP OF GUILFORD, BALTIMORE, MD., SHOWING EXTENSION OF UNITED RAILWAYS & ELECTRIC COMPANY'S ST. PAUL STREET LINE

standard track construction has been used in this extension.

The company has had two car lines operating over routes bordering this section for some years and felt that ample transportation facilities were being provided for this district. However, the people in Guilford and the development company were anxious to have a car line through the development, and an agreement was made with the railway for the extension and for service as follows: Part of the service on the St. Paul Street

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line, one of the two above referred to, will branch off at Thirty-first Street and University Parkway and operate through Guilford, terminating at Bedford Square, St. Paul Street extended and Charles Street Avenue. The balance of the service on St. Paul Street will terminate at Thirty-first Street and York Road, Waverly, as at present. The new service will give through cars between Bedford Square and Baltimore Street on an eight-minute schedule in the rush hours, and Guilford will have not only complete electric car service, but will also be served by two motor bus lines. It is expected that the construction will be sufficiently advanced to commence operation over the extension about Aug. 1.

Salt Lake & Utah Railroad Extension

Line to Payson Taps Fertile Region—Freight Revenues Expected to Be 60 Per Cent of Total

THE Salt Lake & Utah Railroad is a 1500-volt d.c. interurban line, operating passenger, express and freight service. The company first started running cars through from Salt Lake City to Provo two years ago. A description of this first section of the line was published in the ELECTRIC RAILWAY JOURNAL for Jan. 2, 1915, page 54. Since then the line has been steadily extended and on May 20, 1916, operation of cars to Payson, 20 miles farther south, was begun. This latest extension taps a very rich farming community and it is expected that the resulting freight business will in a short time approximate 60 per cent of the total revenue derived from the operation of the line.

A celebration of the completion of the reclamation project and the extension of the Salt Lake & Utah Railroad Company's line to Payson was held in Payson on May 26 and 27, 1916. The Governor of the State, high officials in the Government service and prominent men of Utah, Idaho and other neighboring States were in attendance.

As now extended the line is 67 miles long, and the twenty-four passenger trains per day give an almost hourly service to Salt Lake City. In addition to the regular service the road now runs two limited trains per day each way. Substantial stations arranged to handle the varied business of the company have been built in every town along the line. At Payson the company has just laid the foundations for a new car shop, also.

GENERAL CHARACTERISTICS OF THE REGION

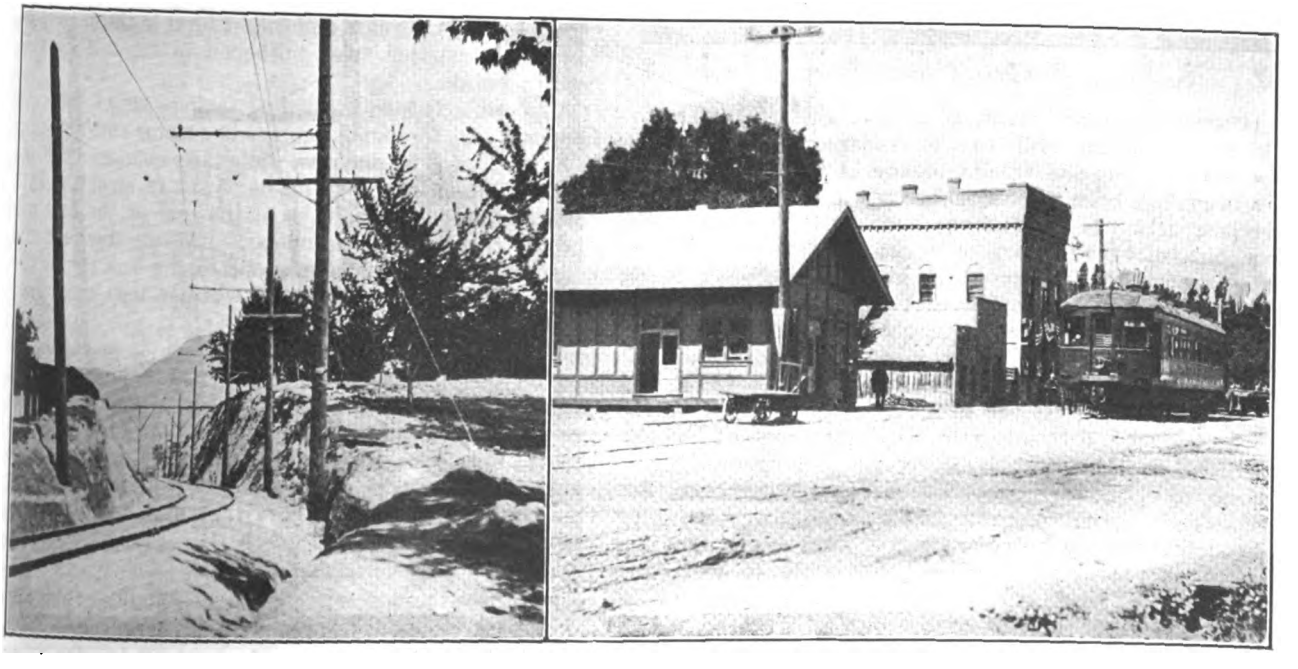
Payson, the present terminus of the line, is in the heart of the great government Strawberry Valley Reclamation Project, which consists of a storage works and a distribution system, separated from each other by more than 50 miles with a half mile of elevation. Some of the best agricultural land in the State is located in this district and the portion of it already irrigated has proved to be well adapted to the raising of fruit, alfalfa, sugar beets, grain and other products.

The interurban road is of special value, as it passes through the heart of the several towns served by its line, whereas the competing steam roads are in some cases 1½ miles from the center of town. Since its advent, the entire country to the south of Salt Lake has received a new impetus. Manufacturing establishments have been opened up and land values have increased. The Salt Lake & Utah Railroad, therefore, naturally expects excellent returns soon for its large outlay. The slogan of the company is "Freight rates with express service," and from present indications there can be no doubt but that in a very short time the freight revenue will exceed the passenger revenue.

SUBSTATIONS AND ROLLING STOCK

To assure reliability of service substations have been supplied at Granger, Bringhurst, Lindon and Springville, each equipped with 250-kw., 60-cycle, three-phase, 750-volt rotary converters connected two in series. In each substation one spare unit was installed and the buildings at Granger and Springville were arranged to accommodate two extra units. Catenary line construction was used.

The rolling stock of the company now consists of nine all-steel, high-speed Niles passenger cars, two express cars, one work car and five trailers. All motor cars have quadruple motor equipments and HL control, arranged for 750/1500-volt service. For local work in Provo, four single-truck cars with double equipments and hand control are used. In order to take care of the rapidly growing freight business, the company now has on order a 50-ton locomotive arranged for full speed



SALT LAKE & UTAH RAILROAD—OVERHEAD CONSTRUCTION AT SUMMIT OF 2.8 PER CENT GRADE, PAYSON; PAYSON FREIGHT AND PASSENGER STATION, SHOWING MOTOR CAR AND FLAT CAR TRAILER

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operation on 750 or 1500 volts. The car motors and controllers, the electrical equipment of the substations, and the catenary material were supplied by the Westinghouse Electric & Manufacturing Company.

The Field of the One-Man Car*

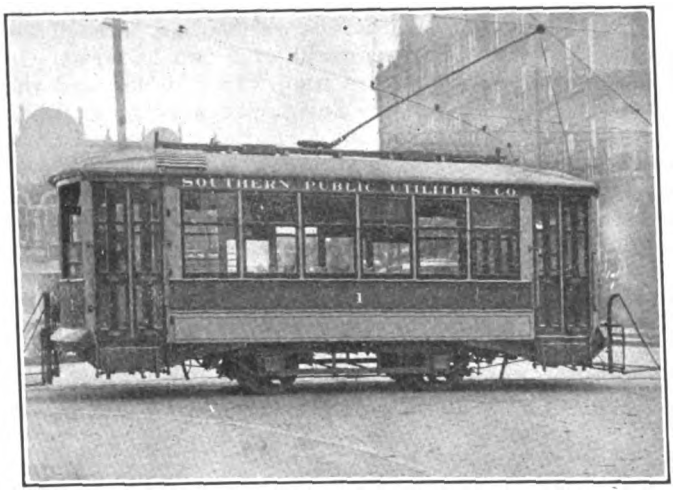
Conditions Under Which One-Man Car Operation Would Be Successful—Experience of Southern Illinois Public Utilities Company

BY J. B. ERVIN

General Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

IT has been stated that light-weight, one-man cars are now in use on 100 railways in this country alone. This is a comparatively recent development in the electric railway industry, and it is desirable to learn the various reasons for their adoption and to study the traffic conditions encountered and results accomplished so that the proper field for this type of car may be more definitely established.

Through the courtesy of the Southern Illinois Public Utilities Company the writer recently had the opportunity to become familiar with the railway conditions in Anderson, S. C. These are strikingly similar to the conditions in Corpus Christi, Tex., as described in a paper by D. R. Locker presented before the meeting of the Southwestern Electrical & Gas Association last May.†



ONE-MAN CAR, SOUTHERN PUBLIC UTILITIES COMPANY

Corpus Christi has a population of about 20,000 with 10 miles of track, while that of Anderson is less by perhaps 5000, but the track mileage is the same. Both railways had been recently subjected to very heavy track reconstruction expenses on account of the paving of the principal city streets, and the operating revenues of both have suffered by reason of the automobile traffic.

Both companies decided that the light-weight, one-man car offered the best prospect for increasing net earnings and, now that one-man operation has been tried out, are well satisfied with the change.

In Corpus Christi the headways, which were previously fifteen and twenty minutes, have been cut in half with an increase of only 6 per cent in operating expense, while the earnings have increased 30 per cent. In making the change the Corpus Christi Railway & Light Company purchased eight new cars weighing 12,000 lb., seating twenty-six passengers and equipped with air brakes and Westinghouse "Wee" motors.

In the case of Anderson the Southern Illinois Public Utilities Company was able to shift some of the larger cars to another of its properties and purchased five new light-weight cars for local one-man operation. On two of these new cars "Wee" motors were installed, and on the other three cars the electrical equipment was transferred from the old cars. These motors are of 19-hp. rating at 600 volts, and weigh 890 lb. each. They are of the smallest standard type yet placed on the market. Some of the old cars were retained for one of the Anderson lines having comparatively heavy traffic, and on this line it was found necessary to place a second man on the car during certain hours on Saturday and Sunday, but otherwise there has been no difficulty in collecting fares without interference with schedules. The cars previously used weighed about 24,000 lb. and seated thirty-two passengers, while the new cars weigh 17,000 lb. and seat twenty-four, with additional movable seats for six on the platform. As the traffic is very light and stops not numerous it was not considered necessary to equip the cars with air brakes.

Lines of short headway and heavy traffic appear at present to be beyond the field of usefulness of the one-man car. With large crowded cars one-man operation would increase the time of stops to such an extent that schedules would be lengthened and street congestion made worse. It has not yet been shown just where the limit of size for one-man operation is. Granting that there must be some limit to the traffic handling capacity of one-man cars, beyond which conditions would be uneconomic or intolerable, the question of their field of application becomes involved with considerations of headway, street congestion, schedules, character of traffic, etc.

Although the one-man car is best fitted for light service, it is probable that the future will witness a gradual extension of its field. There are some periods of the day on all except the very heaviest trunk lines when the big cars are run half empty or when headways are increased to the point where considerable revenue is sacrificed. At such times the smaller one-man cars could be used to advantage if there was some way to take care of the rush-hour traffic without congestion or sacrifice of economy. It has already been found feasible to use a second man for the rush hours only, and probably under certain conditions it will be found practical to have the conductor ride the cars and collect fares in the downtown zone and transfer from outbound to inbound cars at certain points.

A possible future method of taking care of the rush hour may be to couple two smaller motor cars together to be controlled by one man while the second man collects fares. The entrance would be at the front of the first car and the exits would be at the rear of the first car and the front of the second car. The second man would collect the fares at the rear end of the first car as the passengers passed this point, whether they got off or went into the second car.

A similar scheme of fare collection is in successful use on large single-unit cars in Cleveland and other places, and "articulated" cars made of two small cars permanently coupled together have been used in many places, but it remains to be seen whether a platform construction can be developed that will be suitable for communication between cars that have to take sharp curves of city street car lines.

*Abstract of a paper presented at the meeting of the West Virginia Public Utilities Association held at Parkersburg, W. Va., July 12 to 14, 1916.

†See ELECTRIC RAILWAY JOURNAL, May 20, 1916, page 746.

The Rock Island (Ill.) Southern Railway plans to extend its service to Moline, Ill., by auto buses. Tickets will be sold from one end of the road to the other, bus ride included, on the railway mileage basis.

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Utilities Reports Merged

"Public Utilities Reports, Annotated," to Be Official Series Covering All Utility Reports

ACCORDING to a special report of the committee on publication of decisions and orders of state commissions to the executive committee of the National Association of Railway Commissioners, negotiations have been concluded for the merger of "Official Public Service Reports," published by the Law Publishing Company, under the supervision of this committee, and "Public Utilities Reports, Annotated," published by Lawyers Co-operative Publishing Company. The new single series of official reports will cover every decision received from the commissions, either in full or abstracted, and every decision in full which fixes a principle of general interest. It will be issued by Lawyers Co-operative Publishing Company, Rochester, N. Y.

The subscription lists of the two publications have been merged and subscribers to "Official Public Service Reports" will hereafter receive the new reports for $5 per volume, including bi-weekly advance sheets, and the annual digest for $2.50. They will also receive the bound volumes of "Public Utilities Reports, Annotated," already issued for 1915 and 1916, at $5 per volume, which includes payment for the advance sheets of "Official Public Service Reports" which they have received.

When the committee was first authorized, on Nov. 18, 1914, it received (1) an offer from the Lawyers Co-operative Publishing Company, which provided for the unsupervised publication of only such decisions in so-called utility cases as might be selected by its editors, not including carriers cases and many other classes of cases determined by the state commissions; and (2) an offer from the interests which later organized the Law Publishing Company to make a practically complete publication under the supervision of this committee. The arrangement with the Law Publishing Company to publish "Official Public Service Reports" followed, although the other service was being offered, and work on "Official Public Service Reports" was begun during October and November, 1915. The Lawyers Co-operative Publishing Company, however, announced in "Case and Comment," for December, 1915, the inclusion in "Public Utilities Reports, Annotated," of "every decision received from the comsions * * * either in full or abstracted," and "in full, every decision which fixes a principle of general interest." This brought the service offered by the two competing series of reports practically into line.

Since these changes were made, the two publications have been doing practically the same thing, in slightly different ways, in a very limited field, and the continuance of both became an unnecessary burden. Under the new plan the committee has received satisfactory assurances that the editors of the merged publications will co-operate with it in carrying out the policy to be followed in the inclusion, exclusion and summarization of decisions, while undertaking to publish in full, with suitable headnotes and indexes, all that establish a principle of general interest to the commissions and to the professions, advisory supervision by this committee to be continued, and to be of the same general character as has been exercised in respect to "Official Public Service Reports." Thus by the merger all that could be desired has been accomplished, and the waste, expense and probable confusion resulting from duplicate publications has been avoided. The committee therefore recommends the approval of the merger of the two publications by appropriate action of the executive committee of the National Association of Railway Commissioners.

Hurricane and Floods in South Embarrass Utilities

Power Companies and Steam Railroads Hardest Hit by Recent Storms, but Electric Railways Do Not Escape

A DEVASTATING flood, equal in all its fierceness to any that has visited the Ohio or Mississippi valleys, swept through the Piedmont section of the Carolinas last Saturday, Sunday and Monday, July 15, 16 and 17. The flood was the result of a hurricane over the Southern Atlantic coast Thursday night, Friday and Saturday accompanied with cloudbursts. The area that has felt the effects extends from eastern Tennessee, through southeastern West Virginia, southeastern Virginia across North Carolina roughly to Wilmington and embraces virtually all of South Carolina. Through these sections flow the French Broad River, the Broad River, the Catawba River and the Yadkin River, on all of which are located hydroelectric plants supplying hundreds of cotton mils, industrial plants and towns with electric light and power. The flood on the Catawba River was the greatest on record, not a bridge, telephone, telegraph or power wire being left practically from its source to its mouth. The maximum rise opposite Charlotte, N. C., on Sunday was 50 ft. above normal.

From the information available at this time it appears that the damage to the steam railroads in the affected region was very severe, and the hydroelectric plants, which are numerous thereabout, also suffered through flooding. In Charleston, S. C., the wind velocity last Thursday and Friday exceeded 60 m.p.h., and the railway service of the Charleston Consolidated Railway & Lighting Company was suspended for a time. Shortly after noon Friday the suburban and some of the city cars were put in service again. Fire in a substation opposite the power plant increased the embarrassment. This hurricane preceded the floods which did particular damage in western North Carolina. It is reported that the Piedmont & Northern Railway bridge above Belmont went down, and that the flood otherwise interrupted service on this line between Spartanburg and Charlotte.

New Light System for Kansas City Railways

C. E. Fritts, superintendent of power and electrical distribution, Kansas City (Mo.) Railways, is inaugurating a new system of installation of lights. The loss of lamps by theft in the tunnels, suburban stations and crossings, where lights must be maintained, is responsible for the proposed change. The lamps in question are 50-watt and are used in series of five, on a 600-volt circuit. The department draws about 1200 a month, a large proportion being to replace stolen lamps which can be used on the 110-volt house lighting circuits of the Kansas City Light & Power Company. To prevent the lamps from being stolen, the company is planning to install 75-watt lamps, three in series, on the 600-volt circuit, as these 200-volt lamps cannot be used to good advantage on the various house circuits from 105 to 120 volts. It is expected that few lamps will be stolen hereafter. Probably the single are lamps, of which there are a few, will be replaced by two groups on oppostie corners of 75-watt lamps, three in series.

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AMERICAN ASSOCIATION NEWS

Progress on Convention Program

The committee on subjects of the American Association has announced the names of speakers and their topics for the first two days of the convention to be held at Atlantic City, N. J., Oct. 9 to 13, 1916. These are as follows:

Tuesday, Oct. 10, Ivy L. Lee, the well-known publicity expert formerly with the Pennsylvania Railroad and now a member of the personal staff of John D. Rockefeller, will speak on "Publicity."

Philip J. Kealy, president Kansas City (Mo.) Railways, will present a paper on "Unit Costs and Overhead Charges."

Wednesday, Oct. 11, will be "Preparedness Day." Addresses will be made by Major-General Leonard Wood, U. S. A., commander of the Department of the East, and Brig.-General Erasmus M. Weaver, U. S. A., Chief of Coast Artillery.

Convention Entertainment Committee

President Charles L. Henry has announced the completion of the personnel of the entertainment committee which now stands as follows: E. F. Wickwire, Ohio Brass Co., Mansfield, Ohio, chairman; J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company; F. R. Coates, president Toledo Railways & Light Company; E. P. Waller, General Electric Company; E. Besuden, general sales manager Jewett Car Company; F. A. Elmquist, railway representative Sherwin-Williams Company; W. G. Taylor, Westinghouse Traction Brake Company; W. V. Dee, secretary G. Drouvé Company; Ross F. Hayes, Eastern manager Curtain Supply Company, and B. F. Wood, vice-president and chief engineer United Gas & Electric Corporation.

Committee on Fares and Transfers

With Chairman Cyrus S. Ching presiding, a meeting of the transfer committee of the Transportation & Traffic Association was held at the offices of the Boston (Mass.) Elevated Railway on July 13, 1916. Manufacturers of registers had been invited to submit their latest products for consideration, and an Ohmer transfer-issuing machine was demonstrated before the committee. Following this the final draft of this year's report was taken up and the remainder of the session was devoted to its consideration.

T. & T. Association Committees

The special committee of the Transportation and Traffic Association on cost of rush-hour service met in New York on July 6. Data from various companies showing the cost of rush-hour service compared with that of the non-rush periods were discussed by the committee in preparation for the completion of its report by Aug. 1.

The report of the committee on schedules and timetables of this association has been put into shape by a sub-committee consisting of Edward Dana, chairman, Boston, Mass.; H. F. Fritch, Boston, Mass., and H. E. Hicks, Rochester, N. Y.

The Engineering Association committee on standards will meet at association headquarters in New York on July 27 and 28. At this meeting the proposition of the several committees in so far as they affect standards will be considered.

"Owl Car" Fares

Experience of Several Companies Shows that Owl Car Operation at a 5-Cent Fare Is Unprofitable

THE discussion in Pittsburgh in regard to a charge of double rates on owl cars, that is to say, on cars operated after midnight and before the early morning schedule begins at about 5 o'clock, makes the subject of general interest. An investigation by this paper shows that several companies besides that in Pittsburgh charge double fares on owl cars. Three such companies are the Des Moines (Iowa) City Railway; the Little Rock Railway & Electric Company, Little Rock, Ark., and the Lincoln (Neb.) Traction Company. Even at these fares the companies at Des Moines and Little Rock say the service is rendered at a loss on account of the small patronage, and the same would also be true at Lincoln, except that the service given there was put on at the special request of the Chicago, Burlington & Quincy Railroad to run to its roundhouse, and this company guarantees a certain earning capacity for the car.

A plan somewhat similar to the latter arrangement is in existence in Chattanooga, where the company operates two owl cars. One of these is between the city proper and the terminal yards of the Nashville, Chattanooga & St. Louis Railroad, which also guarantees that in the event that the total revenue from such traffic does not amount to $2 per car hour, the company will make up the difference. The other owl car makes one trip only, and was put on primarily for the purpose of taking the company's platform men from the carhouses at night and bringing them in to work in the morning. Regular passengers, however, are taken at a fare of 5 cents each.

The Waterloo, Cedar Falls & Northern Railway established an owl car service at Waterloo, Ia., a few years ago by public request. A 10-cent fare was charged, but the company did not expect the cars would be profitable so issued daily statements of their receipts. During no single night did they take in enough money to pay the wages of the operators, and after a few weeks' trial the cars were withdrawn. As the public had been kept in touch with the situation, there was no criticism of the abandonment of the service.

Double fares for owl cars are also charged in Canada. Thus the Ottawa (Ont.) Electric Railway is permitted in its contract with the city to charge a fare of 10 cents between 12 o'clock midnight and 2 a. m., when the cars stop running. The British Columbia Electric Railway, Vancouver, B. C., at one time charged 5 cents extra for the owl service, but during the last year the fare has been the same as throughout the day.

More than 2000 persons attended the second picnic of the Union Traction Company of Indiana employees and their families, held on July 18, at Broad Ripple Park, just north of Indianapolis, which is the property of the railway. Each year two picnics are held and one-half of the employees attend each day. The first picnic this year was held on July 11. Special cars brought the crowd to the park from Anderson, Marion, Muncie and Tipton. The employees receive tickets entitling them to transportation and the use of the large outdoor swimming pool, the dance hall and different amusement devices and features of the park. During the day a tug-of-war, pole climbing contests, sack races, potato races and short dashes were held, for which prizes were offered by the company.

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COMMUNICATIONS

Moral Obligation of Witnesses

FITCHBURG & LEOMINSTER STREET RAILWAY COMPANY
FITCHBURG, MASS., July 13, 1916.

To the Editors:

Kindly permit me the use of a little of your valuable space to thank you for your editorial in the issue of July 1 relative to "Everyday Law—and Duty—for Women." At the same time let me commend you for your forbearance and extreme leniency toward those responsible for the article in the June issue of *Good Housekeeping* which so grossly misrepresented the claim departments of the railways. It seemed to me that it was a deliberate attempt to disqualify in the minds of the public a profession which has become second to none and is composed of honest men who do their utmost to deal fairly and justly between the public and the companies that they serve. This article would serve the purpose in the eyes of many who might be misguided to lead the public into what might be termed accident criminology.

I say with all seriousness that I know that corporations are doing their level best to gain the confidence of the people that they serve; that they no longer (if ever) countenance deceit, for this is a régime that is not in keeping with the times, and that present-day conditions demand and officials desire the public's confidence. Claim adjusters are not the cold-blooded, heartless creatures depicted, and I say without fear of contradiction by anyone who really knows the inside workings of a claim department that when once deceit and dishonesty on the part of an adjuster are known, his connection with the company that he represents is ended. Intimately acquainted with electric railway claim men from one end of this country to the other for more than ten years and once president of their national association, I say that I know that railway companies are not employing men such as this article would have one believe. This is an age of progress, and corporations are more and more taking the public into their confidence. To righteous dealing of the claim departments is due largely the change of feeling that is spreading over the country.

It has been the persistent and dominant cry of claim men for many years that the confidence of the public must be had, and that honest, fair and just settlements when liability was admitted, formed the best road to such an end. I do not believe that there is an adjuster who would intentionally misrepresent conditions for the sake of obtaining a release. Such a release of itself might stand, but what of the next one attempted under the same conditions, perhaps in the same locality. The adjuster would find the first one staring him hard in the face, and his company would have to stand the brunt of it. It is to be expected that an adjuster will work for the interests of his company, but if he cannot look far and beyond the company viewpoint, put himself on the other side for the time being and then apply that most sound rule of business procedure, common sense, together with a knowledge of values, he has missed his calling.

It would be well, Mr. Editor, to have the author of the article in question spend a day in a busy railway's claim department, listen to the stories as they are told, go out with the adjuster and see him at his task, and then write another article depicting the other side of the question and let the public judge which is correct.

H. K. BENNETT, Claim Agent.

A Puzzle in Psychology

HOT SPRINGS STREET RAILWAY COMPANY
HOT SPRINGS, ARK., July 18, 1916.

To the Editors:

Recently the writer stood on the corner of Main and Markham Streets in a Southern city.

A white woman, of respectable appearance, stood in a doorway at the corner protected from a heavy rain then falling. She was plainly waiting for a car. A five-passenger jitney came up with all curtains buttoned down to protect the passengers from the rain. The jitney was occupied to the limit by the driver and all men passengers. The curtain was unbuttoned to allow one man to stoop his way out at the corner. The woman left her place of shelter and started for the jitney. By drawing her clothes tightly about her, and squeezing herself through the small opening made by the partially unbuttoned curtain, she managed to fairly crawl her way into the jitney, there to be snugged up with damp clothes in a very limited space on the rear seat with strange men. Just a few minutes ahead of this jitney, and again just a few minutes behind it, a large, first-class, double-truck, air-brake street car went the same route the jitney took. The street car had plenty of comfortable, empty seats. The car was well ventilated. The fare was the same as the fare charged by the jitney driver. In case of personal injury the street car company, if liable, could be forced to pay a personal injury claim.

Can some one figure out why she did it?

S. E. DILLON, General Manager.

Mobilization Forces Rapid Track Laying

On account of the heavy travel occasioned by the mobilization of troops at the rifle range, about 3 miles from Golden, Col., a rush order was placed by F. W. Hild, general manager Denver Tramway, to lay 817 ft. of track in the form of a "Y" near this point, so that cars could return without having to proceed to Golden. Mr. Hild and E. A. West, the company's chief engineer, met the contractor at the rifle range on Thursday afternoon, June 29, and inquired if 1600 cu. yd. of fill could be procured right away. The contractor replied that this could be done, and that evening forty-two mules, nine fresnos and two plows and a gang of men were on the job. The contractor started work early on Friday morning, and by noon of Saturday, July 1, the fill was completed. The entire job, including the installation of 600 bonds, went through without a hitch, and the cars were operating over the "Y" before 8 p. m. on that day. The "Y" was substantially built so as to handle locomotives and heavy equipment in loading troops and military stores for service on the Mexican border.

Weight of English Freight Locomotive

Through an ambiguity in connection with the data furnished this journal regarding the electric locomotives for the North-Eastern Railway in England, the weight of these machines was given in a recent article as 148,800 lb. As a matter of fact, these locomotives weighed 166,656 lb., or approximately 83 tons of 2000 lb. each, a proportional increase applying to the published weights of the mechanical parts as well as to the weight of electrical equipment. The specified drawbar pull of 28,000 lb., however, as given in the original data, is not affected by this correction.

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EQUIPMENT AND ITS MAINTENANCE

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

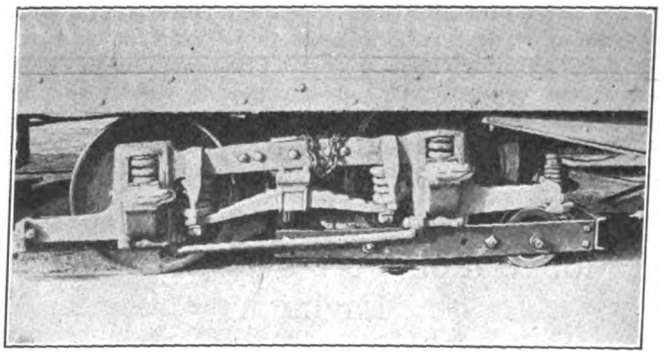
Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.

A Novel Pull-In Truck

BY E. WRIGHT
Master Mechanic Fort Smith Light & Traction Company, Fort Smith, Ark.

The illustrations herewith are of a pull-in truck which is used for bringing in cars with broken axles under their own power. This truck is made from four strips of iron, one channel, 10 ft. of chain, two small wheels and a few bolts. It can be knocked down into three pieces as shown, and is carried in one corner of the emergency car so as to be on the job at all times.

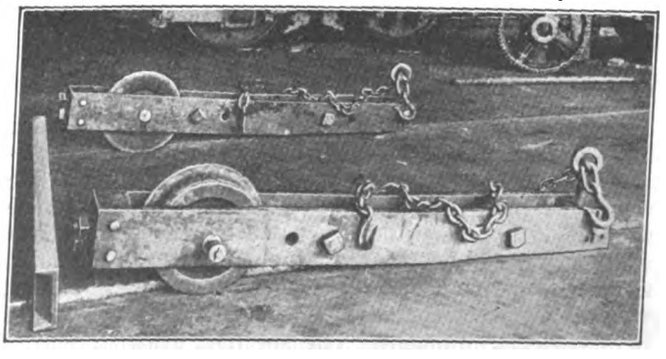
Upon arrival at the place at which it is to be used the pull-in truck is assembled on the track. The motor of the disabled car is chained up, the trucks are jacked up



CAR WITH BROKEN AXLE BEING TAKEN IN WITH EMERGENCY PULL-IN TRUCK

and the pull-in truck is run under far enough to allow the wheels of the broken truck to rest between two bolts which extend through the pull-in truck frame as shown in the accompanying illustration. The pull-in truck is fastened up to the side frame of the car truck by means of a chain through the ring which is attached to one end of each side bar of the former. The car truck is then let down and the motor cut out if mounted on the broken axle. Should this emergency truck be used in pulling in a car equipped with single type trucks, such as Brill 21-E, it is necessary to remove the brake beam so that the shoe heads clear the truck wheels. This puts the brakes out of commission, but if there are no grades to go down the car can be controlled by the reverse, and if there are grades another car can be coupled on and the disabled car thus held back. The car is then ready to go to the barn using the motor that is not disabled.

As stated above, this pull-in truck can be carried about in three pieces and quickly assembled. When knocked down it takes up very little space. The truck wheels have bronze bushings and are also equipped with compression cups for lubrication. It has been the experience of this company that the device effects a considerable saving in wheels and prevents the blocking of traffic while disabled cars are being brought in.



EMERGENCY PULL-IN TRUCK KNOCKED DOWN

Standard Layout Designs of the Brooklyn Rapid Transit System

BY M. BERNARD
Assistant Engineer Way and Structure Department

In the May 6 issue of the ELECTRIC RAILWAY JOURNAL the standard layouts adopted by the Columbus Railway, Power & Light Company, Columbus, Ohio, were described. In this article the standard layouts in use on the Brooklyn Rapid Transit System will be treated.

After a careful study of widths of railroad streets, which in most instances have a 30 ft. to 40 ft. roadway, it was decided to design the standard layouts for these limiting widths. Accordingly, there resulted three standard layouts without car clearance, namely, for

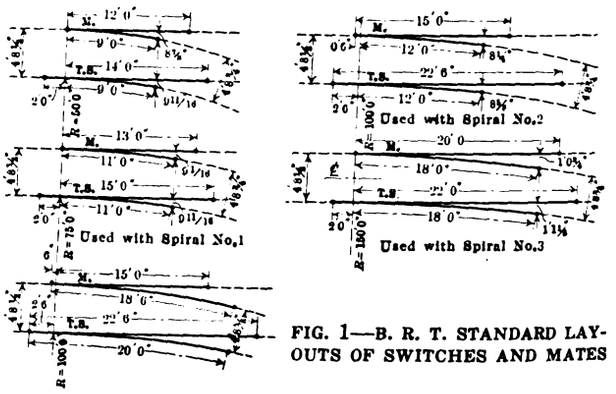


FIG. 1—B. R. T. STANDARD LAYOUTS OF SWITCHES AND MATES

two intersecting roadways each 30 ft. wide, two intersecting roadways, one 30 ft. and the other 40 ft. wide, and two intersecting roadways each 40 ft. wide. Due to the peculiar plan of Brooklyn, there are quite a few streets from which many car lines radiate. Along these streets it was deemed advisable to provide car clearance in the special work layouts. Two layouts were designed accordingly, one for intersecting roadways of 40 ft., the other for two intersecting roadways having widths of 30 ft. and 40 ft., respectively.

Because of the large number of acute angled layouts in Brooklyn it was found necessary also to adopt two additional standard designs, one with and the other without car clearance.

Thus seven designs were adopted as standard, with car clearance provided in three of them. Engineering data of these various layouts are shown in Figs. 2, 3 and 5.

In those cases where the intersecting angle is different from the standard, which is either 45 deg. or 90

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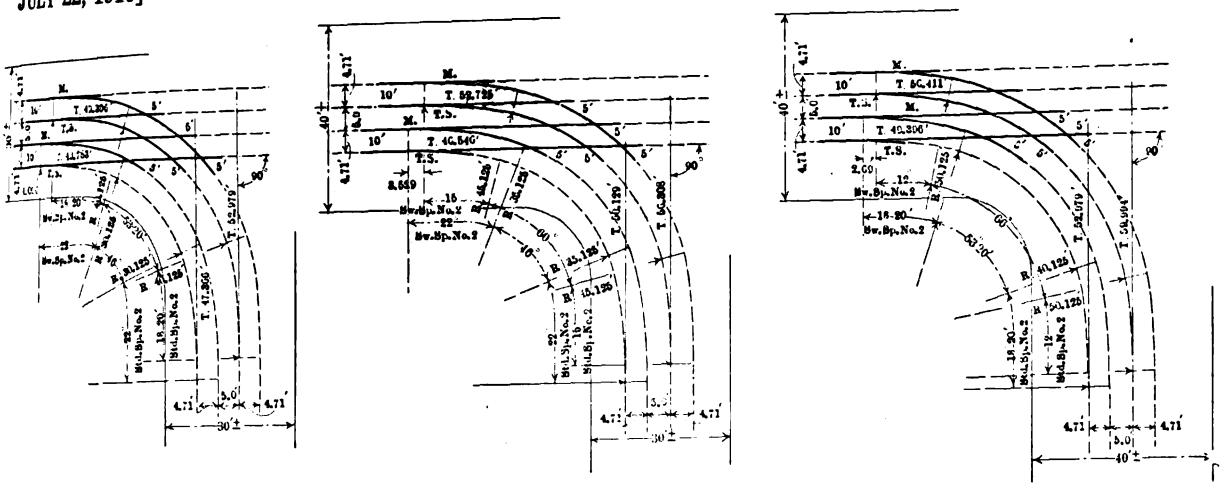

FIG. 2—B. R. T. STANDARD TRACK LAYOUTS SHOWING THREE DESIGNS WITHOUT CAR CLEARANCE FOR TWO INTERSECTING ROADWAYS EACH 30 FT. WIDE, ONE 30 FT. AND THE OTHER 40 FT. WIDE, AND FOR TWO EACH 40 FT. WIDE RESPECTIVELY

deg., the necessary changes in the alignment are made in the plain end outside of the limits of the tangent tracks, either by compounding the radii or by introducing a reverse curve. The latter contingency, however, is avoided if possible. It is expected that these layouts will fulfill all requirements on the system.

All switches are 100 ft. radius, except in those layouts providing for car clearance, in which case the switches

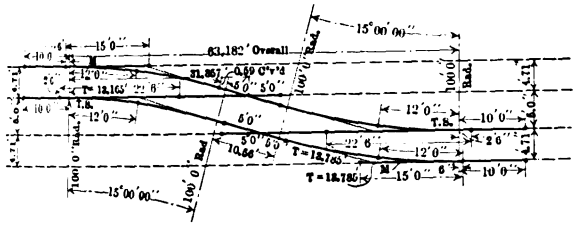

FIG. 4—B. R. T. STANDARD TRACK LAYOUT OF 9-IN. GIRDER RAIL CROSSOVER

of the inner curve are of 150 ft. radius. In layouts where no car clearance is provided the P. T. of the inner curve is as nearly as possible opposite that of the outer curve, whereby the distance between the tracks in the curve is kept down to a minimum. It is the writer's opinion that in such layouts the distance between the tracks should not be more than is necessary for proper installation. This results both in a low first cost of pavement as well as minimum paving maintenance because of the reduction of the paving area as compared to a design with a bulge in the middle. All tongue switches and mates are of B. R. T. standard lengths as shown in Fig. 1. It will be noticed from

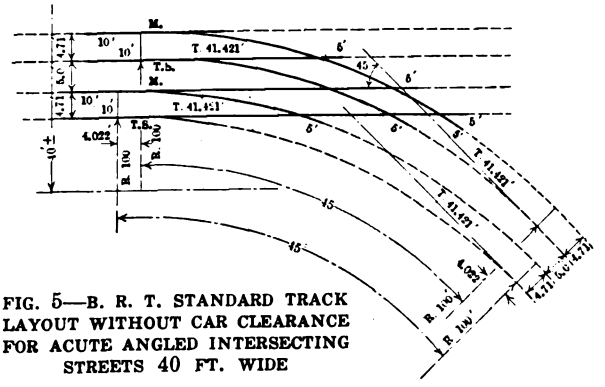

FIG. 5—B. R. T. STANDARD TRACK LAYOUT WITHOUT CAR CLEARANCE FOR ACUTE ANGLED INTERSECTING STREETS 40 FT. WIDE

Fig. 1 that because of the length of the straight arm of the tongue switches only one joint is required between the P. F. and the P. T. Better repairs can be made to this joint than when the arm is near the heel of the switch tongue.

All exterior arms of frogs are 5 ft. long.

All crossovers are of one standard design, the engineering data for which are shown in Fig. 4. Two

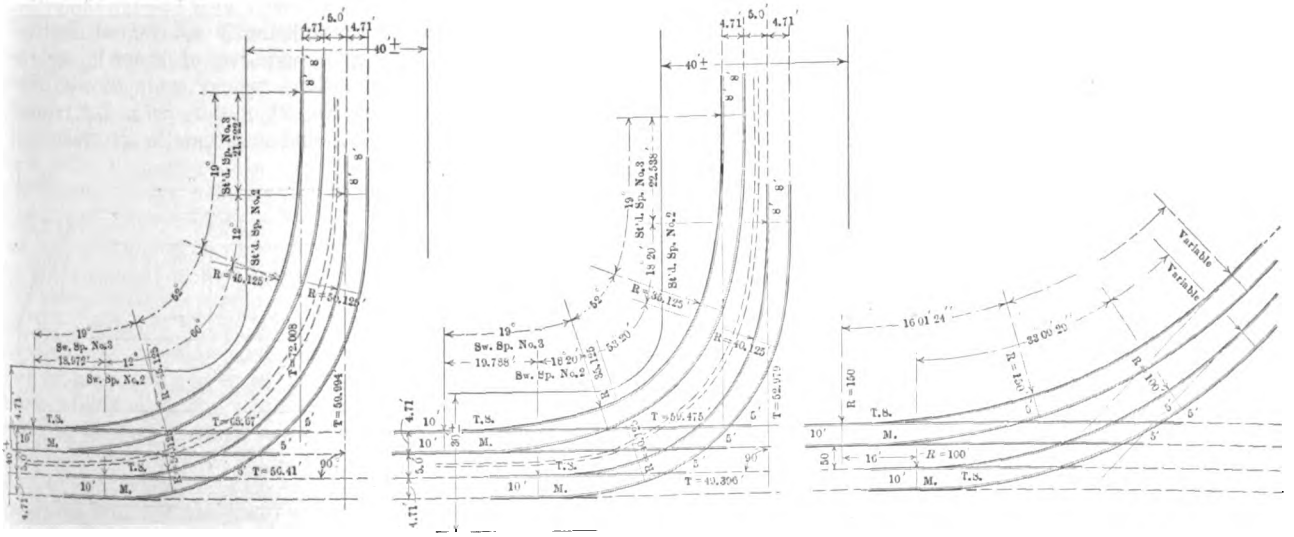

FIG. 3—B. R. T. STANDARD TRACK LAYOUTS SHOWING THREE DESIGNS WITH CAR CLEARANCE FOR TWO INTERSECTING ROADWAYS EACH 40 FT. WIDE, ONE 30 FT. AND THE OTHER 40 FT. WIDE, AND FOR ONE ACUTE ANGLED LAYOUT RESPECTIVELY

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different types of frogs are used. For terminal crossovers standard hard-center construction is used, whereas for emergency crossovers the frogs are either of bolted type or of cast-in (jump) type, with the through run on the straight. No hard center is used in the latter type.

By the adoption of standard designs the cost of plans of special work layouts is reduced to a minimum; comparison of the various designs with the survey of physical conditions at the location in question will enable a draftsman to determine the best design in a very short time; should changes be found necessary these are easily made in the plain ends of the layout. By making interchangeability of parts possible, a layout bought for one location may often be used in another location where the material has failed suddenly.

This occurred on our system recently. A double-track crossing and connecting curve had been used for a year and a half for rerouting cars, after which its usefulness would have practically ended but for the fact that it was found possible to install it at another place where the special work required renewal.

The use of standard layouts will eliminate one great loss to every street railway company, namely, the accumulation of extensive deposits of iron of scrap value, resulting mostly from the past practice of having a special design for every location. There must be at least $1,000,000 worth of material of this description lying at the storeyards of the various electric railways of the country.

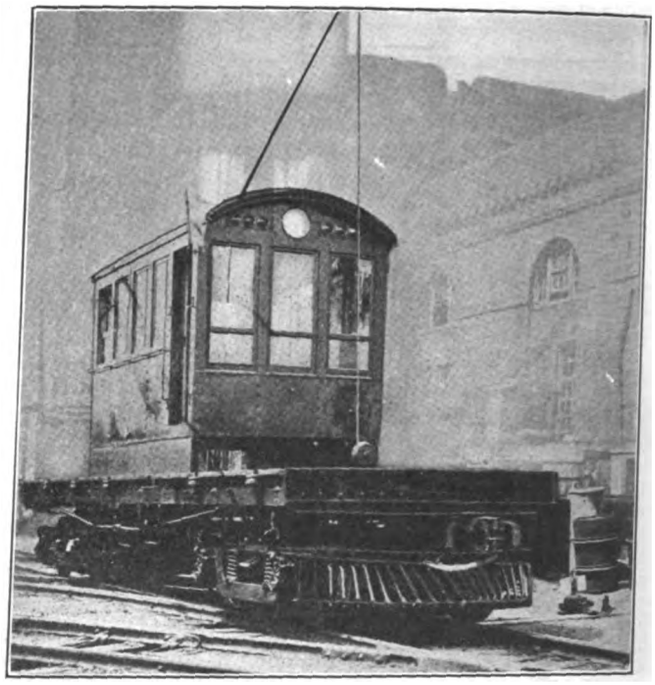
If there should be a change in plans after standard material is received, the latter can probably be used at another location in a short time.

As far as shipments are concerned, it is obvious that they will probably not be much better than if special designs only were used, unless the street railway buys from but one manufacturer or all street railways adopt the same construction.

In order to give an idea of the field for standardization of layouts, the approximate number of branch-offs and connecting curves on the B. R. T. system is given herewith: Single-track branch-offs, seventy-five; double-track branch-offs, 165; single-track connecting curves, twenty; double-track connecting curves, fifty-five.

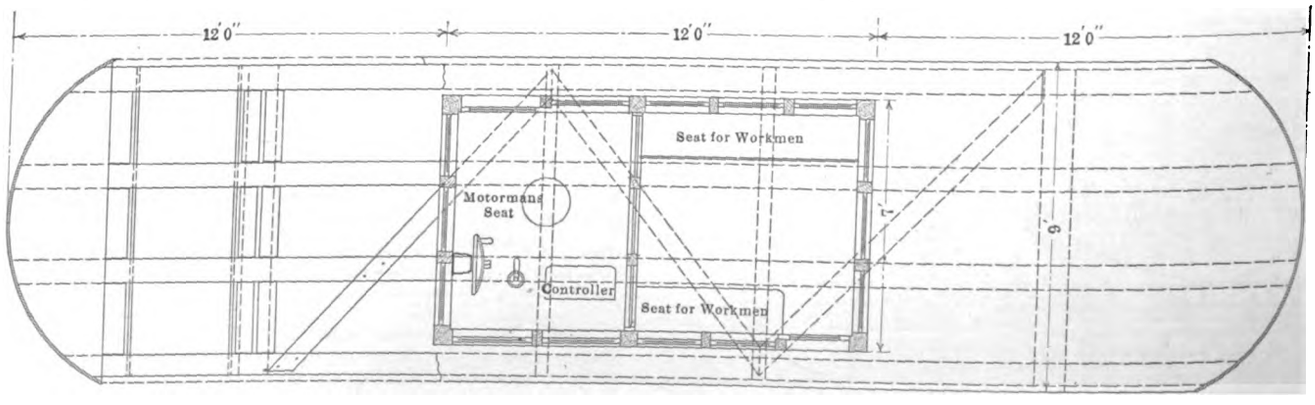
Roadway Utility Motor Car

A large cab so arranged that it does not limit the material carrying capacity is the feature of the roadway motor car which has recently been built at the shops of the Union Traction Company of Indiana, Anderson, Ind. This car is 36 ft. over all in length and 9 ft. wide, and the two-compartment cab is elevated on two 15-in. channels at an equivalent distance above the platform of the car. The cab is 12 ft. long over all and 7 ft. wide, with a glass partition between the motorman's compartment, which occupies 5½ ft. of the length of the cab, and the compartment designed for the workmen and their tools. As shown in the accompanying illustration, the four exterior walls of the cab are formed practically of glass sashes and the cab frame, so that the motorman's view is unobstructed in all directions. The glass partition between the motorman's compartment and that of the workmen was provided as a safety precaution.



VIEW OF ROADWAY UTILITY MOTOR CAR

While the size of the cab is practically one-third of the size of the car platform area, the hauling capacity of this utility car for poles, rails and other long material is unrestricted, because the cab, as mentioned before, is elevated 15 in. above the car-body platform. Stake pockets along the sides of the car are also used to carry poles fastened in slings swung from stakes. The red and green markers and the electric headlights were all recessed into the cab to conform to the standard method for installing this equipment on all the cars of the Union Traction Company. The cab is heated electrically and a series of five lamps furnish the artificial illumination. The car underframe as well as the cab frame are of wooden construction reinforced with steel tie rods, and the cab is covered with 14-gage sheet steel. The underframe is of sufficiently substantial construction to provide a carrying capacity of 60,000 lb., and the car is mounted on Baldwin trucks equipped with four 72-hp. Westinghouse No. 85 motors with L-4 control. Other car equipment includes automatic air brakes and



PLAN OF ROADWAY UTILITY MOTOR CAR OF THE UNION TRACTION COMPANY OF INDIANA

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Tomlinson radial couplers. It will also be noted that this utility car is equipped with a home-made pilot, to which sections of old trolley poles are riveted to form the vertical members.

New Highway Wigwag Signal Installed at Denver, Col.

An accompanying illustration shows the National worm-drive wigwag crossing signal recently put on the market by the Protective Signal Manufacturing Company, Denver, Col., and which is installed in a number of places on the Denver & Rio Grande Railway.

WIGWAG SIGNAL INSTALLED AT WEST MEXICO STREET, DENVER, COL.

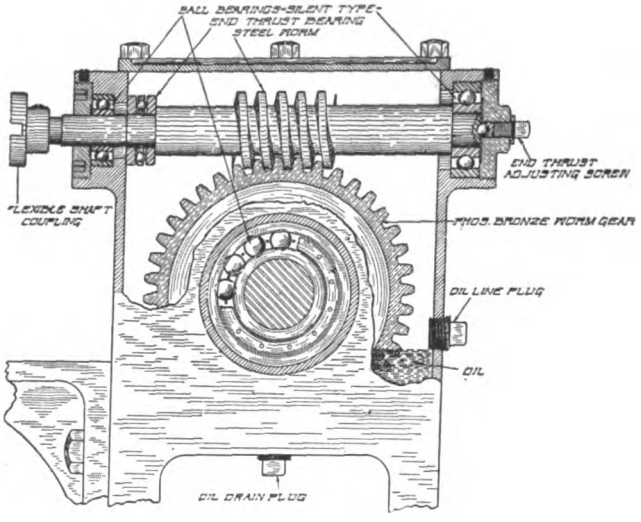
This signal device consists of a bright red enameled disk 38 in. in diameter, swung to and fro at the rate of thirty times a minute by a motor-driven worm and gear; a loud-ringing 12-in. bell; oscillators, which are attached to the rails on either side of the highway crossing and which open or close a circuit by the vibration of their contact members; and automatic thermo-time units which operate in connection with relays, as explained later.

The bearings contained in the worm and gear shown in another illustration are of the ball and roller type in which friction and lubrication are a minimum. The worm is direct connected to a 1/10-hp. 1150 r.p.m., a.c. motor sufficiently powerful to swing a disk several times as heavy as this one. The worm and gear are immersed in oil, and their housing casing is provided with an outlet for drainage as well as an opening at the oil level, so that the proper amount of oil can be gaged. This housing is also provided with a cover held in place by six screws. It can easily be removed to permit inspection.

The oscillator has two moving parts, an upper contact spring and a lower contact vibrating bob. The movement of a train over the oscillator breaks the contact of the spring and bob, thus opening the line circuit.

The automatic thermo-time unit consists of a rod wound with high-resistance insulated wire through which current passes, heating the wire and causing the rod to expand, thus making contact with an adjustment screw and energizing a relay after the lapse of time from thirty seconds to five minutes as adjusted.

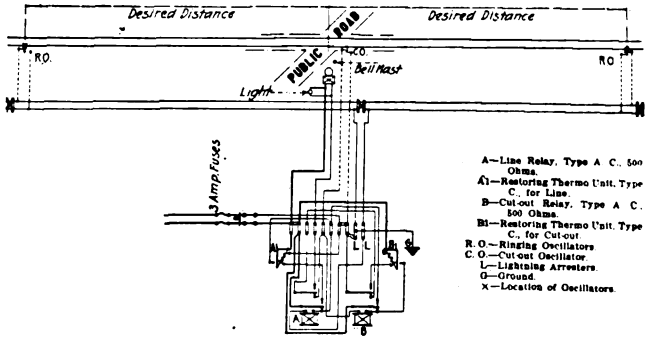
The entire system operates on a closed-circuit principle, the oscillators being placed at any desired distance from the crossing and connected to the signal proper by means of line wires as shown by the accompanying wiring diagram. As a train approaches the crossing it imparts a vibration to the oscillator, opening the line circuit to the relays, which in turn close the circuit to the bell and wigwag as well as to a line thermo-time unit. If the train should stop between the line oscillator and the crossing, the signal would operate in the time for which the thermo-time unit is set. It is then automatically cut out. If the train does not stop between the line oscillator and the crossing it passes over an additional oscillator at the crossing, known as the cut-out oscillator, which drops a stick relay and picks up the line relays, cutting the signal out of operation, as well as opening the circuit to the line thermo-time units. When the cut-out oscillator is operated and drops the cut-out stick relay, it in turn closes the cir-



SECTION OF WORM AND GEAR OF WIGWAG SIGNAL DEVICE

cuit to a cut-out thermo-time unit which is set for a time sufficient to allow a train to pass out of the protected section and over the other ringing oscillator provided to care for movements in the opposite direction, without causing a back ring or false warning. As soon as the thermo cut-out is heated to contact it picks up the cut-out stick relay and automatically opens its own circuit through this relay and restores the apparatus to a normal condition. It is then ready for the next operation.

The oscillator operates entirely independently of any track circuit or any other electrical connection with the rail. It is simply secured to the rail and governs the operation of the signal through its line wire. Any de-



WIRING DIAGRAM OF SINGLE TRACK HIGHWAY CROSSING SIGNAL

sired protection can be given by these oscillators, in so far that they can be placed any desired distance from the crossing.

When in the clear position the disk, or aspect of the crossing signal, is drawn back against the signal mast. At night the lenses in the center of the disk, which are illuminated by Madza lamps, are plainly visible at a distance of 2 miles. The swinging radius of the disk is 67 in., giving a 42-in. swing to the illuminated lenses. This is approximately the same as that given by a watchman or flagman swinging a red lantern from a platform above the roadway.

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TEARING UP ABANDONED RAILWAY TRACK WITH DOUBLE-DRUM POWER WINCH AND BOOM; EMERGENCY LINE TRUCKS FULLY EQUIPPED

Railways Rapidly Adopting Emergency Auto Trucks

The White Company, Cleveland, Ohio, has recently placed on the market several designs of motor trucks which are giving valuable service to electric railways in emergency and general maintenance work.

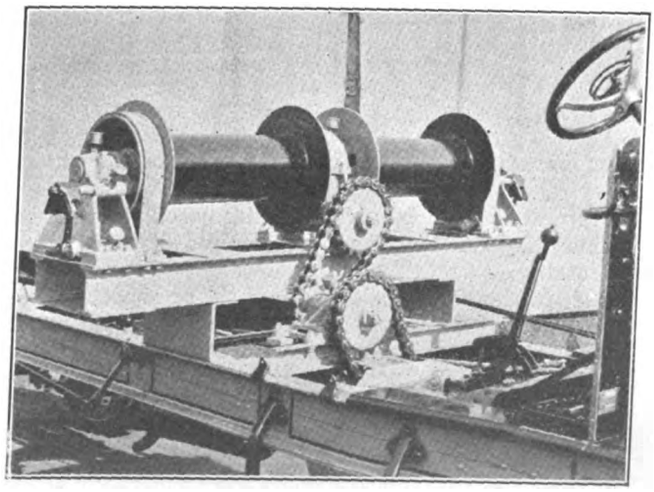
As a result of the various uses to which motor trucks have been applied operating companies have ordered specially designed pieces of motor apparatus to meet their individual requirements. An illustration herewith shows a truck equipped with a double-drum power winch and boom in the process of tearing up abandoned railway tracks and loading the rails on another truck. This mechanism is operated from the transmission of the motor truck by sprocket and chain as shown in another illustration. For this equipment one lever in addition to the regular number is necessary in order to throw in and out the gears which engage with the transmission. This type of truck is used in pulling aerial or underground cable, hauling and setting poles, hoisting transformers, pumping out manholes, righting derailed cars and clearing tracks of obstructions.

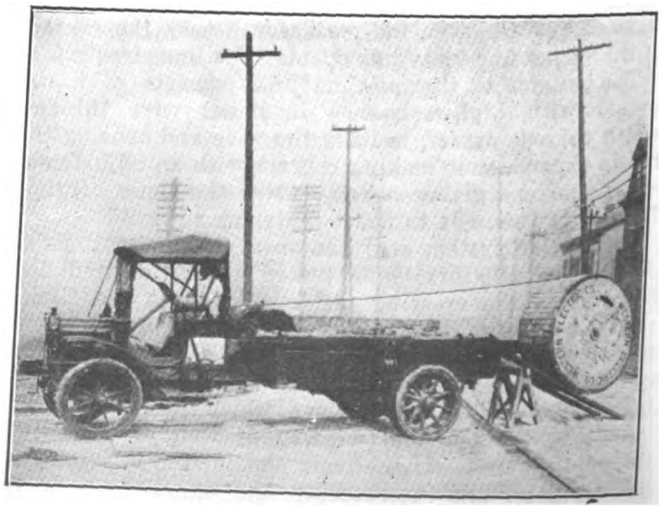
Another picture shows a line truck fully equipped for emergency repairs. Supply bins for carrying small material are mounted on the side, as are also special brackets for carrying ladders, pike poles, etc. In addition, ample room is available in the body of the wagon for carrying wire and other bulky material.

Still another illustration shows a reel of wire being loaded by means of a single-drum power winch, driven from the transmission by sprocket and chain. Although a double-drum power winch is shown, the principle is the same as that applied in the single-drum type. With one of these machines it is possible to pull two sections of cable with one set up. The driver operates the winch for pulling, loading and unloading cable without leaving his seat. With the four-speed transmission cable can be pulled at a speed of 50 ft. per minute, or light pulls can be made at from 50 to 150 ft. per minute with as great a degree of safety as by hand.

TRENTON THREE-SECTION TOWER TRUCK FOR GENERAL MAINTENANCE WORK

Another recent design shown is the tower truck owned by the Massachusetts Northeastern Street Railway. It is equipped with a Trenton three-section tower operated from the opposite side of the car from that shown by means of a cable which is





DOUBLE-DRUM POWER WINCH DRIVEN FROM TRANSMISSION BY SPROCKET AND CHAIN; LOADING A HEAVY REEL OF CABLE WITH SINGLE-DRUM POWER WINCH

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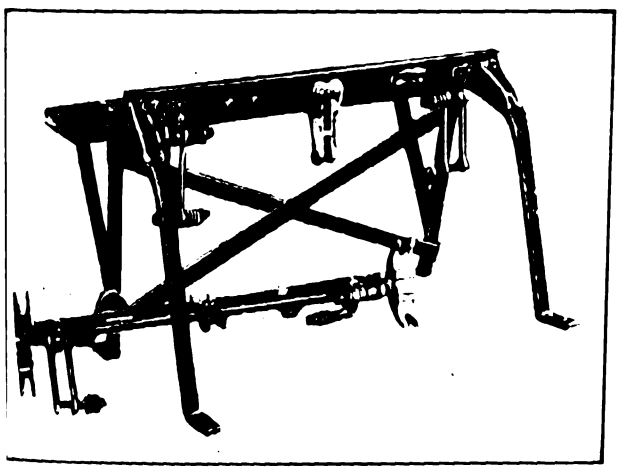
wound up on a single drum by one man. The reinforcing material on the tower consists of 2½ in. x 2½ in. x ¼ in. angle iron. The height from the ground to the platform with platform raised is 19 ft. 11 in. and with platform lowered 10 ft. 7 in. The speed of the truck is 15 m.p.h. when equipped with solid tires and 30 to 35 m.p.h. when equipped with pneumatic tires. Many trucks of this type are in use on general maintenance work, and owing to their lightness are especially valuable in cases of emergency where they are able to save considerable time in reaching the location of the trouble as compared with the heavier types.

Convenient Brake-Beam Holder Used by Kansas City Railways

The work of repairing or dismantling a brake beam in the shops of the Kansas City (Mo.) Railways formerly required one or two men to hold the beam in position and another to do the work. One man has been enabled to handle this work by the use of a brake-beam form described in the current issue of the *Railwayan*, the company publication.

The accompanying illustration shows the general appearance of this device, the form of which is 30 in. high



KANSAS CITY RAILWAYS BRAKE-BEAM HOLDER

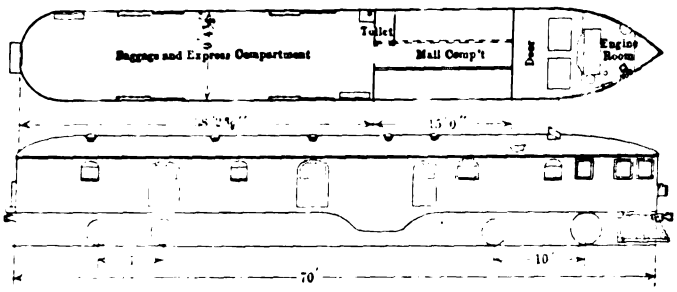
and of rugged construction. The brake beam is removed from the truck and set over the form with the brake heads down. The shoes are knocked off and the brake heads keyed to lugs at each end of the form in the same manner as the brake heads are keyed to the brake shoes. In this way the brake beam is held securely in position while the repairs are being made.

Track Rehabilitation in Kansas City

The ways and structures department of the Kansas City (Mo.) Railways has a number of large jobs under construction. One of these is the rebuilding of a stretch of track between Twenty-seventh and Thirty-first Streets on Parallel Avenue in Kansas City, Kan., which is nearing completion. This track has been entirely rebuilt on a solid concrete base. The Summit Street tracks, between Thirty-first and Thirty-sixth Streets, are being rebuilt. The present rails, which are of the 9-in. center bearing type, will be utilized. The Indiana Avenue job between Thirty-first and Thirty-sixth Streets is complete. Main Street is open for reconstruction work, and the solid concrete type of base will be ordered from Twelfth to Nineteenth Street. Main Street will then have this type of construction from Third Street to the Union Station.

300-Hp. Gasoline Car for Union Pacific

The Union Pacific Railroad has just ordered another combination United States railway mail post-office-baggage 300-hp. motor car from the McKeen Motor Car Company. This car, with passenger coach, will operate



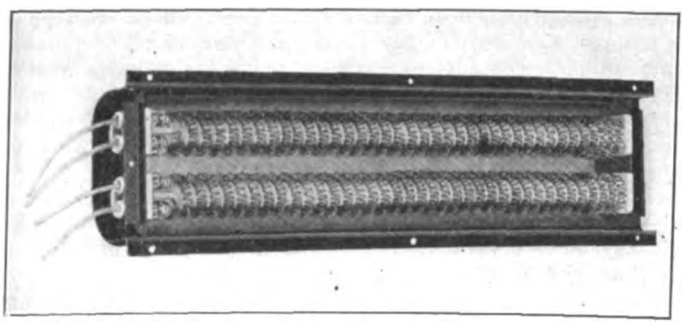
COMBINATION GASOLINE MOTOR CAR FOR UNION PACIFIC RAILROAD

on the Lincoln-Central City district, and will perform a service equivalent to that of a locomotive and three-car passenger train. The motor car is very similar to one purchased from the McKeen Company last year, which, with a passenger coach, displaced a five-unit steam train on the Stapleton branch.

Large Order of Heaters for New York Municipal Railway

The accompanying illustration shows the new two-coil panel electric car heater recently ordered from the Peter Smith Heater Company of Detroit, Mich., by the New York Municipal Railway Corporation for use on the latest 200 cars of the company.

The heating unit is of high-grade wire with a resistance coefficient of practically zero, that is, there is very little change in resistance when the wire is heated. The terminal porcelains are of rugged design, and are provided with baffles which separate the wire terminals,



ELECTRIC HEATER FOR THE LATEST 200 CARS OF THE NEW YORK MUNICIPAL CORPORATION

thus eliminating the possibility of short-circuits at this point. The terminal connections are of the Fahnstock type, which facilitate connecting and disconnecting. The heater coils can be removed from the housing for repairs by taking out a single screw.

The casing is made of two thicknesses of sheet iron, and is lined with asbestos. Its over-all dimensions are 26 in. x 8 in. x 3⅜ in. An order for 6000 of these heaters has been placed with the manufacturer.

The Fifth Avenue Coach Company, New York, has adopted large numerals to designate destinations on its buses, owing to its belief that this will be a more suitable method than that of using assorted colors or letters for signs as formerly used.

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NEWS OF ELECTRIC RAILWAYS

PORTLAND STRIKE SETTLED

Men Returned to Work on July 17 After Being Out for a Period of Five Full Days

The strike of the employees of the Cumberland County Power & Light Company, Portland, Me., declared on July 10, was called off on July 17, an agreement having been reached between the company and the union officials. The strike was precipitated by the discharge on July 10 of several trainmen and linemen for unsatisfactory service.

On July 12 the company received a communication from the local union of the National Brotherhood of Electrical Workers and the local Amalgamated Association demanding that the employees who had been discharged be reinstated with full pay; that all men employed in the future be union men, or those who agreed to become so within a stated time, and that all matters relating to hours of labor, wages and other grievances be handled by a conference committee to be mutually agreed upon by both parties concerned. This communication was received at 10.30 a. m. and a reply was demanded in thirty minutes. The men began to return their cars to the carhouse at noon on the same day that the demands were presented. By 4 p. m. all cars were off the street. A few cars were operated on Saturday morning, July 13, but the men met with so much abuse from both fellow employees and their sympathizers that they asked to be relieved of duty at noon. The company was able to secure a few men from out of town to replace the striking motormen and conductors, and service was resumed on one line at 3 p. m. and operated until sundown. All cars were then taken off the streets. On July 14, 15 and 16 cars manned by strike breakers were operated during the day on three lines only. No cars were operated after dark.

Early on the morning of July 17 an agreement was reached between the company and the union officials and the carmen by a unanimous vote decided to commence operations at once.

The company, with due regard for the welfare of the public and the interests committed to its care, could not accede to the demands made upon it in the communication from the union, the principal one being for a closed shop. George L. Crosman, president of the Portland Chamber of Commerce, appointed a committee of five prominent business men in Portland to act as a board of arbitration, and negotiations were conducted through them. After a number of conferences between the parties concerned the differences were adjusted on the following terms:

There shall be no discrimination by the company or any of its employees on account of membership or non-membership in any labor organization, and the wages and schedule conditions now in force will remain as at present until May 1, 1917. The company will reinstate without prejudice employees discharged since July 9, 1916, as well as those who left the service on or before July 12, 1916. Disputes will be settled by mutual discussion, or, if agreement cannot be reached, by a board of arbitration appointed in the usual way. The agreement will be in force until April 30, 1917.

NEW WATER-POWER LEGISLATION

The House of Representatives on July 14 passed a substitute measure for the Senate (Shields) bill for regulating the construction of dams across navigable waters. The measure is now in the hands of a conference committee composed of Congressmen and Senators. There was some disappointment on the part of the conservationists over the decision to send the bill to conference, but others are somewhat relieved because they apprehnd that unsafe legislation might result if an attempt should be made to jam the measure through just before adjournment. The bill will probably not be reported out of the conference for several weeks. Like the Adamson bill, the present House bill provides that not more than 50 per cent of the output of any plant shall be sold to one customer except upon the written consent of the Secretary of War.

NEW BOSTON WAGE AGREEMENT SIGNED

Approximate 2-Cent Raise for Trainmen, With Additional 0.5-Cent Raise if Dividends Reach 6 Per Cent

Following almost daily conferences since early in April between officials of the Boston (Mass.) Elevated Railway and representatives of the Amalgamated Association, an agreement was signed on July 15 covering wages and working conditions for three years from May 1, 1916. About 5000 blue-uniformed men and 4800 shop, maintenance of way, power station and miscellaneous employees are concerned in the agreement.

The new scale of wages will probably cost the company about $2,000,000 more than its present labor charges in the three years. In brief, blue-uniformed men are to receive an advance of 2 cents an hour, and shop, maintenance of way, power station and miscellaneous employees 1 cent an hour for the first year of the agreement, making the maximum rate for surface car motormen and conductors that year 34 cents an hour. In each of the next two years a further advance of 0.75 cent an hour is to be given to blue-uniformed men and 1 cent an hour to miscellaneous employees, maintenance, shop and power station men, the maximum rates for surface car platform men being 34.75 cents an hour in the second year and 35.5 cents an hour in the third year of the agreement. In detail, the wage scale of platform men on both the surface and rapid transit lines is shown herewith:

WAGES OF MOTORMEN OF RAPID TRANSIT LINES

Year of Service	Present Rate per Hour	May 1, 1916 to May 1, 1917	May 1, 1917 to May 1, 1918	May 1, 1918 to May 1, 1919
First	30.25	32.25	33	33.75
Second	31	33	33.75	34.5
Third	31.75	33.75	34.5	35.25
Fourth	32.5	34.5	35.25	36
Fifth	33.25	35.25	36	36.75
Sixth and thereafter	34	36	36.75	37.5

WAGES OF GUARDS OF RAPID TRANSIT LINES

Year of Service	Present Rate per Hour	May 1, 1916 to May 1, 1917	May 1, 1917 to May 1, 1918	May 1, 1918 to May 1, 1919
First	25.5	27.5	28.25	29
Second	26.5	28.5	29.25	30
Third	27	29	29.75	30.5
Fourth	27.5	29.5	30.25	31
Fifth	28	30	30.75	31.5
Sixth and thereafter	28.5	30.5	31.25	32

WAGES OF BRAKEMEN OF RAPID TRANSIT LINES

Year of Service	Present Rate per Hour	May 1, 1916 to May 1, 1917	May 1, 1917 to May 1, 1918	May 1, 1918 to May 1, 1919
First	22	24	24.75	25.5
Second	22.5	24.5	25.25	26
Third	23.25	25.25	26	26.75
Fourth	23.75	25.75	26.5	27.25
Fifth	24.25	26.25	27	27.75
Sixth and thereafter	24.75	26.75	27.5	28.25

WAGES OF MOTORMEN AND CONDUCTORS OF SURFACE LINES IN CENTS PER HOUR

Scale in Effect	1st Year 1-6M	1st Year 2-6M	2d Year 1-6M	2d Year 2-6M	3d Year	4th Year	5th Year	6th Year	Av. per Hr. for 10 Years
5/1/16....	28.75	29.0	30.25	30.25	31.0	31.5	32.5	34.0	31.354
5/1/17....	29.5	29.75	31.0	31.0	31.75	32.25	33.25	34.75	32.104
5/1/18....	30.25	30.5	31.75	31.75	32.5	33.0	34.0	35.5	32.854

A most important and novel provision of the agreement arranges for a further increase of 0.5 cent an hour on all the rates in the last year of its term, on condition that the company is able to pay a 6 per cent dividend in either of the fiscal years ending June 30, 1918, or June 30, 1919. In the 1915-16 fiscal year just closed the company was able to earn only 5 per cent in dividends. It has recently applied to the State authorities for an investigation of its increasing financial necessities, and by early fall, at the latest, it is expected that the special recess commission created by the Legislature in response to a special message of Governor McCall will begin to hold hearings. The foregoing feature of the agreement aligns both the company and its employees on the same side of the quest for a fair return upon the company's investment, which has now reached a total of about $132,000,000.

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Commenting editorially upon this feature the Boston *Herald* pointed out early in the week ended July 22 that with representatives of both labor and capital supporting the movement toward larger compensation for the service rendered, the outcome should be favorable to the company. The special commission includes in its membership the Massachusetts Public Service Commission, the Boston Transit Commission and representatives from the Massachusetts Senate and House, and is to report at the coming session in January.

The agreement is a document of some 108 closely typewritten pages. It defines working conditions in the transportation and other departments of the road in detail. In future 70 per cent of the runs will be scheduled inside of the nine hours' work in eleven which is named in the Massachusetts law as the legal limit (subject to extension on request of employee), whereas only 40 per cent of the runs on the Boston system have fallen within the nine hours in eleven range. The remaining 30 per cent will be arranged to be completed in fourteen hours instead of sixteen hours, and regular men will be paid overtime work at the end of eleven hours instead of twelve as heretofore. Extra men will receive overtime pay at the end of thirteen hours in place of fourteen. By the system of promotion which will be in use on the rapid transit lines, a brakeman when promoted to a guard or guard to a motorman's post will receive a guarantee of nine hours' daily pay in the grade from which he has been advanced, if he does not receive a full day's work in the new grade. Men called for snow work will be paid from the time of calling rather than of reporting. Snow work will be assigned to train service men according to their seniority rating, and two hours' pay will be guaranteed.

The agreement was signed by W. D. Mahon for the union and Matthew C. Brush, vice-president, for the company. Mr. Brush has been in immediate charge of the negotiations from the standpoint of the road since their inception.

BIDS RECEIVED ON LAST UNDER-RIVER TUNNEL

The Public Service Commission for the First District of New York has received bids for the construction of the last piece of under-river tunnel construction remaining to be placed under contract, namely, the new two-track tube under the East River from Second Avenue and Sixtieth Street, Manhattan, to a connection with the new elevated lines in Queens at Queensboro Bridge Plaza station. The tunnel will connect the Queens lines with the route under Fifty-ninth Street and Central Park West, which is to connect the Broadway-Seventh Avenue line in Manhattan, to be operated by the New York Municipal Railway Corporation. The latter corporation is to have trackage rights over the Queens lines terminating respectively at Corona and Astoria. The low bidder on the tunnel work was Patrick McGovern & Company, New York City, whose bid was $4,194,797, which is considered a reasonable bid for under-river tunnel work. The Degnon Contracting Company, New York City, last year made an offer to build the tunnel for $4,500,000, in the event that certain changes were made in the contract held by Degnon for the sections immediately to the west of the tunnel in Manhattan, reducing the amount of work to be done there. In the bid on the tunnel, however, the Degnon Company went below its proffer by $253,000, but was more than $50,000 over the McGovern bid. The tunnel work is a part of Route No. 61 adopted by the commission on July 28, 1915, following the decision of the commission made at the request of the Board of Estimate & Apportionment to abandon the route over the Queensboro Bridge as a part of the line to connect with the Queens lines. The Degnon proposition contained the suggestion that the route be changed from bridge to tunnel. City officials had estimated that $2,000,000 or more would be necessary to alter the Queensboro Bridge sufficiently to carry the heavy weight of the all-steel subway trains. If the cost of these alterations to the bridge is added to $500,000 which the Degnon Company agreed to cut from this contract on the Fifty-ninth Street and Sixtieth Street line in return for a change in route and deducting from the McGovern bid for the tunnel, the remainder represents approximately the net additional cost to the city through the construction of a tunnel instead of utilizing the bridge route.

HARRISBURG EMPLOYEES DECLARE STRIKE

Refusal of Company to Recognize Union Precipitates Strike in Pennsylvania Capital

About 176 employees of the Harrisburg (Pa.) Railways went on strike on Sunday, July 16, shortly after midnight. Since that time more men have joined the union, known as Division 709 of the Amalgamated Association, and the number on strike on Wednesday evening, July 19, was close to 200. The strike vote was taken after midnight when the men had completed their Saturday evening runs. The strike is the result of the refusal of Frank B. Musser, president of the Harrisburg Railways, to treat with the union. The members of the union asked full recognition of the union in connection with their other demands, which were as follows: An increase of from 4 to 8 cents an hour for motormen and conductors; extra pay for overtime; permission to sign seven days in advance of the day an employee wants to be away from his work; permission to post notices of union business in the carhouses; recognition of the union; that a man suspended be paid for the time he lost if after a hearing it has been found that he was suspended unjustly; that suburban motormen and conductors who are compelled to handle freight be furnished at least one uniform a year by the company: that the company install stools in every car on the system for the men; that the shopmen be compelled to clean the cars and equip them; that the company pay the men for one-half hour's work in making out accident reports; that the company maintain an adequate list of extra men, so that the regular employees need not overwork unless they desire.

The scale of wages for motormen and conductors asked for in the demands follows: First six months, 26 cents an hour; second six months, 28 cents an hour; second year, 30 cents an hour; third, 32 cents an hour; fourth year and thereafter, 34 cents an hour. The scale for other employees as arranged in the demands is: Car cleaners and switchmen, 23 cents an hour; greasers, 23 cents an hour; night watchmen, 23 cents an hour; repairmen, 28 cents an hour; trackmen, 23 cents an hour; firemen, 25 cents an hour.

In a statement to the public President Musser declared that the company would not treat with committees of the men when they represented a branch of the Amalgamated. His statement issued the day before the strike began follows in part:

"This company has never refused to treat with its men individually or collectively, so long as the interests of the men as a body could be considered from a purely local standpoint. It does refuse, however, to treat with committees when they represent an organization of employees which in turn owes allegiance to a national body whose aims seem to be confined solely to the imposition of certain working conditions in all localities, without regard to the adaptability thereof to the general conditions which prevail in each respective locality.

"No better evidence of the company's attitude toward its men can be given than that it has voluntarily from time to time, as business conditions warranted, increased the wage scale from 12½ cents to 26 cents an hour—comparing favorably with the wage scales of neighboring Pennsylvania cities in the same class, the last increase being May 1 last.

"As to the comforts of its men, in the operation of cars, rules and regulations have from time to time been modified upon the suggestion of employees, looking to increased comforts, keeping in mind, of course, that the safety and convenience of the public must always be conserved, as well as the interests of the employees.

"Some of the men have complained about the necessity of being upon their feet during working hours. Notwithstanding that in this they do not differ from the carpenter, steelworker, mechanic and many other branches of labor, stools have for a long time been permitted on suburban lines, and have been ordered for city lines for the use of motormen, except in congested parts of the city where the safety and convenience of the public demand absolute freedom of body and constant watchfulness on all sides.

"The company realizes that in the performance of its duties to the public the highest degree of efficiency is essential on the part of employees, and quite naturally is on the alert to improve working conditions at all times as business conditions make them possible."

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Organizer Thorpe issued a statement on July 15, in which he said:

"After the company refused to meet the committee to discuss the demands, the committee then offered to submit the entire matter to a board of arbitration. This was refused by Mr. Musser. Therefore the employees feel that there is but one alternative left, which is to suspend work. This will be done unless there is a change of attitude on the part of the company toward the employees before Sunday morning, July 16, at midnight."

Only sixteen of the usual fifty cars were operating Sunday. On July 17 scarcely anyone rode in the seventeen cars which were operated. On July 18 the company again attempted to resume operation, but brick hurlers among crowds of sympathizers early caused the company to suspend all operation for the day. On July 19 twenty cars were run, but there was considerable disorder.

The first step toward a possible settlement of the strike was made on Thursday morning, July 20, when President Musser met a committee of the strikers as individuals at the company's offices. Another meeting was arranged for Friday, July 21, at 2 o'clock. On July 20 fifteen cars were operated throughout the day. At 4 o'clock, however, mobs again stoned the cars and they were then returned to the carhouses. Mr. Musser issued a statement in which he intimated that he might ask for State police if matters were not remedied. The strikers were paid on July 20 and in the envelopes were notices to the effect that each man was to appear at the carhouse in uniform not later than noon or to turn in what company property he had in his possession and to consider himself no longer an employee of the company. None of the strikers reported for duty.

Efforts were made late on July 19 to get the employees of the Valley Railways operating into Harrisburg from the Cumberland County towns to go on strike, but the men refused to join the union. These men settle all grievances with the company officials through a local grievance committee, a plan desired by Mr. Musser of the Harrisburg Railways.

On Thursday night, July 20, a demonstration of all unions and strike sympathizers was held when the strikers and their friends, several thousand strong, paraded over the city streets. All the cars were off the streets, and there was no disorder.

STRIKE DECLARED IN LOGANSPORT

In an effort to compel the Fort Wayne & Northern Indiana Traction Company to operate its cars on the Logansport city division with both motormen and conductors, some of the employees of the company in Logansport, Ind., went on strike on July 18. For several months past the company has been operating one-man cars in Logansport. The striking employees, who have recently organized, demand a 5 per cent increase in pay and recognition of their union.

Mobs of sympathizers with the striking street car men of Logansport rioted in the streets all night on July 18. The operation of street cars had to be stopped. A policeman and a civilian were shot during an attack on a line car sent to repair the high tension wires torn down by the crowds. No attempt was made to suppress the rioting until July 19. The business district that day was practically in the hands of the mob element and no cars were operated. So serious was the outlook that Mayor Guthrie asked Governor Ralston for assistance to maintain order. The police state that rioting started all over the city at a given signal caused through efforts of outside labor agitators. The company shut off power on the city lines to prevent the wrecking of cars in the hands of rioters, but the linemen who are on strike diverted current from the lines of the Union Traction Company and the rioters ran cars up and down the streets, derailing and wrecking them during the night of July 19. Policemen and citizens recruited quickly as special police guarded the power house of the Fort Wayne & Northern Indiana Traction Company and prevented further depredations. On Thursday morning, July 20, it was reported that the mob element was under control and that cars were again being operated.

TRENTON COMPANY SUSTAINED IN ARBITRATION

Finding of Arbitration Board Justifies Discharges Made—New Working Agreement Arranged

The case against the seven conductors who were dismissed by the Trenton & Mercer County Traction Corporation, Trenton, N. J., on the charge of fare "sniping," has been decided against them following the long arbitration between C. Howard Severs, representing the union; Peter E. Hurley, representing the company, and Clifton Reeves, a United States Commissioner of Conciliation.

Each accused conductor had the privilege of appearing at the different hearings when testimony was being taken. The testimony of the private inspectors was taken in the Philadelphia office of the Pinkerton Detective Agency, which allowed its men to be examined and cross-examined.

The case of the company was to show violation of Section 17 of the agreement between itself and the labor organization and Rule 113 in the Book of Rules referred to in the contract, in which it is required that fares must be collected as soon as possible after passengers get on cars, and must be immediately registered in the presence of the passengers. The evidence produced by the association was for the purpose of showing that the men had been unreasonably and unjustly discharged, and that they should be reinstated to former positions and paid for all time lost.

The written reports made to the detective agency included the following information: Number of report, day of week, date, badge number of conductor, car number, street on and time of day, street off and time of day, collections from street on to street off, passengers previously on, passengers paying, total and fares not registered. They also gave what the register showed, the number of passengers boarding the car, and, in most cases, the fact that the conductor collected from each passenger, and at what point along the line conductors failed to register fares taken. These reports were then forwarded to the company.

The evidence showed that the detective agency had a yearly contract with the railway and that upon request of the company the agency sent its inspectors to Trenton. These inspectors were unknown to the manager and officials of the company.

The company gives the benefit of the doubt to the conductors where persons board cars with children and pay the fares of some of the youngsters and where the number of fares paid cannot be clearly determined, as in the case of free riders, such as uniformed men and others entitled to ride free, and about which there might be some doubt. The company instructs its inspectors to call the attention of the conductor where any mistake is discovered. It was shown at the arbitration that the company did not single out any employees for being too active in labor circles.

The report is signed by Clifton Reeves, the third arbitrator, and by Peter E. Hurley, the arbitrator for the company. Mr. Severs refused to sign the majority report. He said he would issue a statement later.

In commenting editorially on the finding, the Trenton *Advertiser* said: "The report of Clifton Reeves, the third arbitrator, leaves no room to doubt that the testimony and circumstances were studied without prejudice to either side. The extreme patience of the arbitrators in sifting the cases is manifested by the fact that the evidence taken down stenographically covers 231 standard pages, containing more than 55,000 words. Not a line was produced to indicate that the discharges were in a spirit of persecution, as originally charged, but, on the contrary, there was testimony to show that General Manager Hurley had dismissed certain inspectors in previous cases when he regarded their work against the men as unreliable. No discharges of conductors are made except for repeated offenses."

The new working agreement between the Amalgamated Association and the Trenton & Mercer County Traction Corporation has been accepted by each and has been signed. By the wage clause in the agreement the men will receive 29 cents an hour for the coming three years. They have been getting 27 cents. They requested 34 cents. All of the employees, including platform men and track gangs and those working in the power house and carhouses, will receive increases in proportion. There is now no dispute

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relative to the three-year contract between the company and its men, matters other than the wage scale all having been settled previously. The company made two propositions to the men on the wage clause in the working agreement. One was to pay 28 cents an hour for the first year, 29 for the second year and 30 for the third. The second was to pay a flat rate of 29 cents a year for the three years. The increase dates from July 1.

PROVISION MADE FOR RAILROAD INQUIRY

Senate and House Approve Resolution for an Inquiry by a Committee of Congress

Approval of a Senate resolution by the House on July 15 made certain an inquiry into the railway transportation problem of the country by a committee of Congress. The House amendments to the Senate resolution are not fundamental, and the commission probably will be organized before Congress adjourns. In his annual message last December the President suggested a commission to investigate "the exceedingly serious and pressing transportation problem."

An inquiry of the broadest scope is to be undertaken under the resolution, which was fathered by Senator Newlands of Nevada. Five senators from the committee on interstate commerce and five representatives from the committee on interstate and foreign commerce, to be elected by the full committees, are to constitute a joint sub-committee to conduct the investigation. The resolution as adopted by the House requires a report to Congress by the second Monday in January, 1917, whereas the Senate resolution provides for an "expeditious report." The scope of the inquiry is forecast by the language of the resolution, which directs a report on·

"The subject of the government control and regulation of interstate and foreign transportation, the efficiency of the existing system in protecting the rights of shippers and carriers and in promoting the public interest, the incorporation or control of the incorporation of carriers, and all proposed changes in the organization of the Interstate Commerce Commission and the act to regulate commerce; also the subject of government ownership of all public utilities, such as telegraph, wireless, telephone, express companies, and railroads engaged in interstate and foreign commerce; the wisdom or feasibility of government ownership of such utilities, and as to the comparative worth and efficiency of government regulation and control as compared with government ownership and operation."

The joint sub-committee has power to summon witnesses, administer oaths, and call upon any department of the government to furnish information desired.

As to the importance and need of the inquiry, Mr. Adamson, who will be chairman or vice-chairman of the joint investigating sub-committee, was quoted in part recently as follows:

"When normal conditions are restored following the present war the tremendous increase of industries and business of our country will more and more burden railroads inadequately equipped and demand increased facilities. As the roads must expend a vast outlay of money to handle business before they can expect to derive revenue therefrom, the question of financing these necessary and vast improvements becomes a momentous one, and that is one of the questions that the railroads desire to present for consideration and solution to this joint sub-committee.

"Since the approval of the act to regulate commerce in 1887 the system has had a gradual and irregular growth by various and sporadic amendments, some of them making decided if not radical changes in the original plans and policies and some of them adding new and important activities. So the entire law to regulate commerce as now in force is not a uniform, compact, symmetrical structure easily understood, but in some parts hardly reconcilable and sometimes inconsistent. To say the least of it, the diversities and incongruities should be carefully considered, and wherever possible unified and improved to the end that Federal regulation of carriers may be successfully carried on with the best possible service to the public."

Pending the inquiry Congress is not expected to attempt any legislation materially affecting the railways.

TOLEDO COMMUNITY PLAN DISCUSSED

At a conference between Mayor Milroy's street railway commission and Henry L. Doherty at Toledo, Ohio, on July 14, a disagreement occurred over the valuation of the property. The clause relating to this provides that when the city shall have raised by accumulation from fares or otherwise a fund equal to 20 per cent of the agreed valuation, plus betterments and extensions less depreciation, the city may take over the property by paying that amount to the Toledo Railways & Light Company, and the remaining 80 per cent in 6 per cent mortgage bonds. Mr. Doherty objected to reducing the amount to be paid by depreciation after the date of valuation and asked that this clause be stricken out.

A tentative agreement was reached to formulate the franchise so that the city may have the power to set aside a portion of the money received from fares for the purchase of the property. This money would be held by trustees and invested by them. Mr. Doherty argued that stockholders should be allowed to vote their own stock, as that will make them feel that they have a voice in the management and will give the public greater interest in the company. Chairman Johnson Thurston feared that outside interests might get control of the stock if it was left in the hands of the purchasers. It was agreed that dividends on stock shall be at the rate of 6 per cent per annum and that the maximum fare shall be 5 cents.

Under agreements already reached the street railroad property is to be separated from the power house and other property. A new corporation, probably to be known as the Toledo Community Traction Company, is to be incorporated. The street railway property is to be valued by agreement between the commission and the company or, in the event of disagreement, by arbitration, and stock to the amount of the valuation obtained is to be issued in shares of $10 par value each. This stock is to be passed to the Toledo Railways & Light Company in payment for the property, but is to be deposited with five trustees to be selected, under a trust agreement, and is to be voted by them for a period of five years. Trust certificates are to be issued to the company. There will be no bonds. The stock is to be sold to citizens of Toledo, if they will purchase it all, but if not the matter is in the hands of the trustees. The city will have five years in which to raise the money with which to purchase the property of the company.

President Johnson Thurston raised the question on July 13 as to just what part of the property is to be purchased by the new company and mentioned the fact that the abandonment of some of the lines had been considered, if the old company had continued to operate the road. Mr. Doherty insisted that his company must sell all or none of the property, even if very little is paid for the portions that are not needed.

Texas Midland Not to Be Electrified.—Col. E. H. R. Green, president of the Texas Midland Railroad, denied in New York on July 20 to a representative of the ELECTRIC RAILWAY JOURNAL the report from Texas a few days previously that it was proposed to equip the railroad at this time for electric operation.

Offer Made for Edmonton Municipal Line.—American bankers are said to have made a proposition to the city of Edmonton, Alta., to purchase the Edmonton Radial Railway, which has been operated by the city. The system comprises 53 miles of line, and in 1915 the deficit was $135,758, with a total deficit from operation to date of $581,605.

Removal of Receiver on Account of Strike Unlikely.—Decision has been reserved by Supreme Court Justice Marcus of Erie County on the application of certain stockholders of the Buffalo (N. Y.) Southern Railway to have Nathan Bundy removed as receiver and general manager of the line. The action was taken by stockholders as a means of ending a strike of platform men which has been in effect for almost three months. In reserving decision the court intimated that the application would be denied, as stockholders should not make use of a court to settle labor troubles.

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Block Signals Being Installed Between Terre Haute and Brazil.—The Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., is installing electric block signals on the section of its Indianapolis-Terre Haute line between Terre Haute and Brazil, at a cost of $25,000. These signals are the same as those installed on other parts of the system, being the General Railway Signal Company's A. P. type, light indication signals. With the exception of one block between Bridgeport and Plainfield, which is under contract but will not be installed until next year, this completes all electric block protection planned for the line between Indianapolis and Terre Haute.

Fewer Jitneys in Rhode Island.—The operation of jitneys is on the wane in Providence, R. I., and suburbs. Prior to July 2, 1915, about 600 were running in the territory served by the Rhode Island Company's traction system. On that date a city ordinance went into effect in Providence which requires a fee of $5 per passenger seat and a bond of $500 per seat. This had a strong deterrent effect, and at the expiration of the year many original license holders failed to renew. It is estimated that there are now only 100 such vehicles in the whole territory. Many automobiles which formerly ran through the principal streets at 5-cent fares are now operating as cabs, with fares ranging from 25 cents upward per passenger. This obviates the necessity of taking out the license.

Authority to Make Street Repairs Defined.—Walter F. Meier, assistant corporation counsel, in a communication to the Board of Public Works of Seattle, Wash., has advised the board that it is the only body having authority to find that an emergency exists that would authorize the city to make repairs on streets adjacent to car tracks, and to charge the cost of such repairs to the company and reimburse itself from a franchise fund provided by the company. The opinion is the result of an inquiry by Charles R. Case, superintendent of streets, who recently reported to the Board that certain streets occupied by tracks of the Puget Sound Traction, Light & Power Company needed repairs. Mr. Case asked for and received authority to divert money in the franchise fund established by the company.

New Nickel Plate Officers.—J. J. Bernet, until recently vice-president of the New York Central Railroad, was elected president of the New York, Chicago & St. Louis Railroad on July 15 to succeed W. H. Caniff, who resigned after the change of ownership by which Cleveland interests took over the property. The other officers are as follows: Chairman of the board, O. P. Van Sweringen; first vice-president, Warren S. Hayden, Hayden, Miller & Company, Cleveland; second vice-president, Joseph R. Nutt, Citizens' Savings & Trust Company, Cleveland; third vice-president, M. J. Van Sweringen; secretary, W. D. Turner; treasurer, Otto Miller; general counsel, M. B. and H. H. Johnson. The names of the directors were given in the account of the purchase which was published in the ELECTRIC RAILWAY JOURNAL of July 15, page 113. They are O. P. and M. J. Van Sweringen, W. S. Hayden, J. R. Nutt, F. E. Myers, C. L. Bradley, M. B. Johnson, G. W. Davison, E. R. Tinker, G. M-P. Murphy, H. S. Vanderbilt, J. J. Bernet and E. W. Moore.

Cleveland Railway Settles for Taxes.—On July 13 the Cleveland (Ohio) Railway paid into the Cuyahoga County treasury $999,237 in settlement of its taxes for 1913, 1914 and 1915. This amount represented the assessments made on the basis of the valuations named by the State Tax Commission, but did not include penalties and interest which were waived by the county treasurer on the advice of the legal department. The company had instituted injunction suits each year to prevent the collection of the amount assessed on the ground that the valuation was too high. This was done after tendering payment on a valuation which the company claimed was fair. In the trial of these cases the decisions of both the Common Pleas Court and the Court of Appeals were in favor of the county. Preferring not to carry the matter to the Supreme Court, the company offered to make the payment, less interest and penalties, and the officials accepted. The company wanted the State Tax Commission to explain its methods of finding the value of the property, but that body insists upon keeping its methods from the public.

Financial and Corporate

ANNUAL REPORTS

Denver Tramway System

The comparative consolidated statement of income of the Denver (Col.) Tramway System for the years ended March 31, 1915, and 1916, follows:

	1916		1915	
	Amount	Per cent	Amount	Per cent
Gross earnings	$3,174,665	100.00	$3,263,954	100.00
Operating expenses, including partial depreciation in 1916:				
Maintenance	$370,166	11.66	$371,116	11.37
Operation	1,009,564	31.80	1,037,376	31.78
General	246,463	7.76	275,468	8.44
Total	$1,626,193	51.22	$1,683,960	51.59
Net earnings	$1,548,472	48.78	$1,579,994	48.41
Taxes and franchise payments	280,768	8.85	279,220	8.55
Operating income	$1,267,704	39.93	$1,300,774	39.86
Other income	20,607	0.65	32,295	0.98
Gross income	$1,288,311	40.58	$1,333,069	40.84
Deductions from income:				
Interest on funded debt	$989,641	31.17	$988,415	30.28
Interest on notes and accounts payable	913	0.03	22,350	0.68
Total	$990,554	31.20	$1,010,765	30.96
Net income	$297,757	9.38	$322,304	9.88

The gross earnings of the system showed a decrease of $89,288, or 2.7 per cent, during the last fiscal year, all of which decrease occurred during the months of March to November, 1915, inclusive. Beginning with December, 1915, and continuing for each month since, the revenues have shown healthy increases. The operating expenses during the fiscal year just passed decreased $57,766, or 3.4 per cent, most of this saving coming in expenses of operation and in general expenses. Owing to a slight increase in taxes and franchise payments and to a loss in other income, the gross income decreased $44,758, or 3.3 per cent. This was somewhat reduced by a decline in interest on notes and accounts payable, so that the net income fell off only $24,547, or 7.6 per cent.

A substantial saving, amounting to $21,049, was shown in the claim and legal departments in the handling and settlements of injuries and damages. The expenditure for this account amounted to 1.8 per cent of the total operating revenue.

During the last fiscal year, the bonded indebtedness of the company was reduced $210,395; through sinking fund payments account of the Denver Tramway Power Company's bonds, $48,000 par value of which were thus retired and account of the Denver City Tramway 5 per cent first and refunding sinking-fund mortgage bonds, $181,000 par value of which were similarly retired. By exchanging first and refunding bonds of the Denver City Tramway for first and collateral mortgage 5 per cent bonds of the Denver & Northwestern Railway, the latter issue has been reduced $359,920, so that the amount now outstanding in the hands of the public is $525,100.

The policy of the board of directors to hold capital expenditures to a minimum without detriment to the property, as indicated in the preceding annual report, was pursued during the last fiscal year. There was expended for betterments and improvements to the property, $91,965. There was expended on the system for maintenance $370,165, which was approximately the amount expended in the previous fiscal year. The questions at issue between the company and the tax assessing bodies of Denver and the State of Colorado were settled during the year. All back taxes were paid and the 1915 taxes will be paid on the basis of the present assessment. It is believed, however, that the assessment for taxation placed upon the company is ex-

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cessive and burdensome, and should be appreciably reduced.

The following table presents some miscellaneous statistics for the entire system:

	1916-15	1915-14
Passengers carried:		
City lines	72,983,006	75,572,785
Interurban lines	923,708	956,034
Total	73,906,714	76,528,819
Passenger earnings per car-mile:		
City lines, cents	25.47	26.53
Interurban lines, cents	27.17	28.98
Passenger earnings per car-hour:		
City lines	$2.46	$2.56
Interurban lines	$4.48	$4.69
Miles of track operated:		
City lines	212.46	213.74
Interurban lines	39.30	39.17
Total	251.76	252.91
Car-miles operated, passenger:		
City lines	11,283,856	11,174,515
Interurban lines	369,809	366,290
Total	11,653,665	11,540,805
Car-hours operated, passenger:		
City lines	1,167,357.6	1,159,205.4
Interurban lines	22,429.8	22,622.4
Total	1,189,787.4	1,181,827.8

Pittsburgh Railways

The income statement of the Pittsburgh (Pa.) Railways for the year ended March 31, 1916, follows:

Gross earnings from street railway operations	$12,123,275
Operating expenses:	
Maintenance of way and structures	$1,026,671
Maintenance of equipment	619,886
Traffic	27,920
Power	1,159,630
Transportation	3,065,388
General and miscellaneous	1,343,890
Total	$7,243,387
Taxes	447,515
Total operating expenses and taxes	$7,690,903
Net earnings from street railway operations	$4,432,372
Auxiliary operations:	
Gross earnings	$145,478
Operating expenses and taxes	97,461
Net earnings	$48,016
Total net earnings	$4,480,388
Other income	107,435
Total income	$4,587,823
Deductions from income (rentals, and interest on current liabilities)	2,974,531
Income before deducting fixed charges	$1,613,292
Fixed charges, interest on funded debt	389,106
Income after deducting fixed charges	$1,224,186
Other deductions:	
Interest on income debentures	$600,000
Depreciation of materials and supplies	3,314
Deferred account, portion written off	91,277
Extraordinary expenditure for improvements, replacements and realignments during the year	417,986
Total	$1,112,578
Net income	$111,608

In the early part of the year conditions in the territory served were much depressed, but during the latter part of the year, owing to the material improvement in business conditions, the gross railway earnings of the company improved and the total for the year showed an increase of $453,184, or 3.8 per cent. Operating expenses decreased $371,733, or 4.9 per cent, and taxes increased $9,433, or 2.1 per cent, so that the net earnings from railway operation showed a gain of $815,483, or 22.5 per cent. The net income for the year was $111,608, as compared to $100,000 in the preceding year, but the former figure was obtained after raising the interest payments on income debentures from $330,739 to $600,000, and after allowing $3,314 for depreciation on materials and supplies, $91,277 for writing off a portion of the deferred account and $417,986 for an extraordinary expenditure for improvements, replacements and realignments during the last year.

There was expended during the year $742,202 for improvements, betterments and extensions on the properties operated by the company, of which $324,215 was charged to capital accounts of this and subsidiary companies. The aforementioned sum of $417,986 was charged against the income account for the year on account of extraordinary expenditures for improvements, replacements and realignments, and there was also charged to this account $91,277 as amortization for the same class of work.

During the year contracts were entered into with the St. Louis Car Company for the construction of fifty double-end, double-truck, low-floor type of motor cars, and seventy-five double-end, double-truck trail cars; with the Cincinnati Car Company for 100 double-truck, single-end, low-floor type of motor cars, and with The J. G. Brill Company for cars. These 240 cars will be delivered some time during the coming year and will replace at least an equal number of fifteen double-truck, double-end, low-floor type interurban single-truck cars and admit of a better distribution of the cars at present in use. The new cars will afford better service and also effect further economies.

ANOTHER PLEA MADE FOR THE INVESTOR

Evidence is fast accumulating in regard to the need for a broader attitude in the far West toward capital seeking investment. As noted in the ELECTRIC RAILWAY JOURNAL of July 15, Commissioner Campbell of the Public Service Commission of Oregon in the Portland *Oregonian* recently issued warning in regard to the effect of corporation baiting. Now comes George K. Weeks, president of the San Francisco-Oakland Terminal Railways, with a similar warning. Mr. Weeks recently returned to San Francisco from a tour of the East, and has given his impressions in an interview in the San Francisco *Examiner*. He referred to certain public utility financing in the East and cited the case of the Kansas City (Mo.) Railways as a criterion of the willingness of investors to furnish funds quickly where a tolerant attitude was assumed toward the investor. In contrast to this, however, he cited the case of California. He is quoted in part as follows:

"I regretted to find a rather general feeling in the East that the people of California were not disposed adequately to protect capital invested in the development of their State. This feeling undoubtedly grew primarily out of the many losses which Easterners have made in California investments of a development character during the last few years, but the fact that only on the Pacific Coast had the jitney been allowed to run wild for nearly two years and inflict radical damage on the electric railways without any corresponding benefit to the traveling public is widely commented upon. If California expects to attract capital in the face of a world-wide competition it will be necessary to afford reasonable protection to the capital already invested here."

SUSPENSION OF CLAYTON ACT ASKED

Frank Trumbull, president Chesapeake & Ohio Railroad; Robert S. Lovett, chairman of board of directors Union Pacific Railroad and Alfred P. Thom, general counsel Southern Railway, representing 84 per cent of the railroads of the country, on July 19 urged upon President Wilson the suspension of that section of the Clayton act compelling competitive bidding for railroad supplies. They requested that the President have the subject investigated by a committee of Congress or the Interstate Commerce Commission.

The act goes into effect on Oct. 15 and the commission has already drafted tentative regulations seeking to put it into effect, as provided by the law. The particular provision relating to the railroads is known as Section 10. Only purchases in excess of $50,000 per year come under the provisions, which stipulate that all purchases of supplies in excess of that amount must be by a system of competitive bidding under regulations promulgated by the commission.

It is asserted by railroad officials that the provisions are unjust and conflicting. Most of the large railroads, moreover, buy supplies for themselves and their subsidiaries in bulk and in many cases without competitive bidding. These supplies are parceled out to the subsidiaries as they need them through the clearing house of the parent organization. The subsidiaries frequently issue stock for the supplies, and the stock is held by the parent concern until such time as it appears advantageous to dispose of it. This practice would be hindered under the act simply because of interlocking directors. Furthermore all of the large companies have purchasing departments which buy equipment by wholesale, and it is contended that the supplies can be purchased cheaper than by competitive bidding. The small railroads, it is

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held, cannot buy to advantage on small competitive bids.

As a result of the mission to Washington it is believed that there may be a suspension of the offensive provisions for two years. Within this time the government is expected to have at work a commission to study the features of railroad regulation and management which now create artificial barriers to development and to efficient operation.

WASHINGTON RAILWAYS SHOW LOSSES

The fifth annual report of the Public Service Commission of Washington, covering the period from Dec. 1, 1914, to Nov. 30, 1915, contains the accompanying table of mileage and earnings figures for electric railways in the State for the year ended June 30, 1915. A comparison of the totals with the preceding year's results shows that the total mileage operated increased 8.05 miles, to a total of 1049.25 miles. Owing to the general depression in the Northwest and to jitney and automobile competition, however, the total operating revenues decreased $1,303,768 or 13.6 per cent. The loss came mostly in passenger traffic, which fell off 25,120,822 or 13.3 per cent. In spite of retrenchments, the saving in operating expenses was only $291,453 or 4.7 per cent, so that the net operating revenue decreased $1,012,315 or 29.7 per cent. The total of taxes paid, however, decreased $5,023 or 0.4 per cent.

STATEMENT OF MILEAGE, OPERATING REVENUES AND EXPENSES OF ELECTRIC RAILWAYS IN WASHINGTON FOR YEAR ENDED JUNE 30, 1915

Name of Company	Total Mileage Operated	Total Operating Revenue	Total Operating Expense	Net Operating Revenue	Total Taxes Paid	Total Number of Passengers Carried	Average Fare Per Revenue Passenger
Gray's Harbor Railway & Light Company	11.94	$94,756	$63,160	$31,596	$8,748	1,801,158	$0.04738
Loyal Railway	2.00	.....	.....	.....	.....	.....	.....
Olympia Light & Power Company	5.99	34,649	29,479	5,169	5,796	730,980	.04960
Pacific Northwest Traction Company	78.52	400,186	224,855	175,330	39,426	1,141,762	.27334
Pacific Traction Company	25.51	82,260	73,138	9,121	4,747	1,744,547	.04918
Puget Sound Electric Company	65.59	386,250	345,891	40,358	65,895	1,436,499	.18738
*Puget Sound International Railway & Power Company	22.96	161,113	130,335	30,778	38,790	3,214,792	.05828
Puget Sound Traction, Light & Power Company	228.60	3,460,958	1,915,396	1,545,561	602,415	90,518,361	.04658
Seattle, Renton & Southern Railway	24.75	290,429	205,400	85,029	26,258	6,323,222	.04158
Spokane & Inland Empire Railroad	251.12	1,243,325	1,067,284	176,040	150,000	12,634,959	.07940
Tacoma Railway & Power Company	105.77	922,965	725,018	197,946	87,085	22,696,270	.04867
Walla Walla Valley Railway	20.61	92,236	65,426	26,810	7,771	1,167,142	.06324
†Washington Electric Railway	9.20	701	211	490	.....	.....	.....
Washington-Oregon Corporation (Chehalis)	6.02	32,030	20,930	11,100	20,384	1,141,611	.06809
Washington-Oregon Corporation (Vancouver)	14.16	55,176	45,246	9,929			
Washington Water Power Company (city lines)	88.59	701,842	688,901	12,941	57,289	16,367,657	.04920
Washington Water Power Company (interurban lines)	23.89	98,203	88,282	9,921	11,958	239,620	.30171
Western Washington Power Company	5.55	27,115	24,196	2,918	954	513,712	.04919
Willapa Electric Railway	5.44	27,864	15,237	12,626	1,743	.....	.....
Yakima Valley Transportation Company	39.14	148,782	134,710	14,071	10,097	2,310,640	.04631
Total	1,049.25	$8,260,849	$5,863,105	$2,397,744	$1,139,363	163,982,932	.....

*Includes Everett Railway, Light & Power Company, under lease.
†Incomplete account; line partially under construction.

Anglo-Argentine Tramways, Ltd., Buenos Ayres, Argentina. — The gross receipts of the Anglo-Argentine Tramways, Ltd., for the calendar year 1915 totaled £2,709,615, a decrease of £141,380 for the year. The working expenses, including £120,000 carried to the depreciation renewals reserve in addition to £265,692 expended on ordinary maintenance, amounted to £1,786,740. This figure, representing a reduction of £94,256 from the preceding year's amount, probably represented the minimum compatible with efficiency, and the outlook was made worse by the continuous rise in the cost of fuel. On account of these facts the directors were unable to recommend the payment of a dividend on the ordinary shares. In 1915 the total number of passengers carried was 316,982,449, as compared to 332,015,254 in 1914, a decrease of 4.5 per cent. Most of this decrease arose in connection with surface traffic, which fell off from 303,500,792 in 1914 to 286,434,755 in 1915, or 5.6 per cent. The subway traffic increased from 28,514,462 in 1914 to 30,547,694 in 1915, or 7.1 per cent. The car kilometers run showed a falling off from 81,628,071 in the preceding year to 81,551,157 in 1915, or 0.09 per cent.

Choctaw Railway & Lighting Company, McAlester, Okla. —The Pittsburgh County Railway, a new corporation, has taken over the railway franchise and the railway property of the Choctaw Railway & Lighting Company, including the railway line in McAlester and the interurban line from McAlester to Hartshorne, a distance of 16 miles. The lighting property formerly operated by the Choctaw Railway & Lighting Company has been taken over by the Choctaw Power & Light Company. This company will sell power to the railway for the operation of its lines. The segregation of the railway and lighting properties at McAlester and their operation as just noted are in accordance with the plans agreed upon by the bondholders following the recent sale of the property of the Choctaw Railway & Lighting Company under foreclosure, as noted in the ELECTRIC RAILWAY JOURNAL of April 8.

Cities Service Company, New York, N. Y.—Following the action of the stockholders of Cities Service Company at a special meeting held on June 29, authorizing an increase in the capital stock to $100,000,000, the company has offered to buy the stock of the Lincoln Gas & Electric Light Company, Lincoln, Neb., issuing its own securities in exchange therefor. Contingent upon the assent of the holders of 75 per cent of the stock of the Lincoln Gas & Electric Light Company, Cities Service Company will accept Lincoln stock until Aug. 1, 1916, giving in payment as of that day 35/100 shares of its 6 per cent cumulative preferred stock and 7/100 shares of common stock for each share of Lincoln stock deposited with Henry L. Doherty & Company, depository. The Lincoln Gas & Electric Light Company has only one class of stock outstanding, the authorized amount being $1,500,000, of which all is outstanding. The company was incorporated in December, 1901, as the successor to the Lincoln Gas & Electric Company and has been under the management of Henry L. Doherty & Company for the last ten years. Cities Service Company has also offered to exchange share for share Cities Service Company preferred stock for the $1,500,000 of 6 per cent preferred stock of Electric Bond Deposit Company, contingent upon the depositing of 75 per cent of this stock by Aug. 1. The first dividend on securities issued in exchange will be the regular monthly dividend of one-half of 1 per cent, payable on Sept. 1, 1916. In the case of Cities Service common this will include also 2 per cent in common stock as declared by the board of directors on May 17 and 19. In accordance with the call issued on May 12 for the $7,000,000 of Cities Service Company 7 per cent convertible notes, interest ceased to accrue after July 12. The Cities Service Company has now outstanding, aside from its preferred and common stocks, only convertible debentures, the amount of which July 10 was $139,175. Of the debenture warrants issued to the common stockholders on July 1 for dividends from Jan. 1, more than half have been to date received for conversion, and of these 95 per cent were exchanged for preferred and common stock and only 5 per cent for debentures.

Glendale & Montrose Railway, Glendale, Cal.—Ownership of the Glendale & Montrose Railway has been acquired by the Great Western Improvement Company of San Francisco from J. Frank Walters of Los Angeles at a reported consideration of $750,000. The road is operated from Eagle Rock City to Glendale, a distance of 3.5 miles, and from Glendale through Montrose to La Crescenta, a distance of 5 miles. The new officers of the Glendale & Montrose Railway are William G. Henshaw, president; John Treanor, vice-

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president, and W. J. Bohon, secretary-treasurer and general manager.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—James W. Wilson, special master, is advertising for sale under foreclosure the property of the Lake Erie, Bowling Green & Napoleon Railway. The sale is to be held at Bowling Green on Aug. 5. C. G. Taylor is receiver of the company.

Sacramento (Cal.) Street Railway.—According to the annual report of the Pacific Gas & Electric Company for the calendar year 1915, the gross earnings of its subsidiary, the Sacramento Street Railway, at $425,338 showed a decrease of $131,570, or 23.62 per cent, as compared to the preceding year. This loss was brought about by the continued competition of jitney buses. In only one year since 1906, *i.e.*, in 1908, were the gross earnings less. As only 2 per cent of the gross revenue of the Pacific Gas & Electric Company, however, is derived from the street railway department, the general effect of the jitney competition was negligible. Some miscellaneous statistics of the street railway line for the last two years follow: Total passengers carried—1915, 9,485,490; 1914, 12,256,142; car-miles—1915, 2,684,508; 1914, 2,481,968; and car-hours—1915, 294,739; 1914, 303,263.

St. Louis & East Side Terminal Railway, East St. Louis, Ill.—The lease made by the Southern Traction Company, East St. Louis, Ill., now in the hands of the receiver, to the St. Louis & East Side Terminal Railway, also of East St. Louis, has been confirmed by the United States Federal Court at Danville, Ill. Through this lease a connection will be made with the St. Louis free bridge as soon as the Belt Railway approach is completed. The work of putting the Southern Traction Company's roadway in condition for immediate operation as a coal line only is now under way. J. T. Taylor, Belleville, Ill., has been appointed general superintendent and traffic maanger to act for the lessees.

Seattle (Wash.) Municipal Street Railway.—Superintendent of Public Utilities A. L. Valentine, in a report to the Council for June, states the Lake Burien line of the Seattle Municipal Street Railway showed a surplus of $614 above expenses. Division "A," however, lost $265 for the month, without including the item of bonded interest. With the item of bonded interest included, the loss was $1,859. Mr. Valentine estimates that the revenues of the two lines for next year will be $40,000 and the cost of operation $63,786, the result being a loss of $23,786. The estimate for 1917 filed with the City Comptroller calls for an allowance of $99,149 for the public utility department, including street railways and weights and measures divisions, as compared to an allowance of $88,736 for 1916. Last year Mr. Valentine estimated the loss on municipal railway operation at $36,000, but the Council made no provision for a levy for this item, allowing it to be included in the levy for general fund purposes. Mr. Valentine has asked for an increase in salaries for next year from $33,791 to $37,770. General expenses are estimated at $6,891 for 1917, as compared to $5,060 for 1916. Interest on the bonded debt is the same for both years, $19,125. The salary estimate for other than railway employees in the department is $30,520, as compared to the 1916 allowance of $28,660. For office supplies and equipment the 1917 estimate is $2,498, while the 1916 allowance was $2,100. There will be an additional item of $238 for State industrial insurance, which was not required in the 1916 budget.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—The Milwaukee & Fox River Valley Railway, a 7-mile line which has been operated under lease by the Sheboygan Railway & Electric Company, has been purchased by the Peter Reiss interests of Sheboygan, Wis., which control the Sheboygan Railway & Electric Company.

United Light & Railways Company, Grand Rapids, Mich.—Samuel Insull, president of the Commonwealth Edison Company, Chicago, Ill., and other large utility corporations, has resigned from the board and from the executive committee of the United Light & Railways Company. At the same time Edward P. Russell, who is identified with the Insull enterprises, also resigned from the board and the executive committee. This company has 265.15 miles of single track among its railway subsidiaries.

DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, one-half of 1 per cent, common.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent preferred, series D; 1½ per cent common.

Jacksonville (Fla.) Traction Company, quarter, 75 cents, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Montreal (Que.) Tramways, quarterly, 2 per cent.

New Hampshire Electric Railways, Haverhill, Mass., 2 per cent.

Warren & Jamestown Street Railway, Jamestown, N. Y., 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	May,	'16	$63,989	*$38,441	$25,548	$17,608	$7,940
1 "	"	'15	60,920	*32,008	28,912	17,500	11,412
12 "	"	'16	797,490	*426,605	370,885	212,983	157,000
12 "	"	'15	791,131	*382,303	408,828	209,928	198,900

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m.,	May,	'16	$103,765	*$65,055	$38,710	$30,065	$8,645
1 "	"	'15	90,909	*59,018	31,891	30,079	1,812
12 "	"	'16	1,167,518	*745,509	422,009	357,721	64,288
12 "	"	'15	1,045,731	*704,925	340,806	347,431	†6,625

COLUMBUS (GA.) ELECTRIC COMPANY

1m.,	May,	'16	$66,694	*$28,710	$37,984	$28,647	$9,337
1 "	"	'15	56,471	*27,395	29,076	28,578	498
12 "	"	'16	771,087	*331,591	439,496	344,173	95,323
12 "	"	'15	694,332	*311,859	382,473	343,840	38,633

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m.,	May,	'16	$1,328,071	*$707,149	$620,922	$420,861	$200,061
1 "	"	'15	1,108,008	*585,862	522,146	359,853	162,293
12 "	"	'16	15,630,910	*8,322,835	7,308,705	4,787,941	2,520,134
12 "	"	'15	14,017,929	*7,520,595	6,497,334	4,294,048	2,203,286

DALLAS (TEX.) ELECTRIC COMPANY

1m.,	May,	'16	$151,437	*$100,925	$50,512	$36,695	‡$15,817
1 "	"	'15	134,611	*86,273	48,338	33,394	14,944
12 "	"	'16	1,887,791	*1,166,867	720,924	420,957	‡312,167
12 "	"	'15	2,012,646	*1,163,448	849,198	402,896	446,302

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m.,	May,	'16	$239,328	*$151,749	$87,579	$62,259	$25,320
1 "	"	'15	194,301	*117,593	76,708	63,889	12,819
12 "	"	'16	2,651,975	*1,588,088	1,063,887	753,794	310,093
12 "	"	'15	2,498,810	*1,483,543	1,015,267	747,005	268,262

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m.,	May,	'16	$154,839	*$94,952	$59,886	$36,607	$23,279
1 "	"	'15	169,249	*101,054	68,194	36,059	32,135
12 "	"	'16	1,910,481	*1,218,539	691,942	435,936	256,006
12 "	"	'15	2,242,177	*1,245,329	996,848	435,353	461,495

GRAND RAPIDS (MICH.) RAILWAY

1m.,	May,	'16	$111,126	*$72,184	$38,942	$14,165	$24,777
1 "	"	'15	92,056	*70,070	21,986	13,739	8,247
12 "	"	'16	1,239,177	*831,849	407,328	167,592	239,736
12 "	"	'15	1,243,271	*834,955	408,316	162,557	245,759

JACKSONVILLE (FLA.) TRACTION COMPANY

1m.,	May,	'16	$53,732	*$34,850	$18,882	$15,442	$3,440
1 "	"	'15	53,336	*36,881	16,455	16,359	96
12 "	"	'16	615,616	*422,232	193,384	178,446	14,938
12 "	"	'15	654,297	*452,217	202,080	163,942	38,138

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m.,	May,	'16	$65,703	*$41,084	$24,619	$16,119	$8,500
1 "	"	'15	61,014	*37,677	23,337	15,611	7,726
12 "	"	'16	759,165	*499,696	259,469	192,171	67,298
12 "	"	'15	698,453	*459,753	238,700	187,112	51,588

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m.,	May,	'16	$194,938	*$121,292	$73,646	$42,570	$31,076
1 "	"	'15	175,513	*107,102	68,411	42,248	26,163
12 "	"	'16	2,226,927	*1,373,113	853,814	514,826	338,988
12 "	"	'15	2,199,969	*1,289,261	910,708	492,029	418,679

NORTHERN TEXAS ELECTRIC COMPANY, FT. WORTH, TEX.

1m.,	May,	'16	$150,755	*$96,489	$54,266	$28,692	$25,574
1 "	"	'15	134,789	*86,142	48,647	27,253	21,394
12 "	"	'16	1,816,978	*1,109,697	707,281	338,578	368,703
12 "	"	'15	1,866,673	*1,065,485	801,188	322,880	478,308

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m.,	May,	'16	$644,795	*$415,239	$229,556	$184,455	$45,101
1 "	"	'15	618,363	*382,464	235,899	181,305	54,594
12 "	"	'16	7,670,305	*4,911,848	2,758,457	2,196,065	562,392
12 "	"	'15	7,983,915	*4,856,970	3,126,945	2,147,088	979,857

SAVANNAH (GA.) ELECTRIC COMPANY

1m.,	May,	'16	$64,343	*$44,401	$19,942	$23,688	†$3,746
1 "	"	'15	64,412	*41,188	23,224	23,119	105
12 "	"	'16	785,175	*526,525	258,650	279,246	†20,596
12 "	"	'15	822,239	*533,831	288,508	277,020	11,488

*Includes taxes. †Deficit. ‡Includes non-operating income.

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Traffic and Transportation

SKIP-STOP OPERATION BEGUN IN DETROIT

Experiment on Woodward Avenue to Be Continued for Thirty Days—Stopping Places Indicated on Poles

Skip-stop operation was placed in effect by the Detroit (Mich.) United Railway on Sunday, July 16, on Woodward and Jefferson Avenues, two of its heaviest lines. The experiment is to be conducted for a period of thirty days under authority received by Police Commissioner Gillespie from the Detroit Common Council. Several months ago the company started skip-stop operation on Woodward Avenue, but the Council discontinued it after three days, upon the request of one Alderman and without investigation as to the merits of the system.

On Woodward Avenue, after leaving the central business district, cars are now stopping at practically every other block, and on the return trip the cars stop at the streets missed in going the other direction. In this manner riders are obliged to walk only one additional block under the new plan. On Jefferson Avenue, where there are many long blocks, trolley stations have been discontinued, thirty-four stops being eliminated on the eastbound trip and thirty stops cut on the westbound trip.

The company has figured a saving of eight minutes on the half-trip on Woodward Avenue, bringing the average speed of the line from something under 9 m. p. h. up to 11.6 m. p. h. A saving of three minutes on the half-trip has been accomplished on Jefferson Avenue, boosting the speed from approximately 10 m. p. h. to better than 11 m. p. h.

In order to inform the public as to the stopping places, trolley poles at the points where the cars stop bear a 6-ft. band of white paint and a sign, "Cars stop here." Reports from inspectors and conductors show that on the first day of operation a very small number of riders forgot about the change in stops.

Police Commissioner Gillespie has been an active supporter of the company's proposal to experiment with the skip-stop, and it was through his efforts that the Council granted permission for the trial. He has announced the expectation of having some complaints from a few merchants who object to cars not stopping at their corners because they think they lose business, but his reply had been that if the majority of car riders are benefited the City Council should not pay any attention to the merchants. In a recent interview he pointed out that the merchant on the street corner had no more right to a car stop in front of his place than the merchant in the center of the block.

The company believes that most of the car riders will favor the continuance of the skip-stop. With the very rapid growth of the city the running time of cars on Woodward and Jefferson Avenues has lengthened out more than 25 per cent within the last few years. In its publicity campaign in favor of the skip-stop the company has pointed out not only the time-saving feature to the rider, but also the relief of congestion through the more rapid operation of the cars and the additional car mileage which they are enabled to run.

The police commissioner has announced the intention of the department to enforce on Woodward Avenue, the city's main traffic artery, an ordinance requiring automobiles to stop 6 ft. behind a standing street car. The ordinance was adopted several months ago, but enforcement was abandoned until the skip-stop plan for street cars could be put into effect. The commissioner desires, through the ordinance, to divert all but local automobile traffic to other streets on which there are no car lines.

In an announcement to the public the company said: "This test of the skip stop is purely experimental. Whether it will be made permanent or extended to other lines depends wholly upon the car riders—you."

RECENT ATLANTA ADS

The Georgia Railway & Power Company, Atlanta, Ga., has recently run a number of striking advertisements in the daily press. One of the ads, "Our Good Name," follows:

"Now and then you read that somebody is suing us for damages on an allegation that through our negligence someone has been hurt.

"Later, if the courtesy has been granted to us by the newspaper, you read our denial.

"Perhaps you've wondered why we should be sensitive to such charges. Doubtless you've thought their whys and wherefores are trivial; that civil action on debts alleged to be due are matters for the courts and juries to decide, and that the general public isn't interested. In that you're right.

"We're sensitive because invariably when we've been to blame we make full amend without waiting to be sued. But if we believe we do not owe a bill, of course we contest any effort to make us pay it—contest it in court, where the suit has been filed.

"But there's another court you may have overlooked—the court of PUBLIC OPINION. We're very careful in our work; trained to vigilance against risk of danger; watchful always that, however careless others may be, no injury shall result through fault of ours. We're jealous of our record in this good purpose.

"When in the court of public opinion we're accused of having been careless, the big consideration involved there is our most cherished possession—our good name.

"To defend this—that's why, wherever it be assailed, we seek to answer."

Another ad, "Between the Two," follows:

"Inasmuch as the laws of economy have decreed in your interest that public utilities shall not be duplicated, some folks may think we've got everything our own way.

"The community supplies a demand and a license and a franchise. Quite so. But free? No indeed! We pay for every bit of it, in full measure. City and county and State authorities assess the charges and hand us the bill.

"That's one set of costs. Here's another:

"The cost of copper wire, steel rails, and about everything else we manufacture into your street car ride or your kilowatt-hour of electricity, has piled up one increase on another in recent months. Mortal man could not restrain 'em.

"Yet the price of your street car ride still is that same little nickel; your kilowatt-hour is billed at the same reduced figure of yesteryear.

"On the one hand, the State directs our services in detail and tells us the maximum we may charge for them.

"On the other, our cost of doing business keeps nobody awake o' nights but us; and when it comes to raw materials, we're a consumer in a market where the sky's the limit.

"Everything our own way?

"Far from it! We've got to hustle for a living!"

New York Turn-Back Order to Stand.—The car-ahead order issued several weeks ago by the Public Service Commission for the First District of New York requiring surface railways to make daily reports on the turning back of cars before they reach their destination, has gone into effect. After a hearing on July 11, which was attended by representatives of the street railways, the commission decided not to revoke the order. The companies are required to make daily reports to the commission showing the number of cars turned back on the previous day and the reasons.

Trail Cars Ordered for East Boston Tunnel.—An order has been issued by the Public Service Commission of Massachusetts requiring the Boston Elevated Railway to install trail cars in the East Boston tunnel, to reroute the cars on two tunnel lines and to construct a new double-track line from Day Square, East Boston, to Orient Heights. It is requested that the work be done as soon as possible. Furthermore, the company is ordered to submit to the commission for its approval plans for the construction of multiple-unit center-entrance steel cars of the same general design as the trail cars now in use.

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"Isles of Safety" Condemned.—Commissioner of Public Works of Manhattan Ralph Folks in a letter in the current issue of *Greater New York*, the bulletin of the Merchants' Association, says it is the unanimous opinion of the police department, the Safety First Society, and others that "isles of safety" increase traffic dangers to pedestrians, because they induce those afoot to attempt to cross streets while traffic is moving. He adds that the "isles" prevent the maintaining of an adequate number of traffic lines in one direction during the period when movement in that direction is greater than that in the opposite. He says that a traffic policeman is the best "isle of safety."

Detroit Has a Record Day.—Saturday, July 1, was the biggest day on record for the Detroit United Lines when, excluding the Sandwich, Windsor & Amherstburg Railway, 1,491,635 passengers of all kinds, revenue, transfer and employees, were carried. The figures include passengers on all city and interurban lines operated by the company with the exception mentioned. On July 4 approximately 207,000 passengers were transported on the company's interurban lines. This required the operation of 956 trains with a total of 1480 cars. The dispatchers gave 1360 written orders and 212 verbal orders. The only interurban accident for the day occurred when a car on the Wyandotte division overran a derail.

Excess Service in Seattle.—According to checks made and reported to A. L. Valentine, Superintendent of Public Utilities of Seattle, Wash., during the morning rush hour on July 12, the Capital Hill and Broadway cars of the Puget Sound Traction, Light & Power Company carried 727 passengers, as compared with 804 passengers carried by jitneys on these two runs. It is stated that on the Broadway line there were twice as many seats as passengers during the rush-hour period. On June 26 a new schedule involving material reductions in service was put into effect by the company on the Capitol Hill line. Officials of the company state that from the recent check made, it is clearly evident there is still an excess of service on both the lines mentioned.

Women's Page in Company Publication.—The United Railways, St. Louis, Mo., instituted in the *United Railways Bulletin* for July a page for women and children, which will be devoted each month to matters of special interest to them. Items of feminine interest, recipes, labor-saving devices, health and household hints will be among its features. On that page also there is a notice of the inauguration of the sewing department, which has been started for the purpose of giving the women the same advantages in their sewing that they would find in the best equipped tailoring college, and entirely without cost to them. The company hopes to make the woman's page in the *Bulletin* the clearing house for information regarding these activities.

New Plan to Facilitate Loading in Detroit.—To facilitate loading of street cars at certain congested points on Woodward Avenue, Detroit, the police department has painted arrows on the pavement in the safety zones at locations directly opposite the entrance doors of motor and trailer cars when brought to a stop at certain intersections. The purpose of the arrows is to direct passengers to the proper place in the zones where they may quickly board cars when the latter stop, thereby saving time to the public and in the operation of cars. Heretofore, with no definite indication of the proper place to stand, intending passengers have occupied all parts of the safety zone and when the cars stopped many were compelled to run up and down in the zone to reach the boarding place.

Safety Campaign in Kansas City Schools.—The Kansas City (Mo.) Railways has received permission from the school board of Kansas City to distribute blotters and calendars in the public schools this fall and winter and to conduct prize essay contests on safety first. The publicity department of the company, under E. B. Atchley, will handle the matter. Small safety first blotters, the series published by the Knapp Company, will be distributed in each of the sixty-five schools, and each room will receive a calendar on which will be shown safety first pictures indicating infractions of safety rules with reference to street cars. It is likely that essay contests will be arranged in six or eight schools each month during the school year. Money or other gifts will be offered as prizes, as the school board designates.

To Improve San Francisco Suburban Traffic.—A meeting of the Mayors of several San Mateo County cities with Mayor Rolph of San Francisco, Cal., was held recently to discuss the proposed consolidation of the two counties. One of the important features involved is the transportation problem, and a report on this subject by the various city engineers has been called for in the near future, with a view to determining means of cutting down the time between San Francisco and the San Mateo County cities. This could be done by means of tunnels through the hills and a surface road in San Mateo County without grade crossings. The combined length of the present Southern Pacific tunnels on the Bay Shore cut-off is 9950 ft. and on the basis of the cost of Twin Peaks tunnel, similar tunnels are estimated to cost about $2,900,000.

Newspaper Men Entertained by Traffic Officials.—Much desirable newspaper publicity was obtained in cities throughout western New York by the Niagara Gorge Railroad, operating the Great Gorge route and the line to Fort Niagara Beach, by inviting representatives of the daily newspapers to make the trip to the resort on the day before the official opening. About twenty-five were in the party. The private car Ondiara was used and the members went as guests of John Edbauer, general passenger agent, assisted by George H. Stagg, traffic passenger agent, and Edward H. Buddenhagen, manager of the beach company. At the beach an athletic program had been arranged for the newspapermen and later there was a banquet at the beach hotel. On the way back to Buffalo the party passed through the Niagara Gorge at night and viewed the American and Canadian Falls under navy searchlights of 8000 cp.

Railway Protests Against Wilkes-Barre Jitneys.—During the hearing at the State capitol on July 7 of the Wilkes-Barre jitney complaints filed before the Public Service Commission by the Wilkes-Barre (Pa.) Railway against 250 jitney operators, counsel for the drivers declared that the jitneys did not come under the regulation of the Public Service Commission, but were subject only to municipal control. The railway complained because the jitney men are operating without a certificate of convenience from the State. Counsel for the jitney men held that there was a public demand for jitneys in Wilkes-Barre, especially in the summer. F. W. Wheaton, Evan C. Jones and Paul Bedford represented the company. The jitney interests were represented by Roger Dever and S. S. Herring. Mr. Wheaton, arguing for State regulation, declared that at times small cars carried as many as seventeen passengers.

Cars Ordered to Be Fumigated.—In an opinion handed down on June 30 by Commissioner Michael J. Ryan of the Pennsylvania Public Service Commission, the Valley Railways Company, operating in Cumberland and Perry Counties, is ordered to fumigate its cars "at frequent intervals" and to see that they are cleaned every night after arrival at the carhouse. The commission also ordered that the company's schedule between Harrisburg and Marysville be so changed that a car will run every half hour between the hours of 4 p. m. and 6.30 p. m., instead of every hour. The complaint against the company was made by John F. Shannon. In his opinion regarding the Harrisburg-Marysville schedules, Commissioner Ryan says: "While trolley companies cannot be expected to furnish a seat to every passenger, chronic overcrowding during rush hours on lines connecting cities and suburbs present conditions that can and must be remedied."

Seattle Corporation Defines City's Right on Jitneys.—Hugh M. Caldwell, corporation counsel of Seattle, Wash., in an opinion written for the Council at the request of Councilman Thomson, chairman of the city utilities committee in regard to the powers of the Council to regulate jitneys, states that the Council has the authority to designate by ordinance routes for jitneys and to restrain the drivers from collecting fares or receiving and discharging passengers on streets where street railways are operated. He further states that the jitneys may be prohibited entirely from the use of streets where there are car lines. He

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said: "The Council should bear in mind the fact that while the right to make the regulations concerning which you make inquiry is primarily with the City Council, its action may be reviewed by the courts to determine whether such legislation is for the public good, and whether it is reasonable, unjust or oppressive."

Vancouver Publication Christened.—The four-page paper of the British Columbia Electric Railway, Vancouver, B. C., has been christened *The Buzzer*. No. 7, the issue for July 14, is the first to be properly authenticated. In announcing the selection made the editor says: "The name which forms the headpiece of this number has been chosen by W. G. Murrin, general superintendent, as the most suitable from among 5041 names submitted. As you, our patrons, cooperate with us by using the buzzer to communicate with the motorman, we hope to communicate to you each week through the medium of *The Buzzer* and to extend our service to you thereby. Eleven persons submitted this name for our bulletin and as we left the competition open until June 30 the fairest way of awarding the prizes seemed to us to be dividing the money and, by increasing it, to hand each of the eleven $2. Nine persons sent in the name selected as the second best and they will receive $1.50 each."

Buffalo Paraders Handled Expeditiously.—All lines operating through Main Street and the downtown business district of Buffalo, N. Y., were rerouted by the International Railway so as not to interfere with the military preparedness parade in which more than 56,000 men and women marched. During the progress of the parade, however, cars were routed through side streets in order to handle the crowd of almost 250,000 persons who witnessed the spectacle, the greatest patriotic demonstration the city has ever seen. N. H. Brown, general superintendent of transportation; Thomas Connette, superintendent of the Buffalo city lines, and the assistant superintendents personally directed the movement of traffic. Cars were held on side streets during the progress of the parade, and one-minute schedules were maintained on almost all lines radiating from the downtown district within a few minutes after the last marcher had walked past the reviewing stand. The manner in which crowds were handled brought favorable comment from officials in charge of the demonstration. Public utility companies, including the International Railway, Buffalo General Electric Company, Iroquois Natural Gas Company, and the Buffalo & Lake Erie Traction Company, were represented in the parade by almost 500 marchers. The representatives of these companies were headed by Charles R. Huntly, president of the Buffalo General Electric Company. Each participant carried a small American flag. A number of prominent steam engineers and trainmen marched in the transportation division.

Complaint Against Corning Company Closed.—Upon assurances that the four new cars required to bring the rolling stock of the Corning & Painted Post Street Railway, Corning, N. Y., up to passable condition will be in operation by Sept. 1, the Public Service Commission for the Second District has closed the complaint of residents of Corning, the town of Corning and the village of Painted Post against the company. The complaint also asked for changes in the transfer system of the company, but the commission found that the transfer rules were just and reasonable, and the attorney for the complainants has been satisfied not to press this part of the complaint. In the course of the hearings on this case it developed that all of the rolling stock of the company, with the exception of the open cars for summer use, was in an unsatisfactory condition. The rails were relaid recently and were in fair condition. The company signified its intention of improving the cars and in correspondence with the commission it has stated that it has rented some equipment from the Elmira Water, Light & Railroad Company until new cars can be secured. Four of these new cars have been ordered and are now in process of being assembled. The company has been required to add these cars to its equipment on the recommendation of Charles R. Barnes, the electric railway inspector of the commission, who reported to the commission recently that satisfactory progress was being made in securing the cars and that in his opinion they will be ready for service on Sept. 1, or before the severe weather makes them necessary.

Personal Mention

Richard Jones, Louisville, Ky., has been appointed district superintendent of the Ohio Service Company, Cambridge, Ohio, operating the railway, electric light and power systems there. Mr. Jones formerly was connected with the Louisville Railway.

C. Nesbitt Duffy, vice-president of the Manila Electric Railway & Light Company, Manila, P. I., presided at a large dinner given in Manila on June 1 under the auspices of the Merchants' Association in honor of David I. Wash, ex-governor of Massachusetts.

W. J. McGraw, assistant auditor of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has resigned. A successor will not be appointed, but the work done by Mr. McGraw will be taken over by the auditing department under W. H. Dautel, the auditor of the company.

Edward Garrett, district superintendent of the Park & River division of the International Railway, Buffalo, N. Y., has resigned. Mr. Garrett has been with the International Railway for more than twenty years and has supervision of the Canadian lines and traffic over the upper steel arch and Lewiston bridges.

John T. Taylor, Belleville, Ill., has been named general superintendent of the Southern Traction Company, East St. Louis, Ill., and is now engaged in the rehabilitation of the roadbed of the company preparatory to its opening as a coal line. This road has remained idle since the failure of the Southern Traction Company of Illinois, and has been in charge of William E. Trautman as receiver.

S. S. Hawks, electrical superintendent in charge of the lighting of substations, electrical vehicles, etc., under Thomas F. Mullaney, chief engineer of the Third Avenue Railway, New York, N. Y., has been appointed superintendent of the Great Falls (Mont.) Street Railway. Mr. Hawks was formerly associated on electrical construction work with Mr. Mullaney before Mr. Mullaney went with the Third Avenue Railway.

Bernard Whalen, who for the last ten years has been assistant to Superintendent E. H. Henning of the Niagara Falls division of the International Railway, Buffalo, N. Y., has been promoted to district superintendent of the Park & River division to succeed Edward Garrett, resigned. Mr. Whalen will have supervision over 22 miles of the International Railway's lines, including the Canadian lines on the Park & River division from the upper steel arch bridge to Queenstown and traffic over the upper and Lewiston bridges.

OBITUARY

Edwin V. Smith, president of Eccles & Smith, San Francisco, Cal., tool and railroad supply manufacturers, died recently at the Fairmont Hospital in that city. Mr. Smith was forty-eight years old and a native of Santa Clara.

Norman Wait Harris, founder of the Harris Trust & Savings Bank, Chicago, Ill., and a member of the banking firms which bear his name in New York and Boston, died on July 15 at his summer home on the shore of Lake Geneva, Wis. Mr. Harris was born in Becket, Mass., on Aug. 15, 1846. He came to Chicago in 1882 and organized the banking house of N. W. Harris & Company, with offices in New York and Boston. Mr. Harris through his firm was interested in a number of public utility properties, among them the Des Moines (Iowa) City Railway.

Richard F. Rankine, Niagara Falls, N. Y., for several years treasurer of the International Traction Company, now known as the International Railway, Buffalo, N. Y., is dead. He was fifty-four years old. Mr. Rankine was graduated from Hobart College in 1882 and from 1892-1894 he was secretary and treasurer of the Niagara State Reservation at Niagara Falls, N. Y. In 1899 he assumed the treasurership of the International Traction Company. He resigned that position to become associated with W. Caryl Ely, Buffalo, formerly president of the International Traction Company.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

St. Petersburg-Tampa Railway, St. Petersburg, Fla.—Incorporated to construct an electric railway from Tampa to St. Petersburg, across Old Tampa Bay. Capital stock, $50,000. Officers: George S. Gandy, Sr., president; H. Walter Fuller, manager of the St. Petersburg Investment Company, vice-president, and Alfred Gandy, secretary, all of St. Petersburg. [July 1, '16.]

Atlanta & Anderson Electric Railway, Atlanta, Ga.—For the purpose of preparing the legal way for the construction of the proposed electric railway from Atlanta to Anderson, S. C., a bill has been introduced in the Senate to amend the act for carrying into effect the section of the constitution of the State which provides for the incorporation of railroads, so as to include interurban railroads. It is understood that as soon as this amendment is made the Atlanta & Anderson Railway will make application for a charter. J. L. Murphy, Atlanta, is interested. [July 15, '16.]

***Electric Standard Railways, Williamsport, Pa.**—Incorporated in Delaware to construct and operate railways. Capital stock, $1,000,000. Incorporators: George L. Campbell, Harry R. Noll and Harry W. Lukens, all of Williamsport, Pa.

FRANCHISES

***Indian Spring, Fla.**—Harry C. Case, Clearwater, has received a franchise from the Council to construct an electric railway on the county road from the Jungle to Seminole Bridge, about 1½ miles. The cost of construction is estimated at $15,000.

Wichita, Kan.—The Arkansas Valley Interurban Railway has received a franchise from the Council to construct a line over several streets in Wichita.

Detroit, Mich.—The Detroit United Railway has received a thirty-year franchise from the Council for a line on Hamilton Boulevard in Highland Park, a village immediately north of Detroit, from the Detroit city limits to the Six Mile Road.

Roanoke, Va.—The Roanoke Railway & Electric Company has asked the Council for a franchise to construct a line on Ninth Street from Jamison Avenue to Virginian right-of-way opposite the plant of the Fiscose Company.

TRACK AND ROADWAY

Glendale & Montrose Railway, Glendale, Cal.—The Great Western Improvement Company, San Francisco, which has recently acquired the Glendale & Montrose Railway, plans to reconstruct the line and place it in first-class operating condition. It is reported that the company may extend the line to Sunland, Littlelands and possibly to La Canada.

Martinez & Concord Interurban Railway, Martinez, Cal.—A contract will be let by this company within sixty days for grading on its proposed line from Martinez to Government Ranch, 6½ miles. About 15,000 cu. yd. of material per mile will be handled. The maximum curvature is about 4 deg. and the maximum grade about 2 per cent. About 900 lineal ft. of open deck pile trestle will be constructed. Clifford McClellan, San Francisco, is interested. [July 1, '16.]

Municipal Railways of San Francisco, San Francisco, Cal.—A contract has been awarded to the United States Steel Products Company, San Francisco, for furnishing and delivering track special work, contract No. 82.

San Francisco-Oakland Terminal Railways, San Francisco, Cal.—This company has filed an application with the Railroad Commission of California requesting authority to suspend operation for five years on its single-track line on San Pablo Avenue from the city of Richmond to Potrero Avenue, Contra Costa County. The company states that its line is unremunerative and at the present time is only operating a car twice a day over the tracks. The Board of Supervisors of Contra Costa County recently granted the company permission to suspend operation.

Connecticut Company, New Haven, Conn.—A contract has been let by this company to Fred D. Ley Company, Springfield, for the double-tracking of Jubilee Street and Dwight Street, New Britain.

St. Petersburg-Tampa Railway, St. Petersburg, Fla.—Plans have been prepared and work will be begun this summer on this company's proposed line from St. Petersburg to Tampa. George S. Gandy, Sr., St. Petersburg, president. [July 1, '16.]

***West Coast Electric Railway, Sarasota, Fla.**—It is reported that this company has been organized to construct a line south from Tampa to Bradentown, Venice, Sarasota and other points. A. Evans Townsend, Sarasota, is interested.

Atlanta & Carolina Railway, Atlanta, Ga.—Announcement has been made that the property of the Atlanta & Carolina Railway will be sold at receivers' sale in Atlanta on Aug. 1. The property includes franchises and right-of-way from Atlanta to Augusta, about 15 miles of which have been graded; also about 3 miles of track beginning on Confederate Avenue, near the entrance to White City, Atlanta, extending along Confederate Avenue beyond the Soldiers' Home into Moreland Avenue and to the DeKalb County line. The company proposed to construct a line from Atlanta to Augusta, thence into South Carolina. R. F. Church, 318 Peters Building, Atlanta, receiver. [Sept. 11, '15.]

Freeport Railway & Light Company, Freeport, Ill.—This company will soon begin laying 3500 ft. of new track along North Galena Avenue.

La Salle County Electric Railroad, Ottawa, Ill.—Plans are being made to revive the project to construct a line from Ottawa to Mendota. At a recent meeting held in Ottawa a committee was appointed to interview farmers along the proposed line to secure co-operation in the construction of the road. It is stated that it would cost about $825,000 to pay the indebtedness already contracted by the road and to complete the construction of the line. No changes would be made in the old organization except that the road would be extended as far as Earlville. The old plans call for a line from Ottawa to Mendota. W. C. Vittum, Ottawa, is interested. [July 31, '15.]

***Chicago, Springfield & Cairo Railway, Springfield, Ill.**—Plans are being considered by this company for the construction of an electric railway from Springfield to Hillsboro.

Madison Light & Railway Company, Madison, Ind.—A rearrangement of the lines of the Madison Light & Railway Company has been proposed by the City Council and the Board of Public Works has been instructed to confer with the company on the subject. It is proposed to remove the Main Street tracks to Second Street, and to abandon the Walnut Street portion of the line.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company will ballast 60 miles of track this summer, and on Sept. 1 will place four new fast cars in service between Wichita and Hutchinson which will make the trip in one hour and fifty minutes, instead of two hours and twenty minutes now required.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—Surveys have been made by this comany for a new bridge across the New Meadows River between West Bath and Brunswick. The bridge will take the place of the present one built sixteen years ago.

Springfield (Mass.) Street Railway.—This company will construct new tracks on Center Street, from the top of Rockrimmon Hill to Exchange Street.

Worcester (Mass.) Consolidated Street Railway.—This company is reconstructing its track on Merriam Avenue.

Detroit (Mich.) United Railway.—Surveys are being made by this company for the construction of a 2-mile extension from the center to the southeastern part of the city, to be completed within a year.

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United Light & Railways Company, Grand Rapids, Mich.—It is reported that this company will spend about $250,000 improving its property in Mason City, Iowa, including the laying of new steel ties and heavy rails.

Great Falls, Mont.—The construction of an electric railway north of Great Falls, Mont., for a distance of about 60 miles, is proposed in order to serve a rich farming section that at present has no railway. The Great Falls Commercial Club has taken the matter up and on July 26 and 27 will make an automobile trip through the country into which the line is to be built. The situation is a peculiar one in that while this section has no road it is bounded on all sides by steam roads and farmers are hauling their grain from 35 to 45 miles to railroad tracks. The plan of the Great Falls Commercial Club is to interest local capital in building the road, if when the trip is taken, it is found that the tonnage would be sufficient to support an electric line.

Public Service Railway, Newark, N. J.—This company recently made an inspection of the line of the Burlington County Transit Company for the purpose of determining the condition of the roadbed as a part of the negotiations now in progress between the two corporations for a traffic agreement that will provide for the operation of Public Service Railway cars from Camden to Mount Holly.

***Penn's Grove, N. J.**—Plans are being made by the Penn's Grove Improvement Company, Penn's Grove, to construct a line from Penn's Grove to Woodstown and thence to Newfield, about 40 miles.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—This company is reconstructing its tracks and paving West State Street between Prospect and Overbrook Avenues.

International Railway, Buffalo, N. Y.—Negotiations have been closed by this company for the purchase of a 30-ft. strip of land extending from the Tonawanda Creek in the town of Tonawanda, north to Wheatfield Street. The purchase of this property became necessary in order to permit the company to make its four-track fill through North Tonawanda for the new fast line from Buffalo to Niagara Falls. The price paid for the land was about $25,000.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has awarded a contract for the supply of special work, including frogs, crossovers, switches, etc., for use on the new Seventh Avenue subway in Manhattan to the Pennsylvania Steel Company, New York City, at $65,316. The commission has also received bids for the construction of station finish for the Grand Central station of the Queensboro subway, including the lengthening of the island platform of the present station of that subway in Forty-second Street between Lexington and Third Avenues, which is to be extended westerly for about 500 ft. and from that point will connect by underground passageway and elevators with the present Grand Central station of the first subway. The lowest bidder on this work was the Thomas J. Waters Company, New York City, at $22,649.

Akron Belt Line Railroad, Akron, Ohio.—It is reported that the Akron Belt Line Railroad, recently incorporated, plans to construct a line on a strip of canal land 7000 ft. long and 25 ft. wide extending from Market Street to Bartges Street, leased by the company from the State, and on private right-of-way to connect with the Northern Ohio Railway at North Street. The project involves the purchase of the Northern Ohio Railway and the probable merger of the two. It is stated that the Northern Ohio Railway is to be partially electrified, probably as far as New London, about 58 miles. Later the entire road may be electrified. Glenn Brown, Akron, is interested. [July 8, '16.]

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company is extending its Elm Street line to connect with the Leavittsburg branch on Market Street at an estimated cost of $50,000.

Pittsburg County Railway, McAlester, Okla.—The Pittsburg County Railroad, the incorporation of which was recently noted in the ELECTRIC RAILWAY JOURNAL, has acquired the property of the old Choctaw Railway & Light Company, including a line from McAlester to Hartshorne, and will operate and possibly extend them. [July 8, '16.]

Oklahoma (Okla.) Railway.—Operation has been begun on this company's extension from Edmond to Guthrie, 16 miles.

***Ardenwald, Ore.**—Rights-of-way are being secured for a line from Ardenwald, near Sellwood, into the Pleasant Valley district, about 9 miles. J. D. Lee, Portland, is interested.

Southern Oregon Traction Company, Medford, Ore.—As a result of an election held recently at Medford, S. S. Bullis, president of the Southern Oregon Traction Company, has been awarded a contract for the construction of the proposed 30-mile municipal railroad, for which bonds in the sum of $300,000 were voted some time ago.

***Roseburg & Eastern Railroad, Roseburg, Ore.**—The City Council has adopted plans and specifications prepared by the city engineer for the construction of the proposed Roseburg & Eastern Railroad, to be built by the municipality, and it is reported bids for construction will be asked at an early date. The proposed line will be about thirty miles in length, and will touch one of the richest timber belts in Oregon, and is estimated to cost, including equipment, about $400,000. The Council plans to have actual construction begin not later than Aug. 15.

Huntingdon, Lewistown & Juniata Valley Traction Company, Huntingdon, Pa.—Plans are being considered by this company for the construction of an extension to Cold Springs.

Johnstown-Somerset Traction Company, Johnstown, Pa.—Officials of the Johnstown-Somerset Traction Company are rushing along the work of building the line between Johnstown and Holsopple, so that the cars can be put into service before fall. It was originally intended that the line be operated by July 4. However, delays in the arrival of the materials and other obstacles prevented the early completion of the line. [May 6, '16.]

Valley Railways, Lemoyne, Pa.—This company is constructing double track between Wormleysburg and West Fairview bridge, near Harrisburg, Pa., about 1 mile.

***Quakertown & Delaware River Railroad, Quakertown, Pa.**—This company, operating from Quakertown to Riegelsville, 15 miles, was sold at auction to John M. Buckland of Allentown. It is understood that the railroad will be equipped for electrical operation.

Texas Electric Railway, Dallas, Tex.—The Board of City Commissioners has ordered this company to reconstruct its tracks on Hudson Street from Greenville to Hubert Streets, on Lindell Street from Greenville to Beacon Streets and on Brooklyn Street from Beckley to Adams Street.

Ogden, Logan & Idaho Railway, Ogden, Utah.—Plans are being considered by this company for the construction of an extension to its Washington Avenue line up Twenty-ninth Street to Jefferson Avenue. It is stated that the company plans to abandon its line between Five Points and Harrisville.

Bingham & Garfield Railway, Salt Lake City, Utah.—It is reported that plans are being considered for the electrification of the Bingham & Garfield Railway. D. C. Jackling, Salt Lake City, general manager.

Princeton (W. Va.) Power Company.—It is reported that this company's line between Bluefield and Princeton is about completed and plans are being made to establish an amusement park midway between the two cities.

SHOPS AND BUILDINGS

Illinois Traction System, Peoria, Ill.—This company is remodeling its station at Urbana, Ill., a new front being placed in the building and a more commodious entrance being provided.

Tri-City Railway, Rock Island, Ill.—It is reported that this company will receive bids soon for the construction of a brick and reinforced concrete shop building, to be built at Rock Island. The building will be 160 ft. x 300 ft., part one story and part two stories high. The cost is estimated at about $80,000.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company will reconstruct its Wichita terminal this summer.

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Kansas City, Mo.—Karl D. Klemm, president of the Kansas City, Kaw Valley & Western Railway has attained title to property at Fourth and Wyandotte Streets, from the Depot Carriage & Baggage Company, which is to be used for an interurban freight station for all the Kansas City interurban railways. The site cost $33,000.

Sand Springs Railway, Tulsa, Okla.—It is reported that this company will erect a four-story building, the lower floor to contain a waiting room and the upper floors to contain offices.

Altoona & Logan Valley Electric Railway, Altoona, Pa.—Messrs. Ebert & Hastings have received a permit for the construction of a building at 1202 Eleventh Street, Altoona, to be used by the Altoona & Logan Valley Electric Railway. The structure will be three stories, of brick construction. The first floor will contain a waiting room and the general and transportation office departments will be located on the upper floors. It is estimated that the cost will be about $18,000.

Pittsburgh (Pa.) Railways.—A contract has been let by this company to D. T. Riffle, Pittsburgh, for the construction of a new carhouse at Ingram.

Dallas, Tex.—The Dallas Interurban Terminal Association has announced that it will build a two-story model brick building to be used as a clubhouse for employees of the various interurban lines entering Dallas, all of which will enter the terminal station. The building will be erected on the southwest corner of the interurban yards and will cost $5,000. The building will be equipped as a model club with shower baths, lockers, reading rooms and amusement rooms.

Monongahela Valley Traction Company, Fairmont, W. Va.—A contract has been awarded by this company to Holbert & Speden, Fairmont, for the construction of a new terminal building and station for the railway at Weston, to be completed by Dec. 16.

POWER HOUSES AND SUBSTATIONS

United Railways & Electric Company, Baltimore, Md.—A contract has been awarded by this company to the West Construction Company, Baltimore, for the construction of a transformer station on Belvedere Avenue. The building will be of reinforced-concrete construction and similar to the Harford Road station of the company. The cost is estimated at $40,000.

Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.—This company is installing a 6250-kva. steam turbine at its Bay Front station in Ashland and is also installing a 3000-kw. generating unit at the Superior Falls plant on the Montreal River.

United Railways, St. Louis, Mo.—Work is being rushed on this company's new substation at Kirkwood, which was begun in May. The building will be absolutely fireproof, and the electrical equipment of the bustation will consist of one 600-kw. rotary converter, with air blast transformers and other accompanying equipment to be taken from the Brentwood substation. The ultimate capacity of the station is two 1000-kw. converters, the building being designed for the installation of either 600-kw. units. The switchboard will accommodate one alternating-current line, two rotary converters, portable converter and three direct-current feeder sections, or more, as made necessary. The substation will be fed from the Brentwood substation by means of the recently completed 13,200-volt line. The equipment will be secured from the General Electric Company, Schenectady.

Muskogee (Okla.) Traction Company.—It is reported that this company is contemplating the construction of a power plant to operate its system. The proposed plant will develop from 500 to 700 hp. and cost about $100,000. The company now purchases energy from the Muskogee Gas & Electric Company. The railway operates 31 miles of road between Bacone, Muskogee and Fort Gibson.

Houston, Richmond & Western Traction Company, Houston, Tex.—It is reported that a contract for the construction of a powerhouse will soon be let by this company, which proposes to construct a line between Houston and San Antonio.

Manufactures and Supplies

SMALL AMOUNT OF SECOND-HAND EQUIPMENT AVAILABLE

Conditions in the Second-Hand Business Have Been Excellent Since the First of the Year

In an endeavor to find out how dealers in second-hand railway equipment have been affected by the war, several of the dealers located in New York City were interviewed.

We find that, in the majority of cases, business was fairly quiet from the beginning of the war in August, 1914, until the end of 1915. This was due to the fact that during this period manufacturers were able to handle all the business there was to be had.

Beginning with the first of January, this year, business increased tremendously and the dealers have been unable to secure enough equipment to supply the demand. Prices have been on a 20 per cent higher scale than in normal times. Due to the demand for apparatus created by the inability of manufacturers to supply necessary new equipment in a reasonable length of time, a considerable quantity of second-hand material has been sold at a price equal to that of new equipment.

One of the leading dealers reports that during this period of activity more than 95 per cent of his sales were made on a cash basis, while previously at least half of his business was done on a time basis.

Although business has slackened considerably during the last thirty days, it is still more active than in normal times. This is looked upon as the usual summer dullness, and renewed activity in this line is looked for early in the fall.

ROLLING STOCK

Great Falls (Mont.) Street Railway, is reported to have ordered seven all-steel cars for delivery about Sept. 15.

Fort Scott Gas & Electric Company, Fort Scott, Kan., lost two cars in a fire at the Fort Scott carhouse on July 1.

Boston (Mass.) Elevated Railway has ordered from the Laconia Car Company the fifty articulated center-sections referred to in the ELECTRIC RAILWAY JOURNAL of July 15.

Detroit United Railway, Detroit, Mich., has purchased twelve 20-yd. all-steel differential dump cars from the Differential Car Company, Nashville, Tenn., for its track department construction forces.

Freeport Railway & Light Company, Freeport, Ill., has received a new car from the McGuire-Cummings Manufacturing Company. This company is reported to have several other new cars on order for delivery in December.

Interborough Rapid Transit Company, New York, N. Y., has awarded a contract to the Pullman Company for 311 steel passenger car bodies. Of these bodies, 234 will be used as motor cars and seventy-seven as trailers on the new subway lines. The cars, with motors complete, will cost $14,000 and the trailers $10,000 each.

TRADE NOTES

Protective Signal Manufacturing Company, Denver, Col., has received a contract from the Denver & Rio Grande Railroad to instal eleven complete signal systems at crossings between Denver and Pueblo.

Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., has appointed Holden & White, Chicago, Ill., as sales representatives for its products in the states of Illinois, Iowa, Indiana, Wisconsin and Michigan.

Curtain Supply Company, Chicago, Ill., has received an order to equip with curtains, ring fixtures and Rex rollers the ten cars recently ordered from the Laconia Car Company by the United Traction Company, Albany, N. Y.

Westinghouse Air Brake Company & Westinghouse Traction Brake Company, Pittsburgh, Pa., announce the removal of their St. Louis offices from the Security Building to Suite 1407-1415 Boatmen's Bank Building, St. Louis, Mo. C. P. Cass is southwestern manager.

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Union Switch & Signal Company, Swissvale, Pa., announces the appointment of Aaron Dean, as special representative with headquarters in New York. Mr. Dean was formerly resident manager of the New York office. W. T. Allen has been appointed resident manager.

Holden & White, Chicago, Ill., through their Eastern agents, the U. S. Metal & Manufacturing Company, have received an order to equip with Garland ventilators the seventy storage-battery cars recently ordered from the Southern Car Company by the New York (N. Y.) Railways.

McQuay-Norris Manufacturing Company, St. Louis, Mo., has just completed an addition to its factory which increases it by one-third. This plant is a white tile and terra cotta front building of the most modern construction and is devoted exclusively to the manufacture of "Leak-Proof" piston rings and "Lynite" pistons for Fords.

Smith-Ward Brake Company, New York, N. Y., reports the recent receipt of orders for brake adjusters from the following companies: Bay State Street Railway, Chicago & Milwaukee Electric Railroad, Conestoga Traction Company, Connecticut Company, Dayton & Troy Electric Railway, Holyoke Street Railway, Scioto Valley Traction Company and Washington, Baltimore & Annapolis Electric Railroad.

J. G. White Engineering Corporation, New York, N. Y., has been awarded a contract by the Board of Electrical Commissioners of Norwalk, Conn., for the designing, engineering and construction work in connection with extensions and improvements to the present electric light and power station at South Norwalk, and the installation of an ornamental street lighting system in the Second Taxing District of the city of Norwalk.

St. Louis Car Company, St. Louis, Mo., at its annual meeting and election of officers on July 12, re-elected John I. Beggs president and J. M. Taylor secretary and treasurer. Edwin B. Meissner, formerly assistant to the president, was elected vice-president. Mr. Meissner was chief clerk to Mr. Beggs when he was president of the Milwaukee Electric Railway & Light Company and came to the St. Louis Car Company with Mr. Beggs. The board of directors was re-elected with the exception of George J. Kobusch. F. E. Bartelme and Sears Leamann were elected to the board.

ADVERTISING LITERATURE

Fletcher Manufacturing Company, Dayton, Ohio, has issued supplement No. 2 to catalog No. 567.

S. K. F. Ball Bearing Company, Hartford, Conn., has issued a catalog on S. K. F. ball bearings for cotton-seed oil machinery.

Nordberg Manufacturing Company, Milwaukee, Wis., has issued bulletin No. 28 describing and illustrating its "Poppet" valve engines.

Brown Portable Elevator Company, Chicago, Ill., is distributing a pamphlet showing the adaptability of its product to unloading boats and cars.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued Bulletin No. 200 which contains a list of the second-hand equipment the company has on hand.

International Machine Tool Company, Indianapolis, Ind., has issued an illustrated booklet on the "Libby" heavy duty turret lathe in railroad shops.

Bayway Chemical Company, Elizabeth, N. J., has issued a pamphlet on Zulite, a preservative and protective paint for iron, steel, woodwork and roofs.

Woods Fare Box Company, Decatur, Ill., has issued a circular on its fare box entitled "Fare Paid Direct to the Company and Not to the Conductor."

Roller-Smith Company, New York, N. Y., has issued bulletin No. 300, describing and illustrating its portable direct-reading slide wire ohmmeters.

Protective Signal Manufacturing Company, Denver, Col., has issued bulletin No. 6 which describes and illustrates the National worm-drive wig-wag signal.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued a price-list sheet describing and illustrating the "triple-beam" trolley wire section insulator.

Russell M. Seeds Company, Indianapolis, Ind., has issued a booklet entitled Three Thirty University Square, which describes and illustrates the new home recently acquired by this company.

Carnegie Steel Company, Pittsburgh, Pa., has issued an illustrated catalog, third edition, on its gear blanks and miscellaneous circular sections. The wheels, gear blanks and other specialties mentioned therein are made of rolled steel on the Slick wheel mill of this company, and covers sizes in general use for structural and interurban railway equipment, machine shops, high-power lathes, etc.

General Electric Company, Schenectady, N. Y., has issued bulletin No. 45603 on its graded shunt resistance multigap lightning arresters for alternating-current constant potential circuits. This pamphlet is illustrated with descriptive diagrams and halftones. The action of the arrester is described in detail and the various designs are pictured. The bulletin also describes and illustrates choke coils for use with these arresters.

NEW PUBLICATIONS

Telephone Rates in Detroit. By Edward P. Burch, Detroit, Mich. 207 pages. Cloth.

This is a report submitted to the city of Detroit in regard to an investigation by Mr. Burch as consulting engineer into the proposed advance in rates of the Michigan State Telephone Company in the Detroit exchange district. The basis of the valuation work is that used by Mr. Burch as engineer in charge of the Detroit United Railway valuation in 1914. The book contains various sections in regard to the basis for depreciation, a rational use of life tables, the determination of a reasonable rate of return, a study of the cost of service, etc., that would undoubtedly be of general interest to those connected with valuation work.

Examples in Magnetism. By F. E. Austin, professor of electrical engineering, Thayer School of Civil Engineering, Dartmouth College. F. E. Austin, Hanover, N. H. 85 pages, illustrated. Flexible leather, $1.10.

The book has been prepared for beginners in electrical engineering and by means of illustrated examples shows the application of the familiar principles of mechanics to the solution of problems in magnetics. It should be of interest to electrical workers who are familiar with the fundamentals of physics.

Principles of Direct Electrical Machines. By Alexander S. Langsdorf, professor of electrical engineering and dean of the Schools of Engineering and Architecture, Washington University. McGraw-Hill Book Company, New York. 404 pages, illustrated. Cloth, $3 net.

This book is the first of a series of electrical engineering text-books outlined by a special committee for the McGraw-Hill Book Company. It deals with the fundamental laws of electric and magnetic circuits, the theory of operation and the operating characteristics of direct-current machinery. The author's treatment of armature winding, armature reaction and its compensation, and commutation are unusually complete. Numerous diagrams illustrate the text. The book has been prepared for use as a college text-book and the methods of the calculus have been freely used.

Alternating-Current Electricity and Its Application to Industry. Second Course. By W. H. Timbie, head of Department of Applied Science at Wentworth Institute, and H. H. Higbie, professor of electrical engineering at the University of Michigan. John Wiley & Sons, Inc., New York, 729 pages, illustrated. Cloth, $3 net.

In this the "Second Course" of a two-volume text-book on the above subject, the authors have discussed in considerable detail the theory and operating characteristics of electrical machines and transmission lines. Care has been taken to point out the practical applications of the theory discussed. The subject matter is presented in a clear style and mathematical expressions have been omitted wherever it has been possible to express clearly in words the idea involved. Abundant use of illustrative diagrams and problems has been made. The book could be studied with profit by electrical workers who are familiar with the fundamentals of physics, algebra and trigonometry. A review of the first volume of this text appeared in the ELECTRIC RAILWAY JOURNAL, Aug. 28, 1915, page 384.

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Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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PUBLIC SERVICE TRAFFIC PROBLEMS

The leading article in the ELECTRIC RAILWAY JOURNAL this week is by H. C. Donecker, assistant general manager Public Service Railway, and in it he gives an intimate picture of the traffic problems of that company from the inside point of view. His article is a complement to that by J. W. Brown, assistant superintendent of the same company, printed in our issue for May 13, 1916. Both of these writers have had much to do with the working out of the transportation problems connected with the new terminal which was formally opened to the public on April 28, 1916. Our readers have now a practically complete story of this $6,000,000 undertaking from its inception, when the plan was announced in our news columns, right up to date, after it has had several weeks of severe service testing. The new terminal is so immense and so different from anything else of its kind that it is difficult for any one who has not personally inspected it to appreciate its extent and uniqueness. We hope that the excellent illustrations which accompany Mr. Donecker's article will assist the reader in forming in his mind a graphic background for the interesting story which is told in this issue.

EXPERIENCE ORDINANCE BACK-FIRES

A good example of retributive justice has been shown this week in the refusal of the Yonkers (N. Y.) Railroad and the Westchester Electric Railroad to operate their cars, abandoned by strikers, until ordinances requiring motormen and conductors to have fifteen days' experience on the companies' cars are vacated or superseded. Probably it never occurred to those who were instrumental in passing the ordinances that the railways would simply abide thereby and refrain from giving service in strike time under such unfair conditions or that there was a limit to which the public could go in its inconsiderate aid of strikers without regard to the questions at issue. As a matter of fact, the chances are that the ordinances are unconstitutional. As reported in our issue of May 27, Judge Ewbank in the Marion Circuit Court has held unconstitutional an Indianapolis ordinance requiring motormen and conductors to receive thirty days' instruction from men in service one year before being permitted to operate street cars in the city. This was also a strike ordinance, intended to coerce the local company into an unwarranted settlement. That the outcome in the present case will be the same is not now certain, although the Public Service Commission, before whom the matter is said to be placed, may well be expected to order the companies to operate regardless of the ordinances. The least that such a body can do is to allow the strike to be settled on its merits without the introduction of vicious and biased restrictions like experience ordinances.

CANADIAN G. O. IS A FAILURE

Another tale has now been told regarding the evils of government ownership — a tale more worthy of attention than many others, for it covers railway operation in a country whose physical, economic and political conditions are most nearly like ours, *i. e.*, Canada. In the June issue of *The Journal of Political Economy*, Samuel O. Dunn has made a critical and exhaustive review of the subject, leading unmistakably to the conclusion that the results obtained constitute a powerful argument in favor of abandoning government ownership in Canada and against adopting it in the United States. The government railroads in Canada, Mr. Dunn avers, are an utter financial failure, the excess of the total amount they have cost the public (exclusive of comparative taxes) over their present value being $268,000,000 or $154,378 a mile. With rates that are unjustly burdensome to general taxpayers, the lines have displayed evidences of construction waste, extravagant mismanagement, inaccurate accounting and "pork barrel" improvements that would seem unbelievable to one not acquainted with the inevitable attributes of government ownership. With a capitalization per mile less than the construction cost of the Intercolonial Railway, one of the Canadian government lines, the railroads in the United States handle 5 per cent more passenger traffic and 27 per cent more freight traffic per mile with only 2.6 per cent greater operating expenses. The major cause of this showing has been "politics," and the attempt of the present management to eliminate political influences is met with local opposition and a general lack of assistance. The picture certainly is not pretty, but as an educative one it has great value.

PSYCHOLOGY IN SIGNS

The force of a printed or spoken suggestion is much greater than we ordinarily think. Some years ago the slogan of a large city department store was, "Shall we deliver it, or will you take it with you?" Signs bearing this slogan were posted here and there throughout the store, and almost invariably it was put as a question by clerks to customers who had just made a purchase. In the course of an economy campaign, someone suggested that the slogan be reversed, or made to read, "Will you take it with you, or shall we deliver it?" The change was made and resulted in an annual saving of several thousand dollars in the delivery serv-

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ice. On the face of it, the change appears insignificant; its dollars and cents value was due to the fact that the mind is more likely to be influenced by a first impression than by a later one. In connection with the signs used for the guidance of passengers in matters of safety, cleanliness and general comfort, the lesson is one that any railway operating department might well take to heart. In the publicity department considerable attention has been given to the subject of psychology in connection with signs and other advertising matter. In the operating departments, however, the imperative tone, which an attempt at brevity has given many signs, tends involuntarily to arouse resentment in the minds of some people, while to others, because of the innate contrariness which so often runs through human nature, the sign is an invitation to do the opposite thing. Possibly, if such signs contained first a suggestion of safety, cleanliness or whatever the desired end might be, followed by a properly worded request, they would be more effective. Of course, no direct money saving would result from a careful study of the wording of operating department signs, but the indirect result in increased effectiveness and good will might well repay the effort.

THE RAILWAYS AND THE TECHNICAL SCHOOLS

Of late, some little space in our columns has been devoted to the subject of co-operative courses in electric railway work. One phase of the subject that we think has not been sufficiently emphasized, is that there could be far better co-operation between the railways and the technical schools that do not have co-operative courses than there is now. In many states where state universities giving training in the agricultural and mechanical arts are maintained, the public utilities carry a very considerable portion of the burden of taxation. Farmers as a class are not often accused of being overly endowed with the co-operative spirit, yet we believe it is a safe assertion that the farmers in these states make more use of the opportunities afforded by the universities and co-operate with them to a greater extent than do the railways. The fault does not all lie with the railways, nor does it all lie with the schools. Co-operation is possible along several lines. University extension courses might be organized for railway employees, and special problems in railway operation which do not require immediate solution, might be made the subjects of graduate and undergraduate research work. For example, traffic studies, transmission line and equipment tests of a special nature all furnish very suitable material in the way of research problems. From the standpoint of the railways, co-operation with technical schools in such matters would lower costs and at the same time give the railways an opportunity to pick promising young men for their organizations. From the standpoint of the university, such work increases the interest of the student in his studies, acquaints him with actual conditions and assists in keeping the university staff in close touch with real problems. All these things make for better equipped graduates and enable the universities to turn over to prospective employers a better product. The railways have problems galore. The universities have, or will have if the demand is sufficient, the equipment to work out these special problems, the solutions of which in the final analysis are for the benefit of the commonwealth. Cannot the two be brought together in a more effective manner than they are at present?

ADDITIONAL FORMS OF MUTUAL INSURANCE

The proposal of the New York Electric Railway Association to enter an organization for mutual insurance in regard to workmen's accident compensation suggests the thought of how important a part insurance in one form or another plays in the present-day life of every electric railway company. Broadly speaking, insurance is founded upon the principle of distributing the risk of disaster over as wide a field as possible. Although the principle has been employed for centuries, yet it remained for the present generation to develop its use extensively. In the electric railway field insurance against various contingencies is common. It is usual for electric railways to insure against loss by fire. The workmen's compensation laws have necessitated insurance against injuries to employees. An interesting outgrowth of the workmen's compensation situation has been the formation of the Utilities Mutual.

Mutual insurance is capable of considerable extension. One of the advantages which has led to the rapid extension of control of electric railways and other public utility properties by holding companies is the insurance protection which is thus afforded to the investor. Many large holding and operating companies have set up contingent reserves, supported by actual cash or other quick assets, from which extraordinary losses suffered by any of the constituent companies may be paid. Investment bankers look with favor upon this practice. The small electric railway is subject to the constant menace of an impairment of its financial position through a serious wreck. Summer travel and the operation of pleasure parks tend to increase the hazard. Numerous instances could be cited of small companies which have been plunged into financial difficulties through an unfortunate head-on collision or other serious accident. In most cases the bondholders have not suffered any loss for in the majority of states the lien of the mortgage protects them against tort claimants. The loss has befallen the stockholders, whose equity has been materially reduced and in some cases completely wiped out in the reorganization of the company. In a still larger number of cases a serious accident means a reduction in or the passing of dividends.

Risks of this character can well be covered by some form of mutual insurance. Difficulties must, of course, be encountered and solved. The well-managed company employing efficient operating methods, whose line is equipped with automatic signals, would not want to be put upon the same basis as a less efficient company in a mutual insurance organization. Similar difficulties, however, have been met and successfully solved in the numerous mutuals for insuring manufacturing plants against fire losses. Anything which tends to decrease the risk of an investor through the impairment of his equity is to the advantage of the industry.

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ACCIDENT INSURANCE ASSOCIATIONS PENALIZE TRAVEL ON ELECTRIC RAILWAYS

Our attention has been directed to the limitations of the policies of several of the assessment accident insurance associations which cater particularly to traveling salesmen. In these policies certain sums are paid for all classes of accidents, but the payment is doubled when the accident occurs while the insured is riding as a passenger on a train moved by steam power or else by electricity at the terminal only of a steam railroad. In other words, if the insured is injured while traveling as a passenger on an electric interurban or on an electrified trans-continental line other than at terminals, he is penalized 50 per cent of the amount which would be paid to him if he had been riding behind a steam locomotive. For instance, in the case of the electrification on the Chicago, Milwaukee & St. Paul Railroad, a person injured while on the electric division, as we understand the terms of the policy, would be able to collect only half the amount which he would if that section was still being operated by steam. Why these accident insurance associations discriminate against electric transportation is a question difficult to answer. The old line casualty companies make no such distinction. Inquiries among the insurance officials brought the reply that riding on an electric railway would represent an additional hazard, and the members of the association were receiving all the benefits they paid for.

In districts where a net work of interurban railways exists, traveling salesmen use electric lines in preference to steam railroads because the more frequent service permits them to make several cities and villages where they made one or two before. If these salesmen take into account their insurance when traveling, the limitations of these association accident insurance policies may influence them to travel by steam rather than by the electric railroads. To our way of thinking this is unnecessary discrimination, because the statistics of the electric interurban and steam railroads in the principal Central States, so far as the figures are available in the published reports of the commissions, show that the number of persons killed and injured annually on electric interurban lines is much less than that for steam railroads. For instance, the report of the Illinois commission for 1913 shows that one passenger was killed or injured on interurban roads to each 380,000 passengers carried, whereas the ratio on steam railroads was one passenger killed or injured to each 86,200 passengers carried. For 1914 a much better ratio obtained, being one passenger killed or injured to each 680,100 for the electric railways and one passenger in each 101,000 for the steam railroads. The latest figures from Ohio and Iowa show about the same relation between the two classes of roads as do also those from Michigan, although in the latter State the statistics from interurban and city roads are grouped. In Indiana, no direct comparison is possible because the report of the commission for 1914 does not give the steam railroad figures, but the electric railway figures do not differ materially from those of the other Central States quoted. It seems to us that in view of these facts the accident insurance associations should change their policies.

SALES END OF TRANSPORTATION

Transportation is a commodity to be bought and sold, and as such it is to some extent, at least, subject to the laws of trade. Electric railways are just beginning to realize the importance of salesmanship in their business. This, by virtue partly of the keener competition and partly of the larger units of sale, has been appreciated by the steam railroads for some time. Where interurban roads were in competition with steam railroads, the "selling game" was learned earliest. A large part of the publicity program of any electric railway must be planned from the salesman's point of view.

There are at least three elements in every satisfactory sale: a good proposition, conviction on the part of the salesman that it is a good proposition, and skill in convincing a prospective customer that it is a good proposition. To be a good proposition the prospective sale must hold possibilities of profit for buyer and seller. But the best of bargains will fail to appeal unless advertised convincingly. That the average nickel street car ride is well worth the money is fairly well understood by the railway management, which realizes how small the profit is, but the average rider is not a deep thinker and needs to be convinced.

It is true that there are many difficulties in the way of selling transportation, but the more numerous the difficulties the greater the need for good salesmanship. For one thing, the unit is so small that individual selling is out of the question; in general the public must be reached in the mass. Another difficulty is the ingrained prejudice of the public against corporations. Again, in spite of the high degree of literacy on the part of the American public, it is almost impossible to get its members to read anything of an argumentative nature. The steam roads are making a strenuous effort to do so at this critical juncture in their labor situation, and the very strenuousness of these efforts emphasizes the magnitude of the problem. Other difficulties will occur to the reader, but these will serve to illustrate the point. The true salesman, however, while realizing the magnitude of the job before him, will not be intimidated thereby, and fortunate is the railway whose management contains such.

There is another side to this matter, however—one which furnishes encouragement. Urban transportation is one of the most conspicuous and most intimate elements of community life. Our cars are constantly coming and going and provide a considerable advertisement in so doing. A great deal of riding will be done simply because the cars are there even if the service is poor and the management apathetic. There is thus a good foundation to work upon. Deep down in its heart the public appreciates how necessary the railways are to the community in which the lines operate, and this passive appreciation can be roused into active sympathy when occasion demands. All of these things and many others make it possible to sell more transportation, and that at a higher price than the present, if necessary.

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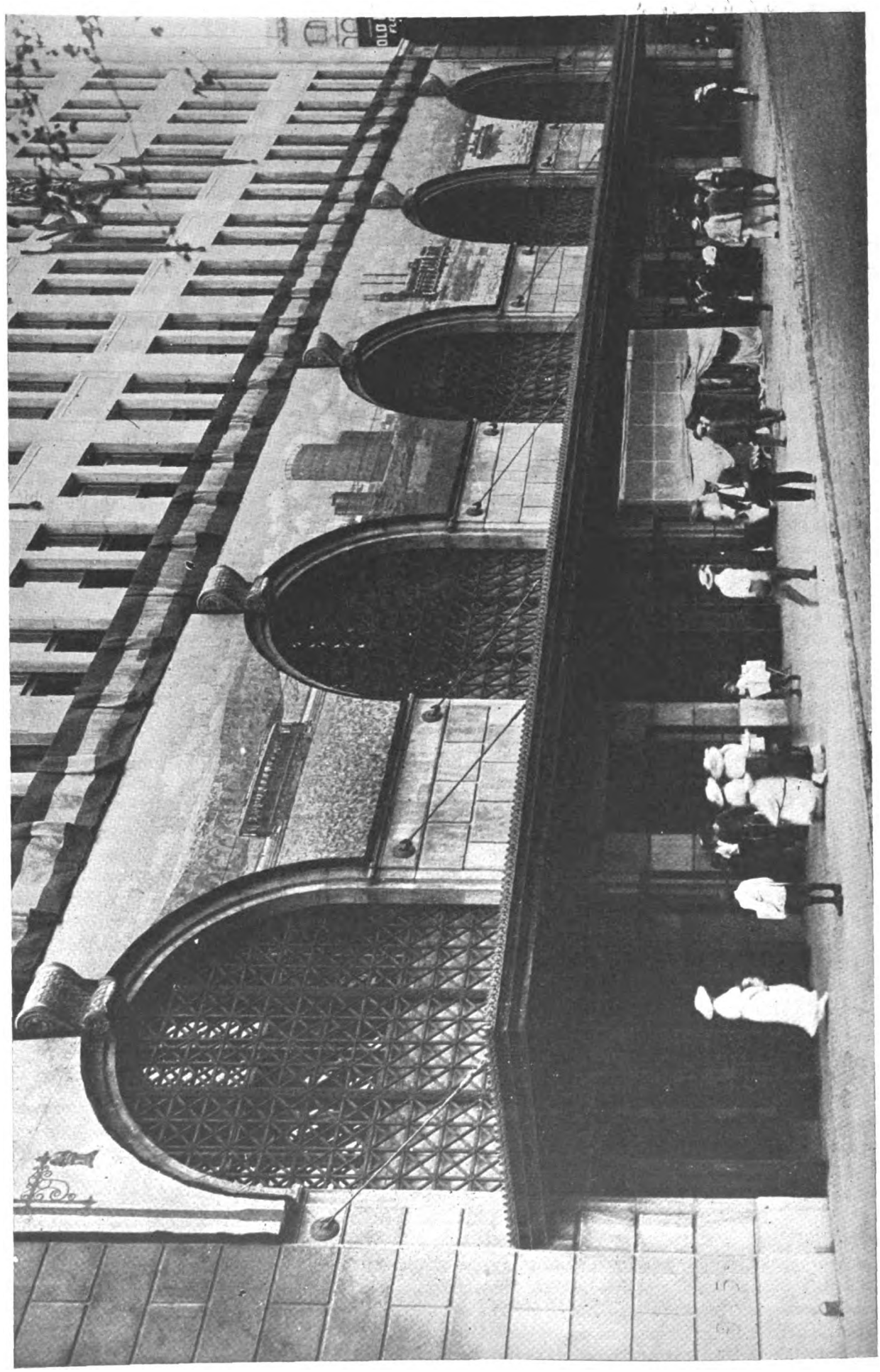

Façade of Public Service Terminal Building on Park Place, Newark, N. J.

Paintings above marquise are in honor of Newark's 250th Anniversary Celebration

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Rerouteing a Traffic of Nine Cars a Minute

How the Public Service Railway Solved the Problem of Handling Traffic of Exceptional Density by Means of the New Terminal in Newark

By H. C. DONECKER
Assistant General Manager Public Service Railway

THE recent opening of the Public Service Terminal in the city of Newark, N. J., marked the culmination of plans which had been in process of development since 1913, designed to overcome the extreme congestion in the heart of that city. The whole terminal scheme involved not only the construction of the magnificent building recently thrown open to the public, but required also the installation of extensive track connections for which a total of twenty-nine franchises were secured, these covering approximately 10 miles of track and thirty special work layouts.

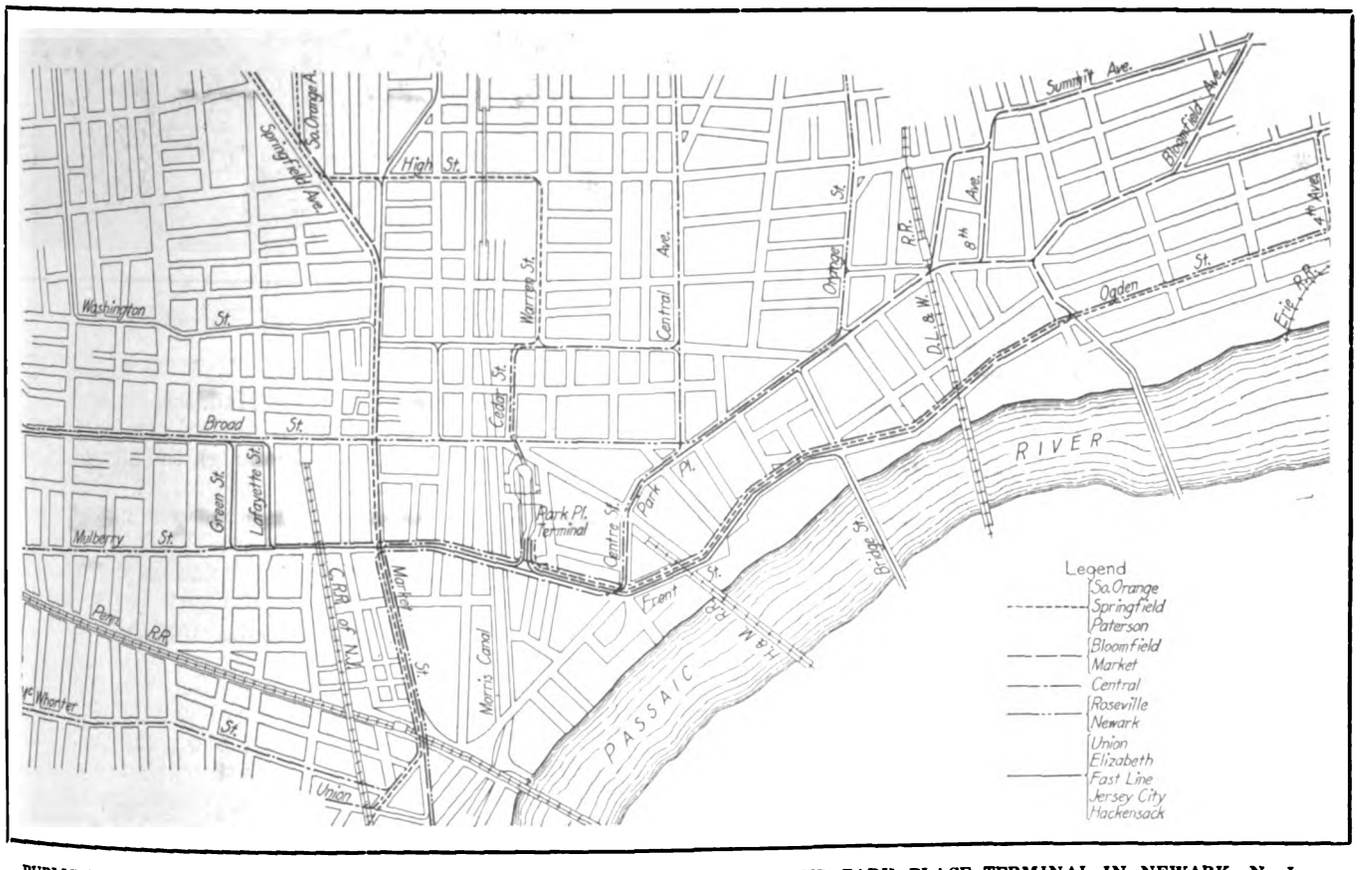
A BUSY TRAFFIC CENTER

Broad and Market Streets, the business center of the city, is reputed to be the second busiest corner in the country. So far as the street railway was concerned, there were scheduled to cross this intersection in the busiest hours of the day some 527 cars per hour, or nearly nine cars per minute. This car movement involved not only a double-track right-angle crossing at this point, but also curves from Broad Street into Market Street from south to east and from Market Street into Broad Street from west to north. The problems to be overcome in a traffic situation like this are obvious, and it can readily be understood that the slightest interruption meant a reduction in the percentage of car movements during the maximum hours, with consequent impairment of efficiency in rush-hour operation in this section. In other words, the intersection at Broad and Market Streets had reached the saturation point, and, unless it were possible to attain perfection in the orderly movement of cars crossing this intersection in the rush periods, maintenance of the commission hour-schedule was an impossibility. Records taken indicated that the average of efficiency was 95.2 per cent, or 502 cars for the maximum hour.

Not only was it necessary to meet the congestion difficulties presented due to the number of car movements on the street railway tracks, but there had to be faced, in addition, interferences from an extensive vehicular and pedestrian traffic at this point, Broad and Market Streets being the main arteries of the city of Newark and the "Four Corners" the heart of the business and shopping district. Some idea of the density of traffic at this intersection may be gained from the following figures which were developed from a count taken during the hours from 6 a. m. to 7 p. m. on a typical day previous to the opening of our terminal building:

TRAFFIC MOVEMENT AT BROAD AND MARKET STREETS, NEWARK, N. J., DEC. 22, 1915, 6. A. M.-7 P. M.

Number of electric railway cars	3,719
Passengers carried	76,291
Pedestrians	153,435
Number of vehicles	16,892



PUBLIC SERVICE RAILWAY REROUTEING—MAP OF REROUTEING SECTION AROUND PARK PLACE TERMINAL IN NEWARK, N. J.

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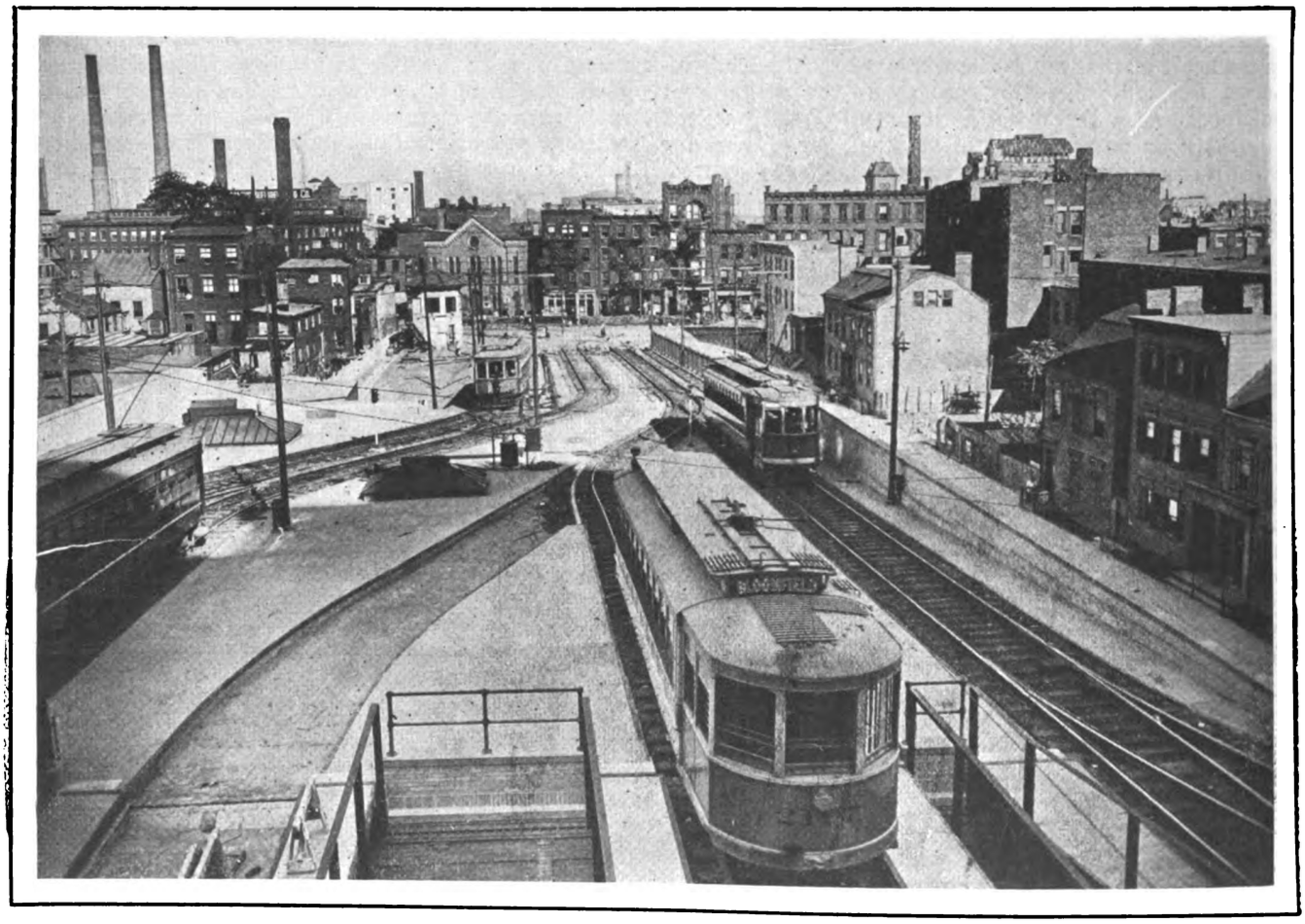
Even the above does not give a complete picture of the situation for there must also be borne in mind the fact that the crossing at Broad and Market Streets was a general transfer point for all of the lines crossing this intersection, the extent of the transfer interchange being indicated in the accompanying diagram No. 1, which shows the transfer movement by lines and by directions during the afternoon rush hour of a typical day.

WHY TRAFFIC AT BROAD AND MARKET STREETS IS CONGESTED

Some comments on the relation of Broad and Market Streets to the points of interest in the city and to outlying sections might be in order, and will serve to illustrate its importance as a meeting point of many lines serving the surrounding territory in all directions. For instance, the routes through Broad Street running north and south at this intersection reached not only the northern and southern sections of the city of Newark, but also provided through service to Belleville, Nutley, Passaic, Paterson, Harrison, East Newark, Kearney, Bloomfield, Glen Ridge, Montclair, Verona, Caldwell, Elizabeth, Roselle, Cranford, Westfield, Plainfield, Dunellen, Bound Brook, New Brunswick, Trenton and Perth Amboy, while a short block away, some 200 ft. north, there were operated cars (to which Broad Street and Market Street lines transferred) which were destined for Jersey City, Hackensack, Rutherford, Carlstadt, Woodbridge, Hasbrouck Heights, Leonia, Fort Lee and Edgewater.

From the routes above mentioned, connections could be made to Englewood and Tenafly, to Raritan and Somerville, to points between Trenton and Camden, and to South River and South Amboy; in fact, the northbound and southbound lines on Broad Street formed the arteries which by through routes or direct connections furnished transportation facilities from Tenafly on the north to Clementon on the south, a distance, as the bird flies, of 94 miles and by track of 125 miles. The lines on Broad Street also provided means for reaching the station of the Hudson & Manhattan Railroad, the lines of which run direct from Newark to Cortlandt Street, New York, or by transfer to Thirty-third Street and Broadway, and which handle approximately 1,200,000 passengers a month from this one station in Newark. In addition to the Hudson & Manhattan tube station, these lines reached the stations of the Delaware, Lackawanna & Western Railroad, the Central Railroad of New York and the Lehigh Valley Railroad, as well as the City Hall.



PUBLIC SERVICE RAILWAY REROUTEING—VIEW FROM REAR OF TERMINAL ELEVATED FLOOR LOOKING TOWARD MULBERRY STREET

The Market Street lines furnished service from Jersey City on the east to and through the city of Newark to the Oranges (East Orange, Orange, West Orange and South Orange), to Irvington, Hilton and Springfield, besides operating through the large industrial territory along the Passaic River and passing the Pennsylvania Railroad station, the Court House and also various amusement parks lying west of Broad and Market Streets.

While the relief of the congestion described above, which was encountered at Broad and Market Streets and to a less degree at other points in the business district of Newark, was, of course, the primary consideration in the development of the rerouteing plans, the terminal building itself had also for its object the housing of the home offices of Public Service Corporation of New Jersey, including the electric and gas de-

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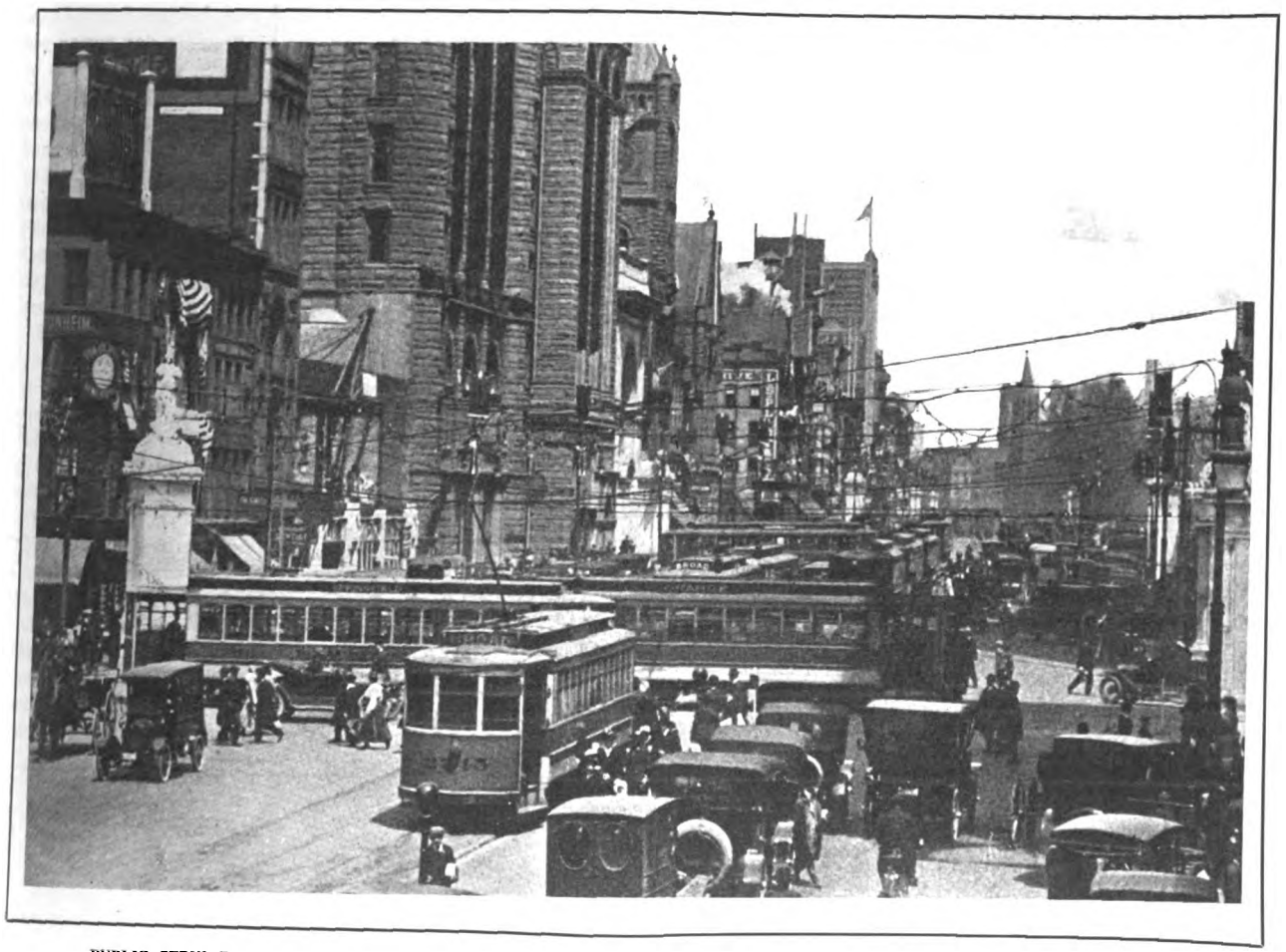
partments, as well as the railway, and, in addition, it provided a station for the heart of the Essex division, especially for those lines of a suburban or interurban character. Of necessity, the terminal had to be located close to the center of the city so that passengers might reach their destinations as conveniently as under the old operation. The site selected fits the conditions admirably, being but 975 ft. from Broad and Market Streets, and covering the entire space between Park Place (which is only 200 ft. across a park from Broad Street) and Mulberry Street, to which street were transferred many of the lines which formerly operated on Broad Street. The location is between the Hudson & Manhattan tube station and the City Hall, and is likewise about equally distant from the Pennsylvania Railroad station and the Court House. Moreover, the principal department store center faces the terminal building.



PUBLIC SERVICE RAILWAY REROUTEING—SCENE AT BROAD AND MARKET STREETS BEFORE THE REROUTEING

GETTING READY FOR REROUTEING

In the actual development of our rerouteing plans, we were concerned particularly with the following:

(*a*) Relief from congestion.

(*b*) Minimum disturbance of existing routes.

(*c*) Least possible change in termini and routes, this to insure the delivery of patrons as closely as possible to the points at which they formerly alighted from cars without transfer.

(*d*) Minimum transferring of passengers.

(*e*) Elimination of radical changes, excepting where the trend of travel demanded them.

(*f*) Avoidance, where possible, of any revision of routes which would necessitate the changing of the operation of a line from one carhouse to another.

(*g*) Transfer of suburban or interurban lines to streets of least congestion.

(*h*) Equalization of car movements over given streets to the end that maximum speed might be maintained in the business district.

(*i*) Proper and early advertising of proposed changes.

(*j*) The institution of such changes at a time when the least inconvenience would be caused, and when the public and trainmen would have an opportunity to familiarize themselves with the new operation under the most favorable conditions.

Combined with all of the above there was, of course, always kept in mind the institution of such economies as were possible and which the new investment in terminal and incidental facilities made essential, such economies, of course, not to involve any curtailment in service.

Some idea of the extent of the problems involved in the development of the final plans may be gained from consideration of the fact that nineteen of the thirty-one lines in the Essex division were directly affected by the opening of the terminal and four were indirectly affected. Five hundred and ninety-nine cars are operated in the rush hour in this division, and of these 425 run on lines directly involved in the terminal scheme, and 117 on those lines which were indirectly affected by the changes. This left but fifty-seven cars on those lines which did not in any way enter into the rerouteing.

Coincident with the selection of the terminal site, there was prepared a comprehensive study of necessary track changes, all subsequent to the general investigation which had been made of the requirements of the railway and, as well, of the details of future city planning work. There then followed the working out of the

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problems of the construction of the terminal proper, with the final development of plans involving the following:

1. A subway from Washington Street, some 685 ft. west of the terminal site, by which cars from the western sections could be brought under Broad Street into the terminal structure.

2. The placing of a concourse floor immediately above the lower or subway floor.

3. The elevation of tracks into a third level from Mulberry Street, 700 ft. east of the front of the terminal on Park Place, by which cars from the east, south and north might enter the new building.

THE TRAFFIC CHECKERS AND THEIR WORK

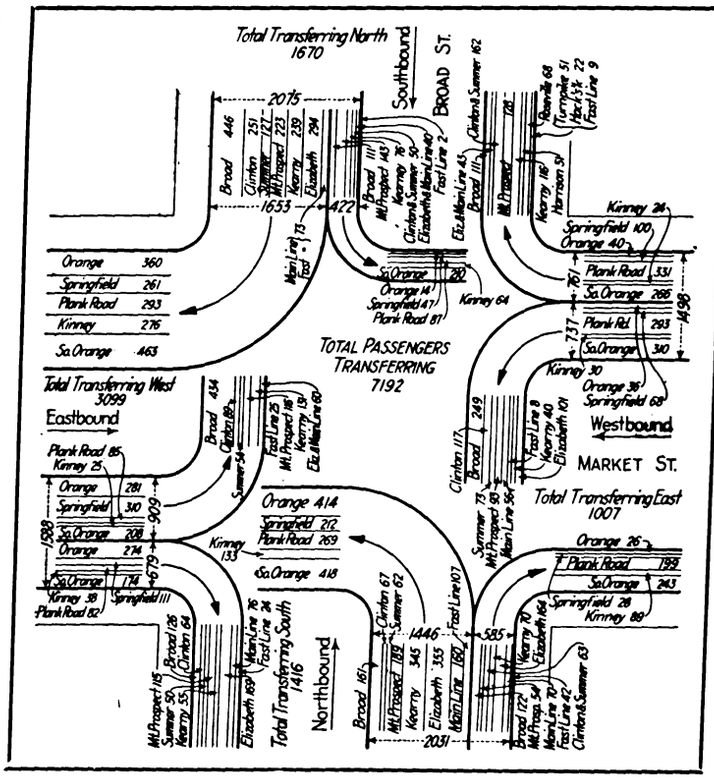
Passing over all of the intervening steps of obtaining ordinance rights, Public Utility Commission consents, etc., we come to the organization of a force whose work should be to determine, as accurately as possible, the riding habits of the people of Newark. On the Public Service Railway, work of this character is handled in the time-table section of the transportation department and is under the general supervision of the general superintendent.

There is constantly at work a force of twenty young men investigating traffic demands throughout the system, paying most attention naturally to the main trunk lines. This corps was augmented by some twelve men reporting directly to one of the representatives of our time-table department who has the title of "traffic engineer."

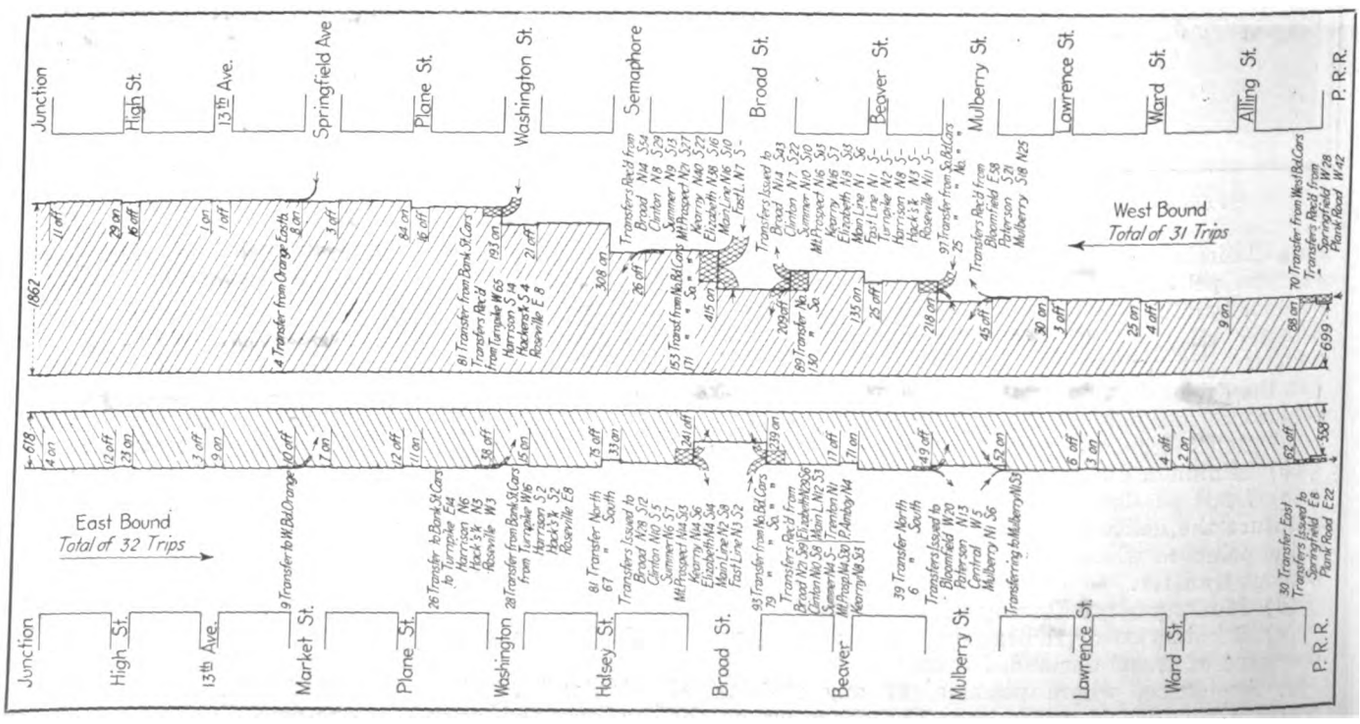
The business section of Newark was first segregated into two districts: the Market Street section, including all lines operating on Market Street from High Street to the Pennsylvania Railroad station (0.84 mile), and the Broad Street section, covering Broad Street from the Delaware, Lackawanna & Western Railroad station on the north to Clinton Avenue on the south (1.51 miles).

Beginning in June, 1915, there was undertaken the work of observing the riding on all of the lines operating in the business districts above referred to. Records were taken on each line for eighteen hours a day during five week days by crews of two men each, who boarded the cars at one end of the district and counted the load, noting also the number of passengers who boarded and alighted at each corner. These counts were entered on forms like that on page 178.

In working up the data, each day was divided into four periods: the morning rush hours, from 6 to 9 a. m.; the midday non-rush hours, from 9 a. m. to 4 p. m.; the evening rush hours, from 4 to 7 p. m., and the night non-rush hours, from 7 p. m. to 12 midnight. The records of counts which had been turned in by the checkers were



PUBLIC SERVICE RAILWAY REROUTEING—DIAGRAM NO. 1, TRANSFERS AT BROAD AND MARKET STREETS



PUBLIC SERVICE RAILWAY REROUTEING—DIAGRAM NO. 2, TRANSFERS TO AND FROM BROAD STREET

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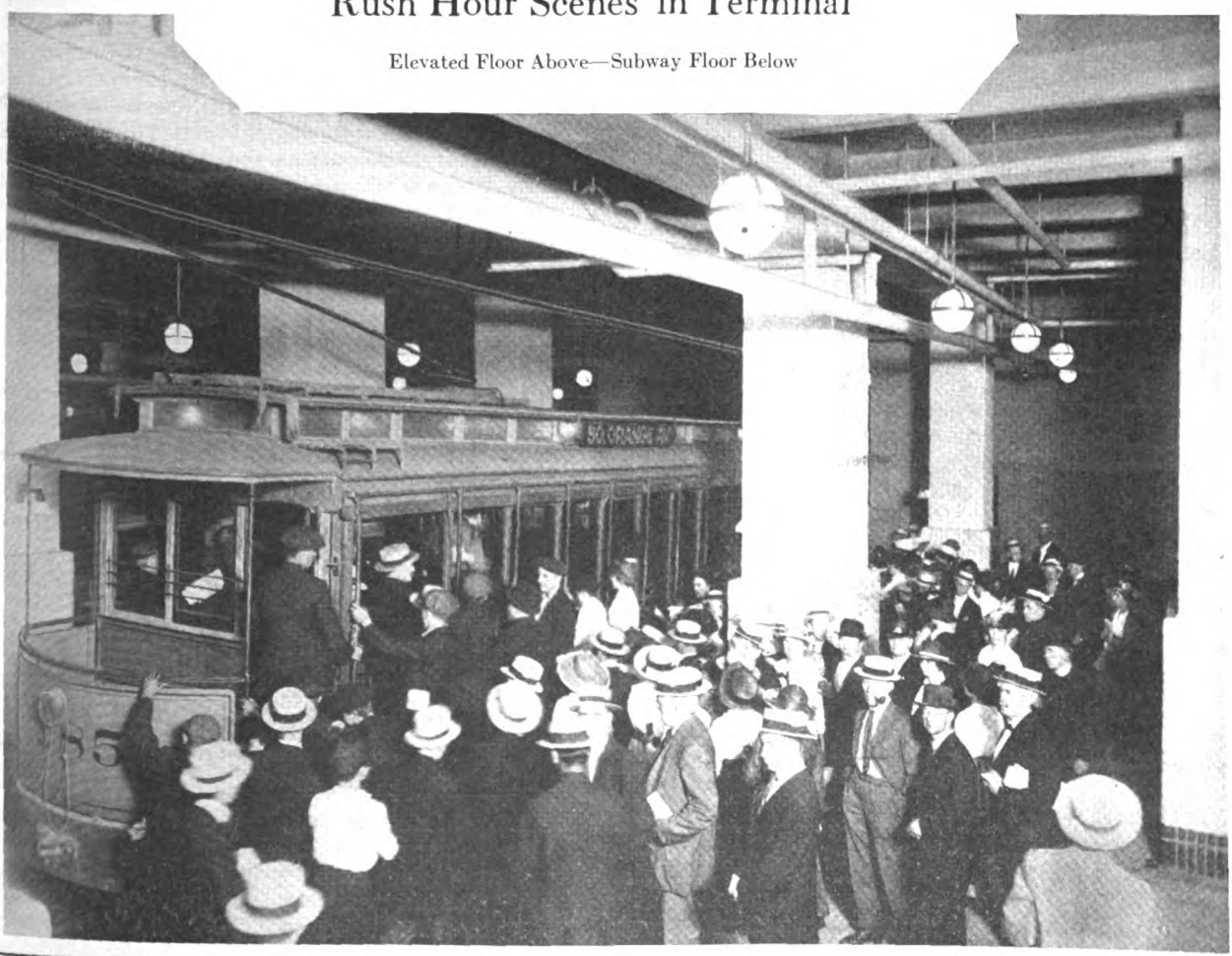
Public Service Railway Rerouteing—Rush Hour Scenes in Terminal

Elevated Floor Above—Subway Floor Below



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Sheet No.....

Line.....Date.....

Car No.....Direction .....

Time boarding car.....

Time leaving car.....

Load on car when boarded.....

STREET	ON	OFF

PUBLIC SERVICE RAILWAY REROUTEING—FORM USED IN COLLECTING TRAFFIC DATA

separated into periods, as above, and totaled by days. Charts were then made showing the traffic for an average of the five days for each period of the day.

In addition to the data secured in the above manner on the cars, information regarding transfers—which was very important in the solution of the rerouteing problem—was secured from the auditing department. Transfers were taken from conductors' trip envelopes and counted for each period of the day, the data thus obtained being applied to the charts developed from the observation records.

THE TRAFFIC CHARTS AND WHAT THEY SHOWED

An example of a completed chart is shown in diagram No. 2 shown on page 176, which, it will be noted, gives full data of through and transferring passengers on one of the Market Street lines in the afternoon rush, the figures representing the average riding for the week beginning July 19, 1915, for thirty-two eastbound and thirty-one westbound trips. In addition, charts were prepared showing the transfer movement by lines and by directions at important intersections. An example of these developments has already been given in diagram No. 1 covering the afternoon rush hours at Broad and Market Streets.

From the above-described distribution charts it was possible to determine where people boarded and left the cars in the business district, for the riding into the business area was clearly shown, and also its distribution within that section as well as the traffic across or through it. Following up the alighting of passengers at intersections with other lines, our records of transfers indicated whether or not such alighting passengers boarded intersecting lines and in which direction they went. The records of our auditing department supplemented by the observations of our checking corps gave us an accurate study of the whole transfer movement by districts, by lines, by direction and by time of day, and permitted us to differentiate between rush and non-rush requirements where any variation existed. This enabled us in some cases to divert a line from its original route and to superimpose upon another line a tripper service to take care of a well-defined transfer movement which occurred only in rush periods and over only a portion of the through line whose route was changed.

PRINCIPLES OF REROUTEING

The final result of our investigations led, after due consideration of the elements (*a*) to (*j*), as listed on page 175, to the adoption of the following general plans:

(*a*) Where possible, the combination of lines covering for substantial portions the routes of both, but diverting traffic to different outlying termini, thus bringing about the elimination of street looping in the center of the city.

(*b*) The routeing of all lines of suburban and interurban character through streets of least congestion to the terminal structure.

(*c*) Where possible, the retention on the old routes and termini of lines or parts of line which operate within the city and have not been eliminated or combined with other lines.

This has accomplished the following:

It has brought about the splitting of some lines into two parts. For instance, the South Orange line serves in the outlying section, Maplewood, South Orange and the western part of Newark. That portion of the line which runs to South Orange and Maplewood has its new city terminus in the terminal, whereas that portion of the service which operates only to the city line retains its original route across Broad and Market Streets, passing the Pennsylvania Railroad station, to what is termed the "Ironbound" district of Newark.

It has to a large extent segregated the passengers bound for the outlying points from the purely local riders.

It has reduced running time and has insured greater regularity of headway by the transfer of suburban and interurban lines from congested streets to those of less vehicular travel.

It has given an opportunity for a general speeding up of cars on lines affected by the terminal rerouteing, and this, of course, has been accompanied by better maintenance of headways.

It has also permitted the institution of more frequent service at a minimum of cost and has brought about a more efficient use of existing equipment and a higher maximum carrying capacity, due to the greater number of trips which may be made with a given number of cars.

It has produced extreme flexibility of operation in the center of the city at times of service interruptions due to parades, fires, etc., which demand—as has so frequently happened during this period of Newark's 250th anniversary celebration—the stoppage of operation on Broad Street and also on Market. Under such circumstances it has been possible still to maintain the service because the new layout and the building permit the diverting of cars from these two main streets into the terminal from the east, west, north and south, and the splitting of the lines thus diverted so that there is no interruption in the operation. For example, one part of a line will operate from the subway level west from the terminal, and the remaining part, serving the territory east of Broad Street, may run from the elevated level east thereof.

To illustrate the relief which the rerouteing has afforded at congested points, I would direct attention to the following figures giving the car movements in the rush hours at four intersections before and after April 30, 1916:

Street Intersection	Maximum Number of Car Movements Per Hour: Before Rerouteing	After Rerouteing
Broad and Market Streets	527	326
Market and Mulberry Streets	425	230
Broad Street and Central Avenue	392	276
Broad and Bridge Streets	352	236

After having determined upon the changes in routes which the trend of traffic seemed to warrant, the next question to be taken up was that of our transfer system. The necessary revisions were inaugurated with no serious complications resulting, the condition sought being a situation that would not involve a curtailment

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of the facilities heretofore afforded, but which would at the same time insure proper protection to the company's revenue. This we feel has been accomplished with satisfaction to all concerned.

INAUGURATING THE NEW SERVICE

The next thing considered was the method of instituting the changes, two plans presenting themselves: (1) A progressive change; that is, taking perhaps one line at a time, or (2) simultaneous changes.

The final decision was a compromise. The lines which did not enter the terminal, but whose routes were affected by the terminal scheme, were rerouted on April 25, 1916, and all other lines (those which in whole or in part actually entered the terminal building) were altered on April 30. In order to insure less confusion on the part of passengers and to enable the trainmen to familiarize themselves with the new operation under the best conditions, the last and greatest change was made on a Sunday which seemed most favorable by reason of the absence of peak conditions. A total of 50,000 people were handled in and out of the terminal building on the opening day.

Prior to the institution of the rerouteing, extensive newspaper advertising was carried on and, in addition, posters were placed in the windows of cars throughout the division and some 250,000 folders describing the new routeing were distributed by conductors, who were also instructed to acquaint patrons with the details verbally where possible.

It is gratifying to note that this great change has been accomplished with little confusion and with a minimum of complaint on the part of the citizens. Newspaper comments have been highly commendatory, and the terminal is daily increasing in usefulness. In other words, the people are gradually educating themselves to taking the short walk necessary to reach the new building, appreciating that no great development in urban transportation facilities has yet been accomplished which did not involve some increase in walking in order that the full benefits might be insured. The new structure is, furthermore, affording a splendid waiting place for the purely interurban lines of the company, which in itself makes such routes the more attractive to the patrons. A transfer under cover in bad weather is another advantage not to be minimized, and one which will be the more appreciated as the winter season approaches.

Last and most important, of course, is the provision which the terminal makes for the future growth of Newark and its environs. The relief of congestion at Broad and Market Streets anticipates the development of this territory, we are sure, for the period of a quarter of a century.

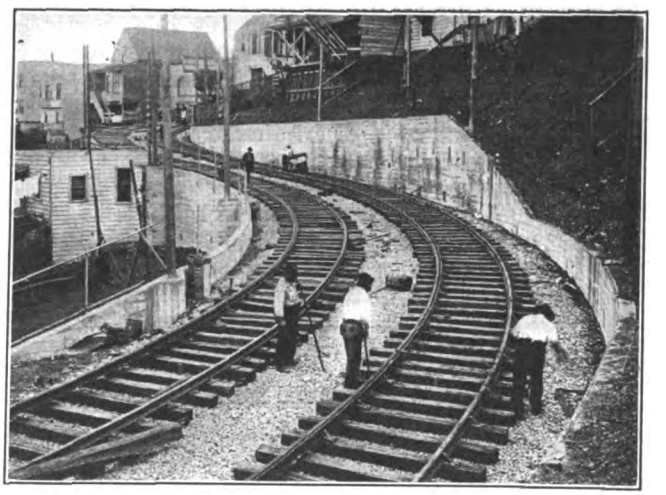
Reports which have just been received from all parts of the Pennsylvania Railroad System show that in the first six months of the present year 92,380,184 passengers were carried without loss of the life of a single one of them in a train accident. This completes two and one-half years in which no passenger has been killed in a train accident on any part of the Pennsylvania System, either east or west of Pittsburgh. In that time 453,952,298 passengers have been safely carried, in more than 3,000,000 trains, for a total distance of more than 10,000,000,000 miles, or 400,000 times around the world. Upward of 3,500,000 freight trains were operated in the same period over the 12,000 miles of line and 26,000 miles of track which make up the Pennsylvania railroad system. On the lines east of Pittsburgh no passenger has been killed in a train accident for more than three and one-half years.

Extension Built to Evade a Hill

San Francisco Municipal Railway Detours Around Church Street Summit and Cuts Through Eleven Houses on 1400 Feet of Private Right of Way

IN building the Church Street extension of the San Francisco Municipal Railway it was found necessary to get beyond the summit of the Church Street hill and impracticable to build a line directly over the 19.3 per cent grade on which Church Street had been built. Several cable and funicular schemes were proposed and abandoned as dangerous and expensive, after which surveys were made for a circuitous detour through private property. It was found that the latter method would allow a 9 per cent grade compensated on the maximum curvature which would have a radius of 100 ft. This plan was finally adopted, and the new line has recently been completed.

The original plan was to make a new street around the hill with a width of 50 ft., which would allow for vehicular traffic as well as the right-of-way on a 9 per cent grade. This plan had to be abandoned because of



SAN FRANCISCO MUNICIPAL RAILWAY PRIVATE WAY LINE ON CHURCH STREET HILL

the strenuous opposition to assessments on the property that would be benefited. Accordingly, a 28-ft. right-of-way was determined upon which would, of course, have to be reserved exclusively for railway use but which would be bought outright by the city. This involved forty-two property owners and the moving in whole or in part of eleven houses. An appraisal of the property involved was made by a competent real estate man, and settlement was made with every owner without resort to the courts, the total purchase price being practically the same as the appraised value.

Instead of the usual concrete poles through the private right-of-way, steel poles were used, about one-half of these being set in the concrete retaining walls that mark the property line. The maximum height of these walls is 18 ft. above the ballasted grade. The private right-of-way is being fenced for its entire length with stout wire-mesh fencing, and to further discourage the appropriation of the private way as a tradesmen's entrance, etc., the rough ballasted track will be left unpaved. Location and construction have been under the general direction of M. M. O'Shaughnessy, city engineer.

A vehicle which can take current from tramway trolley wires when it is running over a tram route, and which is also fitted with batteries, has been devised by D. J. Benzer, manager Bradford (England) Tramways.

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Fare Zones Adjusted in Maine

Maine Commission Authorizes a 2-Cent and an 8-Cent Zone on the Lewiston, Augusta & Waterville Street Railway—8.5 per Cent Return Declared Reasonable—No Deduction for Depreciation

THE Maine Public Utilities Commission in a recent rate decision established a 2-cent and an 8-cent fare zone in a portion of one of the lines of the Lewiston, Augusta & Waterville Street Railway running between Lewiston and Mechanic Falls, a distance of about 10 miles. The total cash fare between these two towns was and still is 20 cents, but one of the fare limits has been ordered to be moved and the cash fares in the four zones changed from four 5-cent fares to two 5-cent fares, a 2-cent fare and an 8-cent fare.

This change in fare limits and rates of fare in two of the zones is the result of a formal complaint filed with the commission on March 31, 1915, by a number of citizens of the town of Mechanic Falls and vicinity against the rates and service on the line mentioned. The complainants stated that the rates were excessively high, and that as compared with the charges for similar service on other lines or branches of the system they were not only high but discriminatory. The complainants called particular attention to the fact that the fare from Lewiston to Minot Corner, a distance of 5.5 miles, was 15 cents, and the fare from Hackett's Mills to Mechanic Falls, a distance of less than 4 miles, 10 cents, and that the fare from the second limit out of Lewiston to Minot Corner, a distance of 0.5 mile, was 5 cents. They also made the claim that sufficient seating capacity was not provided at all times.

VALUE DETERMINED FROM BOOKS

The commission did not require a physical valuation of the property of the company, for it was able to reach a definite conclusion as to value based upon matter contained in the books and papers of the company. A physical valuation, it stated, would mean in whole or in part an attempt to reproduce and then depreciate the property under what is known as the "reproduction new —less depreciation" theory. This method is used in cases where the original cost data are not available, or where such as are available are vague, insufficient or unreliable, but in all cases where original cost can be ascertained with substantial accuracy this latter method of fixing value is regarded by the courts as most satisfactory. The commission, therefore, used the figures representing the original cost of this line as obtained from the books and papers of both the railway and the Northern Construction Company.

The examination showed that the entire original cost of building the Mechanic Falls line from the corner of Washington Street and Minot Avenue to the end of the line was $166,430. This amount includes the following charges and percentages of the total cost: $546 or 0.32 per cent for engineering, $1,148 or 0.7 per cent for legal expenses, and $9,046 or 5.4 per cent for contingencies. The total is thus less than 6.5 per cent for such overhead charges. The commission stated that not only are allowances for these matters regarded as entirely proper, but that the range of the total allowed is between 9 per cent and 23 per cent, with an average of 15 per cent. The company was, therefore, very conservative in its claim for these usual allowances, and the commission recognized this point. The company did not make any claim in its statement of value for interest during construction, which is usually allowed, or for taxes, which are sometimes allowed.

The commission also allowed $7,068 for the cost of track used jointly by the cars operating between Lewiston and Mechanic Falls, and cars of other lines operating within the cities of Lewiston and Auburn. This proportionate amount was determined by pro-rating the cost of the joint track on the basis of the traffic density. The total book investment in cars and equipment chargeable to the Mechanic Falls line was found to be $16,895. In determining the proportion of estimated power-house cost of $50,000 chargeable against the Mechanic Falls line, the ratio of the total output of the Lewiston station to the kilowatt-hour consumption on the Mechanic Falls line, ascertained from the output of the Mechanic Falls substation, was used. This was found to be 11.5 per cent of the total production, thus giving $5,750 chargeable to the Mechanic Falls line for power-station value. For carhouse and shops, the commission accepted the figures presented by the company, and on the basis of cars operated allowed $3,261 for the Mechanic Falls line. A further allowance of $375 was made on the basis of space used in another carhouse for storage. The total investment for the line thus was $199,781.

NO DEDUCTION FOR DEPRECIATION IN THIS CASE

The total earnings for the line in question were figured at $34,238, with expenses of $17,426, giving net earnings of $16,812. This amount of net earnings represented a return of nearly 8.5 per cent on the value of the property. The operating expenses shown above included depreciation only upon rolling stock, and the company felt that additional depreciation of 3 per cent upon track and overhead, 6 per cent upon power station and 2.5 per cent upon carhouses and shops should also be allowed. In commenting upon this question of depreciation the commission said:

"Depreciation is deferred maintenance, and in a case where any public utility has permitted its plant or any substantial portion thereof to become insufficient or inadequate on account of failure properly to maintain it, such condition is actual depreciation, and should be properly noticed by decreasing the original cost of the property by the amount actually depreciated. This is just and fair because the company is taking certain money from the public in the form of rates, tolls or charges, and distributing it to its stockholders in the form of dividends, when a certain portion of such amount should be laid out upon the property in keeping it up to as near 100 per cent efficiency as possible. If, on the other hand, a public utility is spending a sufficient amount each year properly to maintain all of its property, and as a result thereof its plant is rendering nearly 100 per cent service, it would be unfair to deduct any considerable amount for depreciation, for the reason that the company would thereafter receive its return upon this reduced value. Being obliged to charge and receive no more than reasonable rates upon a fair value, it would thus never be able to obtain a sufficient amount to place and maintain its particular property in proper and efficient condition.

"In the case of a street railway, its track, roadbed,

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poles and wires, carhouses, shops and power houses are ordinarily by maintenance kept in such state of repair that there is never very much actual depreciation. Its equipment of cars, on the other hand, necessarily depreciates, and a certain reserve should be maintained to care for this depreciation. As a matter of fact, the present company maintains its roadbed, tracks, poles, wires, carhouses and power plant in excellent condition, and it maintains such a depreciation reserve upon equipment as satisfies the requirements of the Interstate Commerce Commission. In the absence of evidence that this is not sufficient, we ought to be satisfied, and for the reasons above stated we do not in this particular case feel that there should be any deduction from the ascertained investment of $199,781. We therefore find that this amount is the fair value of the company's property. And inasmuch as we make no deduction from this figure representing original cost and present value, we do not allow any additions to operating expenses for the items of depreciation claimed by the company, but find the total operating expenses with all proper additions and deductions to be $17,426, yielding a return of approximately 8.5 per cent."

8.5 PER CENT RETURN IS FAIR

In commenting upon what should be considered a fair rate of return upon the money invested, the commission made the following statement:

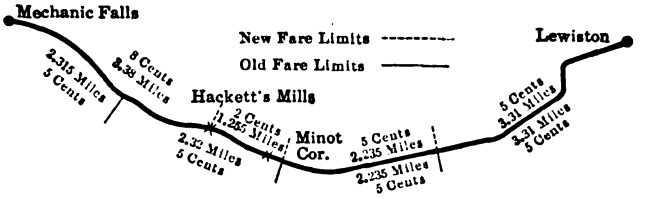
"At first view it may be said that 8.5 per cent is a very liberal allowance; that a figure more nearly like that paid for ordinary loans would be adequate. We believe, however, that on inspection most people will agree that this is not true. As long at least as the charge is not greater than the value of the service, the return should be sufficient to encourage the investment of capital in similar enterprises where there is a fair demand for it. Unless this principle is recognized, the State cannot expect the improved transportation facilities in its sections not now served by railroads and street railways. Capitalists will not invest their money in enterprises attended by more or less hazard, inconvenience and necessity for personal attention unless there is reasonable hope of higher rate of return than they could secure from usual investments in securities.

"In arriving at our conclusion in this case, we take into consideration the fact that the present rate averages but 2 cents per mile—20 cents for 10 miles over a suburban line where the short hauls are comparatively few. This cannot be said to be more than the service is worth. A reduction of one zone, to 15 cents, which was suggested by the complainants, would, unless the travel was greatly increased, entail more than a loss of 25 per cent of the profit or return on the investment. It would decrease the gross income one-fourth, and the net approximately one-half. In other words, to grant the smallest reduction suggested would reduce the return on the respondent's investment to 4 per cent. We do not wish to be understood as committing ourselves in the proposition that 8 per cent is a reasonable return on money invested in all public utilities. The character of the utility, the character and density of population of the community in which it operates, and many other things must be taken into consideration. What we do say here—and we repeat it so that there may be no misunderstanding—is that 8 per cent on the money actually invested in a suburban branch of an electric railway is not an unreasonable return where the service is furnished at 2 cents per mile.

"It necessarily follows that there can be no reduction of the 20-cent fare between Lewiston and Mechanic Falls, unless the company can be permitted or compelled to carry passengers between these two places and intermediate points at a rate which yields less than a fair return. If this can be accomplished at all, it can only be upon the theory formerly prevailing that a street railway can be permitted or compelled to serve a portion of its patrons at a loss if it appears that its business as a whole is sufficiently remunerative to warrant such carriage at a loss. Other commissions and some courts seem to have misunderstood a certain decision of the United States Supreme Court; but upon March 8, 1915, this court handed down three decisions, viz.: Northern Pacific Railroad *vs.* North Dakota, and Minneapolis, St. Paul & Sault Ste. Marie Railroad *vs.* the same, 236 U. S., 585, and Norfolk & Western Railway *vs.* Conley, 236 U. S., 605, the first one of which is of special interest. According to this decision, we feel that the same court would hold that this commission would have no authority to compel the street railway to carry passengers upon the Mechanic Falls line at either a loss or at less than a fair return merely because its business as a whole was profitable and would not materially suffer on account of the loss of the receipt of less than a fair return from the services to Mechanic Falls patrons."

DISCRIMINATION AND SERVICE

The complainants insisted that because the company carried passengers upon other branches of its road much longer distances for 5 cents than it transported



MAP OF MECHANIC FALLS LINE

passengers upon the Mechanic Falls line, it showed discrimination and inferential proof that the road could and should extend its fare limits on the Mechanic Falls branch. Some evidence was introduced with reference to one or two other branches, but it was very meager, and no effort was made to show conditions existing upon these other branches, such as density of population, the amount of traffic and other essential facts. The commission fully realized the justice of establishing fare limits with reasonable reference to the volume of travel and residential, business and territorial conditions along a given route, and as the claimants attempted to compare the fare limits of the Mechanic Falls line with those of other lines which were entirely dissimilar in these respects, it asserted that the limits on these lines had no bearing whatsoever on the limits or rates of fare which should be established on the Mechanic Falls line.

In regard to the complaints about the crowded condition of the cars at certain hours of the day, the commission did not make any ruling. It stated that it was engaged in making a study of rush-hour conditions, and until that study was completed it would not make any order relative to the relief of the alleged condition.

FARE LIMITS DIFFICULT TO FIX

The commission said that no single problem in the matter of transportation on electric railways is perhaps more perplexing to the management or more annoying to patrons than the location of the fare limits. The determination of the zones will inevitably inconvenience some people, but the railway cannot be absolutely controlled solely by the desire and inconvenience of a particular patron. Distance, while an important factor, cannot always govern. The first fare limit out of Lewiston upon the Mechanic Falls branch, as shown in

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the accompanying map, is located about 3.3 miles from Lisbon Street, Lewiston, the starting point of this line. Although this zone was greater than the remaining ones, the commission held that this was proper, as an important village was accommodated thereby, and the records of the company showed that about 45 per cent of the entire traffic on this line was within the first fare zone. It, therefore, ordered that the first limit be continued in its present location.

Regarding the location of the other limits, there were a number of protests made at the time of the hearing. The distance between the end of the first fare limit out of Lewiston and Mechanic Falls had been divided approximately into three equal parts, so that the lengths of the second, third and fourth zones were as follows: 2.235 miles, 2.32 miles and 2.315 miles respectively. While the complainants did not dispute the territorial equality of this division, they stated that its fairness was not real. They said that the second fare limit ended at a "hole in the ground" where nobody lived, where no roads converged and where patrons to take the car had to walk 0.5 mile or more. They also stated that the third fare limit ended in a desolate, unfrequented place, where there was nothing except an imaginary line which the company had fixed for its own convenience.

The commission decided that the protests of the complainants had merit. For instance, between Lewiston and Mechanic Falls are two small settlements, known as Minot Corner and Hackett's Mills, these being located about 0.6 mile apart. Each is a place where several roads from near-by territory converge. The post-office is located at the former; a cluster of houses and a fair-sized mill at the latter. Either of these places is a natural point for the putting up of teams by persons who are to take cars for Lewiston or Mechanic Falls. The second fare limit out of Lewiston was located about 0.5 mile from Minot Corner towards Lewiston, which meant that a person coming to Minot Corner along any of the crossroads had to walk 0.5 mile towards Lewiston and take the car and pay 10 cents, or take the car at the corner and pay 15 cents, 5 cents of which was for the first half mile. The third fare limit out of Lewiston was about 1 mile beyond Hackett's Mills towards Mechanic Falls, so that a person desiring to go to Mechanic Falls from Hackett's Mills had to pay 10 cents, 5 cents of which he was obliged to pay for the first mile.

As before stated, the commission decided that the first fare limit out of Lewiston was proper and no change was ordered. From Mechanic Falls it felt that there should be a fare limit at Hackett's Mills, a distance of 3.38 miles from Mechanic Falls, for which 8 cents would be a proper charge. It was then decided that the second fare limit out of Lewiston should remain where it was and the fare of 5 cents continued, and that the fare between the end of this second zone and Hackett's Mills should be 2 cents. With this arrangement of fares and fare limits, passengers going between Lewiston and Mechanic Falls would pay no more than formerly. A passenger taking a car at Hackett's Mills for Mechanic Falls would pay 8 cents instead of 10 cents. A passenger taking a car at Hackett's Mills for Lewiston would pay 12 cents instead of 15 cents, a reduction of 20 per cent in both cases.

In making this decision the commission stated that although this would make an apparent reduction in revenue to the company, the evidence presented at the hearing led it to believe that the travel from Hackett's Mills to Mechanic Falls would be materially increased because of the reduction from 10 cents to 8 cents. It realized the possibility of error on its part in making this reduction, however, and provided in its order for the reopening of the case on petition after a trial of one year.

COMMUTATION TICKET SERVICE EXTENDED

It has been the practice of the company for a number of years to sell commutation tickets for transportation between Lewiston and Mechanic Falls in books of sixty coupons, good for bearer only, limited to sixty days from date of sale, and sold for $9, each coupon entitling the holder to ride between Lewiston and Mechanic Falls for 15 cents instead of 20 cents, the regular cash fare. At the hearing a number of witnesses testified that these commutation tickets were of little value to persons living in Mechanic Falls, for only a relatively few persons had use for a ticket which required the holder to ride from Mechanic Falls to Lewiston each week day, and that, furthermore, $9 was a considerable cash investment for the ordinary workingman to make at one time. In view of these arguments the commission ordered that the company place on sale commutation books for twelve, twenty-four, thirty-six and forty-eight rides, good for one week, two weeks, three weeks and four weeks respectively, all at the rate of 15 cents per ride.

For a number of years the company has also sold strip tickets at the rate of eleven for 50 cents, each being good for a 5-cent ride. The commission ordered that each of these tickets be regarded as cash in the amount of 5 cents within any of the limits between Lewiston and Mechanic Falls. Thus a passenger riding within the 8-cent zone is entitled to use a ticket and 3 cents in payment of fare, thereby obtaining the ride for about 7.5 cents within this zone. By a strict interpretation of the ruling, a passenger riding within the 2-cent limit could present one of these tickets and receive 3 cents in change. The commission has advised, however, that it was not intended to have the company make any refunds on tickets presented in payment of fares.

The new fares and fare limits became effective on April 27, 1916. At the present time there has not been sufficient time to obtain definite information regarding the effect on the earnings.

Geographical Distribution Stabilizes Utility Properties.

The new sixty-four page booklet of the Standard Gas & Electric Company, Chicago, Ill., showing attractive photographs of the properties and cities served, contains interesting graphic charts illustrating the stability and progress of gross and net earnings of subsidiaries even during a period which seriously disturbed the country. The booklet says:

"The separated location of the properties is an element of strength. It is an application of the law of averages to public utility investments. Electric and gas companies are the least affected of all industries by general business depressions, but there are occasionally acute local or sectional recessions which unfavorably affect earnings. These acute dislocations, however, do not occur throughout any considerable number of states at any one time. During the recent depression in the lumber industry of the Northwest the wheat growing states, Minnesota, North Dakota and South Dakota, enjoyed marked prosperity. While the low price of cotton was keenly felt at Mobile, Ala, and Fort Smith, Ark., the city of San Diego reached a high point in its prosperity during the holding of the Panama-California Exposition. At the same time the zinc industry of Wisconsin and Illinois established new records for productiveness. Similar instances are many, but the examples given indicate the character of protection accorded the investor by a wide geographical distribution."

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Study of Chicago's Congested Traffic

The Report of the Board of Supervising Engineers, Chicago Traction, on Possibilities of Improving Street Railway Service Involves an Analysis of the Causes of the Congested Conditions and their Remedies

AN extended study of the extent and causes of traffic congestion in the Chicago Loop has just been completed. New recommendations have been made for capacity, routeing, street traffic regulation, car operation and physical changes. The data on which the foregoing are based have just been issued in an advance reprint from the ninth annual report of the Board of Supervising Engineers, Chicago Traction. Its title is "Investigation of Traffic Conditions and Track Capacity with Respect to Possibilities of Improved Street Railway Service and Rerouteing of cars of the Chicago Surface Lines." The report contains 159 pages besides maps.

Some Recommendations in the Report:

(1) Two car berths at each important stop.

(2) Street semaphore signals.

(3) Introduction of skip stops.

(4) Stricter regulations of vehicular service.

(5) Increase in turn-back service.

(6) Rerouting.

The plan followed in making the observations and gathering the data was:

1. To ascertain how many cars per hour are passing through the Loop district on the main trunk line streets, and

2. To ascertain the conditions that restrict and prevent realizing a higher standard of service in cars per hour over these tracks.

3. To analyze the possible changes that might be made, both with respect to the relief of interfering surface congestion to the operation of cars, and

4. To develop possible improvements that might be made by a change in routeing.

Briefly, the analysis shows that undue congestion results when an attempt is made to pass cars continuously through certain downtown crossings, according to existing schedules; that the capacity at controlling points has been exhausted under the present scheme of routeing, and that the only real alternatives (even assuming a great improvement in traffic regulation) are: (1) Rerouteing within the congested districts, and (2) provision of additional traffic entrances thereto.

Even the benefits of the first alternative will have been exhausted at the prevailing rate of growth by the time subways or other additional outlets will have become available for street railway operation.

No attempt has been made to decide or assume certain matters of contention which will require authoritative action, viz.: rush-hour loading standard and through-routeing of rush-hour trippers.

Alternative assumptions, however, have been made from which may be drawn conclusions within reasonable limitations as to the comparative results.

SPECIFIC RECOMMENDATIONS

I. Capacity and Routeing:

The report does not recommend definitely a fixed routeing plan, but presents several plans comprising a wide range of possibilities as to rerouteing and a service standard. The board favors its Plan II.

II. Traffic Regulation:

1. Advocate the reservation of a two-car loading berth next to each important near-side (or special far-side) stop in the terminal district within which no vehicles shall be parked. Vehicles passing this reserved strip should pass close to the curb, and there await the next proceed signal.

2. At less important intersections the reserved space can be reduced to one car length, which should be established throughout the city at all stops.

3. The limits of these reserved loading berths should be indicated at the most important points by white strips painted upon the pavement, together with a painted iron marker resting upon the pavement at the upstream end.

4. Electric semaphore signals should be placed at the heaviest crossings, to be operated by a traffic officer occupying a raised position at the curb. These semaphores should preferably be suspended at the center of the crossings from overhead messenger wires, so that they may be seen from long distances without confusion. They can readily be fitted with an automatic air whistle.

5. At all crossings where cars turn on the inside loop, traffic regulations should permit these cars to pass on either traffic signal whenever it is necessary to do this in order to relieve the berth from oncoming cars.

6. The vehicle parking ordinances should be more rigidly enforced on car line streets to preserve free way for the second line of vehicles moving next to the car. Considerable advantage may be taken of the precedent already established by city ordinances prohibiting parking within a specified distance of fire hydrants.

7. Encourage the company to report regularly all deliberate violations by vehicles occupying the track needlessly.

8. Ordinances should be favored limiting the width of vehicles or burden carried through the downtown streets or across the bridges.

9. At important branch-offs congestion could be greatly relieved by the use of a double berth far-side stop; *i.e.*, avoiding any loading of cars before passing the switch. This movement should be in charge of a supervisor. During rush hours, the electric switch should be manually operated and during non-rush hours in the ordinary way. The electric connections suited to this class of work were illustrated in the board's sixth annual report.

10. Traffic signal interval should be as short as possible, consistent with the relative demands for traffic; *i.e.*, no dead time should be permitted or holding the crossing open for approaching vehicles.

III. Car Operation:

1. Avoid extreme shortening of the loading zones on downtown lines so that the loading will not be concentrated at too few points, and thereby introduce a new controlling element of congestion.

2. Increase the turn-back car service during rush hours on those lines on which a large proportion of the

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traffic clearly originates just outside of the Loop district. This special service to be of greatest effect should be properly advertised.

3. Encourage prompt acceleration and braking, and this as uniform as possible (except over special work). A rate of 2 m.p.h.p.s. will not be uncomfortable to passengers if uniform and is easily within the power of the motor equipment. It is the erratic handling of the car that causes the discomfort.

4. Encourage multiple car or double berth operation at congested crossings; the second car to follow the first just within safe braking distance in the form of disconnected train operation.

5. Encourage conductors to give forward bell promptly the moment loading is completed without waiting for making change or for transfers, so that cars may not be held over until the next traffic signal to proceed. A full interval is frequently lost in this way at critical points.

At points of heavy traffic where more than ten passengers usually board a car at one time, the outer portion of the hinged hand rail on the rear platform should be dropped so as to permit the full width of the platform step to be used for loading, thereby increasing the reservoir capacity of the platform and decreasing the loading time proportionately. This applies principally to the downtown district.

6. Too frequent stops on certain outlet throats prevent reasonable speed being made during rush hours. A system of skip-stops should be put into operation at least within the following districts:

North throats: Chicago River to Division Street.

West throats: Canal Street to Ashland Avenue.

In these "close-in" districts stops vary from 190 to 470 ft. apart, averaging about 330 ft., permitting about sixteen stops per mile. Consequently, stops should be made at alternate blocks and discrimination as to service between the two sides of the street may easily be avoided by staggering these skip-stops. On diagonal thoroughfares, it is equally important to develop an arbitrary system of stops which will fairly equalize the intervening distances and eliminate all unnecessary stops. Wherever more than eight stops per mile (660 ft. spacing) are encountered, consideration should be given to the skip-stop plan but without instituting excessively long "skips" such as 1000 ft. or more. This, of course, does not apply to the downtown district, in which practically all stops are necessary in order to avoid too concentrated loading. Where such skip-stop plan is put into effect the stopping points should be definitely shown by painted poles, suspended flags or other means.

IV. Physical Layout:

1. The Board of Local Improvements, the Chicago Plan Commission, the Chicago Terminal Commission and other public bodies having jurisdiction over the broader movements of city planning should incorporate in every plan for street and district development the elements essential to the improvement of local transportation. This refers to:

(*a*) Street system involving streets closed by railroad occupation, absence of bridges over the river, width of streets, street obstructions preventing four lines of moving traffic, etc.

(*b*) Pavement involving excessive crowning—granite vs. smooth pavements, etc.

(*c*) Bridges and viaducts involving grade of approaches, width of roadways, etc.

(*d*) Rear delivery vs. front delivery of merchandise, involving width of alleys, interior courts, arcades, etc.

2. Ascertain the possibilities of widening Wabash Avenue roadway, north of Madison Street, to the same width as that south of Madison Street. This can be done without seriously impairing the sub-sidewalk space now occupied by abutting property holders.

3. Secure such modification of the standard pavement contour, especially when smooth surface paving is used, as will make it possible for teamsters to use the roadway outside of the car tracks during inclement as well as good weather. The new paving in Van Buren Street is a good example.

4. In considering modifications of the elevated loop structure plan for the ultimate relief of Loop streets at present obstructed by elevated columns, at least by moving the obstructing columns from roadway to curb.

DEDUCTIONS FROM TRAFFIC OBSERVATIONS

Under the heading of "Deductions from Data of Fact," the report presents a section which deals largely with the subject of track capacity and routeing. The results are in turn reflected in the recommendations. The entire investigation practically focuses upon four essential factors, and these should always be held in mind in reviewing this report: (1) track and crossing capacity, (2) routeing system, (3) traffic regulation, (4) service standard.

Manifestly, none of these factors can be intelligently considered without the others. Any reasonable conclusion must recognize all others in due proportion, based somewhat upon judgment but largely upon analysis of the facts. Wherever judgment has entered into the conclusions herein, the same has been noted.

In the simplest terms the questions to be answered are these:

1. Is the capacity of the downtown surface tracks already exhausted?

2. Can the situation be materially improved by rerouteing?

3. With rerouteing, how many years normal growth may be provided for before the capacity is again exhausted?

At the controlling points of the routes or loops the present rate of car movement during the evening rush hours is so great that the track capacity has been practically exhausted, even assuming that all avoidable vehicle interference is removed. That the present number of cars are actually operated on these tracks, handicapped by this avoidable vehicle interference, simply means that cars accumulate from time to time at such a rate as to require as many as five cars to pass per signal. This necessarily decreases largely the quality of service rendered and accounts for the fact that the average speed of transit through the terminal district is frequently lower than walking speed.

Thus, this investigation presents, as a net result, the serious fact that the capacity of the downtown streets under present routeing has long since been exhausted and that re-routeing should be immediately undertaken to relieve the situation for the next few years. Even then in all probability the relief will not last much beyond the earliest date that subways or other additional outlets will be available.

DEFINITION OF CAPACITY

For the purpose of this study, the capacity of a street crossing is considered to be the permissible maximum rate of car movement, or amount of car traffic (expressed in cars per hour or other units of time) which can reasonably be operated with existing standard equipment under the improved condition of traffic regulation assumed and recommended herein, across or over the crossing without unduly slowing up the operating schedules or discriminating against vehicle traffic as it exists to-day.

The capacity of any given track using the crossing is

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dependent entirely upon the distribution of traffic required on the various tracks comprising the crossing and, to some extent, upon the volume of vehicle traffic when the latter becomes a governing factor. The capacity of any given track outside of the limiting points of congestion, viz., the heaviest crossing, is usually so much greater than that of the limiting point as to be negligible in this study. On a clear track unobstructed by vehicles or other obstructing factors, track capacity is actually dependent only upon the maximum free running speed and safe braking distance. While all stops that are made operate to reduce the schedule speed in proportion to their number and duration, the capacity of a given line or route will be finally determined by the maximum regular duration of stop at any point on it.

ELEMENTS OF CAPACITY

The various factors entering into the determination of track capacity or car movement, all of which have received consideration directly or indirectly in this study are principally as follows:

1. Normal method of car berthing employed—single or multiple.
2. Readiness to move on signal; *i.e.*, whether sufficient cars are scheduled so as to be available at the berth.
3. Interference with running or berthing of cars by vehicles in or alongside the track.
4. Interference with cars at crossings, due to vehicle traffic, other cars and pedestrians.
5. Proportion of traffic in various directions—both car and vehicle; *i.e.*, how nearly traffic is balanced at the crossing and the proportion of curve to straight through movement.
6. Personal equation of traffic officers in anticipating movement, in preserving proportionate intervals and in making fullest use thereof.
7. Promptness with which traffic signal is responded to; *i.e.*, the relative amount of delay in starting due to carelessness or inattention.
8. The type of curve or loop employed; *i.e.*, whether inside or outside loop; inside or outside curve, and right or left hand loop.
9. Time required for various car movements at crossings, including the effect of inside curve movements on every signal.
10. Loading time required; *i.e.*, the importance of the particular crossing with respect to the various loading zones.
11. Suitability of car design for rapid boarding and alighting with platform capacity sufficient to absorb the usual groups boarding without excessive delays in collecting fares and making change.
12. Physical capacity of equipment to accelerate and brake at the maximum uniform rate possible without discomfort to passengers.

PHYSICAL CAPACITY OF EQUIPMENT

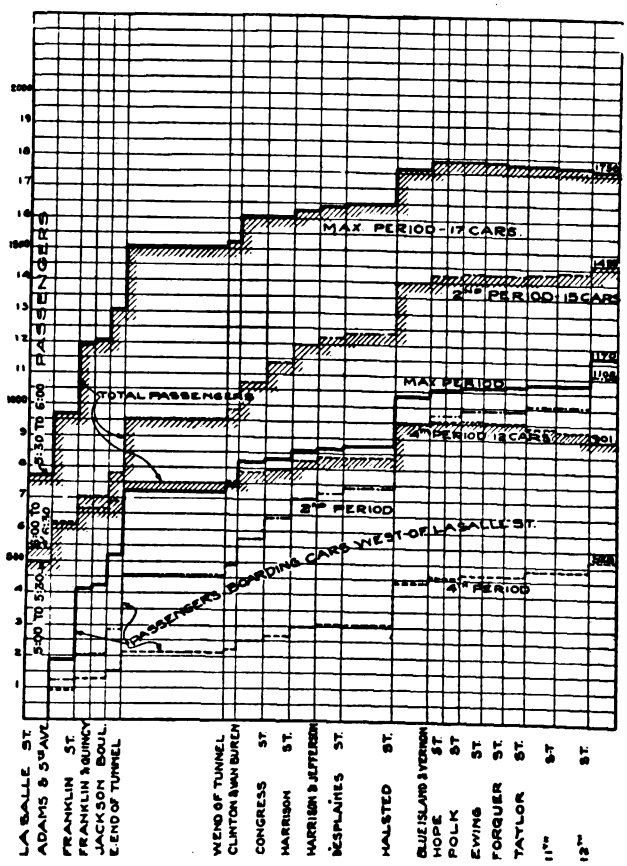
The results of the acceleration tests on typical rush-hour trips and an analysis of loading speed previously made for many different locations indicate that every reasonable effort has been made by the Surface Lines to provide equipment capable of maximum duty. The surface cars now load faster than cars in most other cities and are operating under heavier duty than the elevated rapid transit equipment of Chicago with respect to acceleration and braking. It is only with improvement in other directions that this physical capacity can be made available for maximum useful service.

ENFORCEMENT OF TRAFFIC REGULATIONS

After a study of existing ordinances and observation on the street of their inadequacy and the laxity with which even the present ones are enforced, there appears to be a considerable opportunity for improvement. For example, all car loading berths can be kept free from parked vehicles; multiple berthing of cars can be carried out without obstructions due to intervening vehicles; improper parking of vehicles between blocks can be prevented so as to eliminate much of the "creeping" behind slow vehicles occupying the track; the use of the street for loading merchandise can be prohibited at least during rush hours; and the duration of the signal interval can be roughly proportioned to the pressure of traffic movement in the respective directions and as uniform as possible.

CONDITIONS DUE TO ROUTEING

Equally important with the above is the fact that the particular routeing plan employed has a most direct



This traffic flow diagram indicates that on this route there are as many passengers boarding in the immediate vicinity of Franklin as originate in the loop and shows the advisability of turnback service.

TRAFFIC FLOW DIAGRAM—BLUE ISLAND AVENUE BY HALF-HOUR PERIODS, COUNT OF FEB. 16, 1915

bearing upon the service capacity of the downtown street system. Admittedly, rearrangement of long established terminals may be serious for a time. Nevertheless, such a rearrangement is to a large degree the main source of increased service capacity for the surface lines. A dual responsibility exists between the city and the companies in a proper enforcement of the ordinances on the one hand and the perfection of the routeing plan on the other; neither, unaided, can accomplish the desired results.

The capacity studies have clearly indicated that with a definite routeing plan each line has a point of limited capacity. Any attempt to operate cars at a higher rate than justified by this capacity simply results in piling up surplus cars for one or more blocks until the congestion can be worked out. These critical points usually

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occur where heavy routes intersect with curves. In fact, curve operation, especially with the outside curve, constitutes the weakest point in the routeing system and the source of maximum delay and congestion during rush-hour service. Inside curves at street crossings offer far less obstruction owing to the clearance special work employed. In fact, at certain of the heavy downtown traffic points cars are now permitted to proceed around the inside curve on any signal, with the result that a total movement per track is operated which is considerably greater than possible with even a straight through crossing. This result, however, can only be realized fully when transverse car traffic is so routed as not to interfere with or superimpose upon the inside curve movements, *i.e.*, when the curve movements take place simultaneously in opposite quadrants, and the through cross movement is relatively light. This practice should be encouraged so as to obtain maximum capacity.

Straight crossings occasion very much less delay; in fact, they are a negligible factor except where a very high rate of car movement is concerned.

It may be noted here that the so-called "line delay" at heavy traffic points, due to the whistle signal, may be more apparent than real, for, as a matter of fact, with straight crossings the signal interval may be so adjusted on the average as to permit cars in berth about sufficient time to load and then proceed promptly. The alternate signal system is necessary for vehicle regulation. Therefore, with the near-side stop principle, cars simply may use the signal time for loading and unloading.

INSIDE LOOPS

Where lines intersect, it is extremely necessary to utilize the inside loop around the block, as contrasted with the outside loop; the former, known as the figure 8 or closed loop, crosses itself once but interferes with no other traffic. However, the outside loop, while not intersecting with itself, interferes on curves with other lines of traffic at three intersecting points. Hence, where many routes intersect and other car traffic is encountered, the disadvantage of the outer loop appears.

The one disadvantage of the inside loop, viz., the throat crossing, may fortunately be obviated in many cases by closing the loop on some street outside of the congested district. By thus removing the closing curve outside of the zone of maximum congestion, a terminal system much simpler in operation and quite as effective with regard to loading points is obtained and the track capacity is largely increased.

THROUGH ROUTEING

An analysis of through versus curve movements shows so favorably for the former as to remove any doubt as to the desirability of adopting the through route principle to its maximum practicable extent. This results from the relative time economy of the through movement as compared with a curve movement, even disregarding entirely all other advantages which may be cited in support of the through route plan from the passengers' viewpoint.

If this primary advantage is not admitted in any desired scheme of rerouteing, the function of this study ceases with a statement of how much increased capacity may be derived from the downtown terminal system under present conditions of routeing. But it is believed that such a viewpoint is needlessly conservative because of the fact that the interim growth in traffic, before an adequate rapid transit system can be put into full operation, will practically force a consideration of means of improving existing conditions. The effect of unification and the operation of the surface and elevated lines under one management must not be forgotten, however, when considering this subject.

The following data show actual observed time required for unit car movements on clear unobstructed track only:

ACTUAL OBSERVED TIME REQUIRED FOR UNIT CAR MOVEMENTS ON CLEAR UNOBSTRUCTED TRACK ONLY

	Number of cars each direction	Max. time from building line to clear special work	Av. time used* from curb to clear special work
Straight crossing	1	11 sec.	9 sec.
Straight crossing	2	21 sec.	18 sec.
Outside curve	1	17 sec.	14 sec.
Outside curve	2	27 sec.	24 sec.
Combination outside curve and straight	2	43 sec.	40 sec.
Comparison of straight and curve movement:			
Straight crossing (2 cars each way)		21 sec.	18 sec.
Combination outside curve and straight (2 cars each way)		43 sec.	40 sec.
Lost time due to curve		22 sec.	22 sec.
Lost time per car		5.5 sec.	5.5 sec.
Lost time in per cent of straight crossing time		104.5%	122%

Note—*This unit is an average between time in passing—
(a) From building line to clear special work, and
(b) From fouling point at crossing to clear, practically amounting to time from "curb to clear."

Based on the foregoing data the average time required to operate four cars on a crossing (two in each direction) is as follows:

Straight crossing	18 seconds
Combined outside curve and straight crossing	40 seconds
Lost time due to curve	22 seconds
Lost time due to curve—per cent of straight time	122 per cent

RESERVOIR TRACKS

It is necessary to point out one qualification of any plan adopting universal through routeing in such a special case as now exists in the Wabash Avenue loop. This results from the great advantage of having "reservoir tracks" upon which rush-hour trippers may be "piled up" inbound in order to meet most effectively the sudden demand of outbound rush-hour service. Such a condition exists in Wabash Avenue, due to the preponderance of department stores and office buildings. But the result of this "reservoir operation" is that the average speed of northbound trippers entering the loop just prior to the evening peak is reduced to as low as 2.5 mph., then is increased to normal as the traffic peak is passed.

Obviously, the operation of through routes at normal speed, mixed in with these trippers, becomes impracticable, which fact has an important bearing upon any routeing plan. Both through routeing and "reservoir operation" are highly desirable. When an attempt is made to combine them on one track, one service or the other must be sacrificed. Obviously, for the best results, the service should be separated if possible.

LOADING ZONES

Two important matters may be emphasized here bearing upon car operation in relation to routeing:

1. The danger of reducing too much the number of established loading points in the terminal district, and
2. The desirability of instituting regular rush hour turn-back service as far as practicable on the principle of zone operation.

How serious the first may become, without careful investigation of the actual sources of travel, is illustrated by a recent proposal to shorten all of the west side loops so as to turn at Clark instead of State Street as at present. This case was tested out from actual observations at loading points over the Madison Street line and it was found that turning short in Clark Street would have introduced so long a headway as to limit the service capacity below that contemplated.

It will be immediately apparent that such a move would needlessly inconvenience passengers and also

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would entirely defeat its own purpose by concentrating so much loading in a few points that the extra time required to make up for the slower loading of large groups (which would have to board at these few points) would in all probability so greatly increase the headway as to reduce the capacity of the line below requirements. This, of course, applies mostly to loop or stub lines, but it may also apply to improperly located through routes when the number of loading points provided are insufficient.

TURN-BACK SERVICE

Previous traffic counts (see cut on page 185) have clearly established the fact that on some routes a very large proportion of passengers are picked up outside of the immediate loop district. For this "pick-up" traffic, it is purely a waste of car mileage to operate equipment therefor down through the congested center. Here, turn-back service becomes of maximum usefulness as, for example, Madison and the Blue Island routes where 50 and 67 per cent respectively of the outbound passengers during the maximum are picked up west of Fifth Avenue and west of La Salle Street.

But it should also be stated that such conditions do not by any means exist universally. Each line must, therefore, be studied by itself to determine where turn-back service may be of maximum usefulness.

CAPACITY OF STREET CROSSINGS

After extended observation of the actual traffic movement, under present methods of operation, certain fundamental assumptions are here made as a basis of all calculations of capacity. These are believed to be reasonable in view of the fact that the assumed regulations are to-day in successful operation in other cities. The assumptions follow:

1. Double berthing of cars during time of maximum movement.
2. Cars are always loaded ready to move promptly on signal; *i.e.*, at least two cars will be waiting at any time when the signal is given.
3. At any crossing the total time each street is open is to be approximately proportional to the relative traffic thereon.
4. At the congested crossings, cars using the inside curve are permitted to move on either signal.
5. Excessively long signal intervals to be avoided.
6. All interference with proper berthing by obstructing vehicles to be abolished through enforced regulations herein recommended.
7. Interference between cars and vehicles at crossings, when either or both are moving around curves, to be considered unavoidable.
8. When vehicle movement is unquestionably the controlling factor, the distribution of time between the two streets at a crossing is fixed by vehicle rather than by car traffic.

These assumptions simply accept the principle of the multiple berthing, readiness to move, and abatement of the nuisance of the vehicle interference at loading berths. Unavoidable vehicle interference at crossings is accepted without change.

It does not seem practicable to provide for loading berths, free from vehicular obstructions, for more than two cars, because of the necessary occupation of a portion of the street, for at least temporary parking by automobiles and other vehicles.

In regard to multiple berthing, if a street could be reserved for street car traffic only, it would be reasonable to assume a basis of three or four car berthings ready to move on signal with a corresponding increased capacity in cars per hour.

Thus, if the police regulation of traffic accomplishes results to be anticipated from experience in this and other cities, the burden of delay in downtown operation will be more equally distributed between the city and the railway company.

TYPICAL ANALYSIS

It is well at this point to explain the method of calculating capacity by applying the average units of time actually found to be required for various free car movements to derive the maximum rate of movement expressed in cars per hour, which may be said to be the capacity of the crossing. The following method may appear complicated but in reality it means the building up of a composite result from unit data obtained from observation and analysis of each contributing factor.

METHOD OF APPROXIMATION

Step 1. Observations: (a) Ascertain rush-hour car traffic required on each line converging at the crossing under some uniform service standard. (b) Ascertain the actual vehicle traffic in each and all directions during the corresponding rush period. (c) Determine the average time unit for various car movements free from vehicle obstruction.

Step 2. Calculate the total time for making the required free car movements at the crossing by applying the above time units [1—(c)]. If this total time is one hour or 3600 seconds, the true capacity for free movement then results. But, when a crossing is overloaded, the total time required will be greater than the hourly period. In this case the number of cars is too great and the capacity will then be found thus:

Step 3. Reduce the rate of hourly car flow for each individual movement below that "required" by step 1(a) in proportion to the excess time of "required" movement over one hour. Vice versa, where a crossing is underloaded, the capacity would be greater than the "required" car flow and the operation would be reversed.

Step 4. Reduce the car movement, thus found for unobstructed operation, by an interference factor developed from observation of vehicle interference, to obtain the actual capacity of the crossing under existing obstructions in cars per hour for each movement.

Step 5. Finally, apply an additional interference factor to cover unavoidable irregularities in signal intervals, car dispatching, personal equation of the officer or unusual crossing delays, by deducting arbitrarily at least 10 per cent from the previous capacity figures.

It suffices to emphasize here that this method simply modifies the calculated free movement by an amount sufficient to compensate reasonably for unavoidable vehicle interference. Thus, given the car movement and vehicle movement of a certain intersection, the reasonable capacity of each element of that intersection may be found by this same method.

SERVICE STANDARD BASIS

Thus far no consideration has been given to the effect of different service standards upon the question of capacity of these downtown lines; *i.e.*, all calculations have been based upon existing schedules. In order to determine the possibilities of increase for the future on those lines which have not now reached capacity at some controlling point, it is necessary to assume some service standard as a basis for computing the probable rate of growth of car traffic on the streets.

Service standards have been recommended by the City Council of Chicago, the Board of Supervising Engineers and the Public Utilities Commission of Illinois. It is assumed that the following alternative standards will suffice to indicate the probable range to be adopted

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in the near future under any scheme of practicable routeing:

1. Seventy-passengers per car average during the maximum 30-minute interval of the rush period, as determined for any street line or route at the point of maximum travel.

2. Eighty-passengers per car under the same conditions.

It is assumed that a certain number of cars would be turned back at the boundaries of the Loop district on those lines operating through the congested district in proportion to the amount of local travel clearly originating outside of the Loop. As a matter of fact, the Loop lines have been assigned somewhat more service to take care of the Loop demand than appeared to be called for in the studies of downtown vs. outside or pick-up traffic. This was necessary for practical reasons.

The following section of the report discusses the present and proposed methods of routeing, and this section is followed by the presentation of the observed data on physical and operating problems. These facts of interest will be presented in abstract in a later issue.

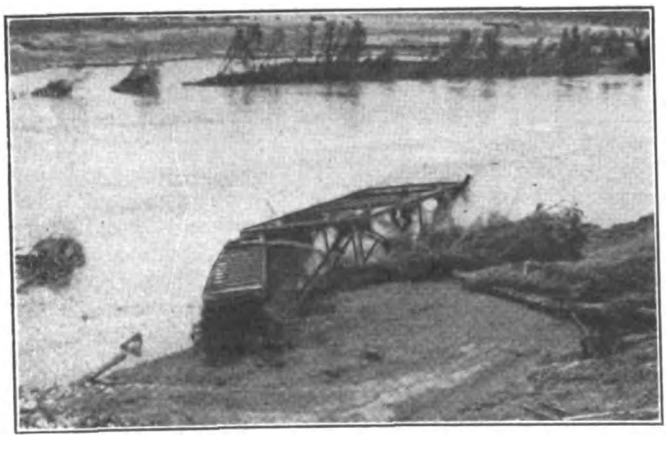
Bridges Destroyed by Flood

Piedmont & Northern and Asheville Electric Roads Suffer Severely from Southern Floods

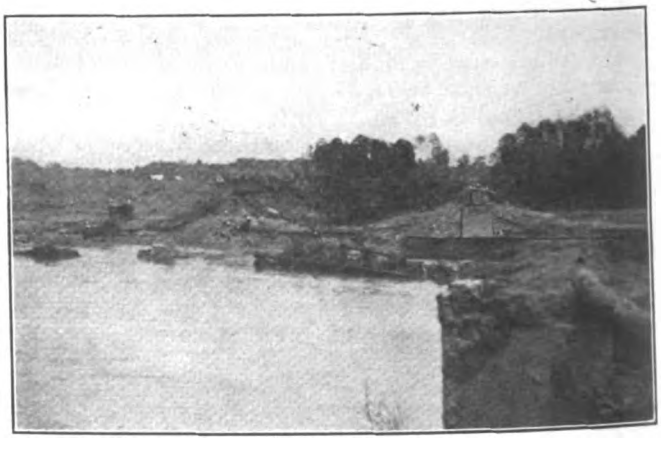
The two upper illustrations show the havoc wrought to the Piedmont & Northern Railway bridge over the Catawaba River near Mt. Holly, N. C., by the floods, reported in last week's issue of the ELECTRIC RAILWAY JOURNAL, which swept through the Piedmont section of the Carolinas. The two lower illustrations show the flooded conditions in different parts of Asheville, N. C., during the flood. The upper right-hand view shows where three bridges formerly stood, the foundations in the right of the picture being those of the Piedmont & Northern Railway bridge. The picture shows part of the ruins of this bridge. The Southern Railway Company bridge at Belmont, N. C., a few miles below Mt. Holly, was also swept away. Six coal cars had been placed on the bridge to save it and a score of men were at work getting the driftwood loose when the bridge finally gave way. Practically every man was drowned. A reinforced-concrete highway bridge at Sloans Ferry was another structure completely destroyed by the flood. It was only two years old and the loss is estimated to be $100,000.

As soon as the water began to recede the Southern Railway Company despatched a steam shovel, three train loads of material and about 500 men to construct a temporary bridge in place of the one destroyed at Belmont. Piles are being placed as rapidly as possible by crews working on both sides of the river, considerable difficulty having been experienced in driving the first few piles, as the water continually washed them loose. Similar work is being done on the Seaboard Air Line and the Piedmont & Northern Railway bridges. Pending the completion of these temporary bridges the railroads have constructed rafts for transporting passengers. Men in row boats are also doing a profitable business in carrying passengers across the river at $1 a person.

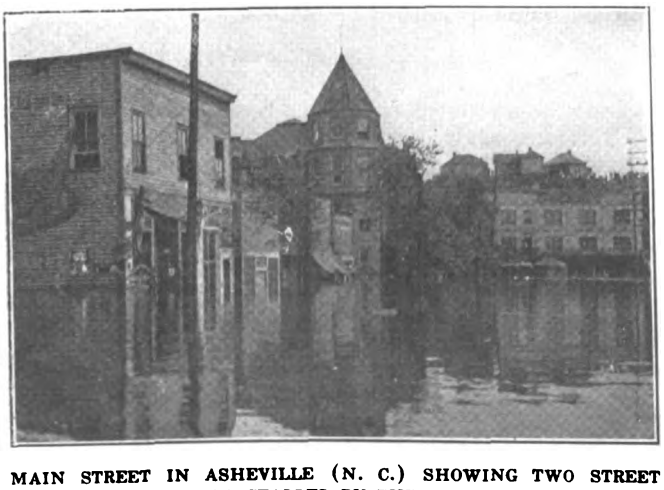
The South Carolina Light, Power & Railway Company of Spartanburg, S. C., was one of the few companies in this section to maintain its full service. Its hydroelectric plant was slightly damaged, but the steam plant was able to carry the entire load.



RUINS OF THE PIEDMONT & NORTHERN RAILWAY BRIDGE AT MT. HOLLY, N. C.



LOCATION NEAR MT. HOLLY (N. C.), SHOWING ALL THAT REMAINS OF THREE BRIDGES



MAIN STREET IN ASHEVILLE (N. C.) SHOWING TWO STREET CARS STALLED BY THE FLOOD

REMAINS OF BRIDGE BETWEEN ASHEVILLE AND BILTMORE (N. C.) WHICH WAS COMPLETELY DESTROYED BY THE FLOOD

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Bay State Company Says Last Word

Submission of Briefs and Final Arguments Now Put Question of Allowing Fare Increases Up to Massachusetts Commission for Decision

Briefs were filed by the opposing counsel at the final hearing before the Massachusetts Public Service Commission on July 24 in the Bay State Street Railway fare case. This case, which was opened on Sept. 2, 1915, involves probably the most elaborate street railway rate problem which has ever been considered by the Massachusetts board. In general the proposed increases, the propriety and reasonableness of which the commission will now judge, cover an increase from 5 to 6 cents as the single cash fare over all lines of the system, which total 955.07 miles of track and serve a population of about 1,351,600, excluding Boston; the sale of nine tickets for 50 cents, receivable for fare in certain localities; the modification of certain existing fare zones and transfer privileges, and the withdrawal of reduced rate tickets other than school tickets. The main points of the company's brief are abstracted below.

INVESTMENT SHOULD BE RATE BASIS

The company maintains that the total outstanding securities (with the exception of $1,994,000 coupon notes) should be recognized as the proper rate base in this case. The remonstrants contended that a portion of the money furnished the property had been provided from income and not by the investors, but R. M. Feustel, expert for the company on valuation, contradicted this on the ground that the cost shown by the appraisal fell short of the securities issued against the property and that the income had never been sufficient to furnish money for the acquisition of new property. Witnesses for the company stated that neither betterments nor new construction were paid for out of earnings, and President Sullivan said that all betterments were capitalized. The actual funds put into the property through security issues amount to more than the original cost figures. The company has never had a reasonable return on its investment, and its maintenance and depreciation expenses since 1893 have averaged 4.95 cents per car mile, or about 24 per cent below the figure deemed necessary by Alton D. Adams, expert for the remonstrants. In case expenditures have been made which could have been capitalized, they have been more than offset by depreciation which has accrued and not been taken out of income.

Although some of the constituent companies paid good dividends at the time of the consolidations and may have made improvements out of earnings, the prosperity of these companies, after the advent of electric operation, was more apparent than real. The Lynn & Boston, for example, though paying 8 per cent dividends, had funded debt outstanding to the extent of three or four times its stock, and the total disbursements of a number of years previous to the consolidations averaged around 5.5 per cent. The bad physical condition of some of the city properties at this time was due to their being reconstructed for electrical operation at an early date. A comparatively high capitalization was to be expected for some of these roads, owing to the high prices for electrical equipment, and other materials prevailing in the early nineties.

The Feustel inventory of physical property was available for checking throughout the entire case. In a report by H. W. Hayes, engineer for the commission, sample checking was made of about 61 miles of track and roadway, including trolley overhead construction. The two inventories checked within 0.5 per cent, Mr. Feustel's figures being the lower.

The difference in overheads, as shown by Mr. Feustel and the company books, was caused in large part by the fact that the Interstate Commerce Commission system of accounts requires that wherever possible such charges shall be assigned to the special overhead accounts only when they can not be assigned elsewhere. If any overheads were paid for out of operating expenses, they were paid for by the stockholders by foregoing dividends or by capitalizing replacements which the public should have paid for. In the last two years alone the stockholders have foregone in the way of dividends considerably more than enough to make up any possible failure to capitalize overheads, and the entire amount has gone back into the property to take care of depreciation.

An extended discussion of overhead charges is included in the brief, with a bibliography of percentage allowances in terms of physical property ranging from 12 to 28.5 per cent. The Feustel appraisal allowed 12.74 per cent of the structural cost or $4,769,000 for all overheads. No opinion evidence was introduced by the company as to the intangible costs incurred, as it was felt that with the full history of the companies before the commission, the question was an economic and legal one for the board to decide.

DIVIDENDS AND DEPRECIATION

The average dividend paid over the whole period by the Bay State constituent companies from 1862 to 1916 was 4.07 per cent; from 1862 to 1900, 3.63 per cent, and from 1900 to 1915, 4.20 per cent. It was urged at the hearings that the payment of any dividend was a return of capital to the stockholder if accrued depreciation had not been cared for. Such a policy has not received commission sanction, although it has been urged in many cases.

President Sullivan explained in his testimony that it was well known in earlier years that the necessity of a greater amount of renewals would increase as the property grew older and that the company would have liked to accumulate a fund. Traffic, however, had failed to develop as expected owing to the automobile, etc., and the failure of revenue together with rising prices had prevented the company from taking care of the full amount of renewals desired in the last three or four years. Yet the directors at all times had carefully weighed the advisability of amounts to be paid in dividends as compared to the amounts to be charged off for depreciation, and declared only such dividends as were thought necessary. At present dividends are practically suspended (only 2.5 per cent being paid in 1915 and 50 cents in 1916).

In view of the sacrifices of the past and future, it is said to be hardly equitable to suggest that depreciation should be deducted from the property value because dividends have been paid. Depreciation has not been deducted in other cases before the Massachusetts commission, even though dividends were paid. In the Manchester (N. H.) case dividends averaging 5.8 per cent had been paid, but the original cost of the property was allowed. Mr. Feustel estimated the annual

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depreciation on the straight-line basis to be 4.41 per cent, the composite life of the depreciable property being 22.7 years and the composite life of the entire property 29.26 years. The annual depreciation on the whole investment is 3.4 per cent.

Taking everything into consideration, the company believes that the total amount of over-capitalization of all the companies would not exceed $1,000,000 and would be more than offset by premiums paid on capital stock. The commission or its predecessor has passed upon securities of the company to the amount of $41,938,400. On June 30, 1916, $46,621,200 in securities were outstanding, excluding coupon notes. The investment cost of the property, including working capital, was fixed by Mr. Feustel at $43,635,365. (See ELECTRIC RAILWAY JOURNAL, Dec. 4, 1915, page 1123.)

RATE OF RETURN TO BE ESTABLISHED

It is not the question of a minimum constitutional rate, but a commercially fair rate, which the commisson has to decide in this case. The board must establish a rate which will insure the ready flow of capital into the industry in order to secure to the public the extensions of the service which their growing needs may require. Massachusetts utilities are in most active competition in obtaining money with utilities in other states. Practically all commissions whose allowances have been investigated by the company allow a rate of 7.5 to 8 per cent. The Wisconsin Railroad Commission habitually allows at least 7.5 per cent. The cost of money has risen with the cost of labor and other commodities, and the investor in the public utility field has been educated by experience to the fact that he cannot expect a profit and must assume a considerable risk. Hence he is demanding a higher return on his money than formerly.

DIFFICULTIES CONFRONTING THE COMPANY

According to the brief, taxes in 1898 took 2.9 per cent of operating revenue and in 1914 6.8 per cent. The ratio of gross earnings to capital investment has increased but slightly in the company's case, from 19.12 per cent in 1901 to 19.60 per cent in 1915. It is extremely problematical whether the necessary increased capital expenditures of the future will better the position of the stockholder. The brief refers to the testimony of C. F. Bancroft, superintendent of motive power and machinery, that it has never been possible to realize any net saving in the cost of power through the installation of additional feeders, for the reason that motormen turn the increased voltage to account in the direction of securing higher acceleration, with the resulting increase of energy consumption.

The brief also mentions the testimony of President Sullivan that while the company wished to establish two repair shops, one north and one south of Boston, no net saving could be secured when the additional capital was considered. He also testified that in general it was impracticable to consolidate car houses, as the dead car-mileage would more than offset the saving which could be effected. Moreover, the anticipated savings resulting from speed increases, as set forth in the report by Bion J. Arnold to the commission, appear impracticable to the company, two-thirds of whose territory is single-tracked. Stops should be eliminated in many places, but in the Bay State territory this cannot be done on a percentage basis. It is very difficult to make valuable use of the time saved on such a system by increased speed, when layovers and single-track conditions are taken into account. It is not believed that the company should decrease service in many cases, as suggested in the Arnold report. Assuming, however, a total net saving of $390,000 along the lines of the Arnold report, the company notes that this is practically offset by the increase in wages due to the labor award, amounting for 1915 to about $345,000.

If the traffic in question is not furnishing a reasonable return (as in various small towns where ticket concessions are made), the wisdom of withdrawing low fares is, it is stated, a problem for the management of the company and not for the commission to consider. The commission has not the authority to prevent the company from raising these unprofitable fares. In So. Pac. vs. I. C. C., 219 U. S. 483, it was held that the powers of the Interstate Commerce Commission did not extend to regulating and controlling the policy of the owner of the railroad in fixing rates and that the commission could not substitute for a just and reasonable rate a lower rate, either on the ground of policy or on the ground that the railroad was by its former conduct in establishing low fares estopped from charging a higher rate where the higher rate was otherwise reasonable.

The brief of the opposition contended that the cost of the system was excessive and criticised the management of the property in general terms.

FINAL ARGUMENT

In his final argument Attorney Jackson declared that the company needs about $2,000,000 more revenue per year; that the only possible increase in revenue is from higher fares, and that public ownership is the only alternative. The company would have been glad many years ago to have discontinued certain unprofitable lines could it have secured permission to do so. Gross earnings have not increased at the rate of wages and material increase. If other street railways in Massachusetts were required to charge off even 3 per cent depreciation in addition to present maintenance, they would be furnishing transportation at less than cost. The Bay State company, the speaker said, is in the same position. The modern policy of regulation is on trial in the Bay State case. From 1899 to 1915 platform wages have increased from 18.6 per cent of operating revenue to 22.6 per cent. The ratio of operating expenses to gross earnings has increased from 61.38 per cent in 1901 to 73.04 at present. Scarcely a street railway company in Massachusetts has adequate financial credit. On the Bay State Street Railway, out of its total capitalization only about $1,000,000 could be classed as water, and a large part of this represents the cost of changing from horse to electric traction. In general, the cost of transportation should be equally shared all over the system.

The safety first problem on the Louisville & Southern Indiana electric lines and the New Albany & Jeffersonville, Ind., city lines, has been reduced chiefly to a question of how to prevent passengers from hurting themselves. Educational work done in the last few years has greatly reduced the disposition of the public to take chances, and it is observed that the character of these casualties is generally minor, although they look bad in the record. The safety work on the system south of Charlestown and Sellersburg, Ind., is under the direction of Harry Hutchens, assistant safety agent of the system. He reports that the records for the first six months of 1916, which have just been made up, show an improvement over the similar period last year. When the system began operating as a whole in 1908 the average for that year was forty-eight accidents a month. The average for the system for last year was eight accidents a month, a reduction of 83 1/3 per cent.

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1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

ASSOCIATION NEWS

1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

Committee on Standards Held This Week—Committee on Electrolysis Met July 21 to Consider Report of American Electrolysis Committee—Exhibit Space Engaged to Date Aggregates 42,000 Square Feet — Company Membership Still Growing Rapidly

Committee on Standards of the Engineering Association

The Engineering Association committee on standards met in New York on July 27 and 28 to consider the recommendations of the several technical committees of the association. The committee members in attendance were: H. H. Adams, Chicago, Ill., chairman; E. B. Katté, New York; Martin Schreiber, Newark, N. J.; J. H. Hanna, Washington, D. C.; C. H. Clark, Cleveland, Ohio; R. C. Cram, Brooklyn, N. Y.; C. L. Cadle, Rochester, N. Y.; C. R. Harte, New Haven, Conn.; A. B. Stitzer, New York (representing J. W. Welsh), W. E. Johnson, Brooklyn, N. Y. (representing W. G. Gove), and J. M. Waldron, New York.

The committee took up first the report of the committee on way matters, discussing the recommendations for revision of specifications for special work and the various materials used in its construction. These revisions were largely changes in form, together with some minor improvements and additions to the text, although a new set of specifications for plain bolted special work was introduced. The revised specifications were approved by the committee as recommended practice. It was decided not to recommend type "C" track construction as a standard design in view of the fact that conditions under which this form of construction is required are exceptional.

The report of a sub-committee on the Engineering Manual was considered, and it was decided to refer this subject back to the committee for further consideration in the light of the facts brought out in the discussion, which was very comprehensive.

The report of the power distribution committee was next considered, and with slight amendments its recommendations were approved, with the exception that it was considered inadvisable to recommend the inclusion of the admirable and exhaustive report on concrete pole design as its extent brought it outside of the contemplated scope of the Manual section on miscellaneous practices.

As this issue of the paper goes to press the committee is considering the recommendations of the block signal and other technical committees.

Exhibit Outlook Good

Secretary Burritt of the American Electric Railway Association reports that the outlook for the exhibit at Atlantic City this fall is very favorable. Up to the present time some 42,000 sq. ft. of space has been engaged by intending exhibitors, and many applications are being received from others, so that it is practically certain now that all the space will be taken up before the convention. The contract for furniture and rugs for the lobby has been let to C. M. Koury Company of Atlantic City, which has had charge of this work at past conventions, and blanks specifying the furniture, rugs and other furnishings desired for the different booths from the Koury Company have been sent to all intending exhibitors. A prompt reply is desired by Secretary Burritt.

Vice-President of Accountants' Association Appointed

The executive committee of the American Electric Railway Accountants' Association has filled the vacancy in the office of third vice-president of the association caused by the death of George G. Whitney, chief clerk Washington (D. C.) Railway & Electric Company. John J. Landers, auditor York (Pa.) Railways, has been appointed to fill out the unexpired term.

New Company Members of Association

The number of manufacturing companies which have joined the association now number 158. The following is a list of those companies which have joined since May 31 and is supplementary to the list published in the issue of June 3:

Acme Supply Company, Chicago, Ill.; Allis-Chalmers Manufacturing Company, Milwaukee, Wis.; American Mason Safety Tread Company, Waltham, Mass.; Anderson Manufacturing Company, A. & J. M., Boston, Mass.; Atlantic Welding Corporation, New York, N. Y.; Atlas Railway Supply Company, Chicago, Ill.

Baldwin Locomotive Works, Philadelphia, Pa.; Bayonet Trolley Harp Company, Springfield, Ohio.

Carnegie Steel Company, Pittsburgh, Pa.; Chicago Varnish Company, Chicago, Ill.; Collier, Barron G., Inc., New York, N. Y.; Commonwealth Steel Company, St. Louis, Mo.; Consolidated Car Fender Company, Providence, R. I.; Cooper Heater Company, Carlisle, Pa.

Davis-Bournonville Company, Jersey City, N. J.; Dearborn Chemical Company, Chicago, Ill.; Differential Car Company, Nashville, Tenn.; Dossert & Company, New York, N. Y.; Duff Manufacturing Company, Pittsburgh, Pa.; Du Pont Fabrikoid Company, Wilmington, Del.

Eclipse Railway Supply Company, Cleveland, Ohio; Electric Railway Improvement Company, Cleveland, Ohio; Ellcon Company, New York, N. Y.

General Railway Signal Company, Rochester, N. Y.; Green Engineering Company, Chicago, Ill.

Heath & Milligan Manufacturing Company, Chicago, Ill.; Holden & White, Chicago, Ill.; Hyatt Roller Bearing Company, Newark, N. J.

Imperial Car Cleaner Company, Newark, N. J.; Indianapolis Switch & Frog Co., Springfield, Ohio.

Jennison-Wright Company, Toledo, Ohio; Jewett Car Company, Newark, Ohio; Johns-Manville Company, H. W., New York, N. Y.

Laconia Car Company, Boston, Mass.; Lincoln Bonding Company, Cleveland, Ohio; Lord Manufacturing Company, New York, N. Y.

Mechanical Rubber Company, Cleveland, Ohio; Midvale Steel Company, Philadelphia, Pa.; More-Jones Brass & Metal Company, St. Louis, Mo.

National Car Wheel Company, Pittsburgh, Pa.; New Haven Trolley Supply Company, New Haven, Conn.; Niles-Bement-Pond Company, New York, N. Y.

Ohmer Fare Register Company, Dayton, Ohio; Oxweld Acetylene Company, Chicago, Ill.

Pratt & Lambert, Inc., Buffalo, N. Y.

Railway Utility Company, Chicago, Ill.; Roebling's Sons Company, John A., Trenton, N. J.; Root Spring Scraper Company, Kalamazoo, Mich.

Sonneborn & Sons, L., New York, N. Y.; Spray Engineering Company, Boston, Mass.; Standard Underground Cable Company, Pittsburgh, Pa.

Trigger Lock Reversible Controller Finger Company, Niagara Falls, N. Y.

Union Electric Company, Pittsburgh, Pa.; U. S. Electric Signal Company, West Newton, Mass.

Western Electric Company, New York, N. Y.; Wilson Corporation, J. G., New York, N. Y.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Steam Shovel with Small Clearance — An Ingenious and Practical Reeling Machine
Geared Door Engine for New York Municipal Railway
Made-Over Open Bench Cars — A "Stunt" for Use with Worn Button-End Axles
Shorter Articles of Interest and Value

Portable Motor-Driven Reeling Machine

BY S. L. FOSTER
Chief Electrician United Railroads of San Francisco.

In the *Street Railway Journal* of June 3, 1905, page 984, there appeared an illustrated article on the above subject describing an appliance that was being used to pull injured lead-covered street railway feeder cable out of the underground ducts in St. Louis and, in combination with a cutting and tearing off device for the lead covering, rapidly accomplishing the double purpose of reeling the insulated conductor up for use elsewhere as overhead feeder and of leaving the lead piled up separately at the mouth of the manhole. This scheme appealed strongly to the United Railroads although they had no lead-covered cable to pull out. As a result the device shown in the accompanying illustrations was constructed at once.

The appliance consists of a condemned Walker 25-hp. single-reduction, 500-volt car motor with a 4.78 to 1 gear ratio. On what corresponds to a 3.75-in. car axle is mounted a steel foot-controlled band brake 12 in. in diameter and 3 in. wide, and a 7.25 in. diameter fixed gypsy drum at one end and another gypsy drum and a six-toothed spur pinion for use with No. 88 sprocket chain or chain belt at the other end. These small drums are sometimes convenient for pulling ropes and straightening out annealed old trolley wire, thereby saving manual or horse power for lowering the filled reels, etc.

The 2-in. shaft on which the empty reel is to be placed is equipped with a 37-tooth sprocket wheel, a reel-driving bar or latch with adjustable dogs or pins for engaging in corresponding holes in the reel, and a suitable set-screwed collar for keeping the reel against the driving bar. It is mounted in inclined, hinged, babbitted, thrust bearings provided with swing bolts and large wing nuts.

The whole mechanism is installed on a 6-in. x 8-in. x 4-ft. x 8-ft. wooden trussed frame with sled ends shod below with ¼-in. sheet iron, and is suitable for being carried on a low four-wheel, two-horse truck or on a flat car. In near-by city work the horse-drawn rig is used, but for country work the appliance is readily transferred intact to a flat car and operated from that location.

The motor is started and stopped by a GE Type K controller and suitable starting resistances and, when reeling up, the strain is held on stops by the foot brake.

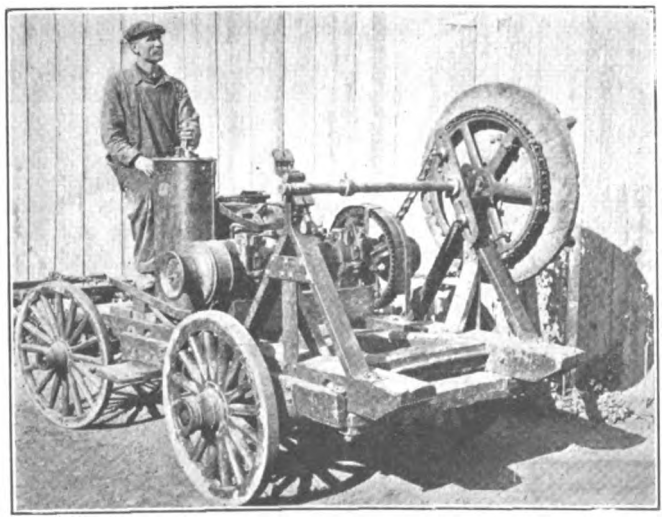
The connection to the trolley wire is made by a hooked pole and to the rail by a weight laid on the latter, though a poorer ground is often more desirable than the rail so as to introduce resistance and hold down the speed, for the appliance is over-motored for most purposes. To protect the mechanism from chance showers it is provided with a heavy tarpaulin cover.

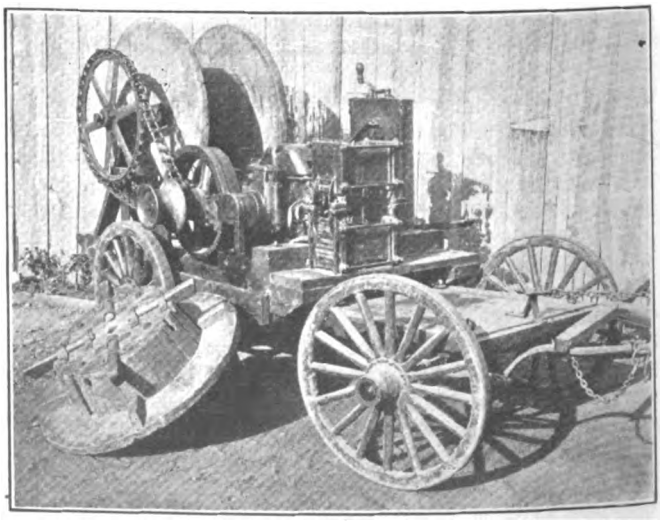
Exclusive of the motor, controller and resistances which were considered about obsolete when acquired, this appliance probably did not cost much more than $150.

During the past eleven years this labor-saving tool has saved its cost many times, being readily used to take down and reel up overhead wires of all sizes and kinds up to 1,000,000 circ. mil triple-braid weatherproof copper. Nothing larger than 1,000,000 circ. mil has been tried, as no cable larger than this is installed overhead in San Francisco. The machine has never failed.

A few months after it was built it became necessary to transfer several miles of 500,000 circ. mil cable from a suburban line where the density of traffic necessary for a certain race track had been found much less than had been anticipated. This line was constructed on a narrow right-of-way over the usual "fills" and "cuts" found on such routes. The use of horses and wagons was out of the question, and even room for setting up the empty reel was lacking.

The illustrated reeling machine was transferred from its wheeled carriage to a flat car, the feeder was cut up in lengths suitable for filling a reel, and the machine rapidly drew it off the cross-arms and turned it out





PORTABLE MOTOR-DRIVEN REELING MACHINE BUILT AND USED BY THE UNITED RAILROADS OF SAN FRANCISCO

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reeled up ready for convenient transportation without interrupting the regular car service. The cost of going 15 miles to this job, taking down and reeling up the cable and bringing it back to the storeyard was $3.50 per 1000 ft. On this length of feeder the saving, compared with the usual expense of taking down and reeling up 500,000-circ. mil cable by hand in city work where there is ample room to handle men and teams on the ground, more than repaid at once the full cost of constructing the reeling machine.

Since then it has been used a surprising number of times with strikingly rapid and efficient results as, for example, in taking down long lengths of 1,000,000-circ. mil cable put up temporarily for special aeroplane exhibits at distant parks; in transferring heavy feeders from one street to a parallel street to escape the necessity of putting them underground or because the franchise had expired and the municipality had constructed a line on the abandoned route; in removing at the rate of 18,000 ft. per day, from among numerous foreign wires on a business street, 20 miles of No. 0000 11,000-volt a.c. cable from 50-ft. and 60-ft. poles where replaced by underground conductors; in transferring conductors from reels crushed in transcontinental transportation to new reels or from one reel to another to secure exact linear measurements in disputes between company and wire contractor; in reeling up spliced-up pieces of conductors, etc.

The facility, safety and speed with which the United Railroads' overhead conductors can be drawn off the poles in long, continuous, reel-filling lengths by this appliance is due principally to the tapered form of brass splicer used on these conductors, descriptions and illustrations of which appeared on page 955 of the Nov. 6, 1915, issue of the ELECTRIC RAILWAY JOURNAL. These double-tapered splicers are slightly, if any, larger in diameter than the weatherproof cable and readily slide over the cross-arms without any attention.

If a feeder happens to be on the end pin of the cross-arm on the track side of the pole with the spanwires attached above the feeders and there are no interfering foreign service wires crossing the street under the feeder, it can be taken down by this appliance without running any risk of the weatherproof insulation being abraded by being dragged over the cross-arms or along the ground. The conductor can be cast off one cross-arm after another as the 25-hp. motor on the machine performs at the same time the double task of driving the wagon or flat car along the street or rails and of snugly reeling up the taut cable.

In transferring feeder cable from one street to another, if the distance is short the reel, still in place on the machine, is hauled to the new location, the cable drawn off and only a single empty reel is required for the whole transfer of miles of cable from pole line to pole line.

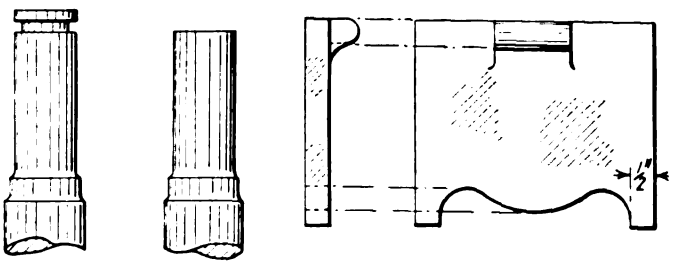
In removing a full reel from the machine the sprocket chain is opened at the key link by a special sprocket-chain wrench, planks are inserted under the flanges of the reel, the slant hinged shaft bearings at either end are opened by the wing-nutted, hinged bolts and the reel and shaft together allowed to slowly roll to the ground or waiting vehicle, the speed being controlled by ropes snubbed around the gypsy drums on the ends of the motor gear axle. When pulling cable off the reel while still in the machine the sprocket chain is cast off.

Even when in the linemen's quarters this reeling appliance is made to earn its interest and upkeep by having a half reel equipped with a 2-ft. diameter taper drum attached to the spokes of the overhung sprocket wheel for making up short handcoils of strand or trolley wire for the repair crews. The galvanized cable comes in mile lengths entirely unsuitable for use on ordinary maintenence work. By means of the reeling machine these mile lengths are cut up cheaply by apprentices into 250-ft. coils ready for the linemen to hang up on their cars or wagons. It should be added that before the outside men get these short coils the strand is given two coats of linseed oil paint by immersion. Trolley wire also is made up by the reeling machine into coils of convenient size for use by emergency men. Four 2.5-in. by 1.5-in. removable oak pegs are inserted around the periphery of the half reel at the flangeless, smaller end of the tapered drum to retain the coil of strand until it has been securely tied, cut off and is ready to remove for painting.

Another Scheme for Reclaiming Worn Button-End Axles

BY J. S. MILLS
Foreman Electrical Department Morris Park Shops, Long Island Railroad

The writer has noted the method used in renewing button-type journal ends by J. N. Graham, master mechanic of the Rockford & Interurban Railway, which was described on page 89 of the Jan. 8 issue of the ELECTRIC RAILWAY JOURNAL, and also the article by A. H. Thompson, carshed foreman Christchurch (New Zealand) Tramway Board, described on page 788 of the issue for April 22. A scheme was tried by the writer some time ago in which the button-end of the axle was cut off and a special check plate was used to prevent end play, details of which are shown in the accompanying illustration.



Journal before and after removing button-end. Redesigned check plate

SKETCHES ILLUSTRATING METHOD USED IN RECLAIMING WORN BUTTON-END AXLES

When the check-plate groove in the end of the journal became worn, the axle was placed in a lathe and the button cut off flush with the inside edge of the check-plate groove. The check-plate was then redesigned so that it fitted up squarely against the end of the axle after the button-end had been cut off. The redesigned check-plate was cast of brass and touched up on an emery stone, thus eliminating the machine work and materially reducing the cost of the check-plate. In order to hold the check-plate down after it was in position a 13 32-in. hole was drilled through the side of the journal box and a $\frac{3}{8}$-in. bolt was inserted. A nut and a lock washer were then put on outside of the journal box

Axles reclaimed by this method have been in use for more than two years with hard service over a rough roadbed, and have given less trouble than axles used with the old-style check-plate.

If it is desired to renew worn button-end axles on small roads when a lathe with sufficient swing is not at hand, these buttons can be cut off with a hacksaw and the ends of the journals smoothed up with a file. This scheme can also be applied to new journals, and will reduce the cost of both labor and material.

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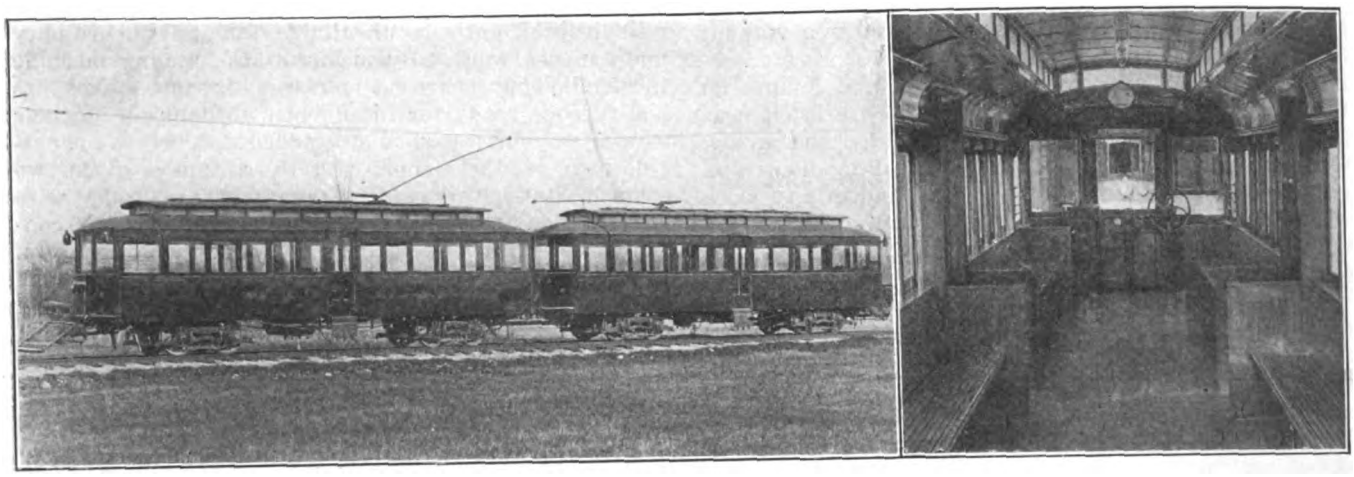

TRAIN OF REMODELED OPEN CARS; INTERIOR OF REMODELED OPEN CAR

Rebuilt Cars for Rush-Hour Service

BY CARROLL H. SHAW
Electrical Engineer Sheboygan Railway & Electric Company, Sheboygan, Wis.

This company has recently placed in daily operation a permanently coupled, two-car train that is made up of two rebuilt Brill Narragannsett open cars. The train is operated between Sheboygan and Kohler, a distance of approximately 4 miles, and is used exclusively to carry workingmen to and from a large manufacturing plant located in the latter village. About 1000 passengers are carried each way daily, and as a majority must be handled before 7 o'clock in the morning and between 5.30 and 6 o'clock in the afternoon, the capacity of the cars that were available before this new equipment was added was taxed to the utmost.

Before these cars were rebuilt they were used only a few hours a year, principally on special occasions such as circus days, holidays or Sundays, and it was felt that if they could be reconstructed to serve throughout the year it would be much better than to purchase additional cars, which would themselves be used but part of the time.

The cars are 41 ft. 6 in. long over all and are 9 ft. 2 in. wide. Each car was equipped originally with fourteen cross-benches, seating capacity, seventy; two 38-hp. No. 401 Stanley motors; Type K-11 control, hand brakes, and Type 27-G Brill trucks with 33-in. wheels. The framing is of wood with 4½-in. x 6-in. sills.

In rebuilding, all of the cross-seats were removed, a new floor was laid, and, with the exception of the openings in the center of the cars for the doors, the sides were sheathed throughout with No. 14 gage sheet steel. The cars are coupled together permanently, 22 control wires being carried between the cars through specially designed terminal blocks which can be opened in case of emergency. The new control is Type K-6, and is arranged for double-end operation. All of the starting grids are located on one car so that in case the train is cut in two one car cannot be operated.

New equipment consisting of straight air brakes, with GE CP-25-C air compressor, and Eclipse Type C fenders has been added. The old trucks, motor equipment and hand brakes have been retained.

The seats are now arranged about the sides of the cars with a total seating capacity of forty. The doors, which are hand operated, have a 27-in. opening, and the three steps are 14 in., 13 in. and 13 in. respectively with treads of 12 in. and 8 in. The doors are single fold. Ten 96-watt Mazda lamps are used in each car for lighting.

The cost of the complete reconstruction is shown in the accompanying table, and represents the full cost of changing the two cars from their original design to the completed two-car train as shown in the illustrations.

Car bodies:	Material	$665.22
	Labor	709.15
Electrical equipment:	Material	211.73
	Labor	59.11
Total		$1,645.21

In its operation the train is giving excellent service, and since the expense of its construction was far below the cost of providing similar capacity by any other means, the officials of the company feel that this method of utilizing old equipment that was still in good condition is an ideal solution for this particular transportation problem. From the operating point of view the important thing accomplished is the more effective use of the equipment resulting from the remodeling

Company Houses on the Norfolk & Western Electrification

The accompanying illustration shows a number of houses which have been built recently by the Norfolk & Western Railway for the accommodation of the employees of the power house and line department at Bluestone Junction, W. Va.

These are modern, eight-room houses with all conveniences, including heat, electric light, etc. There are six new houses in all, in addition to a section house which had been erected some time previous. Four of the houses are now occupied while two are still in the course of construction.

COMPANY HOUSES RECENTLY BUILT AT BLUESTONE JUNCTION, W. VA.

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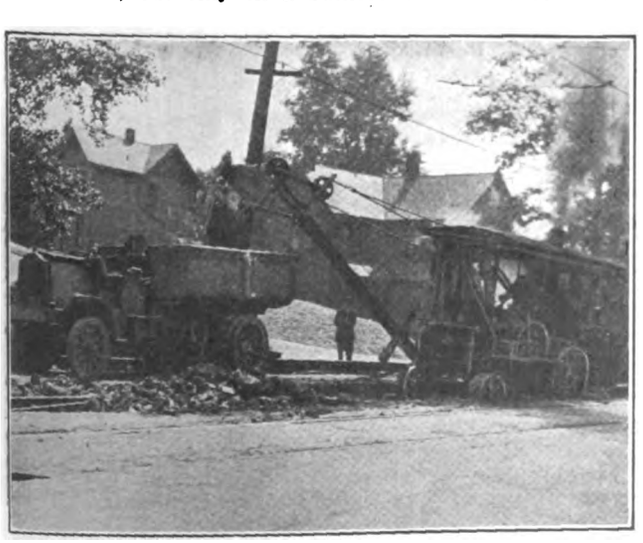
Steam Shovel Requires Only 8-ft. Clearance

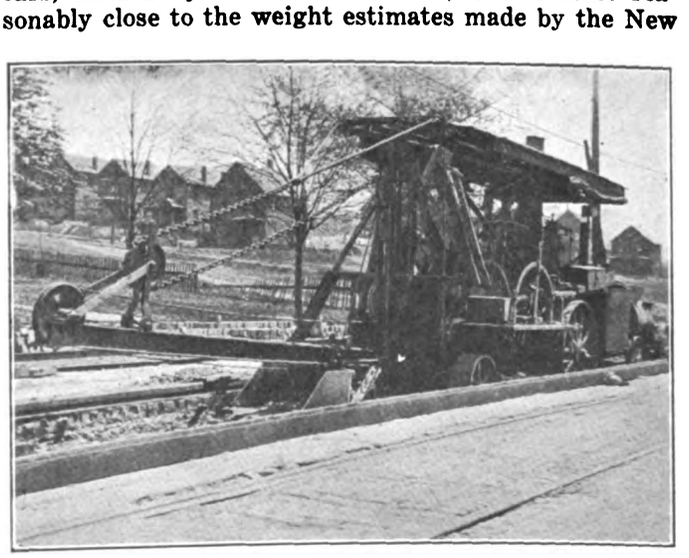
In connection with the rehabilitation of 2½ miles of double track in Youngstown, Ohio, the Stone & Webster Engineering Corporation, in executing a contract for the Mahoning & Shenango Railway & Light Company, employed a steam-shovel tractor which required but an 8-ft. clearance. As shown in the accompanying illustrations, this shovel excavates a 9-ft. trench in rehabilitating a double track, without interfering with the traffic on the adjoining track. The feature of this shovel which makes operation within this limited radius possible, is that the boom is pivoted and swings independent of the power end of the equipment. Another feature of this shovel is that it leaves practically a level trench behind, since the boom, in the excavating position, is lowered parallel with the sub-grade and the shovel advances along the bottom of the trench until the teeth penetrate the material to be removed. When the bucket is filled the boom is elevated and swung over the wagon or truck placed on the clear side of the trench, where the flap bottom is released to dump the material.

This shovel is manufactured by the Keystone Driller Company, Beaver Falls, Pa., and it is operated by two men, one to handle the power end and the other the boom. It is equipped with ½-yd. bucket, which slides back and forth on the boom, its operation being practically the reverse of that for a dragline excavating equipment. In the work done in Youngstown, after the old rails and ties had been removed, no plowing was required, since the direct horizontal pull of the bucket along the bottom of the trench forced it into the material to be excavated. Besides the engineer and fireman, no additional help was required other than the occasional assistance of the track force in case the bottom of the trench became unstable. The shovel is mounted on broad-flanged tractor wheels, and it can move forward with its own power. The wheels are locked in any operating position so that the shovel can resist the backward action of the bucket when loading.

The standard construction adopted for this section of track, which is the main traffic artery of this railway, and serves both the street and interurban railways, includes International steel ties, 134-lb. grooved-girder rail supported on a solid concrete foundation. Brick paving laid on a sand and cement cushion with a tar filler, was also adopted for this work. The steel ties were placed at 6-ft. centers and the concrete foundation took the form of a supporting beam beneath the rails and around the channel ties, but only in a sufficient amount to incase them and form a foundation for the pavement. A tile drain was also installed along the center line of the devilstrip in order to insure a perfectly stable sub-grade. After the rail was laid and fastened to the ties, the track was brought to a permanent line and surface, and the concrete was deposited in place. Temporary joints were applied during the concreting operation, but these were subsequently replaced by Goldschmidt thermit insert welded joints, following which the rail heads were carefully ground to perfect surface.



LIMITED CLEARANCE STEAM SHOVEL IN DUMPING POSITION



LIMITED CLEARANCE STEAM SHOVEL IN LOADING POSITION

The Door Engines of the Latest 250 New York Municipal Cars

The electro-pneumatic door engines for the latest 250 cars of the New York Municipal Railway Corporation reveal the remarkable demands set by present rapid transit operation contrasted with what was considered amply satisfactory little more than a decade ago. In 1903, when the first New York subway was opened, and for some years thereafter, hand operation for doors seemed sufficient. Then came the reconstruction to the center-door type which made power control a necessity, and, finally, the car in which both the end and side doors are power-operated. With each change has come an acceleration in passenger handling which is of the utmost importance on short headway, high-speed lines.

While the New York municipal engineers had the experience of other subway operators as a most helpful basis for study, they had to provide for a distinctly different kind of rapid transit operation with a car of entirely new design and of exceptional length and width (67 ft. x 10 ft.). That one man in the center of the car should be able to control six pairs of doors (three per side) together or singly was perhaps the most novel of the conditions to be cared for. The following paragraphs set forth the specifications and the way they have been met in the National Pneumatic Company's equipment as furnished by the Sayre Company.

DOOR CONTROL REQUIREMENTS

The space available made it necessary to design an engine of greater compactness than had ever before been produced. Another limitation imposed was that of weight. It will be recalled (see ELECTRIC RAILWAY JOURNAL for June 6, 1914, page 1261) that existing elevated structures had been reinforced to carry an axle load not exceeding 30,000 lb. Hence every part of these cars, from body to door mechanism, had to come reasonably close to the weight estimates made by the New

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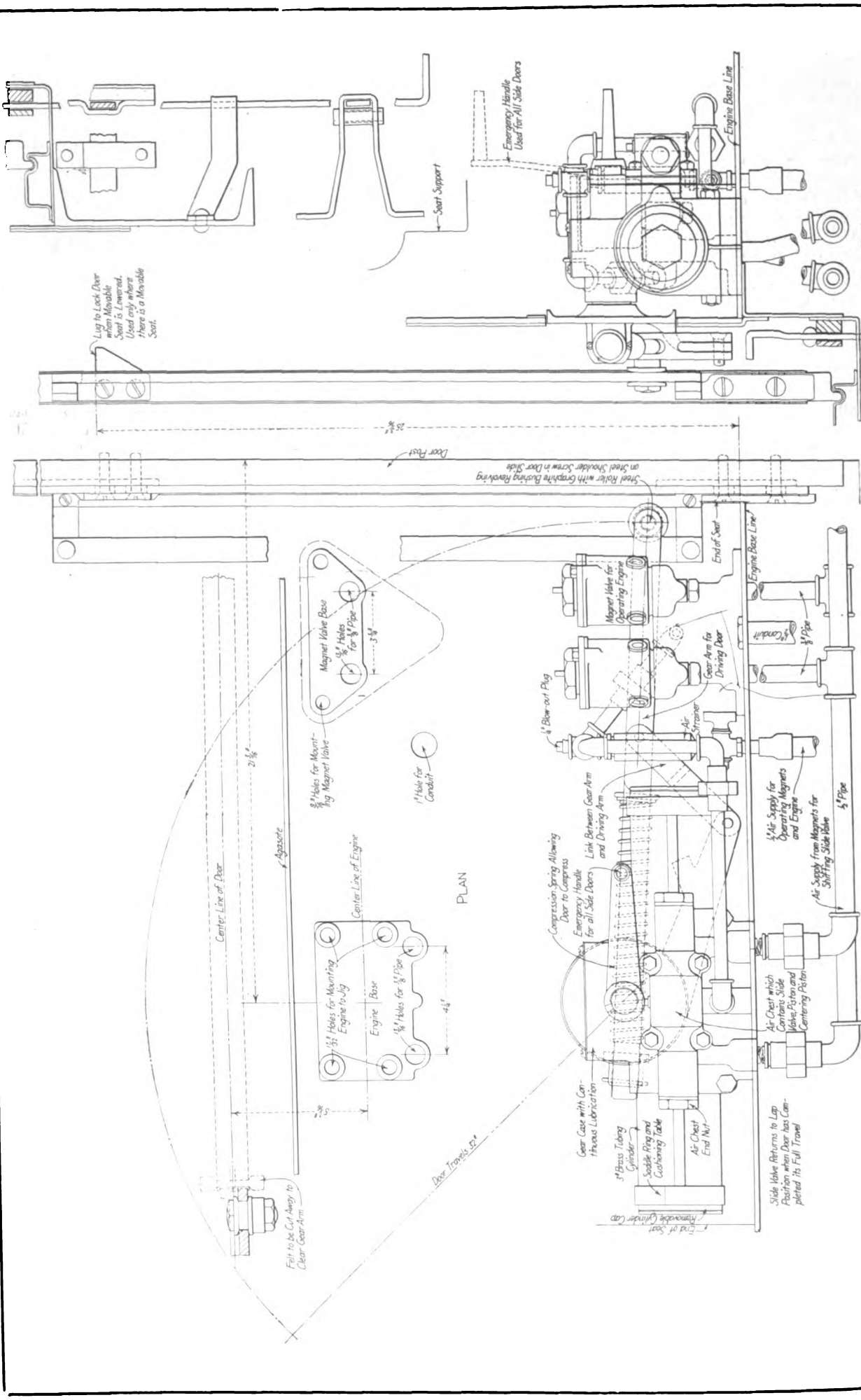

Drawing Presenting Principal Features of Pneumatic Door Engine Used on New York Municipal Railway

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York municipal engineers. Thus, despite the provisions for withstanding vibration and rough treatment by passengers, the fourteen-door engines per car (twelve for the side doors, two for the end doors) weigh only 462 lb. without the piping, and 742 lb. with the piping.

Because of the large number of engines per car, economy in the use of air was strictly enjoined. To guard against all air leakage as far as possible, the valve mechanism of each engine is so arranged that when the door is entirely opened or closed the air supply is cut off at the engine by means of a slide valve, which in turn is operated by small electro-magnetic valves. This slide valve governs the supply of air from the main reservoir. Thus, any possibility of leakage beyond the piston leathers, except while the door is at its actual opening or closing movement, is eliminated. Since this engine exhausts the compressed air, it is possible for a station platform guard to close the door by hand.

Both of the end doors which communicate from one car to the next and all the side doors can be opened mechanically in an emergency. For inside mechanical operation, small handles, located under a seat adjacent to the door, are installed on the main shaft of the engine. These handles are keyed to permit operation in one direction only, being idle until they are picked up. For outside mechanical operation in emergency there is a trigger underneath the car, so connected to the engine arm that the arm can be raised independently of other power.

As one guard operates all the doors on one side of the car and the two end doors from one position at the center of the car, it was necessary to use door engines the valves of which are controlled electrically by means of push-buttons in a push-button group at the center of the car.

The danger that a passenger will be caught in a closing door is avoided by the use of a flexible connection between the door engine and the door itself. This connection allows the door to be forced in an opening direction 5 in. after the door engine has completed its cycle in the closing direction. Consequently, the passenger can remove his arm or foot from the door after it has been closed by the engine. On the other hand, if a door, while closing, is obstructed and brought to rest by such obstruction, the door will not slam when the obstruction is removed, but will continue in the closing direction at its normal speed.

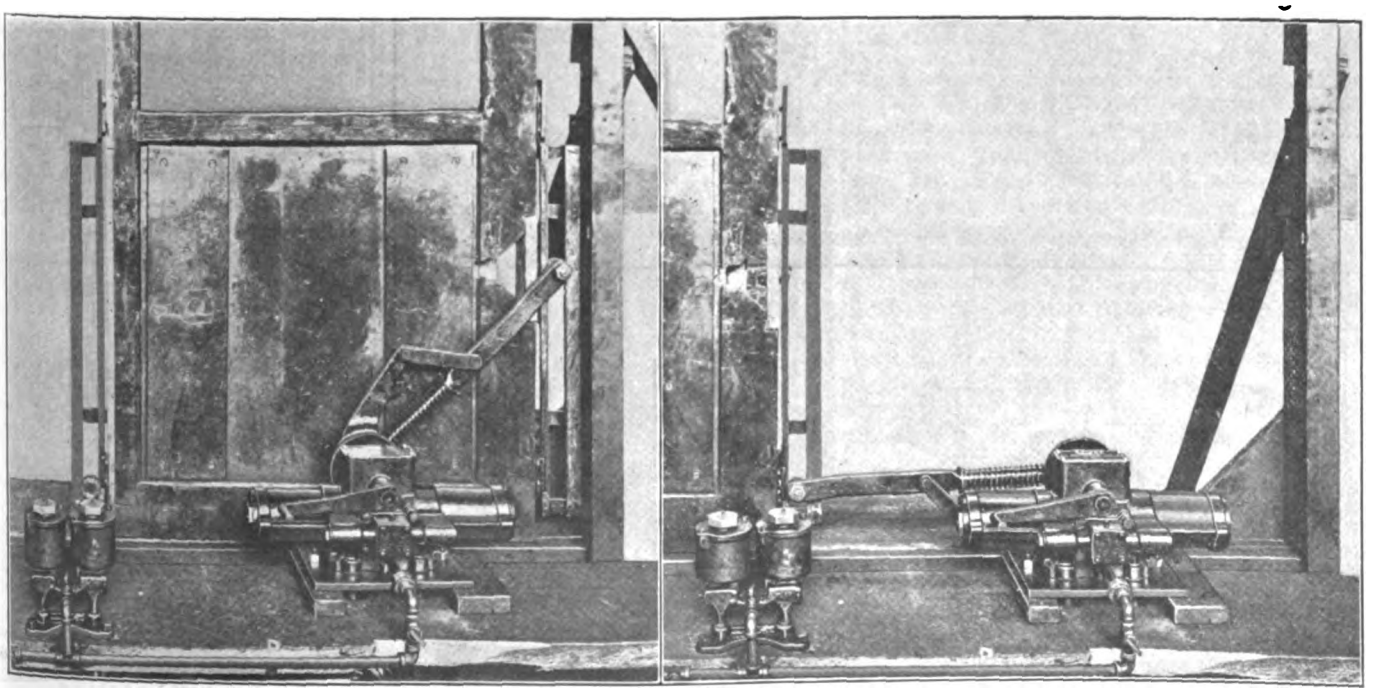
To make the cushioning of the door positive and uniform at all times a non-adjustable cushioning device was built into the engine at the time of manufacture so that the cushioning period could not be changed arbitrarily.

A time limit of one and one-half seconds for opening and two seconds for closing from the instant the control buttons are pressed was established after careful thought as to the fastest speed at which door could be safely operated. This performance is based upon an air pressure between 90 lb. and 100 lb. A variation of 10 per cent is allowed within a temperature range of from zero to 100 deg. Fahr. Should conditions so require, the time limits named could be altered without difficulty. Last winter's operation of the first fifty of these equipments developed no appreciable differences in operation at the summer maximum and winter minimum temperature.

One point in the specification was that the door engine must be capable of making some 300,000 operations between periods of lubrication. These engines are fitted with a central lubricating system which not only lubricates the rack, gear, gear shafts and piston washers, but also the valve and the valve operating mechanism. It is possible to run the engines a much longer period than specified without renewing the lubricants, because all parts run in a continuous bath of grease.

As folding seats are used in front of each pair of doors during the lighter hours of the day, the engines include mechanism for both the mechanical and pneumatic locking of the door behind such of these seats as are in use.

As a substitute for the counterbored cap employed to waterproof the outside ends of armature bearings, a cap made of twenty-six gage tin, costing about one-tenth as much, is now used by the mechanical department of the Kansas City (Mo.) Railway. The tin cap is set over the end of the armature bearing and a special crimping tool is then applied to clamp it in place. In order to fasten the tin cap securely to the bearing, a tapered slot is cut in the bearing near the outside end. The tin cap is then crimped into this slot, where it holds securely until the bearings are renewed.



VIEWS OF NEW YORK MUNICIPAL PNEUMATIC DOOR ENGINE INSTALLED FOR TEST PURPOSES

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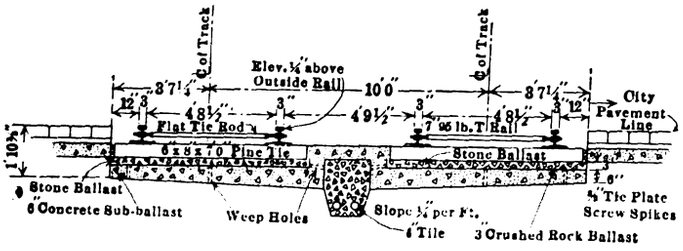
Proposed Milwaukee Track Standards

Track Sections Suggested by the Company Section Are Illustrated

QUESTIONS of operating and engineering standards for the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., are being referred to the various committees of this company's section of the American Electric Railway Association. In the fall of 1915 committees were appointed to investigate and report on the construction of time-tables, schedule speed, roadway, track-zone paving, special work, design of cars, cost of service, rules and regulation, profit-sharing plans, appraisals and employees' co-operative activities.



PROPOSED NEW TYPE OF TRACK SUBSTRUCTURE

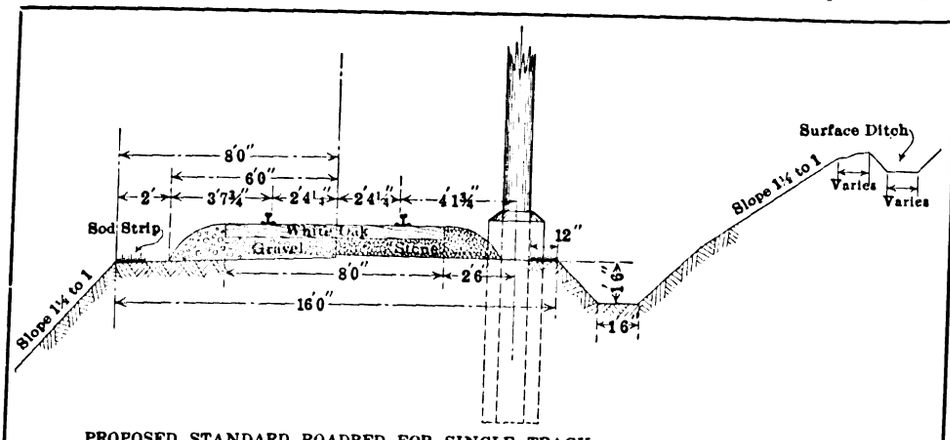
As will be observed, the scope of the work assigned to these various committees includes the more important divisions of the company's railway operations, and each committee is required to make at least two reports during the year. In addition to the foregoing committees, a committee composed of members whose interests cover the various phases of railway operation was also appointed to review the technical press each month. These reviews are mimeographed and distributed among members, and they contain a ready reference of the more important articles appearing in the current issues.

During the year progress reports have been made by these various committees, and in some instances definite recommendations have been made. For instance, the roadway committee has submitted proposed standards for concrete headwalls for cast-iron pipe culverts, a standard highway crossing construction, a standard roadway section for single track on a private right-of-way, for double track in cuts and on embankments. Two types of paved standard track construction for city streets were also recommended, one a plain ballasted construction which has been used quite generally in Milwaukee, and a proposed new type of construction with a concrete substructure and provisions for drainage This standard cross-section and the one for single and double-track roadways on private rights-of-way are shown in the accompanying illustrations.

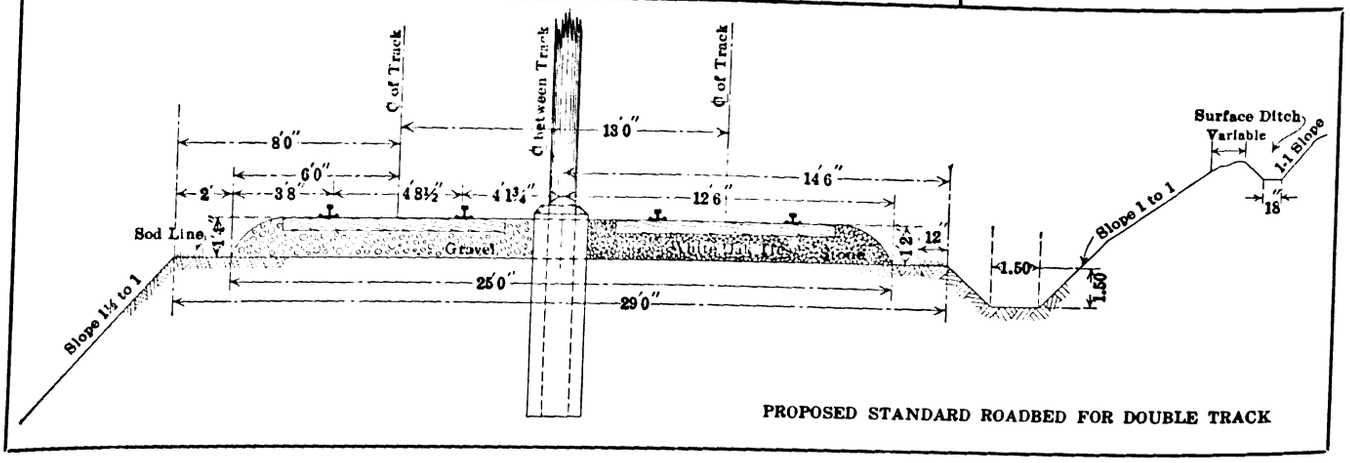
Storage Battery Markers for Emergencies

As a safety precaution the Kansas City (Mo.) Railway carries on each of its cars a tail lamp with a 10-in. red glass lens mounted on the dash and two red markers with 4½-in. lenses. When the trolley energy supply is interrupted the tail lamp and markers are lighted from a 40-amp.-hr. 4-volt storage battery which is automatically cut into the circuit by a small relay. This storage battery is recharged every forty-five days and has not been floated on the line in order to obviate difficulties which might arise on account of a short-circuit. A switch is interposed in the storage-battery circuit so that it may be cut out of service when the car is in storage. This system of emergency lighting has been in service for some time and has proved very satisfactory.

Broken trolley poles are now being fitted with sleeves and welded together with oxy-acetylene for $1.10 each in the shops of the Kansas City Railway Company, Kansas City, Mo. It has been the practice in the past to weld these trolley poles together without a sleeve, but they failed by breaking. The sleeve consists of a 6-in. section of seamless steel tubing with a 3/32-in. wall. The ends of the sleeve are bored out so that they will fit the ends of the trolley pole perfectly. The ends of the broken trolley pole are then slipped into this sleeve and the welding is then performed on a special table fitted with clamps to hold the work securely in position.



PROPOSED STANDARD ROADBED FOR SINGLE TRACK



PROPOSED STANDARD ROADBED FOR DOUBLE TRACK

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NEWS OF ELECTRIC RAILWAYS

STRIKE DECLARED ON NEW YORK SUBURBAN LINE

So-Called Experience Ordinances Add Unusual Complication to Orderly Operation of Cars

The trainmen of the Yonkers Railroad and the Westchester Electric Railroad, which are included in the system of the Third Avenue Railway, New York, are on strike, and no cars are being operated in Yonkers, Mount Vernon and New Rochelle. The strike was declared on Saturday, July 22, after the men who are affiliated with the local Amalgamated union had voted to go out if the company decided not to meet their demands with respect to wages or to arbitrate the differences over the wage scale. The men demanded an increase in pay of 5 cents an hour over the present rate of 25 cents an hour for the first year and 28 cents thereafter. This demand was refused by Edward A. Maher, vice-president and general manager of the Westchester Electric Railroad, acting for that company and for the Yonkers Railroad in the absence of Frederick W. Whitridge, president of the Third Avenue Railroad, who sailed recently for Europe.

Before he left for Europe Mr. Whitridge made an offer to the men of 26 cents an hour for the first year of service, 29 cents for the second, third, fourth and fifth years and 30 cents after five years. The men considered this an unequal increase and rejected it. Mr. Whitridge in a public announcement of an interview with the representatives of the men said that he had increased the wages of the men on the system to the amount upward of $500,000 annually. He said that the situation as to wages had changed materially in the last few years. He therefore proposed to put all men with the exception of those who ran storage-battery cars on the same basis, with pay on the sliding scale previously mentioned. Everything had gone up in price except the rate which the railroad could charge to the public. Hope for the company lay in the exercise of ingenuity, skill, proper work and increased business. Ingenuity, skill and labor could do no more for the company. Increased traffic would help out, but he did not see how it was possible for the company to pay more than it was now doing until there was some possibility of getting larger compensation from the public.

On July 24 the Yonkers Railroad and the Westchester Electric Railroad carried in the daily papers in the territory in which they operate an advertisement which read: "We desire herewith to notify the employees of the Yonkers Railroad and the Westchester Electric Railroad who went on strike on July 22 that all of such employees who report for work on or before July 27 will retain their rate and place to which they were entitled on July 22. After July 27 any former employee applying for reinstatement will, if he is accepted, be re-employed as a new man and will receive the rate and place of a new man."

The situation in the territory in which the companies operate is complicated by the fact that there are ordinances in Yonkers, Mount Vernon and New Rochelle which prohibit the employment of any man as a motorman or conductor on the city lines unless he has fifteen days' experience on these same lines. The ordinances pretend to be measures of public safety. Mr. Maher for the companies stated that the so-called experience ordinances, passed at the request of the unions, were considered by the officers of the company to be unconstitutional, but that the companies were willing to abide by them so long as they remained in force.

In an effort to compel the companies to restore service at once, Corporation Counsel Curran of Yonkers went to Albany on July 25 to demand that the Public Service Commission for the Second District take action toward annulling the charter of the Yonkers Railroad if it did not resume the operation of its lines without delay. Mayor James T. Lennon is said to have approved this demand.

The tie-up of the lines has worked an unusual hardship on the residents of the territory affected. The New York, New Haven & Hartford Railroad and New York & Port Chester Railroad are taking care of the people whose destinations are in Manhattan and the Bronx. The frequent trains on these roads also serve to furnish some sort of local transportation. New Rochelle, however, was completely tied up save for the main line of the New York, New Haven & Hartford Railroad and the New York & Port Chester Railroad.

On July 27 the strike was extended to the lines of the Union Railway, another Third Avenue Railway subsidiary, which operates in the borough of the Bronx. The company was prompt to resume service there.

The Yonkers Railroad and the Westchester Electric Railroad were prompt to issue to the business men and residents of Westchester County a statement giving the facts concerning the questions at issue. This statement, 16 in. by 12 in., was arranged for poster display and was very effectively paragraphed. It follows in part with the paragraphing eliminated for purposes of economy in space:

"The wages of these employees have been increased twice within the past six months. They have made a further request for an increase, which request has been refused by the companies, and has resulted in this strike. Since 1908 these two companies have been operated at a loss of $488,000, or about $54,000 a year. Despite this fact, during the same period, the wages of the motormen and conductors have been increased from 30 to 38½ per cent. During the past week 50 per cent of the men who worked seven days received more than $21 a week, and 17 per cent received more than $22 a week. Statistics published by the American Electric Railway Association, showing the rate of wages paid by fifty-two of the principal electric street railways in the State of New York, show two roads pay a higher rate, five roads pay a maximum rate as high, forty-five roads pay a lower rate than is paid by the Yonkers Railroad and the Westchester Electric Railroad. The officials of the companies feel that they have been more than just to the employees, and the duty that the officials owe to the security holders of the companies will not permit them to grant the unreasonable demands of these men.

"The real reason for this strike is not that the men are dissatisfied with the increased pay allowed, because, at a conference held with the officials of the companies and a committee representing the men, on July 11, the chairman of this committee, Mr. Hoey, among other things, said: 'There is no dissatisfaction among the older men. Of the 477 motormen and conductors employed on the lines of the Yonkers railroad and the Westchester electric railroad, only ninety men have served less than one year, or 19 per cent of the total number. So that 81 per cent of these men are 'older men.' The real reason for this strike is that the officials of the companies decline and refuse to deal with the motormen and conductors, except as employees of the company, and not as representatives of Local 490 and Local 498 of the Amalgamated Association of Street & Electric Railway Employees of America. The whole situation may be briefly summed up in this question: Shall these roads be operated in the interests of the people who have invested their money in them, the general public and of the employees? or shall the employees be permitted to dictate entirely the policy of the operation of the roads?"

Seymour Van Santvoord, chairman of the Public Service Commission for the Second District of New York, announced at Albany on July 26 that every possible effort would be made by the commission to aid in bringing about an early settlement of the strike. He said that inquiries had already been started by the commission and that a conference with the railroad officials would be held within the next few days. The chairman's statement is as follows:

"In its petition under date of July 22 the city of Yonkers, through its Mayor, James T. Lennon, has petitioned the commission 'to compel the Yonkers Railroad to comply with the provisions and conditions of its several franchises granted to it by the city of Yonkers and to run its cars in compliance therewith,' and also for an order compelling the railroad 'to live up to the conditions agreed upon between the

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railroad company and its employees made before the Public Service Commission of this district on Jan. 15, 1913.' The petition alleges that in a similar dispute between the railroad and its employees in 1913 the company agreed that the matter should be settled by arbitration, but that its officers now state that during the absence abroad of the president of the company no one has power to agree upon arbitration.

"On the occasion of a previous strike upon the Yonkers railroad in 1913 this commission very clearly pointed out the considerations which made it impossible for this body to compel an adjustment of the controversy. These considerations were that if the commission made an order directing the road to resume operations the corporation would decline to obey the order on the ground that the so-called fifteen-day ordinance would prevent it from operating its cars by motormen or conductors who had not first received fifteen days' instructions on the street railway lines of the city, fortified by a proper certificate of fitness from a competent instructor. In such case the only redress would be application for a mandamus to compel obedience to the commission's order. Such application would necessarily be denied if the ordinance were held valid, and if the ordinance by any chance were held to be void by the court, after the mandamus should be issued the only course for the company would be to operate its cars by strikebreakers, probably resulting in scenes of violence and possible bloodshed, because of which it would be a sharp question of discretion whether or not the commission should by its order bring about such a deplorable result.

"The commission is advised that the so-called fifteen-day ordinance of the city of Yonkers remains unrepealed. Moreover, under Section 42 of the Railroad Law, railroad corporations are compelled to subject to thorough examination all applicants for positions as motormen or gripmen as to their habits, physical ability and intelligence, and after being satisfied in these respects the corporation is compelled to place such applicants in the shop or power house, where they may become familiar with the power and machinery which they are to control; thereafter they must be placed on a car with an instructor, and after the latter is satisfied as to the applicant's capability for the position sought the fact must be certified to the officers of the company, and if appointed the applicants shall first serve on the lines of least travel. Any violation of these requirements is made to be a misdemeanor.

"Considerations which actuated the commission in 1913 appeal with equal force to the commission as now constituted, and accordingly as the case stands the commission decides that it is without authority to compel an adjustment of the present unfortunate controversy by any order which it may properly make."

Up to noon on July 28, the representatives of the Amalgamated had failed in their attempt to organize the employees of the Third Avenue Railway proper. Inspector Schmittberger of the New York police at first refused to permit policemen in uniform or plain attire to man the cars of the Union Railway. He asserted that he was acting under orders from Mayor Mitchel. After a conference of Deputy Commissioner Law with Police Commissioner Woods, however, a decision was reached to permit 100 policemen in plain clothes to ride on the cars.

TEXT OF UTILITY INQUIRY RESOLUTION

The text of the House resolution on government ownership or regulation of utilities, which has already passed the Senate and will probably have the signature of the President, follows:

"The committee is appointed to investigate also the subject of government ownership of all public utilities, such as telegraph, telephone and express companies, and railroads engaged in interstate and foreign commerce, and report as to the wisdom or feasibility of government regulation and control, as compared with government ownership and operation."

It is expected that hearings will be held by a sub-committee in the fall, and that a full report returned by the sub-committee will be presented to Congress in the first week of January, 1917. The investigation is a part of the general investigation of common carriers under the Interstate Commerce Commission.

LOYAL HARRISBURG MEN RECEIVE INCREASE

Company Refuses to Treat With Men Except as Individuals —Service Resumed in Part

The Harrisburg (Pa.) Railways on July 26 granted its loyal men a wage increase of 2 cents an hour and agreed to certain working conditions requested by a committee of the loyal employees. Fifty-six of the loyal employees met on July 26 at the request of F. B. Musser, the president of the company, and at his suggestion a committee was appointed to stand as a permanent grievance committee. This committee presented a list of suggestions as to a revised wage scale and working condition adjustments, and the company officials after discussing the matter at length agreed upon changes acceptable to the employees' committee. The schedule of changes is as follows:

1. Effective on Aug. 1 rates of pay of platform men will be as follows: First-year men, 24 cents an hour; second and third year men, 26 cents an hour; fourth-year men, 27 cents an hour; five-year men, 28 cents an hour.
2. Suburban men being relieved of their cars at the termination of the day's run, time will be computed exactly at relief on the hour of relief. Suburban crews being relieved of the cars at the carhouse, at termination of the day's work, if fifteen minutes late, will be allowed thirty minutes therefor. Less than fifteen minutes not to be regarded.
3. Passenger stations will be marked by the company by painted white poles and numbered in the suburban districts.
4. Emergency rope will be provided on all cars in case of line down or other emergency.
5. Toilets for the use of the men will be maintained at present locations until necessity may require changes, in which event arrangements will be made immediately for other points.
6. Extra cars crowded out on the Steelton Division due to be relieved at 9.30 p. m. will not be required for foundry work.
7. It is understood that the Fourth Street crew due to be relieved at 11.52 p. m. will not be used for further work on account of Sunday morning schedule.
8. Stools will be provided for the motormen on all cars, and a committee of the employees will be allowed to outline the radius for the use of these stools.
9. Employees agree in furtherance of this that all grievances by them shall be taken up by the company and not with the general public.

Mr. Musser stated to the ELECTRIC RAILWAY JOURNAL representative that the company will continue to refuse to recognize the local division of the Amalgamated Association. Mr. Musser said:

"We shall be glad at any time to treat with our employees as a body through their permanent committee, so long as they owe allegiance only to the company and not to the Amalgamated Association. By no means will we refuse to re-employ such men as have good records. Each application for re-employment will receive separate and individual consideration. We do not for an instant believe that all or even most of the men now on strike are bad. We do think they have been misguided and misled.

"The directors decided not to recognize the union. I alone could not have maintained that stand without knowing the opinion of the directors. It is not the intention of the company to recognize a union, then let the organization run the company at the expense of the convenience of the public in the future.

"The new men on the cars were brought here only because our loyal employees were intimidated after the riots of last Monday night. If the strikers do not return at once we will start to re-crew all of the cars. Every effort will be made to resume normal service on all lines as soon as possible.

"The new men will be kept here for the protection of the loyal employees and the company's property. When they are not needed any more they will leave. As soon as we can man all of the cars for regular service there will be no need to keep them here."

On learning of the increase in wages and the changes in working conditions the strikers announced that a statement would be made the following day.

On July 26 Mayor Ezra S. Meals declared that all jitneys will be run off the streets as soon as the company succeeds

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in operating its cars on regular schedule. The Mayor also declared that recognition or non-recognition of the union should not be allowed to stand in the way of a settlement of the strike.

On July 21 Mr. Musser met a committee of the strikers to discuss the situation. The committee refused to treat with Mr. Musser except as the recognized committee representing Division 709 of the Amalgamated Association. Mr. Musser insisted he would not discuss grievances with any of the employees except as individuals, and the strikers' committee accordingly retired.

Fifteen cars were operated on July 21. They were protected from violence by a corps of seventy deputy sheriffs who patrolled the lines throughout the city. The crowds in the down-town section were much quieter than at any other time since the start of the strike. One of the reasons for the quieting down of the crowds is believed to have been the issuing of a statement by District Attorney Michael E. Stroup in which he announced that he would prosecute to the full extent of the law any person arrested on violence charges. He said further that it was the duty of all citizens to assist in preserving good order and in observing the law.

Mr. Musser declared in a statement to the press that as the laws of Pennsylvania hold the county responsible for the damage done to cars claims will be presented to the proper officials.

On July 22 seventeen cars were operated and partial service to the suburbs was resumed. The jitney situation grew serious, however, and the newspapers rapped the police for permitting overcrowding and overcharging of passengers. Some of the men charged as high as a dollar to take passengers where the street cars ordinarily take them for a nickel. The strikers acted as dispatchers for jitneys throughout the day.

On the evening of July 22, traffic congestion reached its highest point since the start of the difficulties. The cars did not run late and the jitneys were unable to haul the thousands who always come to the central part of the city on Saturday evening. On July 23, twenty cars were operated, but they carried few passengers.

Chairman McLaughlin, for the strikers, issued a statement on July 24 setting out the position of the men. This statement accused the company of taking an arbitrary stand when the committee tried to meet and adjust the situation without a strike. In this statement Mr. McLaughlin said that so far as the street car men themselves and their organization was concerned, they were ready and willing to meet with the company officials to take up the grievances of the men, but they felt that they had as much right to have a man on their committee to represent the association as Mr. Musser had to have an attorney advise him in regard to any steps taken by the company.

On July 25 an incessant rain drove hundreds to ride on the cars, as many of the jitney men took a day off rather than get their cars wet. There was no disorder during the day, but near midnight three sticks of dynamite and a vial of nitroglycerine were found in a switch near Rutherford station on the Hummelstown line, fortunately before a car had crossed the point.

Following a conference on July 27 with Mayor Meals and the City Commissioners, Mr. Musser announced that the company would meet no more committees from the union; that any men who walked out and wished to re-enter the employ of the company would have to make individual application; that enough men had been employed to re-man all the cars, and that regular schedules would be resumed shortly. At this conference Mayor Meals presented a proposed agreement placed in his hands by the strikers whereby the company would agree to meet a committee from Division 709 without formally recognizing the Amalgamated Association. Mr. Musser refused to consider this agreement.

The strikers and representatives of other labor organizations held a parade on the evening of July 27. About 600 men were in line. The crowds were small and orderly and cars were operated until late in the evening. Forty cars were operated throughout the day.

Mayor Meals announced on July 27 that jitneys would received forty-eight hours notification to suspend operation "when we are ready to issue such orders."

HEARING BUT NO ACTION ON NORFOLK FRANCHISES

The Councils of Norfolk, Va., met on July 25 as a committee of the whole to consider the proposed franchises to the Virginia Railway & Power Company. Only two speeches were made in opposition to the franchises. One of these was by the same man who has appeared in opposition to the grants at various mass meetings. He objected to the combination of the railway and lighting franchises, and to limiting to 500 yd. the distance over which a competing company may operate over the tracks of the Virginia Railway & Power Company. He also advocated six tickets for a quarter sold on the cars, stated that gas rates were too high and tax rates too low, and made numerous other criticisms. The other speaker talked along the same lines. The Councils also received resolutions from the Board of Supervisors of Norfolk County asking that no action be taken until expert advice had been secured. They want what they consider their rights protected in matters of taxation and fares, and do not consider that the city has a right to tax the company on earnings on railway and lighting lines in the county.

Henry W. Anderson, general counsel, spoke for the company and stated that the company was not asking for these franchises, but was willing to accept them in their present shape in order to settle differences between the company and the city. He stated that there was no mystery in connection with the franchises, that they had been passed upon by the city attorney and city electrician, and the committee composed of members of Councils and business bodies were familiar with all the details. The meeting adjourned at the conclusion of Mr. Anderson's talk, without taking any action, to meet again at the call of the chairman.

HEARING BEGUN ON CINCINNATI VALUATION

The hearing on the tentative valuation of the property of the Cincinnati (Ohio) Traction Company, as made by the engineers of the Public Utilities Commission of Ohio, was begun before that body in Columbus on July 20. The commission is not satisfied with the company's valuation and the city claims that both the commission's and the company's figures are much too high.

The hearing is the result of an attempt to get at the value of the property for the purpose of readjusting the rate of fare, as provided in the franchise agreement. The commission has placed the value at $24,333,947. The company's engineers claim a value of $35,837,044. Ward Baldwin, the city's expert, fixed the value at $11,969,284.

The company wants credit in its capitalization for the horses and mules that were worn out, the old inclines, cable lines and old horse cars. The superseded property in this item amounts to $5,558,000. It also asks for an allowance of $5,675,236 in return for the division of earnings it has paid the city since the road began operation under the Rogers law grant, and $3,812,481 as interest during construction, discount, hidden costs, cost of omission and construction hazards. According to its estimates, the cost of reproduction of the tangible property would be $27,640,490. The commission's engineers placed the reproduction cost, less depreciation, at about $21,261,000.

Attorneys Lawrence Maxwell and Ellis G. Kincaid, President W. Kelsey Schoepf and Secretary Walter A. Draper represented the company at the hearing. The city of Cincinnati was represented by City Solicitor Charles A. Groom and Engineer Ward Baldwin.

The first witness called on July 20 was A. L. Drum, under whose direction the company's engineers made the valuation. Mr. Drum said he could not answer the technical questions regarding the work that had been done in making fills, cuts, etc., without the complete records and profiles before him. City Solicitor Groom complained because the witness could not give him details. Attorney Lawrence Maxwell arose and said that the examination of Mr. Drum was entirely improper, and that the city was attacking the commission's valuation and it should produce its evidence. Mr. Groom finally desisted but entered an exception to the ruling of the commission that this was the proper procedure. He then called Engineer Ward Baldwin, the city's expert, who testified in regard to an excavation in Eden

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Park. The company's figures showed an estimate of 44,000 cu. yd. of earth that had been moved at prices varying from 50 cents to $1 per cubic yard. Mr. Baldwin's estimate was 37,000 cu. ft. at 30 cents per cubic yard. Mr. Baldwin stated that he had allowed nothing for excavations in Highland Avenue, Harrison Avenue, Vine Street, Warsaw, Wilder, Burnet and Melish Avenues, because the tracks do not occupy them now. He claimed that, under the franchise, the company was to do this work and that the cost was properly an operating expense and should not be charged to capital account. If the allowances are to be made, he insisted that the company's figures are too high.

KANSAS CITY TERMINAL STATION ORDINANCE PRESENTED

The Interurban Central Station Company, composed of property owners, merchants and others, has asked the City Council of Kansas City, Mo., for an exclusive franchise for an interurban union passenger station, to be established, for a period of twenty-eight years, in the block between Ninth, Tenth, McGee and Oak Streets. The station building as projected would be at least six stories in height, 208 ft. by 132 ft., fireproof, and with walls and foundation strong enough to carry at least four additional stories. Interurban roads would enter and use the station as tenants only. They would have no part in the financing of the project. Section 16 of the Kansas City Railways franchise provides for an interurban passenger terminal, and as encouragement toward the building of such a terminal it stipulates that approximately 1 cent of each 5-cent fare paid by interurban passengers at the city limits, whether entering or leaving the city, should go to the station company in lieu of free public use of a commodious waiting room and the conveniences of a modern station. The officers of the Interurban Central Station Company are: C. C. Peters, president; R. A. Long, vice-president; Dr. W. E. Minor, treasurer; W. C. Scarritt, secretary; Scarritt, Jones & Miller, attorneys. The company is chartered under the laws of Missouri. The investment contemplated by the Interurban Central Station Company at Tenth and McGee Streets is approximately $1,500,000. The company, in its franchise ordinance, pledges itself to complete the central station within two years, and as a guarantee offers a bond in the sum of $50,000, to be forfeited if the station be not completed within the time and under the conditions of the ordinance.

EIGHT-DAY STRIKE IN WILMINGTON

The motormen and conductors in the employ of the Tidewater Power Company, Wilmington, N. C., who went on strike on the morning of July 4, returned to work on July 12, in accordance with the terms of an agreement reached through the efforts of a citizens' committee. Before beginning work each man signed an agreement to abide by the conditions of the settlement.

In a statement which he issued during the progress of the strike Hugh Mac Rae, president, said that the company recognized no differences with the men who left its employ on the morning of July 4. They acted voluntarily, declining the invitation of the officers of the company to further conferences after the company had made a full explanation in writing of the position it would be necessary for it to take and had given the men the reason why further concessions were impossible. Mr. Mac Rae said that the company conceded fifteen out of sixteen demands made upon it by the men, but declined the sixteenth because it involved absolutely the question of whether the officials of the company or the men should conduct the management. This was a matter of principle and not open to arbitration. The points which the company was willing to concede were matters of expediency and could have been arbitrated, but the company yielded immediately at the risk of being considered morally weak. Mr. Mac Rae said that while he could not assent to making a vital principle a subject of arbitration he recognized that the support of public opinion was essential to a public service corporation and would, therefore assent to a committee of 100 men considering the question of whether the position of the company was right or wrong. If these men decided that the company was wrong he would resign his position as president of the company, dispose of his controlling interest, and in the future have no connection whatever with its affairs. If, on the other hand, it was decided that the company was right he would expect unqualified public support.

On July 12 Mr. Mac Rae said that in the settlement the officers of the company had yielded not a single principle for which they had contended from the first. The paramount and fundamental issue at stake was one of authority, and he declared that he had never abandoned the position maintained from the beginning that he could not assent to a division of authority with the conductors and motormen at a point where the company was held morally and financially responsible to the public. He stated that he believed in unions, but that he could never agree to share with others the authority that made him and his company solely responsible to the public.

The agreement which each employee signed on returning to work was concluded as follows:

"We understand further that this agreement, after we have accepted positions again with the Tidewater Power Company, is, as far as we are concerned, to be interpreted solely and absolutely by the citizens' committee, and each signer hereto agrees to abide at all times by the decisions of the citizens' committee and through Mr. Noe, its chairman, where powers and authority have been conferred on him."

SHORT STRIKE IN MEMPHIS

The employees of the Memphis (Tenn.) Street Railway went on a strike on July 22 to enforce their demands for the reinstatement of men alleged to have been discharged on account of their union affiliations, to secure recognition of the union, and changes in the wages and the hours of service. The company employs between 600 and 700 men. It operates 124 miles of line and more than 300 passenger cars. The representatives of the strikers claimed that all but 100 men went out.

The strike was of short duration, for on July 23 T. H. Tutwiler, president and general manager of the company, agreed to meet a committee representing the union in amicable discussion of questions of wages, hours of work, and other matters of mutual interest. All men discharged recently will be put back to work. Present or former employees of the company will not, however, be compelled to join the union.

An effort was made in the early part of the evening of July 22 to keep the service going, but by 9 o'clock not a car was moving in the downtown portion of the city, and but few were being run on the outlying line. There were very few reports of violence. Mounted police patrolled the downtown sections in addition to the patrolmen, and, as far as possible, kept the crowd on the move. Little direct attempt, however, was made by the police to prevent the striking employees from closing in on the cars and inducing the crews to quit work.

MR. DOHERTY OBJECTS TO CITY CHARTER AMENDMENT

At a conference on July 19 between the street railway commission of Toledo, Ohio, and Henry L. Doherty, Mr. Doherty objected to the proposed amendment of the city charter intended to give the city the right to purchase the street railway property at any time on the plan that is being formulated by the commission. He said that with the proposed amendments, the Council could at any time put the question before the people and that by pledging the general credit of the city, 20 per cent of the purchase price could be raised through bonds. Mr. Doherty indicated that he would be willing to sell the property at once, but not upon the plan that is being worked out now. He said that the satisfactory plan for an immediate sale would be a contractual relationship. The city could pay the company 80 per cent of the purchase price in bonds and secure the other 20 per cent through an increase in fares. He indicated that the term of five years would be the only satisfactory limit under the plan the commission is working out.

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UTILITY BOARD CREATED FOR NEW ORLEANS

A City Commissioner of Public Utilities and Four Others to Constitute a Local Board with Broad Powers

The General Assembly of Louisiana has passed an act amending the act incorporating the city of New Orleans so as to provide for a board of public utilities for the city. The measure has been signed by the Governor. The board is to be composed of a City Commissioner of Public Utilities and four other members who are qualified electors of the city. The members are to be appointed by the Governor. The term of office of the appointed members is to be four years, but the terms of the first members are to be for one, two, three and four years respectively. The men appointed to the board are to serve without salary unless otherwise provided by the Commission Council of the city. The terms of the members first appointed will date from Aug. 15, 1916.

The board is vested with authority to supervise and regulate the service rendered by all public utilities within the territorial limits of the city of New Orleans, and is authorized to fix reasonable and just rates of charges for the service and commodities supplied by the public utilities, to establish reasonable and just standards of service, to provide for accurate tests of the appliances for measuring the commodities supplied to the public, to prevent unjust discrimination and extortion in rates, charges, prices, fares, etc.

The board is empowered especially to require corporations and other agencies operating street cars or other instrumentalities for the carrying of passengers within the limits of New Orleans to adopt reasonable necessary safety appliances and sanitary regulations, to re-establish and relocate or extend the routes of the street railroad upon such terms as may be mutually agreed upon between the Commission Council and the corporations operating the properties, to require reasonable and adequate street railway service, and to require any public service utility as a condition of its being permitted to engage in business in New Orleans to secure a license, franchise or permit from the Commission Council.

The act says that it shall be lawful for every public service utility to establish a sliding scale of rates, fares or charges, provided that its schedule showing such scale of rates, fares or charges shall have first been filed with the Commission Council and approved by it, and that it shall be lawful for every public service utility to establish with the consent of the Council a scale of charges subject to automatic adjustment in relation to dividends to be paid to the stockholders or the profits to be realized by any single person engaged in a similar business. The Commission Council is empowered to delegate such of its powers and authorities to commissioners in the department of public utilities as may be necessary for the safe carrying out and execution of the purposes and provisions of the new act. The right of appeal to the court by any order of the Commission Council or the board is reserved to the utilities.

In commenting on the act, the New Orleans Railway & Light Company said:

"The directors, officers and management of the company entirely approve of this measure, both in principle and in its specific provisions. By it the company is assured a non-partisan board which will act upon all complaints brought to it by the public, and the board, acting for the public, must determine the justice or otherwise of such complaints. So far as the present law is concerned, we have nothing whatever to fear from it. We are conscious of the fact that the fundamentals of our several services are proof against attack. We are also confident that the company will get a 'square deal' from the board and that is all that we can ask for or should expect."

STRIKE DEMONSTRATION BY SAN FRANCISCO MUNICIPAL RAILWAY MEN

A spectacular but vain attempt to precipitate a strike on the United Railroad lines was carried out in San Francisco, Cal., on July 14 by stalling cars on the municipal lines at Geary and Market Streets in such a position that both of the Market Street tracks of the private company were blocked. The blockade was staged at 5.30 p. m. when there would be the greatest number of people in the streets and the greatest inconvenience to passengers. The municipal cars are equipped with Westinghouse type H emergency brake valves which can be thrown from either platform. Several successive cars were stalled by throwing this emergency brake just as the cars crossed the private company's tracks. It is believed that at least some of the mischief was done by strike sympathizers and not platform men. As the cars collected in the blockade a union organizer who has been active in San Francisco for some time trying to unionize the United Railroad platform men, led a mob in an effort to make the United Railroad platform men strike and leave their cars in the street. This they refused to do, and regular service was resumed in about half an hour. Meantime nine arrests had been made, including three municipal railway employees. At a hearing before the Board of Public Works of San Francisco on July 21 it developed that six municipal railway employees were implicated in the scheme. T. A. Cashin, superintendent of the municipal line, states that when the hearing has been concluded all city employees who have been shown to be involved will be summarily discharged.

M. O. Ordinance Vetoed.—Mayor Napoleon Rice of Roseburg, Ore., has vetoed an ordinance recently passed by the Council providing for the expenditure of $300,000 in the construction of a municipal railroad between Roseberg and Rock Creek.

Cape May Power Plant Destroyed.—The power plant of the Cape May, Delaware Bay & Sewell's Point Railroad, the Ocean Street Passenger Railway and the Washington Street Railway, Cape May, N. J., was practically destroyed by fire on July 21, involving a loss estimated at $100,000.

Cape May Employees Strike.—All the conductors and motormen on the Cape May, Delaware Bay & Sewell's Point Railroad, Cape May, N. J., and the Ocean Street Passenger Railway went on strike on May 20. The men were paid their June wages on July 19, but claimed that their first two weeks' wages of July remained unpaid.

Iowa Road Not Sold.—The sale of the property of the Chicago, Anamosa & Northern Railroad under foreclosure, set for July 11, was not held. It was reported in May that the road would probably be taken over by the Waterloo, Cedar Falls & Northern Railway, electrified and made part of that system. The Waterloo, Cedar Falls & Northern Railway is not now interested in the road in any way.

Chicago Suburban Line Increases Wages.—The Chicago & Joliet Electric Railway, Joliet, Ill., has voluntarily advanced the wages of its employees to the following scale: First six months, 23 cents; second six months, 26 cents; second year, 28 cents; third year, 29 cents; after three years, 30 cents; Chicago division, 33 cents; work car, 31 cents; baggage car, 31 cents; snow plow and sweeper, time and one-half; overtime, rate plus 2 cents an hour.

Philadelphia Suburban Line Increases Wages.—The Philadelphia & West Chester Traction Company, Upper Darby, Pa., has announced that, beginning Aug. 1, the wages of its trainmen will be increased 2 cents an hour and the salaries of all other employees advanced 4 per cent. This is the second increase voluntarily granted by the company to its workers this year. On Jan. 1 trainmen received an increase of 1 cent an hour, and other employees received an advance of 4 per cent.

Louisville Companies Accept Compensation Act.—The Louisville (Ky.) Railway and the Louisville & Interurban Railway have announced that they will accept the terms of the Kentucky Workmen's Compensation Act, passed by the last Legislature and effective on Aug. 1. The company heretofore has been carrying its own insurance of this kind and will continue to do so. No state fund is created by the law, rates only being stipulated and insurance to be carried by commercial or mutual companies.

San Francisco to Have Rapid Transit Service.—With the completion of the Twin Peaks tunnel, which is to be ready for service some time next year, a 10,000-acre residence district tract hitherto without satisfactory transportation accommodations will be brought within twenty minutes of the business district of San Francisco. In a recent report

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stating these facts, City Engineer M. M. O'Shaughnessy urged every effort toward an early settlement of the legal action between the city and the United Railroads, pending the conclusion of which construction of the new rapid transit line will not be possible.

Service Resumed in Logansport.—On July 24 cars were operated at night in Logansport, Ind., for the first time since the motormen and conductors of the local city lines of the Fort Wayne & Northern Indiana Traction Company there went on strike on July 18. No trouble was experienced on July 23. All the cars were operated on schedule during the day. Two policemen rode on each car. At the meeting of the Trades Assembly on July 23 the strike was discussed, but aside from appointing committees to take up the controversy with a view to attempting to get the company and its employees together nothing definite was done. In order to avoid any possibility of further trouble from the hoodlum element when the cars are operated at night, the sheriff has sworn in several more deputies to maintain order.

Stock to Be Sold to United Light & Railways Employees.—The directors of the United Light & Railways Company, Grand Rapids, Mich., have completed details of a plan by which all officers and employees of the company and its subsidiaries will be permitted to subscribe for preferred and common stocks of the company and to pay for them in small installments over a period of two years. Each officer or employee will be permitted to subscribe for from one to ten blocks of the stocks, each block consisting of one share of preferred and one share of common under a guarantee that the cost of each share of preferred shall not be more than $80 and each share of common not more than $55. Subscriptions are not obligatory and any subscriber may surrender his subscription at any time and obtain the amount paid plus 4 per cent interest.

Sale of Tickets on Cars Made an Issue.—The City Council of Seattle, Wash., recently adopted a resolution reviving the question of the sale of tickets on cars of the Puget Sound Traction, Light & Power Company in Seattle. The resolution requests the corporation counsel to advise the City Council whether an appeal may be taken from the order of the Thurston County Court, enjoining the Public Service Commission from compelling the sale of tickets on street cars. In the event that the corporation counsel rules that no appeal may be had, the Council directs him to advise by what method it is possible to obtain an adjudication of the question. Councilman R. H. Thomson, who voted against the adoption of the resolution, said: "It seems to me that to pursue this issue will increase the transportation trouble we have been having the last seven years. The street railway is making not to exceed 3 per cent on its investment. The legislation proposed will further decrease its income and cause transportation difficulties. This thing ought to be left alone."

Jacksonville Rate Case Decided.—In a rate case at Jacksonville, Ill., involving gas, electric, and street railway rates, the State Public Utilities Commission of Illinois, in an order dated July 11, 1916, found the total for present values to be as follows: Gas department, $200,000; electrical department, $190,000; street railway department, $175,000; total, $565,000. The commission found a reasonable and fair rate of return to be 7 per cent per annum upon the above valuations, and found the depreciation which should be set aside annually to be: Gas department, 7.5 cents per 1000 cu. ft.; electric department, $8,500, plus 4 per cent of cost of additions; street railway department, $99,000, plus 4 per cent of cost of additions. Several schedules of rates for gas, electric and street railway service were fixed. In support of its order the commission reaffirmed its position, taken in the Springfield gas case, on subjects such as overhead expenses, depreciation, going value, fair value of the property, rate of return and rate of depreciation. In addition it discussed special features of the Jacksonville case, such as the division of property among the various classes of service. In regard to depreciation the commission stated that it could not hold one rate to exist for depreciation in a property for time that had passed, and another for time still to come, with the date of the rate proceeding the dividing line. The brief of the Jacksonville Railway & Light Company in this case was abstracted in the ELECTRIC RAILWAY JOURNAL of April 15, 1916.

Financial and Corporate

ANNUAL REPORTS

Washington Railway & Electric Company

The comparative income statement of the Washington Railway & Electric Company, Washington, D. C., and its subsidiaries for the calendar years 1914 and 1915 follows:

	1915		1914	
	Amount	Per cent	Amount	Per cent
Gross earnings from operation	$5,191,627	99.57	$5,048,435	99.33
Miscellaneous income	22,328	0.43	33,890	0.67
Gross income	$5,213,955	100.00	$5,082,325	100.00
Operating expenses (including taxes)	3,009,071	57.71	2,863,736	56.34
Net income	$2,204,884	42.29	$2,218,589	43.66
Interest	$1,144,582	21.96	$1,147,534	22.58
Miscellaneous	43,415	0.83	29,583	0.58
Total	$1,187,997	22.79	$1,177,117	23.16
Surplus for the year	$1,016,887	19.50	$1,041,472	20.50

The gross earnings from operation during 1915 showed an increase of $143,192 or 2.8 per cent. Thus, in spite of the general business depression during the year, the company maintained its record of increases for recent years, the explanation being the unique position occupied by the national capital. Miscellaneous income, however, showed a loss of $11,562, and the operating expenses and taxes increased $145,335. But the 1914 figure shown above for operating expenses and taxes includes depreciation for only half of 1914, since the new accounting classification went into effect on July 1 of that year. With the 1914 amount adjusted for this so as to permit a fair comparison, the operating expenses and taxes in 1915 showed a rise of $115,335, or 4 per cent. As a result the net income increased only $16,293 or 0.7 per cent. A large part of this gain was absorbed by the increase in fixed charges, amounting to $10,880, and the year's surplus rose only $5,413.

The percentage of operating expenses, including taxes, to gross earnings in the last fiscal year was 57.96 per cent, as compared to 56.73 per cent in the preceding year. Complete details are not available in the company's annual report in regard to the various operating expense groups, although it is said that the amount disbursed or set aside for maintenance and depreciation of railway and lighting equipment, including way and structures, was $921,939 in 1915 as compared to $853,327 in 1914, and that $274,880 was disbursed or set aside for maintenance of track and roadway as compared with $270,983 in the preceding year.

The extensions and additions to plant, road and equipment during the year involved an expenditure of $523,296, this amount being divided $212,607 for the Washington Railway & Electric Company and subsidiary railways, and $310,689 for the Potomac Electric Power Company. During the last fiscal year, the cars of the system traveled 10,701,755 miles and carried 86,482,956 passengers, of which 20,378,525 were free transfers. The average fare per pay passenger was 4.291 cents, with an average fare of 3.252 cents for all passengers carried, including transfers.

The legal department during the year settled 600 claims at a total cost of $144,402. While the total expense for claims covering accidents and damages was a little greater than in the preceding year, it may be noted that a much larger number of claims was entered, handled and finally disposed of. More than 46 per cent of those litigated were more than three years old, while others dated from 1907.

The company was fortunate in holding contracts dated before the advance in prices, covering the requirements not only of 1915, but for considerably extended periods. A great saving was effected by a contract covering copper wire and cable negotiated at a time of low prices. Similar economies were enjoyed in the line of iron and steel products, such as gears, brake-shoes, car axles and wheels; also coal, lubricating oils and many other classes of material.

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Middle West Utilities Company

The comparative combined earnings statement of the various subsidiaries of the Middle West Utilities Company, Chicago, Ill., for the fiscal years ended April 30, 1915 and 1916, follows:

	1916	1915
Gross earnings	$8,091,148	$7,634,745
Operating expenses, including taxes	5,013,388	4,877,016
Net earnings from operation	$3,077,760	$2,757,729
Rentals on leased properties	191,645	
	$2,886,115	
Bonds, debenture, and other interest charges paid outside holders	1,339,412	$1,307,629
Dividends on stock and proportion of undistributed earnings to outside holders	206,093	310,428
Total earnings accruing to Middle West Utilities Company	$1,315,968	$1,139,672

According to the above statement the combined subsidiary earnings during the last fiscal year gained $456,403 or almost 6 per cent. The net earnings from operation, less rentals on leased properties, were $2 886,115, and the total earnings accruing to the Middle West Utilities Company after payment of interest charges, amortization of discount on securities, dividends on stock, etc., were $1,315,968, an increase of $176,296, or about 15.5 per cent.

Of the above amount of $1,315,968 the following went to the Middle West Utilities Company: Received and accrued as interest on bonds and debentures, $503,069; received and accrued as interest and brokerage on money advanced, $234,994; received and accrued as dividends on stock, $447,175, making a total of $1,185,238. The Middle West Utilities Company's proportion of the surplus carried to the aggregate surplus accounts of the subsidiary companies on their own books was $130,730.

It was not until September, 1915, that any marked improvement in general business conditions was shown. The summer of 1915 was unusually cold and generally unseasonable, causing a marked falling off in the sale of ice and fuel gas, and in passenger receipts on street and interurban railways. At the end of August, the gross income of the subsidiary companies was $107,276 lower for this fiscal year to that time than it had been in the previous fiscal year. To the general improvement in business which immediately followed, the earnings of the subsidiary operating companies responded remarkably well, with the result that their gross earnings for the whole fiscal year substantially increased as indicated.

CONSOLIDATION OF STRICKLAND LINES APPROVED

Formation of Texas Electric Railway Ratified—Details Proposed for Disposition of New Securities

Stockholders of the Southern Traction Company and of the Texas Traction Company at meetings held in Dallas on July 18 formally ratified the action of the directors of the companies in effecting the consolidation under the name of the Texas Electric Railway, recently chartered under the laws of Texas with the purpose of building and operating an interurban railway from Denison through Dallas, Waxahachie, Waco, Austin, San Antonio to Houston. The meeting of the combined interests will be held soon at which officers and directors for the consolidated company will be elected.

The organization of the Texas Electric Railway with a capital stock of $10,500,000 was referred to in the ELECTRIC RAILWAY JOURNAL of July 15, page 117. The $10,500,000 of stock consists of 105,000 shares of $100 each. Fifteen thousand shares are first preferred, 30,000 are second preferred, and 60,000 are common stock. It was stipulated that first preferred stock should bear 7 per cent yearly dividends as a maximum allowance. Similarly, second preferred stock will bear a 7 per cent maximum dividend. Both issues are subject to redemption at 115 per cent of par, plus the accrued dividend. The following disposition of the stock is proposed:

1. First preferred stock of Texas Electric Railway of the par value of $1,400,000 to be placed in the treasury of the Texas Electric Railway ($900,000 par value thereof to purchase, acquire or discharge the existing floating indebtedness of Texas Traction Company and Southern Traction Company and to retire the $500,000 face value of outstanding second mortgage bonds of Southern Traction Company and the remaining $500,000 par value to be used in the future from time to time to make betterments, improvements and extensions to the properties of the Texas Electric Railway).

2. The second preferred stock of Texas Electric Railway of the total par value of $3,000,000 to be delivered: $1,200,000 par value to the Texas Traction Company and $1,800,000 par value to the Southern Traction Company, or offered for distribution among their respective preferred stockholders at this following ratio, namely: $120 par value of second preferred stock of Texas Electric Railway for each $100 par value of preferred stock of Texas Traction Company and $107.206 par value of second preferred stock of Texas Electric Railway for each $100 par value preferred stock of Southern Traction Company.

3. The common stock of Texas Electric Railway of the total par value of $6,000,000 to be delivered, $2,000,000 par value to Texas Traction Company and $4,000,000 par value to the Southern Traction Company or offered for distribution to their respective stockholders at the following ratios, namely: $100 par value of common stock of Texas Electric Railway for each $100 par value of common stock of the Texas Traction Company, and $80 par value common stock of Texas Electric Railway for each $100 par value of common stock of the Southern Traction Company.

4. The Texas Electric Railway upon acquiring the properties of the Texas Traction Company and the Southern Traction Company to issue its first and refunding mortgage gold bonds to the principal aggregate amount of $5,000,000 to be used in funding or discharging present outstanding bonds of the Southern Traction Company to the same principal amount and also to execute a second refunding mortgage to the principal amount of $1,000,000, to be used in discharging bonds amounting in the aggregate to $100,000 of the Southern Traction Company, both of said mortgages to be subject to present outstanding mortgages or deeds of trust of the Texas Traction Company as far as the properties of the Texas Traction Company are concerned.

REORGANIZATION COMMITTEE APPOINTED FOR UNITED RAILROADS

According to a statement issued by Frank B. Anderson of the Bank of California, a committee of San Francisco bankers will prepare plans for the reorganization of the United Railroads of San Francisco. J. W. Lilienthal, president of the company, says that the committee will have the co-operation of officers of the corporation in this work. The committee consists of Frank B. Anderson, chairman; William H. Crocker, Herbert Fleishhacker, I. W. Hellman, Jr., and J. D. McKee. Its function is to protect all holders of the company's bonds and other securities and at the same time to place the company in a sound position as regards its financial matters.

The San Francisco committee was agreed to after several weeks of negotiation, in the course of which four plans for the reorganization of the company were presented by Mason B. Starring, president of the United Railways Investment Company, New York, which controls the United Railroads of San Francisco; Moritz Rosenthal and Benjamin S. Guinness of Ladenburg, Thalmann & Company, New York. It is probable that the $2,200,000 of securities falling due in the next few months, Mr. Anderson stated, will be paid in cash raised by the issuance of bonds junior to any outstanding underlying bonds. Plans have not yet been definitely formulated, but it is hoped that the outstanding stocks and bonds can be cut to one-half the present total. Any plan that is adopted must first be approved by the California Railroad Commission.

Atlanta & Carolina Railway, Atlanta, Ga.—The property of the Atlanta & Carolina Railway will be sold at receivers' sale in Atlanta on Aug. 1. The company owns franchises and right-of-way from Atlanta to Augusta. About 15 miles of the line have been graded and 3 miles of track have been laid, beginning on Confederate Avenue, Atlanta, and extending to the DeKalb County line. R. E. Church, 318 Peters Building, Atlanta, Ga., is acting in the capacity of receiver of the company.

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Chicago (Ill.) Elevated Railway.—The time for the deposit of the two-year 5 per cent notes of the Chicago Elevated Railway with the National City Bank, New York, N. Y., and its sub-depositaries has been extended to and including Aug. 1.

Chicago, Aurora & De Kalb Railroad, Aurora, Ill.—F. W. Cherry, Princeton, has been appointed receiver of the Chicago, Aurora & De Kalb Railroad to succeed J. H. Bliss and William S. Kirby.

Columbia (Ga.) Electric Company.—The Columbus Railroad, all of the stock of which is owned by the Columbus Electric Company, has applied to the Georgia Railroad Commission for authority to issue $630,830 of additional stock of a par value of $20 a share for the purpose of retiring $423,000 of first consolidated mortgage 5 per cent bonds, of which the Columbus Electric Company owns $370,000, and to retire $207,819 of short-term notes, all reported as held by the Columbus Electric Company.

Detroit (Mich.) United Railway. — William Salomon & Company, New York, N. Y., are offering, in accordance with the market, first consolidated mortgage 4½ per cent gold bonds of the Detroit United Railway of 1902 due on Jan. 1, 1932, but callable on any interest date at 105 and interest. Interest is payable in January and July in New York. The authorized issue of these bonds is $25,000,000, and the amount issued $16,270,000.

Fresno (Cal.) Interurban Railway.—The Railroad Commission of California has authorized the Fresno Interurban Railway to issue $149,700 of first mortgage 6 per cent twenty-five year bonds, $10,936 face value of notes and $8,100 par value of capital stock.

International Traction Company, Buffalo, N. Y. — The Public Service Commission for the Second District of New York has authorized the International Railway, the stock of which is owned by the International Traction Company, to issue additional $1,175,000 of refunding and improvement 5 per cent bonds to be sold at not less than 89. The proceeds, together with the proceeds of the $2,395,000 of bonds heretofore authorized, are to be used to pay for the new line between Buffalo and Niagara Falls. The total of refunding and improvement mortgage 5 per cent bonds outstanding, not including the issues just approved, is $12,799,000.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—The Kansas City, Kaw Valley & Western Railway has filed for record a mortgage for $812,500 in favor of the Commerce Trust Company, Kansas City, Mo., as trustee, covering the holdings of the company in Wyandotte, Leavenworth and Douglas Counties. The instrument is not a lien on the property of the company in Shawnee County.

Lancaster & Southern Street Railway, Millersville, Pa.—The Provident Life & Trust Company, Philadelphia, Pa., mortgage trustee, has given notice that Samuel T. Freeman & Company will sell the property of the Lancaster & Southern Street Railway at public auction in Philadelphia on Aug. 15, free from the lien of the first mortgage of 1911 securing an authorized amount of $225,000 of bonds.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—United States Judge Booth at Minneapolis has appointed Charles P. Bratnober receiver of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, generally known as the Dan Patch line. C. T. Jaffray, vice-president of the First & Security National Bank, has been made chairman of the bondholders' protective committee. The bonded indebtedness outstanding amounts to $750,000 owned by the General Electric Company, J. G. White & Company and investors in Minneapolis and vicinity. The bonds held by the General Electric Company were taken by the company for equipment furnished and those owned by J. G. White & Company were accepted in return for engineering services rendered.

Northern Ohio Traction & Light Company, Akron, Ohio.—On July 20 the Ohio Public Utilities Commission authorized the Northern Ohio Traction & Light Company to issue $14,075,000 of bonds. Of this amount $12,000,000 is to be used to retire present underlying securities and the remainder as follows: $387,000 for double tracking the road between Cuyahoga Falls and Bedford, $160,000 for double tracking between Bedford and Newburg, $275,000 in making improvements between Canton and Massillon, $12,000 for extension of tracks in Akron, $175,000 for double tracking the line between Blue Pond and Springfield Lake on the Canton-Akron division, $340,000 for double track work in Akron, $280,000 for high tension wire near Canton, $350,000 for the new terminal building in Akron and $35,000 for the extension of the Mahoning line in Canton to the factory district.

Public Service Corporation of New Jersey, Newark, N. J.—A financial report just issued by the Public Service Corporation of New Jersey shows a gain of $426,816 in total business for June, or 13.8 per cent over the corresponding month of last year. The balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc. — for amortization, dividends and surplus was $570,001. The increase in surplus available for dividends over the corresponding month of 1915 was $173,993. For the six months ended June 30, 1916, the gross increase in total business amounted to $2,387,302, or 13.3 per cent. The balance available for amortization, dividends and surplus was $2,533,767, while the increase in surplus amounted to $610,164.

Tidewater Southern Railway, Stockton, Cal.—The California Railroad Commission has issued an order authorizing the Tidewater Southern Railway to issue $20,000 of first mortgage bonds to be deposited with New Amsterdam Casualty Company, New York, N. Y., in return for a surety bond amounting to $10,000. The railway company desires to issue the surety bond to the Southern Pacific Company in connection with the construction of standard interlocking plant one-half mile south of Modesto previously ordered by the commission.

Toronto (Ont.) Railway.—Seventy-nine 4½ per cent currency bonds of $1,000 each and 305 sterling bonds of £100 each of the Toronto Railway issued under the first mortgage dated Sept. 1, 1892, have been drawn for redemption at par and interest on Aug. 31. Payment will be made at the office of the Canadian Bank of Commerce in Toronto.

United Railways, St. Louis, Mo.—The Missouri Public Service Commission has authorized the United Railways to issue $200,000 additional of its first general mortgage 4 per cent bonds to provide for the retirement of $200,000 of general mortgage 5 per cent bonds of the Southern Electric Railroad dated Aug. 1, 1896, and maturing Aug. 1, 1916.

West End Street Railway, Boston, Mass.—Merrill, Oldham & Company, R. L. Day & Company and Harris, Forbes & Company, Inc., Boston, Mass., are offering at 100.75, yielding about 4.73 per cent, $1,581,000 of three-year 5 per cent bonds of the West End Street Railway dated Aug. 1, 1916, and due on Aug. 1, 1919. Interest is payable on Feb. 1 and Aug. 1 at the office of the Old Colony Trust Company, Boston, Mass. The bonds have been issued in the denomination of $1,000.

Winona Interurban Railway, Warsaw, Ind.—Judge Harman has appointed C. J. Munton, president and manager of the Fort Wayne & Northwestern Railway, Kendallville, Ind., receiver of the Winona Interurban Railway. The appointment was made on the petition of the First Trust & Savings Bank, Chicago, and E. K. Boiset, trustee. They seek to foreclose a mortgage for $750,000 on the Goshen branch of the Winona system. It is alleged that the defendant has defaulted interest payments on the mortgage, dated July 1, 1905, and that $37,500 is due and unpaid. In the ELECTRIC RAILWAY JOURNAL for Oct. 9, 1915, page 779, it was announced that the company had under consideration a plan for reorganization, and that pending the negotiations caused thereby it would not pay the coupons which matured on Oct. 1, a large amount of the bonds having been deposited with the trustee. It was said then that the company had submitted this plan to its creditors with the statement that unless the holders of the bonds then outstanding consented to some plan which would insure the payment of bond interest, the company would be compelled to default on its interest payment, which would undoubtedly mean the disposal of the property at judicial sale.

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DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1 per cent, ordinary.

Bristol & Plainville Tramway, Bristol, Conn., quarterly, 2 per cent.

Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent, preferred; monthly, one-half of 1 per cent, common; 2 per cent, common (payable in common stock).

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Lehigh Valley Transit Company, Allentown, Pa., quarterly, 1¼ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., $1.25, 5 per cent preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ARKANSAS VALLEY RAILWAY, LIGHT & POWER COMPANY, PUEBLO, COL.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June,		'16	$100,107	$55,908	$44,299	.....	.....
1 "	"	'15	94,618	54,983	39,635	.....	.....
12 "	"	'16	1,215,940	681,102	534,838	.....	.....
12 "	"	'15	1,154,516	685,864	468,652	.....	.....

BATON ROUGE (LA.) ELECTRIC COMPANY

1m., May,		'16	$17,765	*$8,266	$9,498	$3,469	$6,029
1 "	"	'15	14,961	*8,761	6,200	2,166	4,034
12 "	"	'16	201,669	*105,681	95,988	33,610	62,378
12 "	"	'15	181,148	*111,446	69,702	25,127	44,575

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., May,		'16	$10,076	*$9,663	$413	$1,101	†$688
1 "	"	'15	9,473	*8,485	988	1,132	†144
12 "	"	'16	118,566	*99,623	18,943	13,338	5,605
12 "	"	'15	120,004	*99,754	20,250	13,426	6,824

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., May,		'16	$30,278	*$20,036	$10,242	$6,548	$3,694
1 "	"	'15	26,611	*16,411	10,200	6,724	3,476
12 "	"	'16	378,587	*222,213	156,374	78,654	77,720
12 "	"	'15	340,033	*207,966	132,067	78,432	53,635

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., May,		'16	$39,296	*$22,551	$16,745	$12,074	$4,670
1 "	"	'15	36,149	*20,357	15,792	10,993	4,799
5 "	"	'16	167,088	*99,543	67,545	56,695	10,850
5 "	"	'15	149,186	*89,483	59,703	54,771	4,932

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., May,		'16	$65,334	*$36,738	$28,596	$8,870	$19,726
1 "	"	'15	58,140	*31,897	26,243	8,713	17,530
12 "	"	'16	781,095	*407,974	373,121	105,923	267,198
12 "	"	'15	672,184	*388,167	284,017	104,205	179,812

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., May,		'16	$25,962	*$15,625	$10,337	$5,351	$4,986
1 "	"	'15	21,897	*12,602	9,295	5,582	3,713
12 "	"	'16	302,353	*167,948	134,405	65,900	68,505
12 "	"	'15	265,217	*170,818	94,399	67,032	27,367

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m., May,		'16	$502,544	*$222,629	$279,915	$219,395	$60,520
1 "	"	'15	462,256	*194,341	267,915	211,778	56,137
5 "	"	'16	2,484,255	*1,080,135	1,404,120	1,073,376	330,744
5 "	"	'15	2,324,163	*971,741	1,352,422	1,056,629	295,793

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., May,		'16	$24,203	*$16,707	$7,496	$7,159	$337
1 "	"	'15	21,926	*14,334	7,592	7,795	†203
12 "	"	'16	299,054	*182,072	116,982	88,807	28,175
12 "	"	'15	295,356	*188,897	106,459	91,803	14,656

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., May,		'16	$23,844	*$13,373	$10,471	$7,710	$2,761
1 "	"	'15	20,789	*11,690	9,099	7,179	1,920
12 "	"	'16	274,438	*152,313	122,125	88,147	33,978
12 "	"	'15	251,397	*156,465	94,932	86,988	7,944

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m., June,		'16	$321,024	*$188,705	$132,319	$72,031	‡$60,495
1 "	"	'15	246,690	*155,948	90,742	55,954	‡35,229
6 "	"	'16	1,933,918	*1,143,437	790,481	381,028	‡381,028
6 "	"	'15	1,456,918	*916,302	540,616	332,302	‡209,078

TAMPA (FLA.) ELECTRIC COMPANY

1m., May,		'16	$72,781	*$46,209	$26,572	$24,394	$22,178
1 "	"	'15	81,422	*42,851	38,571	4,378	34,193
12 "	"	'16	978,851	*519,135	459,716	52,238	407,478
12 "	"	'15	991,480	*509,480	482,000	52,912	429,088

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

APPEAL FOR EMPLOYEE CO-OPERATION

Mr. Fisher of the Chicago, Ottawa & Peoria Railway Appeals to the Men as Their Friend and Co-Worker

F. E. Fisher, general superintendent of the Chicago, Ottawa & Peoria Railway, Joliet, Ill., recently addressed a letter to the employees in which he discussed problems confronting the company of vital interest to all the men in the service. The letter, extraordinarily human in its appeal, was addressed to "My fellow employees," and was signed by Mr. Fisher as "Your friend and co-worker." The communication was inclosed with the pay checks recently. It follows in full:

"Believing that you are interested in anything that concerns our property, I beg to advise that same is not and has never been a profitably operated one from a financial standpoint. It is dependent upon its earnings from freight and passenger traffic for the money that furnishes you and me a living. The ever-increasing use of the automobile, which has undoubtedly come to stay, has further affected our net earnings seriously, making it necessary to find ways and means of increasing the earnings. I am prompted to ask if by a little more thought and attention to our joint and individual duties we cannot advance the company's interests in the way of increased earnings to such an extent as will enable it to continue to increase our wages, improve our working conditions and at the same time establish a standard of service to the public that will bring forth such favorable comment as to make everyone connected with the property feel proud of the fact. I honestly feel that it can and will be accomplished.

"First, let us adopt as our slogan 'Safety First; Loyalty, Courtesy and Co-Operation.' These four words cover a multitude of results obtainable. We must all feel that the company's interests are our own interests. What will help or hurt one will help or hurt the other, and by keeping this fact always in mind and acting accordingly our goal will be reached. Our campaign of safety first has been fruitful in results, so let us continue to perform our duties in a way safe to ourselves, to others, and to the company. Loyalty is one of the greatest virtues of a railroad employee. Always have a good word to say in behalf of your fellow employee regardless of his rank or position, and also for your company. A knock never gets us anything. Courtesy at all times, regardless of conditions, pays better in dollars and cents and in self respect than almost anything else. Every friend we make for ourselves and the company is an asset. Let us pile up the assets. Last, but not least, is co-operation.

"The field that promises to be the most fruitful for increased earnings is that of freight traffic. There are approximately 200 employees in our family, each of whom purchases the necessities of life from the merchants in the various towns in which he lives, and it is only fair and entirely reasonable that these merchants should be requested in a polite and courteous manner to reciprocate and favor our property with shipments of freight, and to travel on our line whenever they conveniently can, rates and conditions being equal with the steam roads. If each of us will constitute himself a committee of one and endeavor at all times to talk to the merchants with whom we deal, and with our friends, asking them for their business, assuring them that we will endeavor at all times to give them the best service possible, there is no question but that the results desired can be obtained. At least it is worth the effort. Whenever you learn of prospective movements of freight or passengers call them to the attention of one of the agents, or take the time to drop a line to the writer. Any suggestions that you have to offer leading to increased earnings or better service will be most welcome.

"Trusting you will accept this communication in the same spirit in which it is sent, I beg to remain,

"Your Friend and Co-Worker."

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NEW HOUSTON JITNEY ORDINANCE CONSTITUTIONAL

Judge J. D. Harvey of the Eightieth District Court held on July 12 that the new jitney ordinance of Houston, Tex., was constitutional. The decision was rendered in the case of the Houston Jitney Association versus the city of Houston. The ordinance requires operators of jitneys to furnish a $2,500 bond. It was to have gone into effect on July 1, but was suspended by a temporary injunction granted on application of the jitney men, who claimed that it was unconstitutional. Following the decision of Judge Harvey upholding the ordinance motion was made for the dissolution of the temporary injunction. This motion was upheld, but the order for its dissolution was suspended pending an appeal which will be made by the jitney men in the First Court of Civil Appeals. The appelate court will not meet until fall. Meantime the jitney men will operate without bond under the terms of the ordinance which was formerly in effect.

In rendering his decision Judge Harvey stated that while in his opinion the ordinance was constitutional, there are about 400 families dependent on the jitney business for their livelihood, and should he be mistaken in his ruling it would cause a great hardship. He stated that for this reason his order would be suspended, virtually holding the injunction in effect pending the decision of the Court of Appeals.

Under the old ordinance jitney men are paying an annual license fee of $72, instead of $36 a year, which the new ordinance provides.

A petition has been filed by the jitney men, bearing the signatures of more than 3000 citizens, asking for the submission to a referendum vote an ordinance prepared by the jitney men.

DETROIT SKIP STOPS SAVE TIME

Electric Railway Service for July 21, published by the Detroit (Mich.) United Railway, contained the following in regard to the saving in time under the recently installed skip stop:

"The first week of the skip stop operation on Woodward Avenue, from Adams Avenue to Log Cabin, and on Jefferson Avenue, from Hastings Street to the limits, is now almost over, and from the expressions of public opinion that have come to us the plan is meeting with the success we felt sure would follow.

"It has been clearly demonstrated already that it is a time saving plan. And that means you benefit through reducing the length of time spent on the cars.

"The average saving, as shown by schedules, on Woodward Avenue between the Cabin and Adams Avenue, is eight minutes. As a matter of fact, the saving is more than that, as under the old plan it was no uncommon thing for the cars to take much longer time than the schedule indicated. Under the skip stop plan the cars have been operating on time. The former Woodward speed was 9 m.p.h.; the new speed north of Adams is 11 3/5 m.p.h.

"The average saving, as shown by schedule on Jefferson Avenue, between Hastings and the limits, is three minutes, but as a matter of fact the saving is six minutes, as new schedules taking that much longer were in the course of preparation to permit of the operation of a large number of trailers, as the old schedule was too fast to be followed. Under the skip stop plan the speed from Hastings west is 11 4/5 m.p.h., as against 10 miles."

B. R. T. Aids Mayor's Cleanliness Campaign.—The Brooklyn (N. Y.) Rapid Transit Company has aided in the campaign against the spread of the dreaded infantile paralysis by reprinting for distribution in its cars and stations the appeal of Mayor Mitchel, dated July 18, to the citizens for co-operation in the movement for minimizing unsightly and unsanitary street conditions.

Wage Arbitration Proposed.—The employees of the Middlesex & Boston Street Railway, Newtonville, Mass., have rejected the company's compromise offer of an increase in wages of 1 cent an hour each year for three years. According to an existing agreement between the company and the employees, the question of the compensation of the employees must now be submitted to the State Board of Arbitration and Conciliation.

One-Man Cars to Be Used in Topeka.—A. M. Patten, assistant general manager of the Topeka (Kan.) Railway, was quoted recently in part as follows: "Light one-man cars are going to solve the demand for quick street car service. The move to adopt one-man cars is country-wide. Automobiles have revolutionized street car transportation. With the one-man cars we can run two cars practically at the cost of one big one. Car works are developing the new type. Topeka has been using cars weighing 11 and 12 tons. New cars are being built weighing only 5 or 6 tons which carry as many or more people."

One-Man Cars for Tacoma.—L. H. Bean, general manager of the Tacoma (Wash.) Railway & Power Company, recently reported that about Aug. 1 his company will place in operation several one-man cars. Some of the cars will be double-end and some single-end. The first car will be placed in service on the Jefferson Avenue and Pacific Avenue lines. The one-man car will also be used on the Sixth Avenue line to give a rapid rush-hour service. Instead of four ordinary cars during the day, eight of the new ones will be placed on the run, and instead of eight ordinary cars during the rush hours twelve to sixteen of the new light cars may be used, giving a service of a car every four or five minutes. The cars are being built in Tacoma shops under the direction of Superintendent Kurt C. Schluss.

Jitney Ruled From San Francisco Business District.—The Board of Supervisors of San Francisco, Cal., on July 17 ruled jitney buses off Market Street between Fremont and Sixth Streets from 10 a. m. to 4 p. m. The ruling is to take effect in about two weeks. The board further decided that not more than 700 jitney bus permits would be issued for Market Street runs, that each must follow only its specified route and must go to terminal on each trip, that the police shall establish not more than two points in each block on each side of Market Street and that passengers may be taken on and discharged at such points only. Finally, jitney permits will be issued hereafter only to citizens of this country. The main shopping and business district is located on Market Street between the streets from which the jitneys are excluded.

Portland Accident Figures for Six Months.—According to the semi-annual report of Harry P. Coffin, chairman of the public safety commission of Portland, Ore., six persons were killed and 187 injured in Portland during the six months ending June 30. Five of the fatalities were caused by automobiles and the sixth by a street car. Of the 187 injuries, 148 were due to automobile accidents, twenty-one to street car mishaps, three to interurban car accidents, and six to coaster accidents. Two hundred and fifty-six automobile accidents were reported. Of these sixty-nine were classed as unavoidable, and 152 as due to carelessness. There were eighteen collisions between street cars and automobiles and three between street cars and other vehicles. A total of 2103 traffic violations is listed, of which sixteen were due to intoxicated drivers, seventy-two to reckless driving, 480 to speeding, and seventy-six to passing street cars while taking on or discharging passengers.

Vancouver Passenger Figures Compared.—The traffic figures of the British Columbia Electric Railway, Ltd., Vancouver, B. C., for June show the first decrease since Jan. 1 as compared with the corresponding period last year. During June 2,207,206 passengers were carried on Vancouver and suburban lines, as compared with 2,249,951 in June, 1915, a decrease of 42,745. At the same time, the amount paid to the city has gone up from $2,700 in June, 1915, to $3,121 in June, 1916. During the first six months of 1916 the company carried 13,580,993 passengers, as compared with 12,023,413 in the first six months of last year. In commenting on these figures W. G. Murrin, general superintendent, said: "We are giving better service now than we were this time last year, although our policy then was to provide the maximum number of cars that we could under the circumstances. During June, 1916, 564,907 car-miles were operated, as compared with 557,072 car-miles in June, 1915. This increase has taken place when people want the service and means actually more than appears from the bare figures."

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Personal Mention

E. T. McMurray, formerly secretary of the Petaluma & Santa Rosa Railway, Petaluma, Cal., has been elected president of the company.

W. R. Childers has been appointed superintendent of the lines of the Southern Public Utilities Company at Greenville, S. C., to succeed W. R. Brewton, resigned.

C. Harms has been elected secretary of the Petaluma & Santa Rosa Railway, Petaluma, Cal., to succeed E. T. McMurray, who has been elected president of the company.

J. K. Brassill has been appointed superintendent of motive power and marine equipment of the Northwestern Pacific Railroad, San Francisco, Cal., to succeed R. J. Quintrel, who had the title of master mechanic.

Roy Alexander has been appointed superintendent of railways of the Central Illinois Public Service Company, Mattoon, Ill. He succeeds W. M. Brown, who resigned to become connected with the Seattle, Renton & Southern Railway, Seattle, Wash.

H. H. Vreeland, director of welfare of the Interborough Rapid Transit Company and the New York (N. Y.) Railways, has contributed to the industrial welfare number of *The Modern Hospital*, an article on welfare work by public utility corporations.

Joseph A. West, formerly chief engineer of the Ogden (Utah) Rapid Transit Company and the Ogden, Logan & Idaho Railway, has been appointed chief engineer of the Sumpter Valley Railroad of Oregon, and will have charge of the survey and construction of several important extensions into the timber country.

W. R. Brewton, superintendent of the lines of the Southern Public Utilities Company at Greenville, S. C., has resigned from the company. He became connected with the company as a clerk. He was later made bookkeeper and afterwards transferred to the operating department of the railway system.

G. H. Wilson has been appointed auditor of the Evansville (Ind.) Railways to succeed G. L. Ford, resigned. Prior to taking this position Mr. Wilson was a public accountant, in which work he had wide experience. He was born and educated in Indiana and began work as a teacher in the public schools. Later he became connected with commercial work as an instructor in accounting, after having made a special study of this subject.

B. L. Martin has resigned as superintendent of the line department of the Georgia Railway & Power Company, Atlanta, Ga. Mr. Martin has been in the employ of the corporation and its predecessors for twenty-seven years. His former duties will be distributed among T. F. Johnson, superintendent of transmission; E. P. Peck, superintendent of tests and repairs; A. C. Wilson, superintendent of drafts and records, and H. L. Wills.

W. S. Rodger, Detroit, Mich., has been appointed general traffic manager of the Detroit United Lines, the appointment to take effect on Aug. 1. Mr. Rodger will have supervision over the freight, express and passenger business of the company. For the past seven years he has been assistant to E. D. Bronner, general manager of the Michigan Central Railroad, with headquarters at Detroit. Prior to that time he was successively engaged with the Michigan Central as clerk, agent at Joliet, traveling freight agent in the territory west of Chicago and commercial agent at Toledo.

OBITUARY

William A. McGovern, general manager of the Northern Electric Railway, Chico, Cal., died suddenly on July 15 at his cottage at Emerald Bay camp on Lake Tahoe. Mr. McGovern was formerly superintendent of the Oregon Short Line, with headquarters at Pocatello, Idaho. He was a native of Ontario, Can., and was fifty-five years of age.

J. P. Reiss, vice-president of the Sheboygan Railway & Electric Company, Sheboygan, Wis., died suddenly in that city on July 21. Mr. Reiss was connected with the C. Reiss Coal Company, Sheboygan, and was well known throughout the Central West. He and his associates took over the railway and light properties in Sheboygan several years ago from Eastern interests.

Max T. Kirschke, Sr., Chicago, Ill., died on July 18, after a short illness. For nearly four years Mr. Kirschke was a member of the sales force of the Chicago office of the Baldwin Locomotive Works and the Standard Steel Works. He was formerly in the engineering department of the McGuire Cummings Manufacturing Company and the Pullman Company, at Chicago and Pullman.

W. R. Patterson, formerly plant engineer of the Western Electric Company, Chicago, Ill., and since his retirement from the company seven years ago a member of the consulting engineering firm of Patterson & Davidson, Chicago, died on July 19. Mr. Patterson was born at Effingham, N. H., in 1854. In 1876 he was graduated from Dartmouth College. Mr. Patterson entered the employ of the Western Electric Company as a paymaster in 1877 and later he was assigned to make a study of cable manufacture, and out of the years which he devoted to this, finally developed "Patterson" cable, which for many years was generally accepted in the electrical industry as the term descriptive of lead sheath cable.

BIDS CALLED FOR INSTALLING TRACK IN BROADWAY SUBWAY

The Public Service Commission for the First District of New York has set Aug. 10 as the date for the receipt of bids for the installation of tracks on that portion of the Broadway-Fourth Avenue subway system between Fifty-ninth Street and Seventh Avenue, Manhattan, and Flatbush Avenue Extension at Prince Street in Brooklyn. The contract will also include the installation of tracks on the Canal Street connection between Canal Street and Broadway and the Manhattan approach of the Manhattan Bridge. This is the line which gives the Brooklyn Rapid Transit Company, through its New York Municipal Railway Corporation, the contracting company, thoroughfare into the heart of Manhattan. In all, the contract covers the installation of tracks on fifteen sections of subway work, some of which are already entirely completed and some of which are approaching completion. The commission has also let the contract for station finish from the Battery to Fourteenth Street on this line and work is well advanced. The track work is to be let in three divisions, all in one contract. The first division begins at Fifty-ninth Street and Seventh Avenue and extends southerly down Broadway, under Union Square and down Broadway to Vesey Street, thence to Church Street, ending at a point 590 ft. south of Rector Street. The second division comprises the Canal Street section, beginning under Broadway, extending easterly under Canal Street to the bridge approach. The third division begins under Church Street, 590 ft. south of Rector Street, extends under Trinity Place and Morris Street, thence easterly to and under Broadway to Whitehall Street to the East River, beneath the East River by way of the Montague-Whitehall Street tunnels now building, to and under Fulton Street, Brooklyn, through and under other streets and private property to the connection of the Flatbush extension at Prince Street.

The city will supply the contractor with practically all the material that he needs. The steel rails, splice bars, screws, ties and timbers, tie-plates, etc., having been previously purchased by the city under various material contracts. Concrete and concreting material and a small amount of cast iron pipe will be practically all the track installation the contractor has to furnish, besides the labor of laying ties, rails and incidental iron and steel work. The contractor is ordered to begin work within thirty days after the delivery of the contract and must lay 500 ft. of single track a day during any given month, with the option resting with the commission to increase the amount to be laid to 1000 ft. a day. The commission reserves the option of ordering work to be prosecuted simultaneously at several different points. The contract will cover the laying of approximately 25 miles of single track.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Hillsborough-Pinellas Interurban Railway, Tampa, Fla.—Application for a charter has been made by this company to construct a line to be operated by electricity, gas or other power from Tampa to Safety Harbor, Tarpon Springs, Sutherland, Dunedin, Clearwater, Belleair, Largo, St. Petersburg and other points, about 60 miles in Hillsborough and Pinellas Counties. Capital stock, $1,000,000. Officers: H. F. Winter, president; J. E. Winter, vice-president and treasurer, and M. Carabello, secretary, all of Tampa. [July 8, '16.]

***Coatesville, Pa.**—Application for a charter will be made to construct a line from Modena to Coatesville, 10 miles. Among those interested are H. G. Rambo, H. I. Schotter, J. V. Pennegar, Charles F. Humpton and W. J. Elliott, all of Coatesville.

Marlin-Temple Interurban Company, Marlin, Tex.—Incorporated in Texas to construct and operate an interurban line between Marlin and Temple. Capital stock, $1,190. Among the incorporators are G. W. Glass, S. D. Hanna, William Gimmuth, George Houston and E. W. Moore. [July 1, '16.]

FRANCHISES

Sacramento, Cal.—The Northern Electric Railway has received a fifty-year franchise from the Council to construct a line through Sacramento.

Berwyn, Ill.—The City Council of Berwyn has been notified that the new ordinance granted the Metropolitan West Side Elevated Railway for an extension of its Douglas Park branch through the suburb is not acceptable to the company. The ordinance provides that the company shall construct a spur into South Berwyn.

Oneida, Iowa.—The Iowa Railway & Light Company has received a franchise from the Council to extend its transmission lines into Oneida and to furnish electrical service there.

Bowling Green, Ky.—County Road Engineer Malcolm H. Crump was authorized to advertise for bids for the sale of a twenty-year street railway franchise to extend from a point on the Cemetery Pike to the new Fair Grounds. It is understood that the Southern Traction Company, which owns the line, will be the purchaser.

Winnipeg, Man.—The City Council has approved the construction of a temporary line on Talbot Avenue by the Winnipeg Electric Railway.

Toronto, Ont.—The Toronto Railway has received permission to extend its tracks north on Yonge Street from the Canadian Pacific Railway to Farnham Avenue.

Pittsburgh, Pa.—The Pittsburgh Union Passenger Railway has received a ten-year franchise to construct an extension on Woods Run Avenue.

TRACK AND ROADWAY

Visalia Electric Railroad, Exeter, Cal.—Construction will be begun soon on this company's proposed extension from Exeter to Lindsay, thence to the El Mirador orange district. The right-of-way has practically all been secured and definitely decided upon, and offices have been established at Honolulu Street, Lindsay.

Central Florida Interurban Railway, St. Cloud, Fla.—This company, which was recently incorporated, is making a preliminary survey and securing right-of-way for the first section of its proposed line from Hopkins to St. Cloud, about 50 miles. William Hall, St. Cloud, secretary. [July 1, '16.]

Chicago & Joliet Electric Railway, Joliet, Ill.—This company will expend $20,000 for new rails, ties and special work on its North Collins Street line.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company is constructing tracks from Patton Street, Paxton, five blocks north to its new station site.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company will straighten its tracks in the business district of Bluffton, raise the tracks to conform to a new grade and weld and grind the rails.

Vincennes (Ind.) Traction Company, Vincennes, Ind.—This company has filed a petition with the Public Service Commission of Indiana asking that they be compelled to lay only single tracks on First and Seventh Streets and on Fairgrounds Avenue.

Cumberland & Manchester Railroad, Barbourville, Ky.—It is reported that construction on this company's line from Barbourville to Manchester will be completed by Nov. 1. M. E. S. Posey, Barbourville, chief engineer. [April 8, '16.]

Winnipeg (Man.) Electric Railway.—The City Council of Winnipeg has approved the plan of the Winnipeg Electric Railway for a single-track line on Levis Street. The Council has instructed the law department to apply to the public utilities commission for an order to compel the company to build a double-track line on McGregor Street, between Dufferin and Selkirk Avenues; also a temporary track on Sergent Avenue from Arlington to Wall Streets.

Bay State Street Railway, Boston, Mass.—This company has received permission from the Council to relocate its track on Cabot Street from Charnock Street to the Gloucester Crossing and for the extension of the turnout from Charnock Street to Dane Street.

Connecticut Valley Street Railway, Greenfield, Mass.—This company will reconstruct its track on King Street, Northampton.

***Boston & Western Street Railway, Marlboro, Mass.**—This company plans to construct a line from Marlboro to Waltham, about 15 miles.

***Clarksdale, Miss.** — The citizens of Clarksdale have recently voted, by authority of a recent act of the State Legislature, a $100,000 bond issue to provide funds for the construction of a line from Webb, Miss., on the Yazoo & Mississippi Valley Railroad, northwest via Clarksdale to a point on the Mississippi River, about 30 miles. The act authorizing the bond issue also empowered the city to engage in railroad construction and operation. An engineer has been engaged to begin work immediately upon the location of a route. The City Commissioners have also appointed a city railroad commission which will have charge of the location and construction of the line and finally of its operation, the chairman of this commission being M. J. Bouldin.

Kansas City (Mo.) Railways.—This company will construct a double-track line on Eighteenth Street, Kansas City, Kan.

New York Municipal Railway, Brooklyn, N. Y.—Bids for the installation of tracks on the Broadway-Fourth Avenue subway system in Manhattan and Brooklyn, from Fifty-ninth Street, Manhattan, to a connection with the Flatbush Avenue extension of the Interborough Rapid Transit Company will be opened by the Public Service Commission for the First District of New York on Aug. 10. This contract will include the track installation on fifteen sections of subway work, and the contractor will be supplied by the city with a large amount of material, including nails, splice bars, screws, ties and timber, braces and tie plates, on all of which bids have been taken by the Commission. The work of the contractor will consist of little more than the laying of the tracks. About twenty-five miles of single track will be laid under this contract. Provision is made that portions of the subway may be opened and operated before the work is completed. Track installation under this contract also includes the Montague-Whitehall Street tunnels under the East River, and the connection between Canal Street and Broadway and the Manhattan approach of the Manhattan Bridge.

Northern Ohio Traction & Light Company, Akron, Ohio.—More than one mile of car line extension in Canton immediately and a total of 2½ miles before the close of next year have been agreed upon with the business representatives and municipal authorities of that city as the solution

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of the problem of Canton's need of greater street railway facilities. The trackage to be finished this year is known as the Belden Avenue extension and will extend to the city limits in Eighth Street. It connects with the Tuscarawas east line. A ¾-mile extension to be finished within one year will be added to the Garfield Avenue line, extending through Eighteenth Street to Harrison Avenue, thence south to the plant of the Canton Sheet Steel Co. A ½-mile extension will be built to the Navarre line, via Navarre Road to Alden Avenue. An extension to Waco, via Belden Avenue, is also agreed upon, to be built immediately.

Ohio Electric Railway, Cincinnati, Ohio.—The commissioners of Franklin County have asked the Ohio Electric Railway to move its tracks to the center of the highway east of Columbus, where about four miles of brick pavement will be laid. The company objects to the improvement on the ground that it is not in position to pay for its portion, in the neighborhood of $125,000. It is possible that it will build into Westerville over a private right-of-way instead of remaining on the highway where the improvements are to be made.

Dover, Millersburg & Western Railway, Dover, Ohio.—This company advises that contracts will be let within sixty days for grading on its proposed electric line from Dover to Millersburg, 37 miles. Benjamin George, Dover, secretary. [Dec. 11, '15.]

Mahoning Valley Railway, Youngstown, Ohio.—This company plans to construct a 3000-ft. extension of its North Avenue line.

Toronto (Ont.) Civic Railway.—Work has been begun by R. C. Harris, Commissioner of Works, grading the Yonge Street North Toronto hill preparatory to laying foundations for track to connect the Toronto Civic Railway with the Toronto & York Radial Railway.

Toronto (Ont.) Railway.—This company will reconstruct its tracks on Queen Street, between Brock and Roncesvalles, this summer.

Southern Oregon Traction Company, Medford, Ore.—A report from this company states that plans are being contemplated for the construction of a 30-mile extension in the near future.

Eastern Pennsylvania Railways, Pottsville, Pa.—It is reported that this company plans to construct an extension from Tamaqua to Reading.

Saskatoon (Sask.) Municipal Railway.—The city of Saskatoon has placed an order with Smiley & Company, Edmonton, for 50 tons of rails to be placed over the new traffic bridge. The Council plans to construct about 1200 ft. of double track at an estimated cost of $8,600.

Northern Texas Traction Company, Dallas, Tex.—This company has just completed and opened for traffic at Dallas, a viaduct 1800 ft. long, of concrete and steel construction, to connect Dallas with Oak Cliff, and over which the electric street railway and interurban cars are now running. The cost of the viaduct was about $175,000. The company has begun the work of tearing up its tracks on Main Street preparatory to laying heavier rails and paving one-third of the street in connection with the repaving of this thoroughfare by the city. Creosoted block paving on a 6-in. base of concrete will be used, and the cost to the Northern Texas Traction Company for its part of the work will be $115,000.

***Greenville & Northwestern Railroad, McKinney, Tex.**—The question of completing the construction of the Greenville & Northwestern Railroad is being agitated in McKinney in connection with a proposition to electrify the line. The road has been completed from Anna to Blue Ridge and thence to Westminster, but has been inoperative for some time.

Monongahela Valley Traction Company, Fairmont, W. Va.—A contract has been let to Keeley Brothers of Clarksburg for the construction of this company's extension from O'Neil to Wolf Summit.

Janesville & Madison Traction Company, Madison, Wis.—G. Pickhardt advises that the assets of the Janesville & Madison Traction Company, which proposed to construct a line from Janesville to Madison, forty-two miles, have been sold to the Capital Interurban Company, 1012 Majestic Building, Milwaukee, recently organized with the following officers: Gustav Pickhardt, Milwaukee, president, treasurer and purchasing agent; Edgar Smith, Madison, vice-president; E. C. Smith, Madison, secretary; Anton Rosing, Madison, general manager, and C. M. Conlee, Madison, electrical engineer. The company reports that operation will probably be begun around Lake Monona Aug. 1. [March 25, '16.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Work will soon be begun by this company on the construction of a freight station on Garey Avenue between Third and Fourth Streets, Pomona. Plans are also being made by the company to construct a combination freight and passenger station at Claremont.

Northwestern Elevated Railroad, Chicago, Ill.—This company has withdrawn its application for a permit to erect a new station at Wilson Avenue. Officials of the company state that they have decided to build a platform and canopies for the new stub-end terminal and to give access to the old station by means of subways.

Chicago & Joliet Electric Railway, Joliet, Ill.—The carhouse of this company at Joliet has been completely overhauled this summer and much of it has been rebuilt.

Joliet & Eastern Traction Company, Joliet, Ill.—The general offices and waiting rooms of the Joliet & Eastern Traction Company have been removed to the building formerly occupied by the Elgin, Joliet & Eastern Railroad. A spur track from Cass Street has been constructed at this point and the building will be used as the freight and passenger terminal of the line.

Alexandria (La.) Municipal Railway.—Material has been received by the Alexandria Municipal Railway for the construction of a brick carhouse at Lee and Tenth Streets.

Pittsburgh (Pa.) Railways.—This company has awarded a contract to W. F. Trimble & Sons, Pittsburgh, for the construction of a carhouse at Millvale.

POWER HOUSES AND SUBSTATIONS

Pacific Gas & Electric Company, Sacramento, Cal.—This company is spending about $3,000 for improvements to substations in the immediate vicinity of Chico. The machinery at substation No. 2 at Esquon, operated jointly by the Pacific Gas & Electric Company and the Northern Electric Railway, has been raised above flood water at a cost of $1,500.

Massachusetts Northeastern Railway, Haverhill, Mass.—It is reported that this company contemplates the construction of a new boiler house in Merrimac.

Cape May, Delaware Bay & Sewell's Point Railroad, Cape May, N. J.—The $100,000 power plant of the Cape May, Delaware Bay & Sewell's Point Railroad, the Ocean Street Passenger Railway and the Washington Street Railway was practically destroyed by fire on July 21.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The City Council of Columbus has passed an ordinance granting permission to this company to construct a $300,000 power plant on Kimball Street, north of Broad Street. The company will construct its plant 50 ft. west of the levee and it is announced will also build a new retaining wall.

Carbon Transit Company, Mauch Chunk, Pa.—This company is installing a 375-hp. B. & W. water tube boiler of 150 lb. steam pressure, with steel stack, Coppus turbine blower and special furnace for burning its own anthracite culm; also a 300-kw. Westinghouse generator direct-connected to a Russell four-valve engine and a 300-kw. Allis-Chalmers generator direct-connected to an Erie ball cross compound engine with condensing equipment.

Puget Sound Traction, Light & Power Company, Bellingham, Wash.—Plans have been announced by this company for the installation of a 150-hp. substation in Deming to supply that town with energy for business, street and residence lighting. The station will ultimately be increased to 450 hp.

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Manufactures and Supplies

CARBON BRUSH PRICES INCREASING

Imported Materials Are Difficult to Get and Continue to Rise in Price

The majority of the carbon brush makers are experiencing considerable trouble in securing enough of the materials imported for use in their brushes to keep pace with the orders in hand. Several companies have found it necessary to raise prices from 10 to 20 per cent, due to the increased cost of raw materials and also the labor cost, which in one instance is 33 per cent higher than at the beginning of the war.

One company advises that it is obliged to order imported materials in quantities three times as large as were ordered before the war and to carry a heavier stock. Prices have been increased considerably as the percentage of advance on some raw materials has exceeded 100 per cent. In spite of the present high prices some of the customers of this concern have placed large contracts covering their requirements for some time to come. These contracts are not subject to cancellation, as it was necessary for this company to protect itself by purchasing the raw material at the present prices.

About half of the companies interviewed claim that the railways are buying brushes in large quantities to care for the future, while the others say the roads are buying just enough for their immediate requirements.

The prices of the raw materials, and of course the finished product, are higher now than at any time since the beginning of the war, and a number of the manufacturers feel that the highest price has not yet been reached.

ROLLING STOCK

South Covington & Cincinnati Street Railway, Covington, Ky., is in the market for twenty-five 44 ft. 6 in. cars for single end operation.

Shore Line Electric Railway, Norwich, Conn., is converting several open cars into pay-as-you-enter cars at the Greeneville carhouse.

Kankakee & Urbana Traction Company, Urbana, Ill., has purchased five freight cars from the Interstate Car Company, Indianapolis, Ind.

Burlington County Transit Company, Hainesport, N. J., has ordered two 29-ft., semi-convertible cars from The J. G. Brill Company to be equipped with GE 258 four-motor equipments.

Burlington (Vt.) Traction Company has ordered one double-truck convertible car from the J. M. Jones Sons Company and five quadruple equipments of 323 V motors with double-end K-28-B control.

TRADE NOTES

McQuay-Norris Manufacturing Company, St. Louis, Mo., announces that Benjamin R. Evans and Russell W. Long have joined their sales force as field men, traveling out of the St. Louis plant.

Protective Signal Manufacturing Company, Denver, Col., announces that it has opened an office at 550 Peoples Gas Building, Chicago, Ill., and is represented there by J. M. Fitzgerald and O. S. Flath.

King Foundry Company, manufacturers of ornamental street lighting specialties, announces that it has become necessary to move its main office from St. Joseph to Chicago. Its address in the future will be 927 Monadnock Building, Chicago, Ill.

Holden & White, Chicago, Ill., announce that hereafter Garland railway ventilators for electric railway service will be sold in Eastern Canada by C. E. A. Carr Co., Toronto. This company also handles Perry-Hartman side and center bearings for Holden & White.

Gas-Electric Motorbus Corporation, New York, N. Y., has received an order from the Chicago Motor Bus Company for forty buses complete, of the new low-level type. The buses are to be operated on the north side of Chicago. The chassis will be built by this company and the bodies have been ordered from the St. Louis Car Company through Wendell & MacDuffie, Eastern representatives.

Curtain Supply Company, Chicago, Ill., has received an order to equip with ring 88 fixtures and Rex rollers the six cars being built by the Southern Car Company for the Montgomery (Ala.) Light & Traction Company. This company has also received an order for ring fixtures for five buses for the Havana (Cuba) Electric Railway, Light & Power Company.

C. G. Chamberlin, for the past eight years with the F. W. Devoe and C. T. Raynolds Company, New York, in charge of the Electric Railway Department, has associated himself with the W. H. Coe Manufacturing Company, Providence, R. I., and will devote his attention to Coe's gilding wheels and Coe's ribbon gold leaf in the Eastern part of the country. Mr. Chamberlin's wide acquaintance with the field augurs well for his future success.

Union Switch & Signal Company, Swissvale, Pa., announces that J. S. Hobson, formerly General Sales Manager, has been appointed Western Manager in charge of the Chicago, St. Louis and San Francisco offices with headquarters in Chicago. C. E. Denney, formerly assistant General Sales Manager, has been appointed assistant to the President, with headquarters at Swissvale. The positions of General Sales Manager and assistant General Sales Manager have been abolished.

American Embassy, Paris, France, is anxious to receive catalogs, price lists and similar printed material from American manufacturers interested in the French and Spanish markets. The embassy has numerous inquiries almost every day for the names and addresses of American firms capable of furnishing a large variety of products, and it is more helpful to be able to exhibit catalogs to such inquirers than simply to give them names and addresses of American firms. The catalogs should be addressed to the Commercial Attaché of the American Embassy, 36 Avenue de l'Opera, Paris, France.

ADVERTISING LITERATURE

Westinghouse, Church, Kerr & Company, New York, N. Y., have issued a circular in poster form, showing in colors the work of rebuilding a plant without interfering with its output.

Joseph T. Ryerson & Son, Chicago, Ill., has issued bulletin 20,141, describing and illustrating the Riley universal elliptic spring-forming machine which this company recently placed on the market.

Locke Insulator Manufacturing Company, Victor, N. Y., is distributing the 1916 issue of "The Insulator Book," which is profusely illustrated and contains data of considerable interest to the transmission engineer.

Ohmer Fare Register Company, Dayton, Ohio, has issued a booklet on the Ohmer System of fare collection, entitled "The End of the Argument." This company has also published pamphlets on its totalizing registers and transfer machine.

NEW PUBLICATION

Central Station Management. By H. C. Cushing, Jr., and Newton Harrison. D. Van Nostrand Company, New York. 397 pages. Cloth, $2 net.

The authors state in their preface: "It is the purpose of this volume to set forth clearly and simply those principles that are to-day adopted by the successful electric light and power stations of the United States." In a number of instances, however, they have taken the liberty of wandering rather far astray. The book is written in a popular style. Its interest to the average reader would have been enhanced by the use of some appropriate illustrations. Interesting and valuable data are given in the body of the text, but their value would have been greater if the authors had put them in a more usable form. The commercial side of central station management is emphasized, and for that reason the book should be of interest to central station managers and power salesmen. It contains very little matter of interest to electric railway men.

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Electric Railway Journal

Published by the McGraw Publishing Company, Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLVIII NEW YORK, SATURDAY, AUGUST 5, 1916 No. 6

WHAT HAS BECOME OF THE APPRENTICE?

It appears that apprentice courses have gone out of vogue in many of the electric railway repair shops, and never before in the history of the industry has there been such a need for trained young men. The demand for mechanics of all kinds in connection with the manufacture of automobiles, and recently of arms and munitions, has depleted the electric railway machine shops in many localities, and it has been necessary to make the best of inferior workmanship until men can be trained to perform various mechanical operations. Moreover, it is decidedly difficult to obtain an all-around mechanic from the average manufacturing plant because of the prevailing tendency to specialize all machine operations. In the machine shops of some manufacturing plants the work is so highly specialized that mechanics may spend several years and never learn but one or two mechanical operations. Formerly, when there were plenty of first-class machinists brought up through the old style apprentice courses, the need for young blood was not so apparent. The shortage of all kinds of mechanics and the highly specialized experience of most of the mechanics that are available impress the need for the restoration of the apprentice courses. Every electric railway shop should employ young men with a view of putting them through a stated apprentice course. The need of the hour is to make the electric railway repair shop attractive to the average graduate mechanical engineer and, in fact, to all intelligent young men, but unless there is some definite plan for their future the industry need not expect real talent to present itself for work. Every master mechanic should surround himself with one, two or more incipient master mechanics if he has the welfare of his company at heart.

APPRENTICES FOR OTHER DEPARTMENTS

But especially trained men are needed elsewhere than in the shop. The same causes which have depleted the shop of its trained men have likewise deprived other operating departments of their trained employees and diverted the sources from which the raw material for such employees was formerly obtained. In other departments the apprentice problem never was so well worked out as it was in the shop because in the early days the demand for trained men in these departments was never felt to the same extent. The necessity for careful accounting, economical operation of all equipment and studies of traffic and transportation problems, which has arisen because of the increases in operating costs, demands of the public and regulative acts of public commissions, has in these latter days impressed the need for trained men in all departments. If the railways are to secure their fair share of the proper sort of young men in these departments, the opportunities offered must be on a par with those offered in other fields. Some years ago a number of properties announced apprenticeship courses in the transportation department, but little has been heard of these recently. The suggestions made in the previous paragraph in regard to the mechanical department apply as well to other parts of the electric railway business. The work is of a nature that would appeal to college-trained men in many cases if an effort were made to place before them the opportunities which exist in these departments. The graduate student or cadet courses, as they are variously called, which are securing trained men for other public utilities ought to receive serious consideration by electric railway companies.

SELECTION OF APPRENTICES

This problem is of the utmost importance to the management of a railway which is contemplating the establishment or the renovation of an apprentice course. Young men who have any ambition at all about their work are ambitious either for place, fame and power or to be able to do as much, or more, work than their fellows and to do it better. From the first class may be developed men capable of filling the higher administrative positions, while from the second class there is opportunity of developing skilled artisans who will be contented with their calling and faithful to their jobs. And these are the kind of men needed in the shops to-day. The college man is pretty apt to belong to the first class, or else why should he have spent several of the best years of his life in college? If college men of the right sort are attracted to the industry there must be developed some definite plans for their training and future work and, further, these plans must be as attractive as those offered by other fields. The skilled workmen, however, must be recruited from the second class of ambitious young men. To appeal to them the attractions of their work and opportunities must be made equal to those obtaining in neighboring manufacturing plants. We believe that inherently the railway business possesses an attraction for the right kind of young man which is not had by many other lines of work. It may be the fascination of motion and mechanical power, or perhaps because cars and trains have been familiar objects from boyhood days, but whatever the cause there should be no dearth of material from which to draw. Present conditions indicate, however, that a special effort is necessary to attract good men to electric railway work.

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TRAVELING FAR AND CHEAPLY

Elsewhere in this issue will be found an instructive article by D. J. McGrath in regard to the single-fare areas of various American cities. When one glances at the accompanying maps and notes that rides of 8 and 10 miles are available for a single fare in practically all the cities covered, and in some cases more than 15 miles may be ridden by transferring through the center of the city, one is led to wonder when this expansion of ride is going to be limited. Under the 5-cent fare system, the passenger riding 10 miles or more does so at the rate of less than 0.5 cent per mile. The often quoted low fares of European cities cannot begin to compare with this rate. In our American cities, of course, only a small proportion of the passengers ride these long distances, and the loss involved in transporting them is more or less made up by the profit upon the short rides. It must be remembered, however, that as the populations of the cities increase, more and more people spread out into the outlying suburbs, while the more central territory approaches its maximum capacity to house people. Consequently, the proportion of long riders may naturally be expected to increase, thus diminishing the possibility that the traction companies can continue to make both ends meet at a flat 5-cent fare. In the horse-car days of only a quarter of a century ago, when a few short and often unconnected lines constituted the entire traction system of any particular city, the people were glad to pay a nickel even for the limited service. At the present time why should they not be willing to pay a higher rate of fare more nearly commensurate with the improved transportation facilities now offered?

EFFECT OF HIGHER FARES ON REVENUE

The effect of higher fares upon the revenue of four Massachusetts street railways was an interesting piece of evidence recently filed in the Bay State Street Railway fare case. A summary of the exhibit is printed in the News Department of this issue. It shows that although the traffic fell off on three of the roads from 6 to 10.6 per cent when the 6-cent fare was placed in effect, the actual revenue increased from 3 to 9.2 per cent on these lines. By the change the Middlesex & Boston secured $14,956 more revenue, a gain of 3.1 per cent; the Blue Hill gained $2,009, or 3 per cent; the New Bedford & Onset gained $2,187, or 3.3 per cent, and the Norfolk & Bristol gained $5,385, or 9.2 per cent. The periods ranged from eight months to a year, and were of the same length before and after the increase in rates. Other things being equal, higher fares tend somewhat to discourage travel, but it is doubtful if the effect over a longer period would be so marked as in the short intervals specified in the above cases. Experience in Detroit, according to *Public Service*, December, 1914, indicates that the institution of lower fares does not necessarily stimulate riding, street railway traffic being closely related to business conditions and to the growth of the community. It is evident that in most cases additional net income available for dividends needs to be sought in the direction of reduced taxes and other charges as well as in the fare itself, and companies facing the problems of insufficient earnings must take every possible factor into account in trying to better their financial condition. Every little helps, and even the hard-won percentages gained in Massachusetts are welcome under the local conditions prevailing.

THE NEW YORK STRIKE

As this paper is going to press a strike has been in existence for several days on all of the lines of the Third Avenue Railway System in New York, and is being threatened by the labor leaders on the lines of the New York Railways. Vague rumors that the subway and elevated systems of the city will also be drawn into the conflict are heard. The city authorities seem to be doing all that should be expected of them in the way of keeping order. As yet there has been no serious rioting. Police Commissioner Woods has announced that he intends there shall not be any, and Governor Whitman is reported to have promised the commissioner the support of the available militia to preserve order if these men are needed.

The issue seems to be very clearly defined. The labor leaders wish to organize the men on the railway systems in New York as a part of the Amalgamated Association of Street and Electric Railway Employees of America. The companies claim that the greater part of their men do not want to join this organization, and that if established it would represent outside dictation regarding their interests to the people of New York, to the transportation companies within its borders and to the men they employ. In the meantime, the position of the public in the dispute promises to be a very uncomfortable one.

There is every reason why the electric railway companies in New York should not want the outside and irresponsible dictation of their business and policies which would be the logical result of the establishment of the labor organization proposed in New York. The companies are obligated by law to give a certain service at a certain rate, and very close regulation is exercised over them as to the methods and means which they employ in giving this service, but over an essential part of the organization which they require there would be no regulation or control. The law of supply and demand which, together with the financial ability of the companies to pay certain wages, normally regulates these wages, would practically be superseded by a system under which the wages would be dictated by irresponsible labor leaders. The alternative would be a strike, which would probably be more extended than the one now threatened because the men would be organized.

We consider the labor question the most serious problem now before the electric railway companies of this country. The present method of settling labor disputes is an outgrowth of methods which may have been all right when the companies were smaller, and may still be the most available plan in industrial disputes in which the public has only a minor interest. In those

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cases, if wages are forced higher in any instance, the owners of the enterprise have four courses open to them. They can raise their prices to make up for the increase in wages, or they can stop operation until they see whether they can secure cheaper help, or they can abandon the enterprise entirely, or they can move to another city. Usually any one of these plans can be followed without great loss of capital, but none of them is possible with a public utility company, and if its rates and service are regulated, we believe that there is equal reason why some regulation should be applied to the wages which it has to pay.

The necessity for the regulation of rates and service was not realized twenty years ago. It was supposed that the same principles which apply in industrial enterprises would obtain in their case, and if their expenses increased they could increase their rates or reduce their service to correspond. The idea of the desirability of regulation for public utility companies was of slow growth. We realize that the application of a similar system to wages now may appear impracticable, but, broadly speaking, there does not seem to be any other solution to the problem. If the State can fix rates it can establish wages, and while it may not be able to compel men to work permanently for a lower wage than they desire, it can require a time notice of, say, three months or more before a man can resign from public utility employment unless excused because of bodily disability or some other reasonable cause, and it can exercise the police and military power to secure greater freedom for the company to engage labor at the established rate.

SINGLE-PHASE FOR SWISS FEDERAL RAILWAYS

The selection of the single-phase system for the St. Gothard line of the Swiss Federal Railways early in the present year occasioned no surprise on the part of those who have followed the progress on the electrification of these state-owned roads. The tentative selection of this system nearly three years ago indicated that unless something spectacular happened soon to indicate considerable superiority on the part of the direct-current or some other system, the ultimate result was a foregone conclusion. While the total mileage of the Federal Railways is not great, something less than 2000, there is world-wide interest in the gradual electrification of this system, partly on account of its international character, and partly because each step is being taken with a view to the ultimate electrification of the whole system. The government has been feeling its way cautiously in the matter of selecting a system for ultimate general adoption, but it has shown a growing conviction that for the local conditions the single-phase system is best. The conditions which have produced this conviction have been clearly outlined in reports prepared by the government experts, the latest of which is abstracted in this issue.

The St. Gothard line, one section of which is to be in electrical operation by 1918, will be the third important Swiss electrification. The first was that of the Simplon tunnel, and the second the Loetschberg tunnel and adjoining lines. The Simplon tunnel was electrified nearly ten years ago, and three-phase equipment was there used. Three-phase was undoubtedly well adapted for the particular conditions therein encountered, and it should be remembered that it had been applied successfully before that time on the nearby Italian State Railways. At the time there was little experience in heavy traction available anywhere in the world to serve as a guide. When later the Loetschberg tunnel was driven and electrified and the Simplon line was made more accessible from Berne, single-phase equipment had developed to the extent that it was deemed advisable to apply it on this very important railway, employing the heaviest electric locomotives used in Europe up to that time. Meanwhile, the decision to electrify the St. Gothard line had been reached, but it was not considered safe to select single-phase definitely for it until the Loetschberg line was a demonstrated success. It is now so considered, and the government is going ahead with confidence to apply the system on a larger scale.

There are now about a score of single-phase electrifications fairly well distributed geographically. While the larger number are designed for rather light service, several come well within the field of heavy traction. The Federal Railways had therefore ample precedent to guide them, and precedent has undoubtedly had a great deal to do with the present selection. The New York, New Haven & Hartford Railroad must be credited with considerable influence in this direction.

Without desiring to question the wisdom of the decision in this case, it is a point of considerable interest to note that the managers of the Federal Railways should have considered the development of high-voltage direct-current traction to be not sufficiently advanced to at least be seriously considered in making the final selection of system. It is true that, as the report states, at the time of making the selection no exact equivalent of the required service was being furnished by a high-voltage direct-current equipment, but it does seem as if there would have been no great risk in adopting this providing that its characteristics would meet the requirements. As we understand it, the direct-current system was adopted by the New York Central Railroad somewhat more than ten years ago, at least partly, because it was considered to be the only one which had, up to that time, demonstrated its reliability on a large scale. Like the Federal Railways, the New York Central did not wish to experiment. Now we find the single-phase system adopted largely because by the Swiss government experts it is considered in the lead for very heavy traction. The whole situation illustrates once more the fact that heavy traction is in the development stage and we cannot tell what a day may bring forth. While the steam railroads are held back from wholesale electrification partly by financial limitations, the development work on electrical equipment should be expedited, which can best be done by means of such installations as those on the St. Paul Railway, the Norfolk & Western Railway and the New Haven Railroad in the United States, and on the Swiss, Swedish and Italian and other railways, in Europe.

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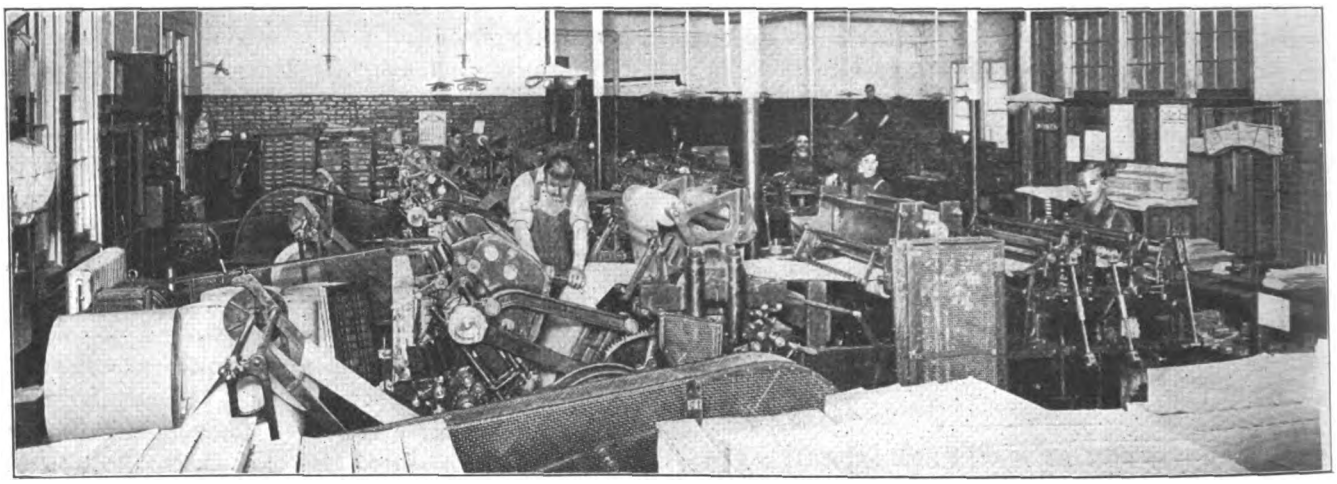
Printing 2,000,000 Transfers a Day

A Description of the Nostrand Avenue Plant of the B. R. T. System Designed to Keep Pace with Rapidly Increasing Business

THE accompanying illustrations show in detail the plan and equipment of the modern printing plant of the Brooklyn Rapid Transit System, by which it is enabled to print 2,000,000 transfers a day on a single machine.

As far back as August, 1903, the Brooklyn Heights Railroad, which was subsequently acquired by the B. R. T. system, placed a printing plant in operation at 40 State Street and commenced making its own transfers. The machinery at that time consisted of two Kidder presses, one Seybold cutter and one stitcher, the combined capacity of these machines being about 500,000 transfers a day. In 1906 an additional press and stitcher were obtained on account of the steadily increasing business, and in 1907 the adoption of a longer transfer caused the installation of more presses. These were flatbed Meisel presses, making 3500 impressions per hour.



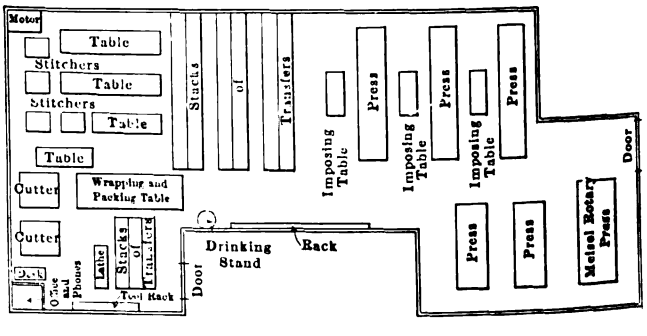
B. R. T. TRANSFER PRINTING PLANT—GENERAL VIEW OF PRESSES

The capacity of the shop has steadily increased until now there are six presses, two cutters and four stitchers. The present plant, which is located at 849 Nostrand Avenue, has a working force of nineteen, and is in charge of N. Müller, who installed the State Street plant in 1903. The working force includes a foreman, two pressmen with three helpers, two boys, one cutter, and ten girls. Of the ten girls, three operate the stitching machines, three tie up bundles, three are engaged in sorting and billing the bundles and one is used as a checker.

The general plan of the printing room, which is about 100 ft. deep and 40 ft. wide, is shown in an accompanying diagram and in the photograph giving a bird's-eye view of the plant.

Three entirely different operations are carried on in this room, printing, cutting and stitching. The south end is occupied by the presses, three on each side of a main aisle. On the walls are shelves and racks containing printing forms, electros, printing inks, etc., and between the presses are small tables for imposing the forms. The cutting and stitching machines are located on the north side, extending the entire width of the room. An overhead line shaft drives these machines, and near the west wall there is a lathe on which all the repair work for the plant is done. A gear and tool rack for the lathe is conveniently located on the adjoining side wall. The middle of the room is used for stacking printed transfers, some of which have not been sent to the cutting machines. Part of the space is also used for packing and billing the completed pads of transfers which are ready to go out to the various depots of the railway system.

All of the printing necessary for any transfer is done in one operation by the Meisel rotary press, which is driven by a 7½-hp. Robbins & Myers motor. The dimensions of the press are such as to take a roll of paper 25¾ in. wide and 34 in. in diameter. It prints from electrotypes which are 3/16 in. thick. The transfers have one color on the under side, another color on the face side, the number being printed in one color and



B. R. T. TRANSFER PRINTING PLANT—PLAN SHOWING LOCATION OF EQUIPMENT

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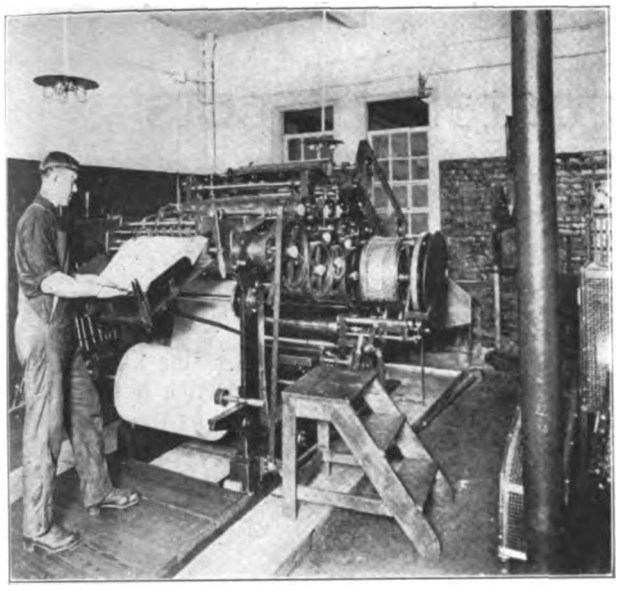
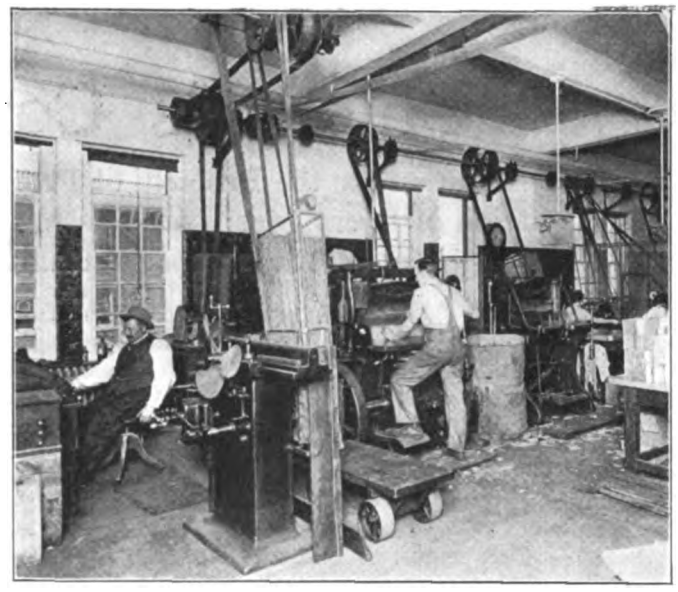


B. R. T. TRANSFER PRINTING PLANT—
ROTARY PRESS



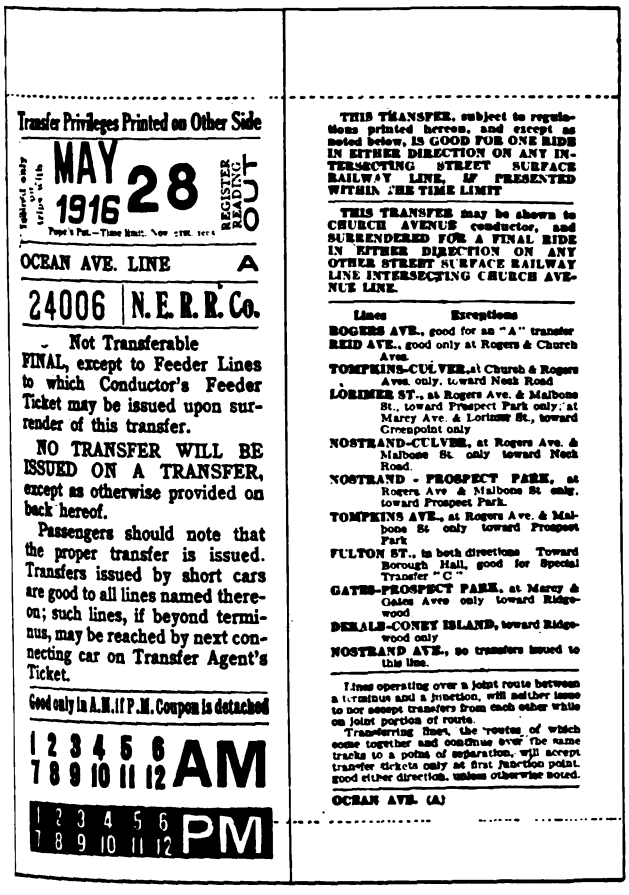
B. R. T. TRANSFER PRINTING PLANT—
CUTTING AND STITCHING MACHINES

the date in another. This press, which is shown in an accompanying illustration, was built especially for the company and has a capacity of 12,000 impressions an hour. The mechanism requires practically no attention, but keeps one man busy taking the printed sheets of transfers away from the collector in which they are deposited by the machine. This press is of the very latest type produced by the manufacturer.

After the transfers have been printed in sheets, three deep and eleven wide, they are taken to the large cutting machine, where they are stacked 1000 deep and cut in three strips, each being one deep and eleven wide. These strips are next taken to the stitching machines, where fifty of the above-mentioned sheets are stitched to a cardboard back as fast as an operator can feed them into the stitcher. They are now ready for the second cutting machine, into which they are stacked 1000 deep and seven stacks wide, being reduced by this machine to stacks of single pads of 50 transfers each. The single stacks are now taken away by girls, who deftly wrap them in large or small quantities as needed by the various lines and pass them on to other girls, who act as checkers and packers. They are then sent in large carriers to the shipping clerk, properly dated and tagged, ready to be sent out to the depots of the various lines.

B. R. T. TRANSFER PRINTING PLANT—
SORTING, COUNTING AND PACKING TRANSFERS

The output of the plant is slightly in excess of 2,000,000 transfers for a working day of nine hours, the maximum number being 3,200,000. The transfers are printed three to six weeks ahead of date and are delivered to the stations three days before they are to be used. They are made from the best poster paper, which comes in rolls of 450 lb. each and is obtained from the Taggert mills. A two-months' supply of paper is kept at all times and is stored in an adjoining room in the building. The foreman of the plant, who was previously connected with the Meisel Company in the operation and installation of similar machines, makes all necessary repairs.


Transfer Privileges Printed on Other Side

MAY 28 1916

REGISTER READING OUT

OCEAN AVE. LINE A

24006 | N. E. R. R. Co.

Not Transferable

FINAL, except to Feeder Lines to which Conductor's Feeder Ticket may be issued upon surrender of this transfer.

NO TRANSFER WILL BE ISSUED ON A TRANSFER, except as otherwise provided on back hereof.

Passengers should note that the proper transfer is issued. Transfers issued by short cars are good to all lines named thereon; such lines, if beyond terminus, may be reached by next connecting car on Transfer Agent's Ticket.

Good only in A.M. if P.M. Coupon is detached

1 2 3 4 5 6 7 8 9 10 11 12 AM

1 2 3 4 5 6 7 8 9 10 11 12 PM

THIS TRANSFER, subject to regulations printed hereon, and except as noted below, IS GOOD FOR ONE RIDE IN EITHER DIRECTION ON ANY INTERSECTING STREET SURFACE RAILWAY LINE, IF PRESENTED WITHIN THE TIME LIMIT

THIS TRANSFER may be shown to CHURCH AVENUE conductor, and SURRENDERED FOR A FINAL RIDE IN EITHER DIRECTION ON ANY OTHER STREET SURFACE RAILWAY LINE INTERSECTING CHURCH AVENUE LINE.

Lines	Exceptions
ROGERS AVE.,	good for an "A" transfer
REID AVE.,	good only at Rogers & Church Aves.
TOMPKINS-CULVER,	at Church & Rogers Aves. only, toward Nesh Road
LORIMER ST.,	at Rogers Ave. & Malbone St., toward Prospect Park only; at Marcy Ave. & Lorimer St., toward Greenpoint only
NOSTRAND-CULVER,	at Rogers Ave. & Malbone St. only toward Nesh Road.
NOSTRAND - PROSPECT PARK,	at Rogers Ave & Malbone St only, toward Prospect Park.
TOMPKINS AVE.,	at Rogers Ave. & Malbone St only toward Prospect Park
FULTON ST.,	in both directions Toward Borough Hall, good for Special Transfer "C"
GATES-PROSPECT PARK,	at Marcy & Gates Aves only toward Ridgewood
BERGEN-CONEY ISLAND,	toward Ridgewood only
NOSTRAND AVE.,	no transfers issued to this line.

Lines operating over a joint route between a terminus and a junction, will neither issue to nor accept transfers from each other while on joint portion of route.

Transferring lines, the routes of which come together and continue over the same tracks to a point of separation, will accept transfer tickets only at first junction point, good either direction, unless otherwise noted.

OCEAN AVE. (A)

B. R. T. TRANSFER PRINTING PLANT—
SAMPLE TRANSFER

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Chicago's Congested Streets

The Only Solution for the Problem of Providing More Surface Transportation Is the Utilization of Every Means for Passing Cars Through the Narrow Throats of Travel—Special Studies Indicate Possible Methods

FUNDAMENTALS for the study of Chicago "Traffic Conditions and Track Capacity" were presented in last week's issue, as an abstract of a new report of the Board of Supervising Engineers, Chicago Traction. The preceding article set forth the board's recommendations and deductions from data of fact. In this issue are given a review of the rerouteing plans and the observed data of fact.

DISCUSSION OF PRESENT ROUTES

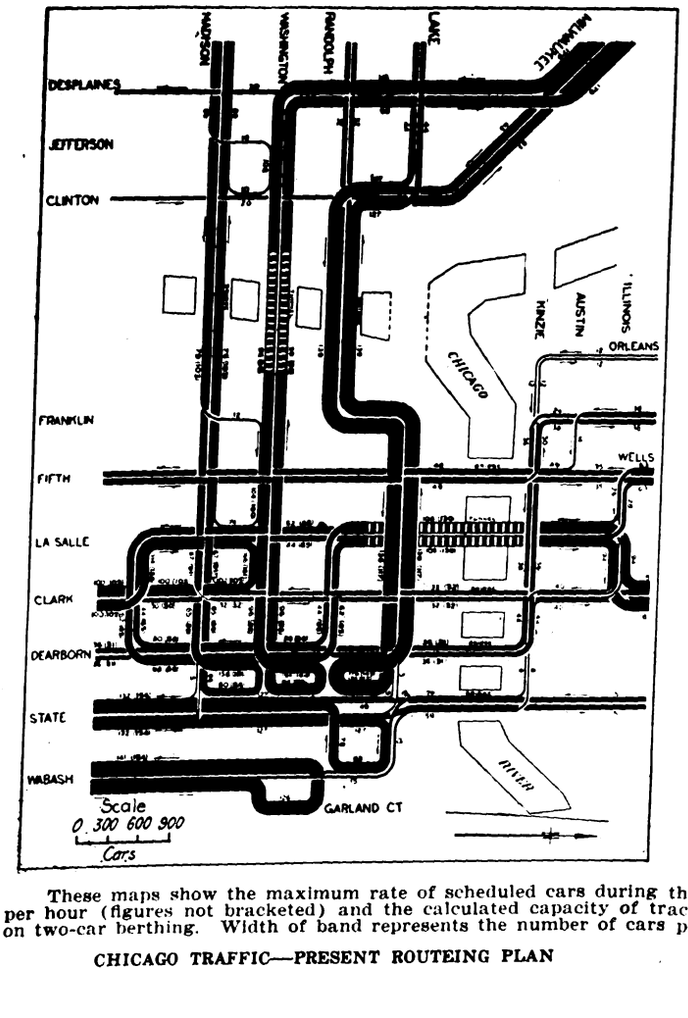
The first map shows the present routes and the calculated capacity of controlling points. This map is extremely valuable as indicating the complexity of present routeing and the effect of superimposing service from different parts of the city. The study has been confined to the most congested areas, viz: the district north of Adams Street and west of State Street. Here much of the congestion is due to conditions at three controlling intersections over which pass practically all the routes entering that section of the Loop district. These intersections are at Dearborn and Lake Streets, Dearborn and Washington Streets, and Clark and Monroe Streets. At each point the general cause of congestion is the same, viz.: the crossing of heavy car traffic on an outside curve and heavy through traffic in other directions. Moreover, these intersections are points of very heavy vehicular and pedestrian traffic, which further complicates the movement.

The Washington-Dearborn crossing has the heaviest total car traffic over any intersection in the downtown business district. This is caused by the convergence of the following maximum scheduled traffic rate:

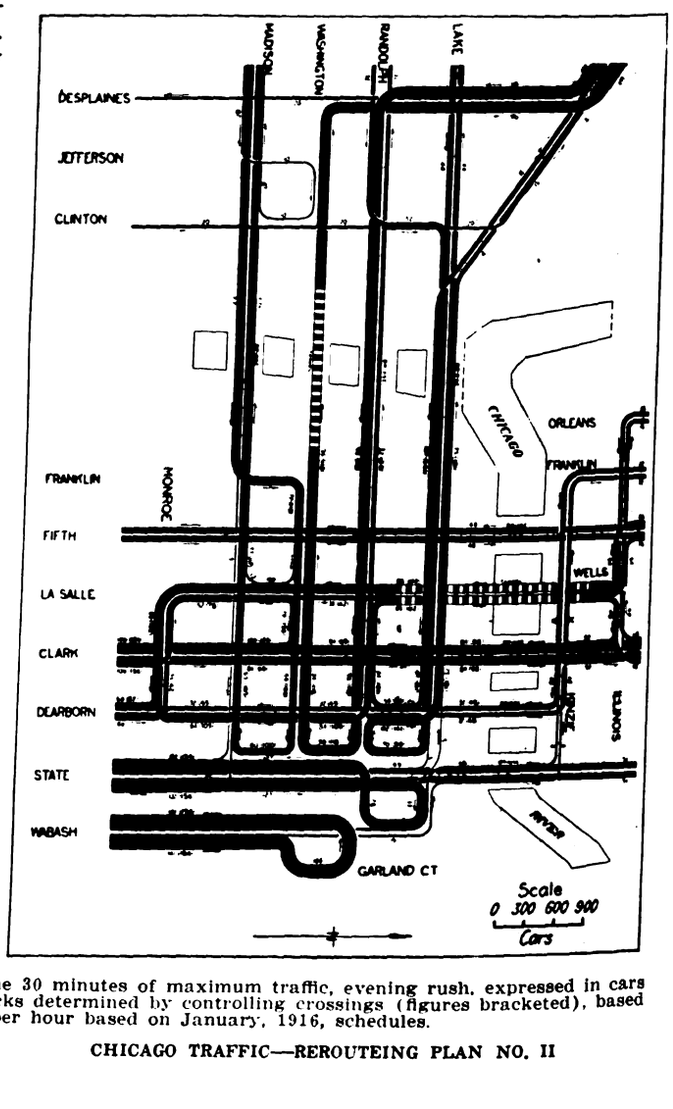
LaSalle outside loop and North Dearborn routes	98 cars per hour
LaSalle inside loop and South Dearborn cars	80 cars per hour
Madison Street loop	60 cars per hour
Washington Street loop	96 cars per hour

In addition, the Washington loop traffic crosses the intersection twice—once straight and once on an outside curve, making a total rate of movement on all tracks of 430 cars per hour. Even now it is barely possible to operate the full movement called for by schedule over this intersection, and certainly no margin for growth exists except possibly on the southbound Dearborn Street track.

A summary of the results of capacity calculations under present routeing is given in Table I and shows the prevailing deficit in capacity on most of the important lines measured by either the "70" or "80" serv-



CHICAGO TRAFFIC—PRESENT ROUTEING PLAN



CHICAGO TRAFFIC—REROUTEING PLAN NO. II

These maps show the maximum rate of scheduled cars during the 30 minutes of maximum traffic, evening rush, expressed in cars per hour (figures not bracketed) and the calculated capacity of tracks determined by controlling crossings (figures bracketed), based on two-car berthing. Width of band represents the number of cars per hour based on January, 1916, schedules.

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ice standard. This surplus or deficit is expressed in per cent of traffic requirements.

BASIC REROUTEING PLANS

From the preceding it is evident that some modifications in routeing are necessary, and several are proposed covering a considerable range in rerouteing, *i.e.* from the minimum effective changes to a very considerable rearrangement of the terminal situation. Car-flow maps are used to indicate graphically the distribution of car traffic under present schedules, which would result from applying the various schemes of rerouteing. For each plan the terminal track capacity was then computed upon a basis of actual service requirements for each route, as measured by a uniform service standard throughout. In other words, each plan accepts fundamentally a uniform service standard as the basis of capacity and the resulting deficit or surplus gives a definite measure of how nearly the demand for service on either a "70" or "80" passenger standard may be met.

TABLE I—PRESENT PLAN OF ROUTEING, SHOWING SURPLUS OR DEFICIT CAPACITY

Lines on	Surplus Capacity Available 70 Passengers Per Car	80 Passengers Per Car
North State Street	(a) 50%	65%
Madison Street	..	10
South State Street	*2	13
Clark Street (north of Illinois)	*8	3
Wabash Avenue (South)	*12	..
Washington Street	*17	*6
Dearborn Street (North)	*27	*20
South Clark Street	*26	*15
Lake Street	*29	*21
Weighted average of all lines	*12	..
Weighted average of all lines, excluding North State Street	*15	*3

(a) It should be noted that although a large surplus capacity is available in the North State Street throat, yet it cannot be used very effectively because of this being a street deadened at Lincoln Park, and therefore only a branch of the Clark Street throat.
*Represents deficit in capacity.

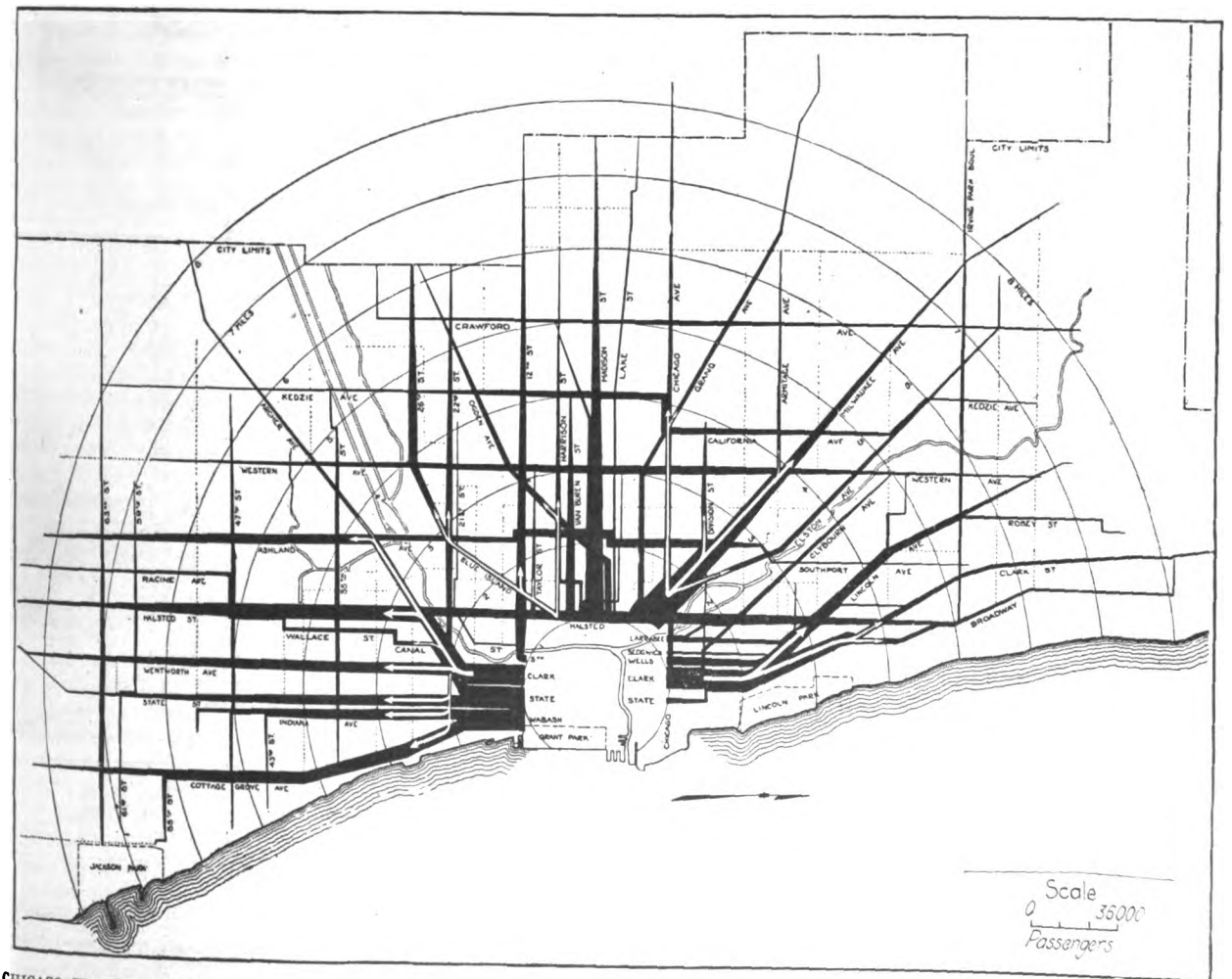
Finally, from this basis is deduced the margin of capacity available to meet probable growth during the period of rapid transit construction, using alternative service standards in conformity with previous discussions before the board. It may be added that, on some of the most important routes, none of the six plans presented provides any reasonable margin for growth to meet in the future the service demand on a 70-standard, and not much margin on an 80-standard.

ACCEPTED ROUTEING PRINCIPLES

The following principles were adopted as far as practicable in all suggested rerouteing plans:

1. Through routeing of balanced car traffic in preference to using loop terminals.
2. Maximum reduction of outside curve movements at crossings.
3. Preferential use of inside curve, so that cars can move on either traffic signal if necessary.
4. Closing of loops outside of congested district.
5. Outbound trippers to operate on the same street as cars of the through line.

One fundamental consideration in these plans is whether it is practicable to through-route rush-hour trippers as well as all-day service. While through-routeing of trippers is already carried out on two important through routes—State Street and "Through Route" No. 22—the general acceptance of this principle for all routes appears to be a point of contention. There-



CHICAGO TRAFFIC—RUSH HOUR PASSENGER TRAFFIC OUTBOUND FROM MILE ZONE, WIDTH OF BLACK LINE SHOWING RELATIVE NUMBER OF PASSENGERS CARRIED

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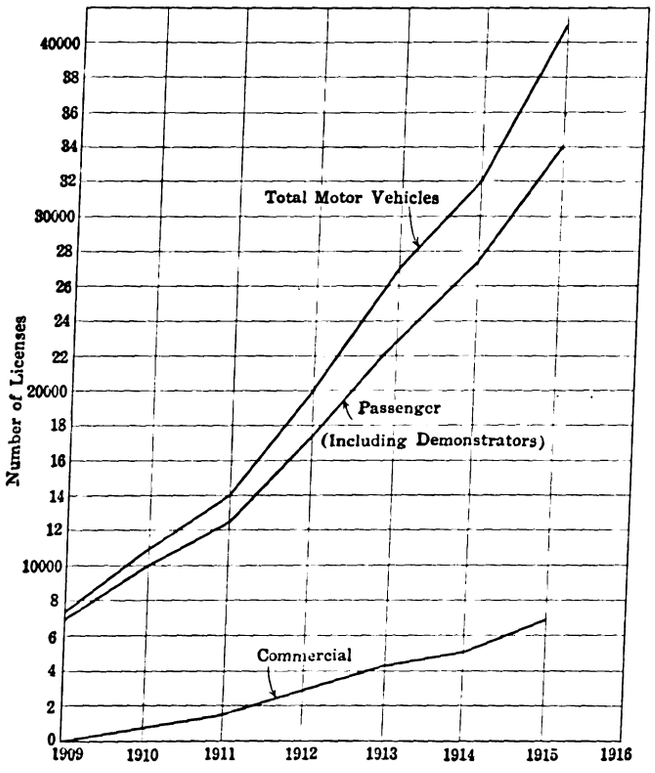


This curve shows the rapid increase in the number of licenses issued to the respective classes of motor vehicles by the City of Chicago.

CHICAGO TRAFFIC—INCREASE OF MOTOR VEHICLE LICENSES

fore, all of the routeing plans have been worked out on an alternative basis, viz.: without rush hour trippers through routed.

CAPACITY OF TUNNELS

Some study was devoted to the matter of safe tunnel capacity in order to determine whether the existing tunnels could be used to their fullest advantage, as called for by the service requirements under the proposed routeing plans and service standards. This safe tunnel capacity was considered to be based upon the following simple assumption: That no car entering the tunnel at a speed of 10 m.p.h. and losing control on the descending grade could overtake the preceding car on the ascending grade, assuming a continuous line of cars moving through the tunnel at the minimum safe headway to be ascertained.

This means that both brakes and electrical equipment of a fully loaded car would become disabled simultaneously so that the motorman could not "buck the motors" for an emergency stop. Considering, then, the grades, weight of car, train friction and windage, the minimum safe spacing may be determined by superimposing time-distance curves for both regular and runaway cars. The above basis will be recognized as exceedingly improbable of occurrence in the ordinary course of events.

This analysis shows that by the time the runaway car catches up with its leader from 26 to 27.5 seconds elapse. Allowing 10 per cent excess, the minimum safe headway then becomes about 28 to 30 seconds, or corresponding to a capacity of at least 120 cars per hour. It is of interest to note that the tunnels are now being operated under a schedule rate of 108 cars per hour for the maximum 30-minute rush period and, at times, with a much higher rate—as many as four cars on the same ascent or descent.

REROUTEING PLANS PRESENTED

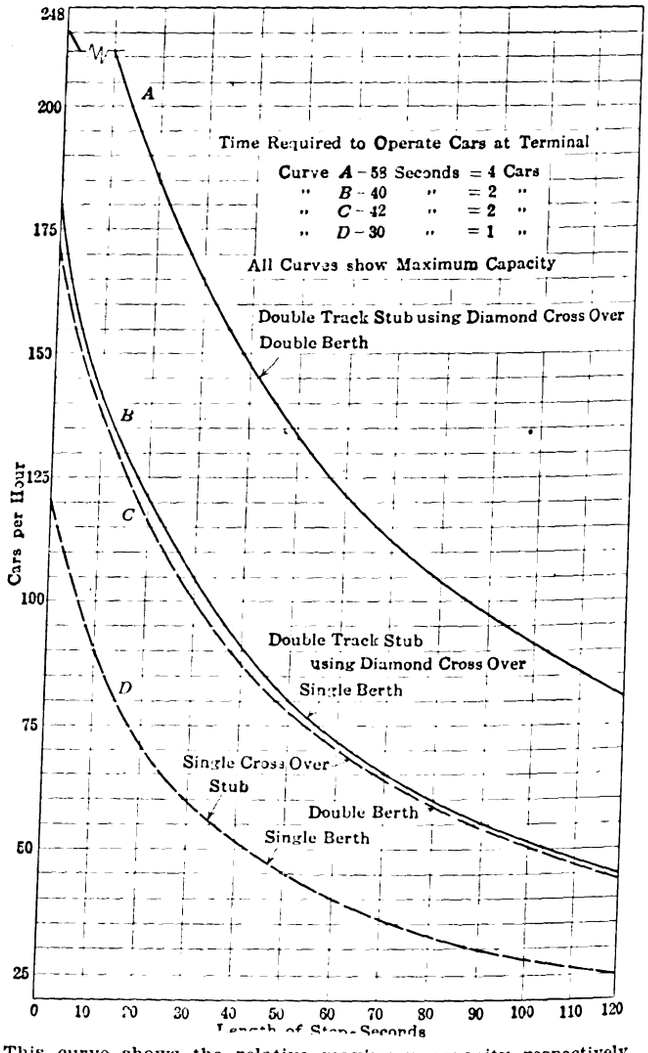
The report, then, presents three rerouteing plans and three alternatives. The details of each plan and analyses of the controlling intersections are discussed and a table of the surplus capacity available on either the 70-passenger or 80-passenger standard is given. Rerouteing plan II, shown on page 318, is recommended for first consideration. In this plan the Clark-Wentworth rush-hour trippers, as well as day service, are through routed, and the Washington and Madison Street loops are lengthened. On the lines over the Lake-Dearborn crossing about 60 per cent more capacity is available than for the same lines under the present scheme of routeing. Capacity studies for Plan II result in the following surplus capacity, measured in per cent of traffic requirements.

TABLE II—PROPOSED REROUTEING UNDER PLAN II, SHOWING SURPLUS OR DEFICIT CAPACITY

Throat	Surplus Capacity Available 70-Passenger Standard	80-Passenger Standard
North State Street	(a) 50%	65%
Lake Street	13	27
Washington Street	11	25
Madison Street	10	22
South State Street	• 2	13
South Clark Street	• 4	10
North Clark Street	• 4	8
North Dearborn Street	• 4	5
Wabash Avenue	•12	..
Weighted average of all throats	2	16
Weighted average of all throats, excluding North State Street	..	13

(a) See note under Table I.
•Deficit.

This table shows, among other things, that in the case of Wabash Avenue, one of the two heaviest down-



This curve shows the relative maximum capacity respectively between a single and double berth operation on a single crossover and also on a double or "diamond" crossover, estimated from observations made during rush hour operation.

CHICAGO TRAFFIC—CAPACITY OF STUB TERMINALS

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town trunk lines, the capacity of the throat is now exhausted even under an 80-standard and with the most favorable routeing plan, and that downtown relief subways, if started immediately, could not be completed too soon.

STUB TERMINAL CAPACITY

In connection with the rerouteing plans the board also made a study of the capacity of stub terminals, of which there are four in the Loop district. The result of this study, shown in a graph on the opposite page, is based on observations on both the single and double-track stub terminals with varying lengths of stops. Thus, the diagram shows that for a total stop of 1 minute, using single berthing, a single track stub can handle only forty cars per hour and a double-track stub only seventy-two cars per hour without congestion. The report concludes from this that any routeing plan involving stub terminals is subject to fixed limitations of service, even though double berth operation is resorted to.

PHYSICAL LAYOUT

Chicago, more than other cities with an extended water front, has its terminal district or traffic center artificially concentrated within a relatively small rectangle bounded on three sides by water and on the fourth largely by railroad yards, this rectangle containing for general business purposes only about 80 to 90 blocks of average size. While this condition alone would be serious, the establishment of the elevated loop inclosing thirty-five blocks in the heart of this rectangle fixed even more inflexibly this terminal "Loop" district within the confines of the river. This policy, which largely resulted from independent ownership of elevated properties, has long been realized as one of the principal elements retarding the expansion of this central business district, and the recent merger of the elevated lines under one operating company and the through routeing of the Northwestern and the South Side "L" trains is an important step directed toward the expansion of the district which must eventually take place, simply from the lack of street capacity within the Loop district to handle the traffic converging from over 100 sq. miles of settled territory. Again, divisional operation of street railways formerly resulted in each system striving to reach and cover this limited Loop district as far as possible. Later, the improvement and unification of these lines created conditions of higher physical standards, operating efficiency and speed of transit, but did little else to relieve fundamentally this concentration except in one particular: the adoption of the principle of through routes. The problem of increasing traffic density still exists, as will be noted from the accompanying map of the city.

Beneath these Loop streets exist approximately 60 miles of freight tunnel, designed for the very purpose of relieving the surface of much of the package freight traffic. It is an unfortunate fact that, as at present organized, this freight Chicago Tunnel Company handles less than one-fifth of the freight transfer and less than one-third as much as the trucks operating upon the surface. How this situation may be remedied is not within the scope of this report, but is referred to here as being an important factor contributing to surface street congestion.

A total of forty-three car lines feed into this Loop district from distances as great as 10 to 15 miles. To accommodate these, there are but thirteen available through entrance streets—three from the north, seven from the west, and three from the south. While these south entrances are uncomplicated by bridge crossings, two of them are seriously obstructed by freight yard operations. These three groups of entrances may be considered as the throats through which must be handled all traffic converging from straight as well as diagonal thoroughfares, and the concentration is the greatest from the south. This condition is well shown in the large map on page 219.

Another source of concentration is traceable to the receding lake front on the north shore, which forces the outlying diagonals into one entrance throat, viz.: Broadway-Clark and Lincoln.

PAVEMENTS

In the wholesale and factory districts granite paving preponderates, while in the retail and office building districts smooth paving is used, either asphalt or wood block. In icy weather, or after sprinkling, heavy teaming on these smooth pavements becomes extremely difficult and, as a result, car movement continues to be seriously impeded at times by vehicles in the track, a condition which has not yet been corrected by enforcement of ordinances. However, the preponderance of passenger automobile traffic, which is increasing by leaps and bounds as indicated by the curve on page 220, offers concrete evidence of the desirability of a different class of pavement within the retail district than that best adapted for trucking purposes.

The conclusion of the abstract of the report will appear in a later issue.

Baltimore Traffic Conditions

General Manager T. S. Cross in Open Letter Explains These Conditions for Enlightenment of Public

On Tuesday of this week T. S. Cross, vice-president and general manager United Railways & Electric Company, Baltimore, Md., addressed a letter to the Maryland Public Service Commission stating the company's position in regard to certain criticisms of its service made by the transportation expert of the commission, B. W. Duer. His letter abounded in data showing the actual situation as regards crowding and contained a denial of any intention of the company to overcrowd the cars.

The company admits a few cases of overcrowding but claims that this is due to the habits of the traveling public. Checks taken by the company showed that the number of cars carrying more than the capacity, which is sixty-eight, amounted to an average of 27 per cent in the morning and 48 per cent in the evening. The average number of loads of less than sixty-eight in the morning was 71 per cent, and in the evening 48 per cent.

The conditions are being closely watched by the traffic department of the company, Mr. Cross states, and since July 20 four additional trips have been put on in the morning and five in the afternoon on one of the lines.

Only thirteen of the cars carried in excess of the limit of sixty-eight, while the average of cars with vacant seats during the morning rush in the three days of the check was forty, or 83 per cent of the whole number of cars checked.

On the three days and during the period in which the checking was done a total of 1549 additional passengers, or more than twenty-two carloads at sixty-eight per car might have been accommodated in the vacant seats on cars on one line.

During the evening rush hours the average cars per day were forty-eight and the average passengers per car were sixty-four. The number of loads in excess of sixty-eight was twenty-three, while the number of cars with vacant seats was thirty, or 63 per cent of the whole number.

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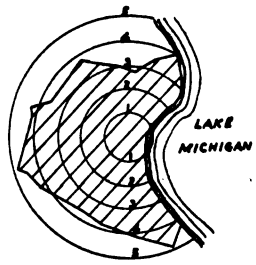
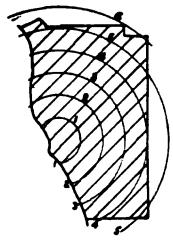


Milwaukee, Wis.

Population (1910), 373,857.
Shaded area has 5-cent fare, 25 tickets for $1, with free transfers.
Area, 33 square miles.
Average radius, 3.6 miles.
A zone system in effect on suburban lines beyond this area.

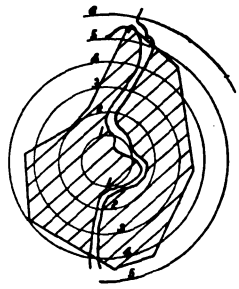


Buffalo, N. Y.

From map on file with Massachusetts Public Service Commission.
Population (1910), 423,715.
Shaded area has 5-cent fare with free transfers.
Area, 38 square miles.
Average radius, 4.8 miles.

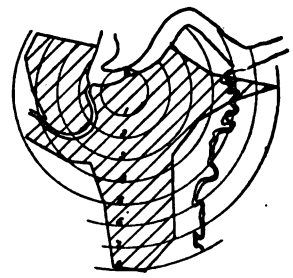
New Bedford, Mass.

Population (1910), 96,652.
Shaded area has 5-cent fare with free transfers.
Area, 12 square miles.
Average radius, 1.9 miles.



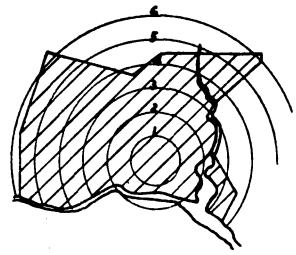
Holyoke, Mass.

Population (1910), 57,730.
Shaded area has 5-cent fare with free transfers.
Area, 43 square miles.
Average radius, 3.7 miles.



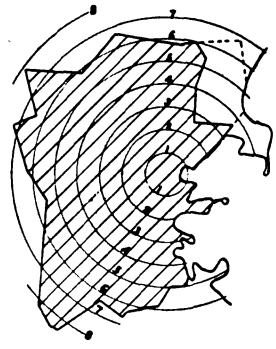
Kansas City, Kan., and Kansas City, Mo.

Combined population (1910), 330,712.
Shaded area has universal 5-cent fare with free transfers.
Area, 51 square miles.
Average radius, 4.9 miles.



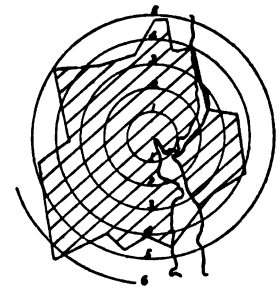
Washington, D. C.

(Wash'ton Ry. & Elec. Co.)
Population (1910), 331,069.
Shaded area has 5-cent fare, 6 tickets for 25 cents, with free transfers.
Area, 48 square miles.
Average radius, 4.6 miles.



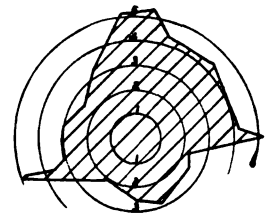
Boston, Mass.

Population (1910), including suburbs with the area shown, 1,043,546.
Shaded area has 5-cent fare with universal free transfers, including transfers between all surface and rapid transit lines.
Area, 81 square miles.
Average radius, 6.0 miles.
The dotted area on the northeast is served by a separate company for a 5-cent fare from the center of Boston. Transfers between the two companies cost 3 cents extra.



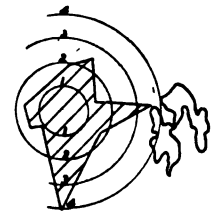
Providence, R. I.

From map in Providence report of Bion J. Arnold, 1911.
Population (1910), 224,326.
Shaded area has 5-cent fare with free transfers.
Area, 48 square miles.
Average radius, 3.9 miles.



Indianapolis, Ind.

Population (1910), 233,650.
Shaded area has 5-cent fare, 25 tickets for $1, with one free transfer allowed.
Area, 36 square miles.
Average radius, 3.4 miles.

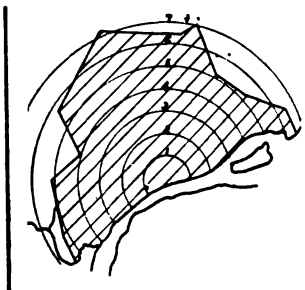


Manchester, N. H.

Population (1910), 70,063.
Shaded area has 5-cent fare with free transfers.
Area, 12 square miles.
Average radius, 1.9 miles.

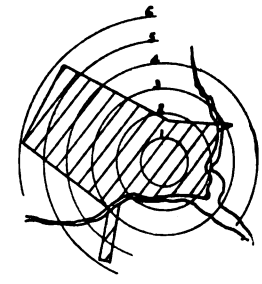
San Francisco, Cal.

From map in "Report of Transportation Facilities, City of San Francisco," by Bion J. Arnold, March, 1913.
Population (1910), 416,912.
Shaded area has universal 5-cent fare with free transfers.
Area, 40 square miles.
Average radius, 5.5 miles.



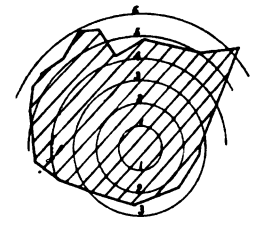
Detroit, Mich.

Population (1910), 465,766.
Shaded area has 5-cent fare, or 7 tickets for 25 cents, with free transfers. On some lines 8 tickets for 25 cents are sold.
Area, 58 square miles.
Average radius, 5.5 miles.



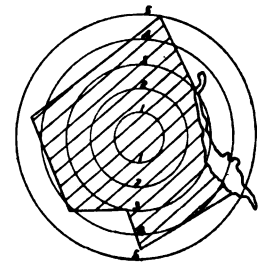
Washington, D. C.

(Capital Traction Co.)
Population (1910), 331,069.
Shaded area has 5-cent fare, 6 tickets for 25 cents, with free transfers.
Area, 29 square miles.
Average radius, 3.5 miles.



Baltimore, Md.

Population (1910), 558,485.
Shaded area has 5-cent fare with free transfers.
Area, 50 square miles.
Average radius, 4.0 miles.



Worcester, Mass.

Population (1910), 145,968.
Shaded area has 5-cent fare with free transfers.
Area, 42 square miles.
Average radius, 3.7 miles.

MAPS OF SINGLE-FARE ZONES IN TYPICAL CITIES

Figures indicate radii of circles in miles from traffic centers

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Long Rides for a Nickel

Examination of Single-Fare Areas of Some American Cities Shows Surprising Availability of Eight and Ten-Mile Rides—Further Expansion Is a Subject of Concern to Railway Operators

By D. J. McGRATH
Research Assistant Massachusetts Institute of Technology

AN essential factor in any study of fares and fare systems is a comparison of the lengths of haul given under existing conditions. Reliable data on the actual average length of passenger hauls are available in only a few scattering cases where extensive traffic counts have been made. The length of haul which is offered for the single fare, as shown by the length of lines to the first fare limits, is a valuable and suggestive form of data which is much more readily obtained. Moreover, it is a form of data which is capable of exact determination, whereas average length of haul figures are frequently compiled from a very limited series of observations and consequently are likely to contain material errors.

In connection with the street railway research work which is being carried on at the Massachusetts Institute of Technology, a set of maps has been prepared to furnish a means of direct comparison between the areas served for a single fare, usually 5 cents, in a number of American cities. These maps are reproduced in the illustrations accompanying this article.

The information used in preparing the maps was generally obtained from officials of the street railway or the public service commission with jurisdiction in the city in question. In a number of cases the stated location of the single-fare points was checked by the personal observation or knowledge of some member of the research staff, but generally the data had to be assumed correct as furnished. In a few cases the data were derived from published reports, as noted on the illustrations. Points used as centers for the drawing of the concentric mileage circles were either named by the parties furnishing the data as the approximate traffic centers, or else chosen because of the location of the city hall or a railroad terminal near the junction of a number of street-car lines.

The method adopted in preparing the figures was to lay out, from the map furnished, a new plot fixing the ends of all city lines, or their single-fare limits at the proper angle and distance from the center. A uniform scale of 3 miles to the inch was employed in making the drawings, but this scale was reduced to about 9 miles to the inch in the course of reproducing the figures for printing in this paper. The ends of the lines thus laid out were then connected so as to form a completely inclosed area, which is generally a polygon approximating a circle, except where large bodies of water or other topographical features have interfered with the circular growth of the city.

It is no doubt a fact that the average city line furnishes service to the population of more or less territory beyond the outer terminus of the line. As the extent of such service, however, is so indeterminate under the varying conditions encountered, it was deemed best for comparative purposes to extend the single-fare area maps only to the ends of the various lines or to their respective single-fare limits.

The area of each single-fare district was determined by planimetering the plotted area, and the result in square miles is stated with each figure. The mere comparison of areas, however, does not always furnish an adequate idea of all the circumstances, for a number of cities are prevented from spreading out in a normal radial manner because of limiting topographical features. Information as to the average radius of operation from the central traffic point affords a more useful comparison. This average radius may be determined approximately by considering the measured area as a circle and computing the radius by the ordinary formula of the circle:

$$\text{Radius} = \sqrt{\frac{\text{Area}}{3.14}}$$

When a body of water or other natural obstacle has distorted the growth of the city in any particular direction, the existing area may be considered as a sector of a circle and the approximate angle subtended may be measured with a protractor. In some instances where the figure is very irregular, an average radius of operation is best obtained by averaging the distances from the center to the various fare limits. Such data are at best only approximate figures, and their reasonableness may be roughly checked by an inspection of the map itself.

Since a number of the various companies have rates other than the straight 5-cent fare, the existing fare system and also the transfer arrangements are briefly described with each map. On the Cleveland map, for example, the extent of the 3-cent fare system is illustrated, and the 5-cent fare territory is also designated. It will be noted that practically all transfers in Cleveland cost 1 cent extra.

New York City and its environs present a rather special case in that there are a number of more or less independent companies operating in the district, with practically no transfer privileges between them. Transfers are usually given, with certain limitations, between lines of the individual systems. The map shown herewith fairly illustrates the distances which may be ridden for a single 5-cent fare from the central point, but rides from one extremity of the area through the center and out toward the other extremity are not generally available for one fare. On the Hudson & Manhattan railroad system fares from uptown points to New Jersey are 7 cents.

The populations of the several cities are given on the maps, the figures being taken from the federal census of 1910. These census figures are only approximately indicative of the populations actually served by the urban traction systems, since the single-fare areas shown in the maps do not always correspond with the political boundaries of the municipalities. In practically all the cases shown, however, the city populations cited are sufficiently correct to give a reasonable idea of the number of people served. One peculiar exception is in the case of Boston. The traction company operating in that city includes within its single-fare area a large number of politically independent suburban cities and

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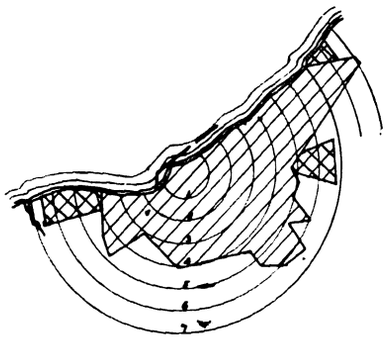
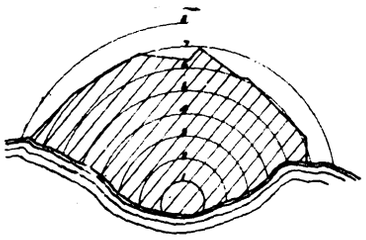


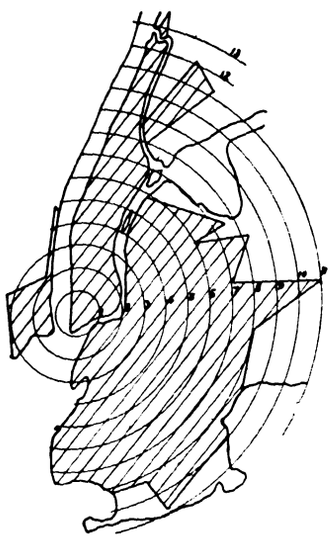
Cleveland, Ohio

Population (1910), 560,663.
Lightly shaded area has 3-cent fares, with 1-cent extra charge for transfers.
Heavily shaded area has 5-cent fare from center of city, *i.e.*, 2 cents in addition to the regular urban fare.
Area (3-cent fare territory), 46 square miles.
Average radius, 5.0 miles.



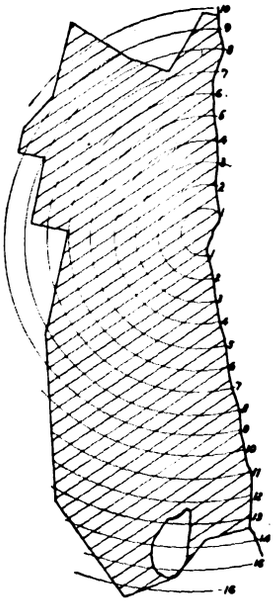
St. Louis, Mo.

Population (1910), 687,029.
Shaded area has 5-cent fare with free transfers.
Area, 56 square miles.
Average radius, 6.5 miles.



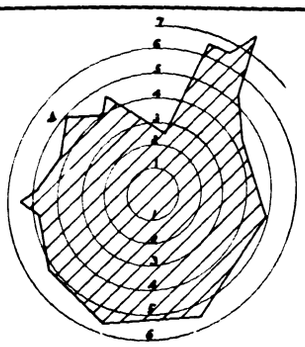
N. Y. Metropolitan District

From data on Map No. 10 in report of Transit Commission, city of Philadelphia, July, 1913.
Includes territory served by the Interborough Rapid Transit Company, New York Railways, Brooklyn Rapid Transit Company, Hudson & Manhattan Railroad and other smaller traction companies.



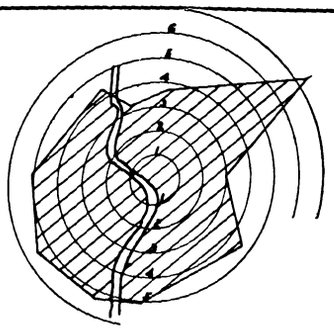
Chicago, Ill.

Population (1910), 2,185,283.
Shaded area has 5-cent fare with free transfers between surface lines.
Area, 182 square miles.
Average radius, 10.8 miles.



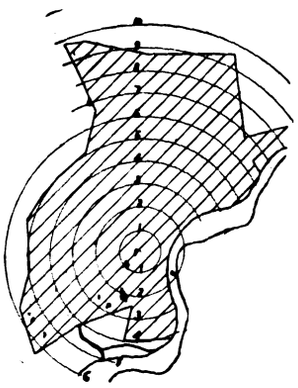
Los Angeles, Cal.

(Urban system only)
From map furnished by Board of Public Utilities, City of Los Angeles.
Population (1910), 319,198.
Shaded area has 5-cent fares with free transfers.
Area, 72 square miles.
Average radius, 4.8 miles.



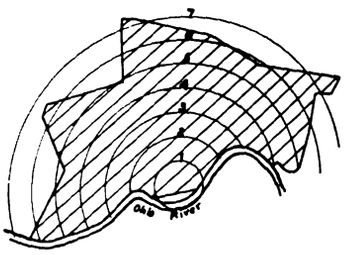
Springfield, Mass.

Population (1910), 88,926.
Shaded area has 5-cent fare with free transfers.
Area, 64 square miles.
Average radius, 4.5 miles.



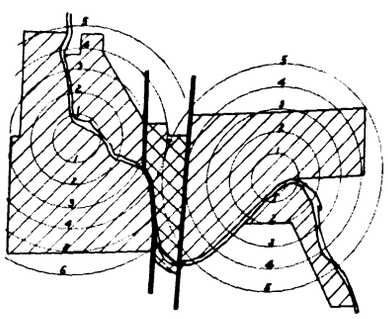
Philadelphia, Pa.

Population (1910), 1,549,008.
Shaded area has 5-cent fare, with limited free transfer system, and some 3-cent transfers.
Area, 91 square miles.
Average radius, 6.2 miles.



Cincinnati, Ohio

Population (1910), 363,591.
Shaded area has 5-cent fare with free transfers. Children's fare, 3 cents.
Area, 58 square miles.
Average radius, 5.9 miles.



Minneapolis, Minn.

Population (1910), 301,408.

St. Paul, Minn.

Population (1910), 214,744.

These two cities constitute two separate single-fare areas, with separate 5-cent fares charged in each city. Between them is a "neutral" or "overlap" zone into which a passengers may ride for one fare from either city, or vice versa. This zone is shown by special shading on the map.
Minneapolis area (including neutral zone), 61 square miles.
Minneapolis, average radius, 4.4 miles.
St. Paul, area (including neutral zone), 50 square miles.
St. Paul, average radius, 4.0 miles.

MAPS OF SINGLE-FARE ZONES IN TYPICAL CITIES

Figures indicate radii of circles in miles from traffic centers

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towns, which are really a part of the metropolitan district. The total population of Boston in 1910 was 670,585, but when the combined populations of the suburban towns and cities within the 5-cent fare are added a total of more than 1,000,000 is obtained. The populations included are as follows: Boston, 670,585; Cambridge, 104,839; Somerville, 77,236; Malden, 44,404; Everett, 33,484; Chelsea, 32,452; Brookline, 27,792; Medford, 23,150; Watertown, 12,875; Arlington, 11,187; Belmont, 5542—total, 1,043,546. The 1915 State census has been completed, but the foregoing figures are taken from the 1910 census in order to keep them on a level with the data cited for the other cities.

A little study of the maps reveals some interesting comparisons. There are single-fare areas ranging all the way from those of a 2 or 3-mile radius in small urban centers up to the greatly extended 5-cent fare lines of the largest cities, such as New York, Chicago, Boston and Philadelphia. Extensions to 6, 8 and even 10 miles are no longer uncommon, and in some cases more than 15 miles may be ridden by transferring through the center of the city. Such a condition represents a tremendous expansion from the short horse-car lines of twenty-five years ago, and it is a development which is giving many street railway operators a great deal of concern at the present time.

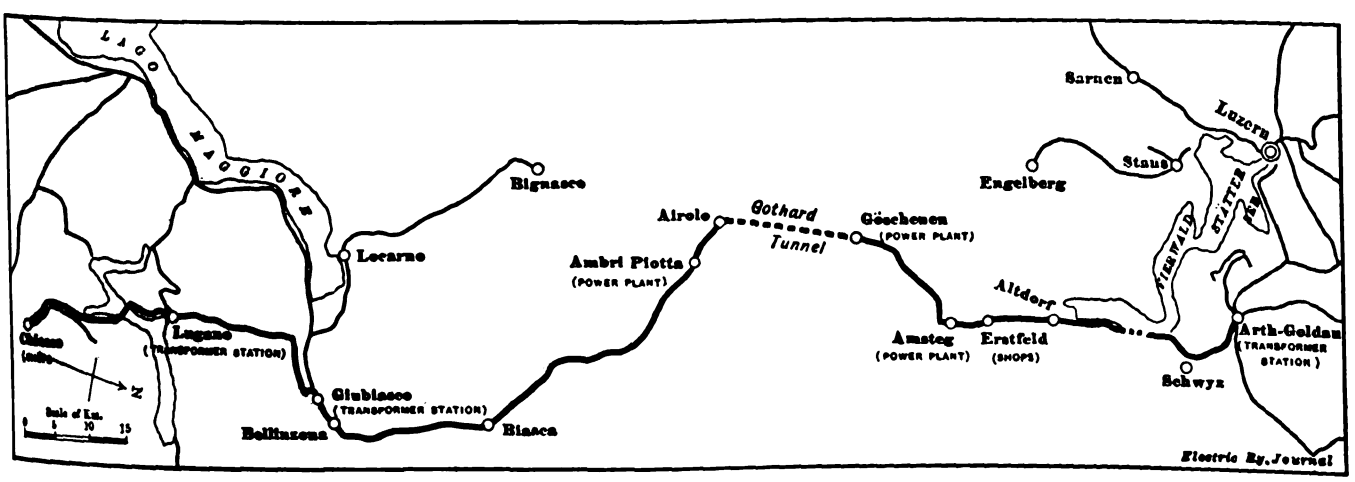
Progress on the St. Gothard Electrification

In Their 1916 Report the General Managers of the Swiss Federal Railways Show Why They Still Consider Single-Phase Best for This Electrification

EARLY in the present year the board of general managers of the Swiss Federal Railways presented to the board of directors a report concerning the choice of system to be adopted for the St. Gothard electrification. It was definitely decided to use single-phase current on the line between Erstfeld and Bellinzona and to install single-phase equipment in the power plants located respectively north and south of the tunnel, that at Amsteg being at the northern slope of the mountain, and the other, which is to be known as the Ritom station, being near the summit of the southern slope. The latter plant will have as a storage basin the Lago Ritom, with a capacity of more than 670,000,000 cu. ft., and it will work under a head of more than 2600 ft. Abstracts of previous reports on this electrification were published in the issues of the ELECTRIC RAILWAY JOURNAL for March 7, 1914, page 524, and March 21, 1914, page 657. The decision to use single-phase was announced at the meeting of the New York Railroad Club on March 17, 1916, as noted on page 605 of the issue of the ELECTRIC RAILWAY JOURNAL for March 25. Work on the power plants has been in progress for some time.

While the previous reports favored single-phase, the actual selection of system was postponed by the managers until the moment when the advancement of the work made a final decision necessary. This point arrived early in the present year and, after reviewing carefully the progress which had been made by continuous current, three-phase and single-phase systems during 1914 and 1915, the tentative selection of single-phase was confirmed.

In the 1916 report the board of managers point out that the system selected for the Erstfeld-Bellinzona line must also be applied later on the sections between Lucerne and Erstfeld and between Chiasso and Bellinzona, and that it should be, if possible, the same as on the other federal lines to be electrified later. They state also that a wrong impression seems to have been given by the fact that the 1916 budget provides for certain experimental work which some seem to think was connected with the choice of system for the St. Gothard electrification. The fact is that the experimental equipment provided for was simply to permit certain investigations to be made in regard to the mounting of the contact wire, the procedure to be followed in the main work and the determination of certain electrical constants not sufficiently known. As the report points out, it was not necessary to make experiments in choosing a system, because there has already been sufficient experience on numerous railways to permit a decision on this point, at least as far as the single-phase and three-phase systems are concerned. In the case of the direct-current system, it was not considered possible to secure information early enough on its value, and such information as could be obtained would not be as conclusive as that which will be furnished by the application of this



OUTLINE MAP SHOWING LOCATION OF ST. GOTHARD LINE NOW BEING ELECTRIFIED

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system by an American company which, at the time of the report, was about to introduce it on a part of its system.

The project approved by the board of directors on Nov. 25, 1913, was based on the single-phase system. In view of the fact that the Loetschberg electrification with single-phase had not then been crowned with the success which it has since achieved, the reservation made in the earlier report as to the type of system was a wise one. The board of managers has, in accordance with its promise, carefully studied all available systems in the meantime, and has utilized competent advice as to the form and frequency of the primary electrical power which should be used.

COMMENTS ON SYSTEMS OF ELECTRIC TRACTION

The three-phase system was not considered applicable on account of the impossibility of securing satisfactory speed control, and of the necessity for using two contact conductors.

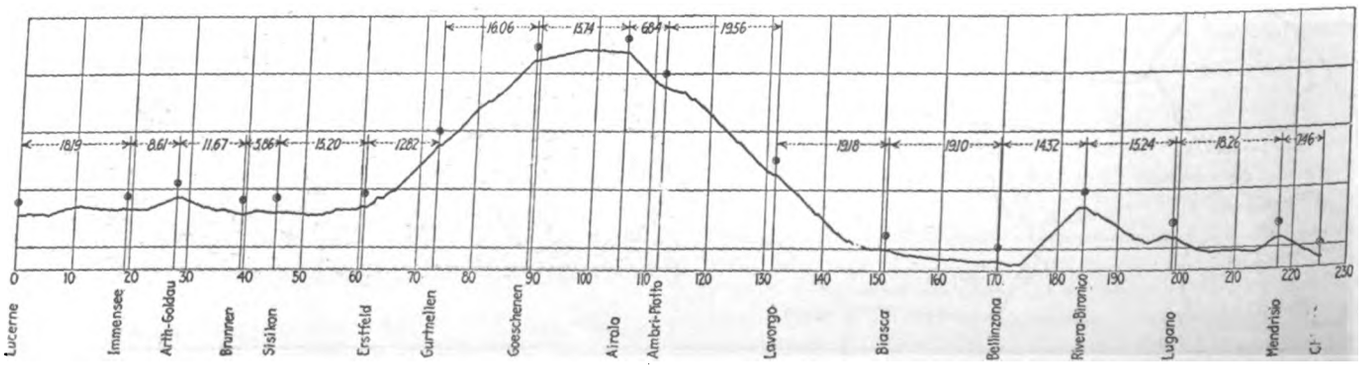
The results obtained with single-phase on the Loetschberg line are such that this system can be recommended without reserve. This opinion is confirmed by the developments on the New Haven, New York, Westchester & Boston, Boston & Maine, Pennsylvania, and Norfolk & Western electrifications in North America. These developments have furnished the solution of all technical problems which have presented themselves on the federal railway system. The adaptability and elasticity of the single-phase current have been well demonstrated, and it has been applied for a considerable time and on a large scale successfully. In addition, nearly all of the manufacturers have participated in the single-phase development.

In order to show that the difficulties encountered in single-phase development had not been overlooked the managers give a number of examples of difficulties encountered in several installations, namely, on the Loetschberg line, the New York, New Haven & Hartford Railroad, the Midi Railway in France and the Wiesenthal line in the Grand Duchy of Baden. In the case of the Loetschberg Railway one of the difficult problems was the design of the locomotives. Even the New Haven Railroad had, until within a few years, a struggle with various technical difficulties. The experience thus gained no doubt influenced the Pennsylvania Railroad to adopt single-phase on the Philadelphia electrification in spite of the good results obtained on three lines of the first importance with low-tension direct-current with the third-rail contact system. In spite of difficulties on the Midi Railway with inductive interference there is no thought of changing the system. The mechanical difficulties on the Wiesenthal line in connection with the locomotive have long since been overcome. The results obtained by the Swedish State Railway on the Kiruna-Riksgraensen line cannot yet be considered definite on account of the interference with its traffic by the present war, but the experience has been sufficiently satisfactory to warrant the equipment of a much longer line between Kiruna and Lulea.

PROGRESS IN DIRECT-CURRENT HEAVY TRACTION

The report reviews the progress which has been made in increasing the voltage on direct-current lines which, while formerly slower in America than in Europe, has lately progressed there much more rapidly and on a larger scale. The managers had followed with great interest the Butte, Anaconda & Pacific Railway electrification and the Canadian Northern Railway electrification at 2400 volts. The former was only of general interest because the capacity of the single locomotive was small and the speed low. The Lancashire & Yorkshire electrification was also mentioned, attention being called to the fact that after experimenting with a 3500-volt line, a 1200-volt third-rail system was adopted on a later section of the same system. The Michigan Railway installation at 2400 volts was also mentioned. In referring to experiments on the last-named railway with voltages higher than 3000, the managers state that these did not appear to be of great interest. They point out that in their previous report they called attention to the necessity of using at least 3000 volts with direct current as applied to heavy trains moving at high velocity. They state that the partisans of the direct-current system, in citing the great increase in the length of line electrified with high-tension direct-current or on the point of being electrified, have principally in mind cases where light trains are used or where the voltage is less than 3000. These cases have little bearing upon the present one. In Europe there is not a single line of this kind which justifies a decision based on immediate experience. At the time of the completion of the report, the Chicago, Milwaukee & St. Paul electrification had not developed far enough to furnish data of value in connection with the St. Gothard line. Further, there has been no opportunity in Europe to experiment with sample direct-current locomotives, which would be particularly necessary as the manufacturers have not had the occasion to construct locomotives which could serve as models. At the same time, generators suitable for heavy direct-current traction, with large capacity at high voltage, have never been built in Europe. Hence, it was not considered possible to use the direct-current system for the St. Gothard line because it is not sufficiently perfected in the form necessary, and because the line between Erstfeld and Bellinzona could not be of an experimental nature nor could it be partially equipped.

While stating the above convictions in regard to the single-phase system, the report of the board of managers points out that the experience with high-tension direct-current traction in America and in Europe justifies the hope that in the near future it will have a value nearer that of the single-phase system. If the latter



PROFILE OF LINE OF WHICH PART IS NOW IN PROCESS OF ELECTRIFICATION BY SWISS FEDERAL RAILWAYS

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had not been available, experiments with the direct-current system for the St. Gothard line would have been recommended. The possibility of using the mercury vapor converter increases the chances of success of the direct-current system, because this apparatus can be properly considered as a means of rendering this system more useful in combination with the alternating-current, which tends more and more to be produced in three-phase form at 50 cycles. This result would be important in the present case because it is probable that in the near future mercury vapor converters may be constructed for voltages and of capacities to permit substituting them for motor-generators in substations for heavy direct-current traction. Two of these converters, of small capacity and for 600 volts, had been used on a railway in Switzerland with good results. It is impossible, however, at this time to predict when such apparatus can be produced in a form suitable for such a project as the St. Gothard line. In spite of the progress already made, the mercury vapor converter has not been sufficiently perfected and popularized to furnish a reason for not selecting single-phase current for this line, which in its natural form can be employed directly without transformation other than that of voltage.

Unity in Form of Energy and of Frequency

The concluding part of the report of the board of managers is devoted to a consideration of the above topic, although after taking into account all the advantages of three-phase, 50-cycle current, the decision was reached to generate single-phase current in the Amsteg and Ritom power stations. The influence that the choice of system by the federal railways would have on the relation of the power plants of the country to the railways was not overlooked, as it was realized that the prevailing tendency toward a standard form of current for transmission would be furthered by its adoption for the primary power of the railway. The railways could, of course, use standard primary power with the single-phase system, and even with the direct-current system, by the use of substations. However, the desire to avoid the transformation of the power from three-phase to single-phase form finally led to the conclusion already mentioned.

It was decided also to plan the two power stations so that when fully equipped they can supply power for the entire line from Lucerne to Chiasso. It is expected that means will be found to utilize the surplus power of these plants in spite of its form and frequency, even if it is necessary at first to transform the greater part of the power. Later the entire single-phase capacity at low frequency will be needed for traction purposes.

Vancouver Railways Furnish Many Recruits

Men from all departments of the British Columbia Electric Railway, Ltd., and the Western Canada Power Company, Vancouver, have enlisted for overseas duty so that business is being conducted with a minimum force of employees. Since August, 1914, the British Columbia Electric Railway has had 368 of its employees enlist and the Western Canada Power Company eighty.

A roster of the men who have enlisted from the latter company is posted in a prominent place at the entrance to the company's offices. On returning from the front the men are reinstated as far as possible and their applications for re-employment receive preference.

For the Movies

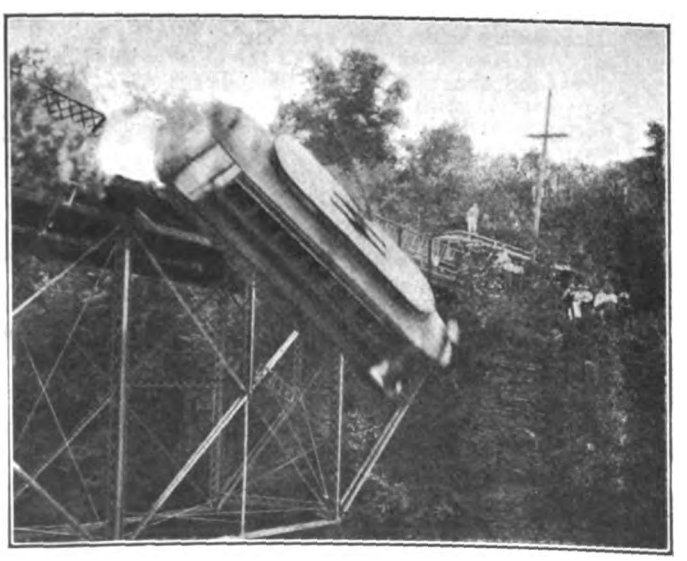
A Realistic Bit of Work in Photographing Street Car Wreck

THE illustration shown herewith, from a picture which hangs in the office of Roger B. Williams, Jr., president Ithaca (N. Y.) Traction Corporation, was taken by Wharton, Inc., a moving picture firm located in Ithaca.

The title of the scenario is "The Prince of India," the final scene of which runs about as follows:

"The villain, who had stolen the Prince's jewel, in order to make his escape, steals a street car at the end of a branch line while the motorman and conductor have left it to obtain a drink of water. The car is started by the villain and is, of course, chased by the motorman and conductor, but without success. The hero, the Prince of India, is riding in an automobile and sees the car being driven by the villain and gives chase, jumping on the rear platform while the car is running at full speed. A fight ensues, in which the villain is knocked out and falls unconscious over the front dashboard and controller of the car just as it is running away down a grade. As the car reaches the bridge at a supposedly terrific speed the hero jumps off on one side safely onto the bridge and the car is derailed, breaking through the railing and falling to the bottom of the gorge."

As a practical matter the moving picture people bought one of the discarded cars of the Ithaca Traction Corporation. The motor had not yet been removed, so that this particular car was used in taking the pictures leading up to the final plunge. There is a slight grade to the north of Fall Creek bridge, and after all the necessary pictures leading up to the final scene were taken the car was stripped of motors and all valuables of every kind. A dummy was then placed on the front platform, in the position left by the villain when he was knocked out by the hero, and the car was permitted to obtain the necessary headway down this grade and, by means of a derailing switch, was derailed at the proper point on the bridge. The iron rail at the side of the bridge had been replaced by a false wooden one built and painted to represent iron. Examination of the illustration shows a piece of this railing falling in advance of the car. The scene was indeed very realistic and, as the distance from the bridge floor to the bottom of the gorge is about 300 ft., the car took as pretty a plunge as could be desired, landing head-on on the ravine floor.



CAR OF ITHACA (N. Y.) TRACTION CORPORATION PLUNGING INTO RAVINE IN "MOVIE" SCENE

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Shall New York Street Railways be Run for the People of New York?

To the People of New York City:

The threat to tie up the street railroads of this City is your problem.

A definite expression of public opinion will be overwhelming.

We believe we are profoundly right, and we want the public of this City to know why.

* * * *

See what is threatened:

An organization from another city, in order to bolster up its side of a dispute in a neighboring community, seeks to stop the very life-blood of the City of New York.

There are no differences between our men and ourselves. It is not even claimed that there are.

But this alien organization proposes to call a strike anyway!

* * * *

We are not fighting labor unions or the principles of organization.

Our problem is a simple one—but very practical.

It is this: We are responsible to the people of New York for providing safe, prompt and continuous transportation service.

For that responsibility we are held vigorously to account by public opinion re-inforced by a Public Service Commission with drastic powers.

The very life of the City depends upon the continuity of our operations. Disrupt it, and New York is prostrate.

* * * *

Our men are being threatened and intimidated by the Amalgamated Association of Street and Electric Railway Employees, an organization with interests in various parts of the United States.

Its main offices are in another city.

Its interests are not primarily the interests of the people of New York, of the transportation companies within its borders, or of the men they employ.

* * * *

To accept the regime of this organization would immediately make the operation of the street railroads of New York a prey to the orders, the prejudices and the disputes of the officers of an alien organization with alien interests, working for alien purposes, and with no responsibility whatever to this community.

Our men want to stay by their jobs. A careful canvass makes that clear.

There is no question, however, of the purpose of this organization, without consultation with, or authority from, our own employees, to call a strike on the lines of the New York Railways, with a hope that through threats and intimidation our men may be induced to stay away from their work.

We are ready, and have always been ready, to meet with our own men to discuss our mutual interests.

* * * *

The management of these lines has worked harmoniously with its men for many years.

We have recognized the impossibility of providing the service the people demand unless men and officers co-operated heartily.

* * * *

Our men themselves know that we want to share with them the increased prosperity of the Company.

We have increased wages twice this year.

During the past several years we have made other increases, as well as constantly adjusted working conditions so as to make them more favorable.

But this alien organization, to serve its own ends, now proposes to throttle the daily life of this Great City in spite of all that.

* * * *

It would be impossible for us to recognize or to deal with this organization without stultifying ourselves in the performance of our supreme duty to the people of this City.

We wish to make it clear, therefore, that we cannot and will not have any dealings whatsoever with this alien organization, although our willingness to meet with our own men stands—and will stand.

* * * *

The public interest in this situation far transcends that of any corporation or its employees.

We are gravely conscious of our duty to leave no step untaken that will avoid an interruption of transportation service.

We are relying upon the loyalty of the uniformed employees of this Company to co-operate with us in maintaining the service we are obligated to give to the people of New York.

The men may, on their part, rely upon us to do everything in our power to see to it that their interests and safety are protected to the full extent of the law.

* * * *

The City authorities of New York have assured us of their determination to preserve order and give ample police protection to our passengers and employees.

With such protection, there will be no doubt of our ability to maintain our service—and maintain it with our loyal, uniformed employees.

* * * *

If every man in New York makes up his mind that insofar as his influence is concerned he will not tolerate an interruption of traffic on the street railways of this City, there won't be any question as to what will happen.

NEW YORK RAILWAYS COMPANY,

THEODORE P. SHONTS, *President.*

Advertisement Appearing During Strike Crisis in New York This Week

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General Tie-Up Threatened in New York

Strike in Westchester County Spreads to Third Avenue System, and Effort of Amalgamated Association to Unionize Other Railway Employees Creates Fear of Strikes on All Metropolitan Lines

SPREADING with marked rapidity from Westchester County, where, as described in last week's issue, the employees of the Yonkers Railroad and the Westchester Electric Railroad went out on strike on July 22, the strike situation in New York City has now become so serious as to threaten the maintenance of transportation service in the whole metropolitan district. The remaining employees of the Third Avenue Railway system, which besides the lines in Westchester County controls important lines in the Bronx and Manhattan, have joined the strikers, and the persistent efforts of outside parties connected with the Amalgamated Association of Street and Electric Railway Employees of America to unionize other lines, make the outlook doubtful. Efforts made by Mayor Mitchel and the Public Service Commission for the First District of New York to bring about a peaceful adjustment of the situation have served only to show clearly that alien interests are seeking to unionize the traction lines in New York at any cost, while the companies are firm in their refusal to recognize such outside interests. The alleged successes of the Amalgamated Association in organizing the employees have been denied by the various companies, and at this writing it looks as if the deadlock would force strikes on many if not all of them to show how far the intrigues of the union organizers have gone and to settle the question of whether the entrance of the Amalgamated Association into New York is to be tolerated.

Unionism the Issue

PRESIDENT SHONTS

"We wish to make it clear that we cannot and will not have any dealings whatsoever with this alien organization (the union), although our willingness to meet with our own men stands—and will stand."

UNION PRESIDENT MAHON

"We will arbitrate gladly every question but our constitutional right to organize."

MAYOR MITCHEL

"It is inconceivable that there should be differences not susceptible of mutual adjustment."

SPREAD OF STRIKE TO THIRD AVENUE SYSTEM

The strike which began on the lines of the Third Avenue Railway system in Westchester County on July 22, and on the Union Railway on July 27, was extended on Sunday, July 30, to all the remaining lines of the system, *i.e.* in Manhattan. The company was compelled to stop running cars on all of its surface lines in Manhattan late Sunday afternoon, because of the strike of motormen and conductors. A sympathetic strike by the uniformed employees of the allied Brooklyn & North River Railroad was declared Sunday evening. With the exception of such cars as were operated in the Bronx by strike-breaking crews on the lines of the Union Railway, the strike temporarily tied up the entire Third Avenue system from the Battery to the boundary of Westchester County. The next morning the company was quick to resume as much of its service as possible, and at present it is operating in the day time about 50 per cent of its normal service in the Bronx, and about 30 per cent of its normal service on the lines in Manhattan. Night service, however, is mostly if not totally suspended on account of the fear of violence by strikers. The cars on the Yonkers Railroad and the Westchester Electric Railroad are still totally out of operation, owing to the experience ordinances in force in Yonkers, Mount Vernon and New Rochelle.

Owing to the vigilance of the New York police force, not much disorder has existed in the districts affected by the strike. Most of the New York police are on strike duty, either detailed on the cars, along the routes or on reserve duty. Police Commissioner Woods as an extra precaution has organized an automobile patrol, using all the department automobiles and borrowing cars from many other city departments. This patrol, like the patrol of the motorcycle, bicycle and horse-policemen in the Bronx, is guarding the lines in Manhattan. Policemen on foot are stationed within sight of each other and in convenient proximity to telephones.

With the employees of the Third Avenue Railway on strike, officials of the Amalgamated Association began to turn their attention to other lines. They were quoted as intending to organize every car line (surface, subway or elevated) in New York, Brooklyn, Queens and Staten Island, as well as the Hudson & Manhattan Railroad in New Jersey. Whether or not strikes would be called would depend upon the manner in which the men were treated by each company after they were organized. The opportunity given by the strike in Westchester County was one which the union officials did not intend to miss if possible.

HIGHER WAGES FOR NEW YORK RAILWAYS

Theodore P. Shonts, president New York Railways, at the annual gathering of the employees of the company at the Manhattan Casino on July 27 had announced an increase in the wages of the motormen and conductors to the following scale: First year, 26 cents; second, third and fourth years, 29 cents; fifth year and thereafter, 30 cents. The former rate of pay per hour of the conductors on the electric lines was as follows: First year, 25 cents; second year, 26 cents; third and fourth years, 27 cents; fifth year and thereafter, 28 cents an hour. The former pay for motormen of electric lines was 26 cents the first year, 27 cents the second year, 28 cents the third and fourth years and 29.5 cents the fifth year and thereafter. Conductors on storage battery lines received 23.5 cents the first year and 24 cents thereafter. Motormen on storage battery lines were paid 25 cents the first year and 26 cents thereafter.

In spite of this increase in wages, however, the union organizers tried to enroll men among the employees of the New York Railways, which with the Third Avenue Railway furnishes practically all the surface transportation in Manhattan and the Bronx. On Sunday night, July 30, Frank Hedley, vice-president and general manager of the New York Railways, issued a statement notifying the employees that labor agitators from various outside cities had announced in secret meetings that they had come to New York to tie-up all street railway traffic regardless of hardships to the

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Our Efforts to Fulfil Our Duty To the People of New York

To the People of New York City:

Our supreme duty is to prevent an interruption in the street railway service of New York.

A communication alleged to represent the demands of our men has been handed to the Mayor. This communication was signed by non-resident officers of an alien organization.

We have had no disputes with our men, and no rommunication from them. We shall, of course, however, confer with the Mayor, and—at any time—with our own men.

* * *

The canvass we have made convinces us that our men are loyal and wish to co-operate with us in maintaining service for the people of New York.

I addressed two large mass meetings of our men at the Ninety-ninth Street and Fiftieth Street car barns last night. At least 2500 men were present. I told the men very frankly our position, and with great enthusiasm these men promised their support.

* * *

We have had a very happy family in the years in which I have been associated with the management of these companies, and no questions have hitherto arisen which could not be satisfactorily settled without necessity for outside interference.

In order that there may be no mistake on our part, however, as to the present attitude of our men, we have asked them to select by secret ballot a group of their fellow-employees empowered to discuss matters of common interest and to consider effective methods of maintaining uninterrupted the transportation service expected by the people of New York.

* * *

We are in no attitude of resistance toward our own men.

Our policy is and has been to work with them and to stand by them.

The sole reason why we feel it unwise that they ally themselves with an alien organization is that we—and they—are responsible to New York, and to New York alone, for maintaining without interruption from any cause the transportation service in this city.

The present tie-up on the Third Avenue Railroad is wholly due to the exigencies of a dispute in a neighboring community.

Alliance by New York street railroad employees with a foreign organization would mean that the transportation service of this city might at any time be interrupted without reference to conditions in New York, and solely to promote in some other city the interests of an organization in no sense responsible—as we are and as our employees are—to the people of this community.

* * *

We recognize a peculiar obligation to our men, and we have felt that they should receive more than ordinary consideration.

As the company has prospered, therefore we have many times in recent years increased the wages of the men.

* * *

We now propose to go a step farther in an effort to get closer to our men and to protect the public against interrupted service.

We believe there are no subjects which may arise at any time which cannot be disposed of at a friendly conference between accredited and representative employees and ourselves.

In addition to considering with a committee of our employees any questions now at issue, we shall invite these representatives to join with us in perfecting a permanent plan for securing more effective understanding and co-operation between management and men.

* * *

We therefore appeal to the people of New York to co-operate with us and our loyal employees in working out a satisfactory and permanent solution of the relationship between management and men which shall be fair to all concerned, and which shall, above all else, protect the supreme right of the people of New York to enjoy—without alien interference—an uninterrupted transportation service.

NEW YORK RAILWAYS COMPANY
THEODORE P. SHONTS, *President.*

Advertisement in Daily Papers of Aug. 2

families of the men and to the public in general. One union man alleged that with twenty-five members he could create enough disturbance to intimidate the rest of the New York Railways employees. Mr. Hedley, therefore, took this means of notifying his employees to be on their guard against the promises and threats of meddlers, and telling them that the management had arranged for adequate protection.

NO DISSATISFACTION ON B. R. T.

On Monday morning the Brooklyn Rapid Transit Company, the third large surface system in New York, issued a statement to the effect that so far as it knew there was no dssatisfaction among its men. It said:

"We think we have as loyal a body of men as any large enterprise in the country. We think they have been given to understand that as the company prospers, their conditions will improve and their remuneration will be increased. Our transportation employees have had their wages increased three times within the last four years. Under these conditions, a strike with all its terrible consequences would seem to be an impossibility. We are confident that it would not originate by general act of our own men. We have no knowledge that outsiders would attempt to stir up dissatisfaction among our workers. If they should, we will stand by our men and protect them in the discharge of their duties."

EFFORTS DIRECTED AGAINST NEW YORK RAILWAYS

On Monday night officials of the New York Railways announced that the Amalgamated Association was still trying to add its "green-car" system to the "red-car" system of the Third Avenue Railway so as practically to deprive Manhattan of all its surface transportation. In a statement issued by Mr. Hedley, the company accused the striking car men of other lines of having made efforts to intimidate employees of the New York Railways. All day Monday small groups of men tried to persuade the company's employees to leave their cars, and mass meetings were continually held, made up principally of strikers from Westchester County. At these meetings volunteers were called for to go out and pull New York Railways men off their cars. As the result hundreds of policemen were detailed to watch the carhouses of the company, and detectives were ordered to accompany all the green cars. Moreover, no passengers were allowed to ride with the motormen on the front seats of the cars.

The remainder of the statement issued by Mr. Hedley shows the general attitude of the company toward the Amalgamated Association and toward its employees, as follows:

"The propaganda of the foreign labor union which is now seeking to interfere with the comfort and convenience of New York, involves domination of the city transportation system by a labor union with interests in various parts of the United States, with main offices in another State and with no responsibility whatever to this community. There is no question whatever of the purpose of this union, without consultation with or authority from our own employees, to call a strike on the lines of the New York Railways, with a hope that through threats and intimidations our men may be induced to stay away from their work.

"Our policy is to do for our men everything that the

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financial condition of the company will permit. Our men themselves know that we are disposed to share with them the increased prosperity of the company. We have increased wages twice this year. During the last several years we have made other increases, as well as constantly adjusted working conditions so as to make them more favorable. We have conducted an exhaustive canvass of our men, and with a single exception every man seen has assured us of his purpose and desire to continue at work. We know that our men are loyal and that they want to stand by us. We propose to stand by them. We are confident that the city authorities will afford passengers on our cars and the employees who man them adequate protection. Relying on this confidence, we propose to continue to give service to the people of New York."

MAYOR MITCHEL'S INTERVENTION FAILED

The repeated reports that the strike of the motormen and conductors on the Third Avenue Railway would be extended to the other traction lines in New York, caused Mayor Mitchel to call a conference for Tuesday afternoon in his office between representatives of the Third Avenue Railway and the Amalgamated Association.

Representatives of the two sides met with the Mayor as requested, but in a very short time matters reached a deadlock over the question of unionizing the men. The meeting was attended by Edward A. Maher, Sr., vice-president and general manager Third Avenue Railway; Edward A. Maher, Jr., assistant general manager of this company; W. D. Mahon, president of the Amalgamated Association, and William B. Fitzgerald, labor organizer.

In his preliminary remarks, Mayor Mitchel stated that the dispute between the Third Avenue Railway and its employees was a matter of concern to the city on account of the question of maintaining service that was involved, and he expressed the conviction that no differences existed which would not be susceptible of adjustment. Asked for an expression in regard to the demands of the men, Mr. Mahon stated that the men wanted (1) the right to organize; (2) a recognition of the union, in that committees from the men voicing grievances should be received by the company, and (3) an increase in pay. From the present rate of 26 cents an hour for the first year, 29 cents for the second, third fourth and fifth years, and 30 cents thereafter, the men desired an increase to 30 cents an hour for the first year and 33 cents an hour for each succeeding year.

Mr. Maher, Jr., stated that the company had received no demands from its employees themselves, that pay had been raised twice in the last six months, and that it felt it could do no more in the line of higher wages. As to the unionization of its employees, Mr. Maher stated that the company was now opposed to it, and would always be so opposed. In Westchester County, where unions existed when the roads were taken over, the company had not opposed the continuance of such organization. On the other lines, however, while Mr. Maher was ready at any time to meet the men as individuals, he would not meet them on a union basis, and in the present instance there was nothing at all to be arbitrated. Mr. Mahon insisted that the employees could not arbitrate the question of union organization and recognition, inasmuch as it was the constitutional right of the men to organize if they so desired.

With the conference at such an *impasse*, Mayor Mitchel dismissed the representatives with a few words of warning to each side in regard to the character of men to be utilized in the strike districts, and stated that in the event of a fight to the finish, the city would do its utmost to perform its duty of maintaining order. After the conference the Mayor held private conversations with each side, but the only result announced was that the union representatives promised to give him a twenty-four-hour notice of any further demands that might result in an extension of the strike situation to other city lines.

MORE INTIMIDATING EFFORTS AGAINST NEW YORK RAILWAYS' EMPLOYEES

Tuesday night, after the failure of the Mayor's peace move, Mr. Hedley and Mr. Shonts issued another statement showing that the efforts of the Amalgamated Association to unionize the employees of this company were still being continued. According to these officials, a careful canvass of the employees convinced them that the men desired to be left free to continue to perform their daily duties with the company. Yet out of town men, it was learned from several sources, were threatening employees of the company if they should continue to operate its cars. In amplification of its previous promise to take care of its men, the company therefore stated:

"The company will do everything in its power to see that these men from out of town shall not interfere with the comfort and convenience of our passengers and employees. We have to-day arranged to establish dormitories and enlarge our restaurant service, so that employees who desire to avail themselves of this privilege, should they consider it an additional safeguard, can sleep in the dormitories and have their meals served to them, free of expense, on this company's property."

In following out the promises made above the company has installed 1800 cots in four of its carhouses, and has arranged for the necessary food supplies to be furnished by its co-operative stores.

GENERAL APPEAL MADE TO THE PUBLIC

On Wednesday morning, Mr. Shonts made a general appeal to the public through the local newspapers, asking the public for a definite expression of opinion in support of the company. The advertisement containing its appeal is reproduced on page 228. The chief point made was that the company was not fighting labor unions or the principles of organization, but that inasmuch as it was responsible to the people of New York for providing safe, prompt and continuous transportation service, it could not submit to the orders, prejudices and disputes of the officers of an alien organization having no local responsibility. This advertisement was repeated in the evening papers, and on Thursday morning a follow-up advertisement appeared, which is reproduced on page 230.

In amplifying the point made in the preceding advertisement that the company was not fighting the principles of organization, Mr. Shonts in the later advertisement said that in order that there might be no mistake as to the present attitude of the New York Railways employees, the company had asked them to select by secret ballot a group of fellow employees empowered to discuss matters of common interest, and to consider effective methods of maintaining uninterrupted the transportation service expected by the people of the city. The company even proposed to go a step further in an effort to get closer to its men, believing that there were no subjects which may arise at any time which could not be disposed of at a friendly conference between accredited and representative employees and officers of the company. Hence, in addition to considering with a committee of its employees any question now at issue, the company stated that it would invite these representatives to join with it in perfecting a permanent plan for securing more effective understand-

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ing and co-operation between the management and the men.

Public Service Commission Begins Investigation

In the meantime, before the second advertisement appeared, the Public Service Commission had decided to investigate the general strike situation, and summoned before it for a hearing on Wednesday afternoon representatives of the Third Avenue Railway and the Amalgamated Association. The commission, Chairman Oscar S. Straus announced, had no power to make orders following such an inquiry, but it had the right and duty to express to the companies, to the employees and to the public its impartial conclusion with respect to the facts. The hearing would be an investigation as to the manner of operation and the adequacy and safety of service.

At its first session, held Wednesday afternoon, the commission did little more than lay a foundation for its investigation. The session was attended by Mr. Maher, Jr.; Alfred J. Cook, counsel; Mr. Mahon, Mr. Fitzgerald and counsel. Mr. Maher told the commission how the whole trouble started with the motormen and conductors on the lines of the Yonkers Railroad and the Westchester Electric Railroad, after the company had offered the men an increase from 25 cents an hour for the first year and 28 cents thereafter, to 26 cents an hour for the first year, 29 cents for the second, third, fourth and fifth years, and 30 cents after five years. The men, however, desired an increase of 5 cents an hour over the present rate and insisted upon a two-scale rate. The company had refused to arbitrate the question, because it had gone as far as it could in granting an increase to the men, inasmuch as the Yonkers Railroad earned only about $2,000 the last year and the Westchester Electric Railroad lost about $56,000.

The Union side of the question was presented by Mr. Fitzgerald, who stated that the men on the Union Railway and the remainder of the Third Avenue Railway system in Manhattan struck out of sympathy with their fellow employees in Westchester County and because they knew the company was opposed to unionization. Mr. Fitzgerald admitted, however, that even if the question at issue in Westchester County had been submitted to arbitration and satisfactorily settled, the danger of a strike on the lines of the Third Avenue Railway in the Bronx and Manhattan would not have been avoided, for the Amalgamated Association would still have endeavored to unionize the employees on these lines. The association did not make an issue of unionization in Westchester County, inasmuch as old unions already existed and recognition of these had been sufficiently made in an old trade agreement informally accepted by the present management. At the end of the hearing, the commission decided to omit a session on Thursday morning in order to allow a second peace conference to be held before Mayor Mitchel, but stated that thereafter sessions would be held both morning and afternoon until the strike situation had been cleared up.

Increase Granted to Interborough Employees

On Wednesday afternoon the directors of the Interborough Rapid Transit Company, which is controlled by the same interests as the New York Railways, adopted a resolution increasing the pay of eleven classes of employees on its subway and elevated lines. Most of the advances were from 15 to 20 cents a day, although some classes of employees received an increase of 10 cents and others an increase of 30 cents. The complete schedule of old rates and the new rates, which are effective from Aug. 1, follows:

	Present Rate (Per 10-Hour Day)		New Rate (Per 10-Hour Day)
*Conductors:			
First year	$2.45	First year	$2.60
Second year	2.45	Second year	2.65
Third year	2.55	Third year	2.75
Fourth year	2.65	After third year	2.80
Fifth year	2.70		
*Guards:			
First year	2.10	First year	2.20
Second year	2.10	Second year	2.30
Third year	2.20	Third year	2.40
Fourth year	2.30	After third year	2.50
Fifth year	2.35		
*Motormen:			
First year	3.25	First year	3.35
Second year	3.50	Second year	3.60
Third year	3.50	Third year	3.70
Fourth year	3.60	Fourth year	3.80
Fifth year	3.70	Fifth year	3.90
After fifth year	3.80	Sixth year	4.00
After eighth year	4.40	After sixth year	4.20
*Special Officers:			
First year	2.40	First year	2.50
After first year	2.50	After first year	2.60
†Porters:			
First year	1.70	First year	1.80
†Switchmen:			
First year	2.70	First year	3.00
Second year	2.80	After first year	3.10
Third year	2.90		
†Starters:			
First year	2.50	First year	2.60
Second year	2.70	First year	2.60
‡Train Clerks:			
First year	2.50	First year	2.60
Second year	2.60	Second year	2.70
Third year	2.70	After second year	2.80
*Agents:			
First year	2.10	First year	2.20
Second year	2.20	Second year	2.30
Third year	2.30	Third year	2.40
Fourth year	2.40	Fourth year	2.50
After fifth year	2.50	After fourth year	2.60
*Gatemen:			
First year	1.90	First year	2.00
After first year	2.00	After first year	2.10
†§Towermen:			
First year	2.60	First year	2.70
After first year	2.70	After first year	2.80

*One day off per month with pay.
†Two days off per month with pay.
‡Two and three days off per month with pay.
§Per eight-hour day.

Mr. Fitzgerald, according to newspaper reports, stated that this new schedule was not satisfactory, mainly for the reason that it did not carry with it recognition of the union. The union organizers, he said, would continue to make efforts to enroll employees of the Interborough Rapid Transit Company as if no increase in pay had been granted.

Demands Made on New York Railways and New York & Queens County Railway

In compliance with the terms made at the first peace conference, Mr. Mahon forwarded to Mayor Mitchel on Wednesday the demands which the employees of the New York Railways and the New York & Queens County Railway were said to have decided to present to their respective companies in regard to wages and the recognition of the union organization. The demands alleged to have been formulated by the motormen and conductors of the New York & Queens County Railway were identical with those for the New York Railways, with the exception that those for the former company included no schedules for storage-battery and horse-car lines. The demands on the New York Railways follow:

1. That the company will allow its employees to organize without any intimidation or interference of any kind.

2. That the officers of the company will agree to meet and treat with the duly accredited officers and committees of the organization upon all questions arising between them in the future.

3. That the company will establish the following rates of wages for the future: Motormen and conductors on the electric lines to receive 30 cents an hour for the

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first year of service and 33 cents an hour thereafter; motormen and conductors on the storage-battery lines to receive 28 cents an hour for the first year and 30 cents an hour thereafter; conductors and drivers on horse-car lines to receive 25 cents an hour for the first year and 28 cents an hour thereafter.

It was understood in connection with these demands that the union would consent to the arbitration of all questions except the right to maintain an organization.

SECOND CONFERENCE IN MAYOR'S OFFICE ALSO MEETS DEADLOCK

Immediately upon the receipt of these demands from Mr. Mahon, Mayor Mitchel arranged for a conference on Thursday morning between the officials of the New York Railways and the New York & Queens County Railway and the representatives of the Amalgamated Association. This conference, however, proved no more fruitful than the one held previously in the Third Avenue case, inasmuch as the two parties were absolutely deadlocked on the question of unionizing the employees. The union men asserted that their demands represented the wishes of a large majority of the employees of each company, and the railway officials emphatically stated that such was not the case. Mr. Shonts in particular said that on Wednesday evening he addressed two meetings of New York Railways employees, including 2700 men or about two-thirds of the operating force, and asked them whether the demands made upon the company were with their knowledge and consent. There was a unanimous "No" in reply. Furthermore, he asked them whether they wanted outsiders to come and intervene between them and the company, and again there was an emphatic negative.

President Shonts then read a formal statement to the Mayor, in part as follows:

"You have handed to us a communication alleged to represent demands of our employees. We do not know whether it represents our employees or not. We do know that at two large and enthusiastic mass meetings of our employees which we addressed last night there was every indication of loyalty, and of a disposition to settle our family affairs within our family ranks. Our men know that we have been and are sincere in our purpose to share with them any increased prosperity of the company. We have increased wages of our men twice this year, and have made other adjustments and increases in recent years.

"It may be said that we can very quickly ascertain whether these demands represent the views of our men if a strike should be called. Our answer is that the interests of the people of New York demand above all else that there should be no strike and no possible interruption in the continuity of transportation service. We know that there has been no strike-vote taken among our employees. We know that the rank and file of our employees have given no one authority to call a strike.

"We nevertheless recognize the unlimited possibilities arising out of threats and intimidation, and that if a small number of men should be induced to strike, many others in no sense desiring to leave their jobs might, out of fear or on account of threats, consider it better policy to remain away from work until the trouble is settled."

After describing the plan of the company to meet with a representative committee of employees, as noted previously in connection with the advertisement to the public, Mr. Shonts concluded with the following words:

"In the event that any effort is made to rush the situation and precipitate trouble, all we ask is that the city authorities protect passengers and our loyal uniformed employees from molestation. Believing that the city will not hesitate to preserve order, we feel confident enough of the sentiment of our men to assure you that transportation service will be maintained."

In regard to the charge that four men had been discharged for joining the union, Mr. Shonts said that this was untrue. In reply to a query by Mayor Mitchel, he stated that until the investigation of the company into the attitude of its men toward unionization was completed, it would be unwise and impolitic to discuss the demands presented by the union officials.

Concerning the demands, William O. Wood, president and general manager New York & Queens County Railway, stated that his company objected to its men organizing under the Amalgamated Association, that it would not recognize the union, and that it was not prepared now to go any farther in the matter of wages. In the last eight years it had increased wages from 25 per cent to 45 per cent.

Mr. Mahon assured Mayor Mitchel that the recognition of the union did not mean a closed shop, for this was seldom demanded and had not been mentioned in the present situation. Mr. Mahon then presented a letter in which he stated that the committees organized on the New York Railways and the New York & Queens County Railway would wait until 3 p. m. Friday for the replies of these companies to their demands and that the employees would vote thereon Friday night. This, Mr. Mahon said, was the final notification. After the conference it was reported that the power-house and shop employees of the companies would also be organized.

COMMISSION SEEKS FUTURE LEGISLATIVE REMEDY

The hearing before the Public Service Commission in connection with the strike was continued on Thursday afternoon. Mr. Straus, chairman of the commission, made a plea to both sides on behalf of the public. He said that the commission proposed, without fear or favor, to place the blame where it belonged. The case might develop the need for authority being vested with the commission by the legislature to act in a case of the present kind. He could not foretell what action would be taken. He pleaded that pending the commission investigation nothing be done to increase the present difficulty. Either side that took a decisive step in the meantime would put itself clearly in the wrong.

Counsel for the company pledged himself to preserve the status quo. He challenged the correctness of the poor working conditions charged by the union to exist on the Third Avenue system. If the commission investigation established the correctness of the contention of the union representatives the company would have to bow before public opinion, even though the commission was without authority to issue compelling orders. Mr. Maher offered in evidence the resolution of the board of directors of the company authorizing President Whitridge to deal with the situation. With respect to the lines in Westchester County, Mr. Whitridge had instructed Mr. Maher, in the event of a strike, to put the cars into carhouses until the experience ordinances were appealed or changed. Mr. Maher had no instructions on any other points. He expressed his willingness to submit to the directors of the company the question of policy with regard to the union. He also said that he would submit to the directors any recommendations of the commission.

MANHATTAN EMPLOYEES PLEDGE THEIR LOYALTY

On Thursday evening the situation was somewhat lightened by pledges of loyalty received from a large number of employees of the New York & Queens County

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Railway and the Interborough Rapid Transit Company. At a meeting of employees of the former company, addressed by Mr. Wood, 400 motormen and conductors signed a paper declaring loyalty to their employers, and at a similar meeting for Interborough employees 100 of these expressed their support of the management. Mr. Shonts read the pledge, which was in part as follows:

"We, the undersigned, conductors of the Broadway and Lenox Avenue division of the subway, solemnly declare it is not our desire to join any street car organization, and our company can rely on our loyalty. We will co-operate with our company in maintaining our standard of efficient service given to the public, and will do everything possible to protect the interest and safety of the company's property and to maintain our loyalty and courtesy to the patrons of the subway.

"The public can depend on us and we assure also the Interborough Rapid Transit Company that the subway employees will never be the prey of or obey any orders given us from any prejudiced organization, but we will continue to obey the orders given us by the officers of our own company. Intimidation and threats will never induce us to abandon our work and our positions, no matter what the threats may be.

"The above statement is the subway employees' stand through the strike and unionizing crisis, and the public may be assured they can travel in safety on the lines of the subway division, and they will have a continuous service from an army of loyal and efficient trainmen and conductors."

This was signed by 100 men engaged in active operation of the train service. The signers added this to the pledge:

"The above 100 conductors and guards represent the voices of all the trainmen of the entire subway system, and request the management of the company, if it deems it proper, to give this letter to the public."

In the Friday morning papers Mr. Shonts issued a general advertisement to the effect that arrangements had been made to have uniformed policemen on all cars as soon as a strike was called, and he quoted sections of the penal law about interference with car operation.

REFUSAL OF UNION DEMANDS

At noon on Friday President Shonts of the New York Railways replied to the men with respect to the demands made on the company by the union, as noted on page 232. He expressed his willingness to treat on Saturday with an accredited committee of employees selected by the men themselves but flatly refused to deal with the men through the union. At the same time President Wood of the New York & Queens County Railway sent his reply to "the chairman of the committee of such of the men as had been proselyted by the representatives of the Amalgamated Association in their effort to tie up transportation in New York City." He also refused to consider the demands made upon his company, because the demands had emanated from an outside organization and did not express the sentiments or desires of his employees any more than the seven men on the committee represented the employees. A copy of this letter was sent to the Mayor, calling attention to the fact that employees who were disaffected might quit Saturday and asking for police protection in the shape of uniformed policemen on the cars and along the lines.

POSITION TAKEN BY THE B. R. T.

While not fearing a strike on its lines, the Brooklyn Rapid Transit Company, as this issue goes to press Friday morning, has published a statement through its president, T. S. Williams, urging its employees to preserve their good relations with the company. Mr. Williams says in part:

"Within a week a handful of men from other cities have injected themselves into the transportation situation on some of the lines in Greater New York and threaten, if they cannot rule, to stop the operation of every car in the community. They include Brooklyn in their boastful plans. The remarkable thing about this demonstration is that it is aimed not only at some small companies where possible differences existed as to conditions of employment, but at companies whose men seemed generally satisfied with conditions and have presented no grievances. The declared purpose of the agitators relates only incidentally to wages or hours—demands as to these would apparently be waived if the companies would concede the right of the outsiders to speak for the companies' men. To accomplish their purpose they would deprive between five and six million people of transportation facilities, and inflict an irreparable loss and injury upon the business of New York.

"I have no reason to believe that any of my co-workers looks with favor upon this outside agitation and wishes it to extend to Brooklyn. On the contrary, there seems to be every evidence that the vast majority of them regard it with disfavor and will not be parties to destroying the relations which now exist, or to inconveniencing the public by severing their connection with the company on such an issue. The company will not compromise or sacrifice what it believes to be the interests of its men by dealing with these outsiders. It will protect its workers in the discharge of their duties. It will continue to encourage faithful service. It will to the extent of its ability, not only as a matter of wise corporate policy but as a matter of justice, continue to conform working conditions and compensation to the reasonable satisfaction of its men. It has not required the assistance or advice of outsiders to bring about three increases in wages during the last four years. It has not required such help to establish pensions, sick benefits, life insurance, medical attendance, good fellowship and the principle of reward for merit.

"I ask that any employee who knows of any general or particular grievance, or who has any suggestion to make for the betterment of conditions or of service, will write directly to me over his signature. I assure him that his statements and suggestions will receive very careful consideration from myself and from heads of departments, and that if reported grievances are found to exist and can be corrected the disposition is here to correct them."

EMPLOYEES REFUSE SEPARATE ARBITRATION IN WESTCHESTER COUNTY

With respect to the strike in Westchester County the mayors of Yonkers, Mount Vernon and New Rochelle on Monday addressed letters to the presidents of the Yonkers Railroad and the Westchester Electric Railroad asking that they consent to arbitration, the men to return to work pending the findings of the board of arbitration. This, it was suggested, should consist of three representatives of the companies, three representatives of the men and the mayors of the three cities. The companies replied that they would be pleased to attend such a meeting. The men in these cities, however, refused to consider arbitration unless the grievances of the men in Manhattan and the Bronx were considered also.

As is often the case the deadlock has resulted in talk of the municipalization of the lines in Yonkers. Mayor Lennon of that city is reported as considering a bill to authorize the city to purchase the Yonkers Railroad. A similar measure died in the Legislature after the strike of 1913. At that time Mr. Whitridge, in his inimitable fashion, asked why the city did not take over the lines there if the people were dissatisfied with the way he ran them.

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1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

ASSOCIATION NEWS

1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

Engineering Standards Committee Approves Many Recommendations of Technical Committees — Mr. Van Hoven Says Claim Agent's Education Is Never Complete—Electrolysis and T. & T. Association Standards Committees Hold Meetings

Engineering Association Committee on Standards

As announced last week, the Engineering Association committee on standards met in New York on July 27 and 28 to act upon the recommendations of the several technical committees. A brief digest of the first day's session was given last week. The second day was devoted to the work of a special committee on the revision of the standard stranding table and to that of the committees on equipment, heavy traction, block signals and power generation.

The first-named committee recommended certain changes in the standard stranding table, made after conference with committees of other interested associations. The purpose of the revision is to provide a more varied classification and in some cases to cheapen the cost of production due to the use of a smaller number of wires in each cable.

The equipment committee desired approval of revisions in flange and tread contours in the standard wheel designs, which was given contingent upon the making of slight modifications to meet the approval of the committee on way matters. A revision of the recommended designs of steel wheels was also approved with the further recommendation that the committee next year give attention to the matter of rim thickness with respect to allowable wear. The revisions mentioned included the elimination of 35-in. and 37-in. wheels, the addition of wheels of smaller sizes, and the simplification of the matter of rim thickness. Revised designs of brake-heads were also approved. These covered the "plate" type of head, a new form developed since the present standards were prepared.

The following recommendations of the equipment committee were also approved: That new designs of car axles as submitted be adopted as standard designs in place of the present standards. That certain changes in the A.I.E.E. standardization rules be suggested. That a submitted design of journal bearing, wedge boxes and thrust plates be substituted for the present standards. That a submitted design of limit-of-wear gage be adopted as standard. That a submitted recommended design be adopted as such.

The joint committee on block signals presented two signal clearance diagrams for adoption as standard, and the recommendation was approved, as was also one to the effect that Section Ss6a, referring to the use of continuous track circuits for the control of automatic signals for high-speed interurban service, be omitted from the manual. A set of requisites for automatic block signal installations was also approved, subject to revision in wording by the committee.

In reviewing the work of the committee on power generation the boiler code of the A.S.M.E. was approved for recommendation as standard, and certain suggestions regarding the A.I.E.E. standardization rules were approved for transmission to the appropriate A.I.E.E. committee.

The meeting of the committee on standards closed with a general discussion of the more general use of the association standards, particularly with relation to securing cost reduction.

Manila Section Discusses the Claim Agent

At the seventeenth regular meeting of the joint company section of the Manila Electric Railroad & Light Company held in Manila, P. I., on June 13, the discussion centered in a paper by C. H. Van Hoven, claim agent, on "How the Claim Agent Earns His Salary." For the membership committee J. M. Bury reported the names of eight new railway members, all from the accounting department. There were also many new members in the electric lighting division of the section, in which the accounting department was again well represented.

Mr. Van Hoven's paper contained an analysis of the opportunities afforded by work in the claim department for promoting friendly relations between the public and the corporation. His decisions reflect the fairness and integrity of his employers, for many claimants are so situated that they cannot enforce their rights even if aware of them.

The claim agent must be able to grasp situations quickly, and to act promptly for the protection of his employers. His education is never complete, and he must keep abreast of the times by keeping up with current literature upon subjects connected with his work. This includes the reading of the technical journals as well as the decisions of the courts in damage cases. From a constant observation of the various kinds of injuries he gains an intuitive knowledge as to their probable results.

After referring to the claim agent as above, Mr. Van Hoven explained the local situation in regard to accidents, especially as it relates to the safety-first movement. His principal points were reinforced by several speakers during the discussion, two of whom made detailed suggestions as to how the other departments can co-operate with the claim department. An interesting feature of the meeting was the interpretation of the discussion from English into Spanish and from Spanish into English by the official interpreter of the section.

Committee on Electrolysis

The joint committee on electrolysis of the American Electric Railway Association and the American Electric Railway Engineering Association held a meeting at the headquarters of the association on July 21. The entire day was devoted to a discussion of the proof sheets of the preliminary report of the American Electrolysis Committee. The latter is the new name of the national joint committee on electrolysis.

T. & T. Standards Committee

The committee on standards of the Transportation & Traffic Association met in New York on Aug. 3 and 4. In addition to the study of committee recommendations, the desirability of changing the name of the standards committee was considered.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Notes by a Car Equipment Inspector — Novel Car Unloading Machine
Shop Kinks—Ventilating Motors, Babbitting Bearings, Changing Wheel Flange Contour
Special Overhead Line Switch — Joint Welding Practice
New Electrical Apparatus for the Power Department

Unloading New Cars in Five Minutes

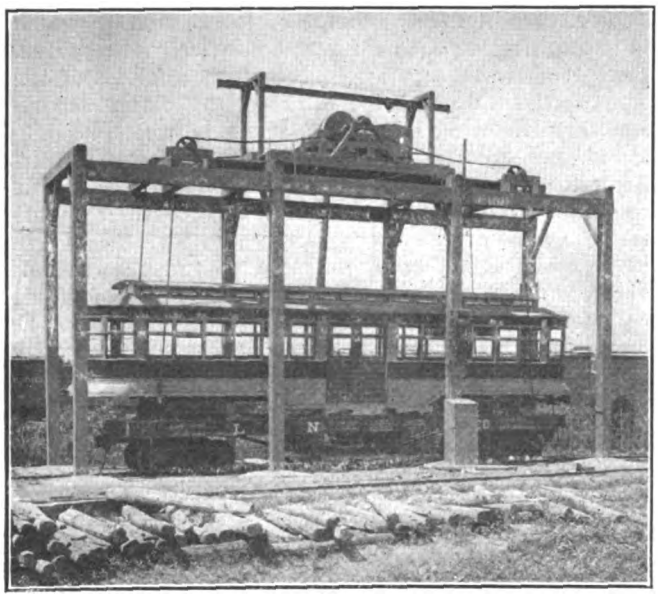
Detroit United Railway Cuts Cost of Unloading Cars by Use of Simple Hoist

BY SYLVESTER POTTER
Master Mechanic Detroit United Railway

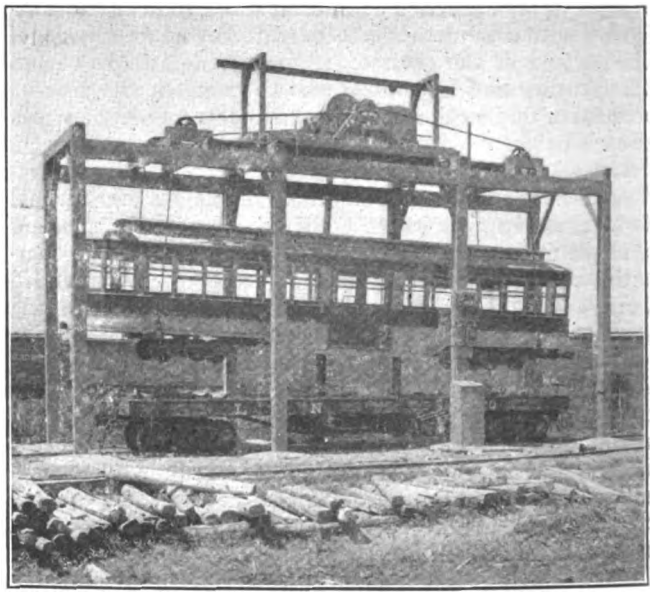
The hoist shown in the accompanying illustrations which is used in the Highland Park Shops of this company is intended for the purpose of unloading cars received from car builders as well as for loading cars for shipment. It may also be used, should occasion require, for loading or unloading heavy and bulky machinery that could not be handled with the regular shop equipment.

The unloading of street or interurban cars without the use of a hoist or crane is a process that requires quite a force of men and may consume considerable time.

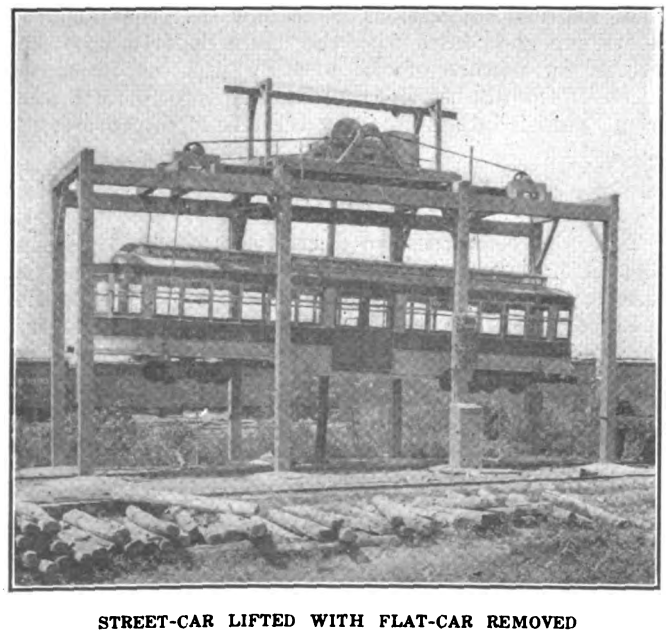
The lifting chains after passing over the chain sheaves are wound on the right and left hand drums, one of which may be seen in the illustrations at the top and center of the hoist. The shaft upon which both



STREET-CAR RECEIVED ON FLAT-CAR READY TO BE UNLOADED



STREET-CAR IN PROCESS OF BEING LIFTED FROM FLAT-CAR



STREET-CAR LIFTED WITH FLAT-CAR REMOVED

STREET-CAR LOWERED ONTO THE RAILS

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drums are mounted carries an ordinary railway gear.

Power is supplied by an old Westinghouse 12A motor with a gear ratio of 14:68. This gives the hoist the proper lifting speed.

With this hoist the time of unloading a car is greatly reduced, ranging from one and one-half to four or five minutes. In addition it requires the services of only two men.

Severe Service Requires Special Overhead Switch

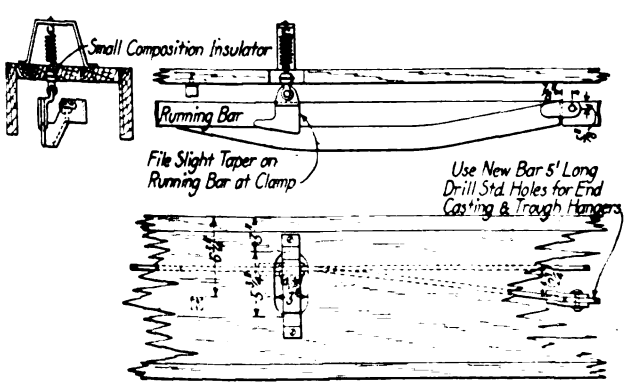
This Switch Forms Element in Insurance Against Interruption to Service

BY G. H. McKELWAY
Line Engineer Brooklyn Rapid Transit System

On the East River bridges between New York and Brooklyn the traffic is so heavy that delays to the cars passing over the bridges must be minimized as much as possible. With 300 cars per hour in the rush hours even a slight delay of a few minutes is a serious proposition, and any hold-up of traffic for a longer time than that is a catastrophe felt more or less by thousands on both sides of the river. For that reason two wires have been installed on both of the roadways of the Brooklyn Bridge, so that in case of a break in one of the wires the poles of the cars can at once be shifted to the other wire and, as soon as the broken wire is tied up, the cars can pass over the bridge as quickly as if nothing had happened. While trolley wire is used on the bridge structure where the tracks are straight, yet at the ends of the bridge, where there are loops on the Manhattan side and curves on the Brooklyn side, the trolley wire is replaced by iron bar. This iron bar is practically unbreakable and therefore does not have to be installed in duplicate.

The problem presented by the circumstances outlined above was to design some kind of an overhead switch, to be located at the junction between the iron bar and double wire construction, which would operate satisfactorily so as to permit of throwing the service from one wire to the other when circumstances so required. The heavy service of approximately a million and a quarter cars in a year added greatly to the difficulty in finding a switch which would stand the severe wear to which it would be subjected.

After several devices had proved unsatisfactory, the switch shown in the accompanying drawing was designed. As will be seen from the drawing, it consists of a tapered iron bar, one end of which can be placed under the running bar and is then held against it by means of a spiral spring attached to the bracket above the trough. The tongue is guided into position by the jaws on the hanger, one of which fits on each side of the running bar. The other end of the bar is fastened to the adjoining iron bar as shown, the bolt being loose enough to permit a slight swing of the bar laterally. When not in use the tongue is swung to one side and held up against the trough by the spring. A stop made of angle iron keeps the tongue from coming in contact with the running bar when in the "off" position. The switch is operated by means of a wooden pole with a hook on the end.



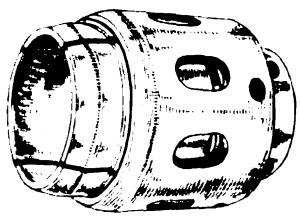
OVERHEAD SWITCH USED WITH IRON BAR TROLLEY CONSTRUCTION

Babbitting Bearings at the Third Avenue Railway Shops

Simple Centering Chuck Is Utilized in Cutting Down Time in Finishing Bearings

BY A. R. JOHNSON
Assistant to Superintendent of Equipment Third Avenue Railway

The question of babbitting bearings has been given careful consideration and is a matter of great importance in the upkeep and reliability of railway equipment. The following methods are employed at the shops of the Third Avenue Railway, New York City.



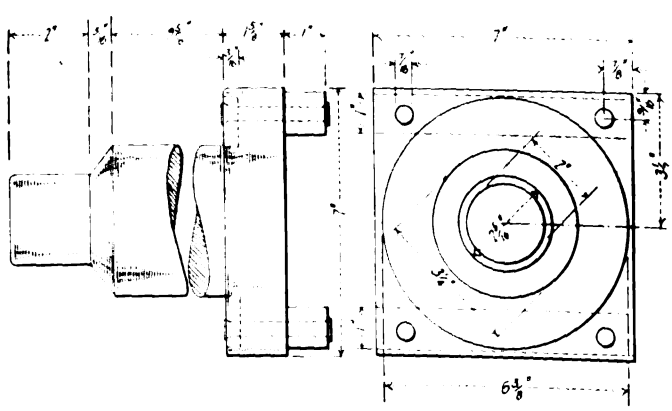
CENTERING CHUCK FOR MACHINING BEARINGS AFTER BABBITTING

All babbitt metal is made according to specifications, there being two grades, one for armature and the other for journal bearings. The better grade, which is used for the armature bearings, comprises 83 1/3 per cent tin, 8 1/3 per cent copper and 8 1/3 per cent antimony.

When re-babbitting bronze bearings the old babbitt is melted out entirely and the outside of the shell is given a coat of lampblack. After this the bearing is submerged in a bath of molten metal, using a little acid if necessary in order to properly tin the inside of the shell and prevent the outside of the bearing from becoming tinned. Iron bearings are thoroughly cleaned and heated before pouring in the babbitt for the purpose of insuring equal contraction of the two metals to avoid loosening of the babbitt when the bearing is finished and cool.

A mandrel such as is shown in the accompanying drawing is used, the one shown being suitable for GE-210 armature bearings. The diameter of the mandrel is slightly smaller than the diameter of the armature shaft, which permits the boring of the bearing to the proper size after babbitting, thus removing the hard surface or skin which adheres to the babbitt metal when it comes into contact with the mandrel in process of pouring.

Numerous methods and devices have been tried out for accurately machining or boring the bearings after



FRONT AND END ELEVATIONS OF MANDREL USED FOR BABBITTING ARMATURE BEARINGS

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babbitting, few of which have proven satisfactory. A chuck shown in the drawing has been designed by H. Krombach, foreman of the armature winding department at the Sixty-fifth Street shop. It is constantly in use at this shop. It enables a man skilled or unskilled to turn out a bearing perfectly true in about one-third of the time taken with the old-style lathe chuck. As the principle of this new-style chuck is practically the same as that of an ordinary drill chuck, all that is necessary is to place the bearing in the chuck and turn the tightening sleeve, which causes the bearing to be clamped in a true and centered position. Bushings must be provided for the different size bearings, as the movement of the jaws is only about ⅛ in.

Summer Ventilation for Motors Obtained by Slight Alterations

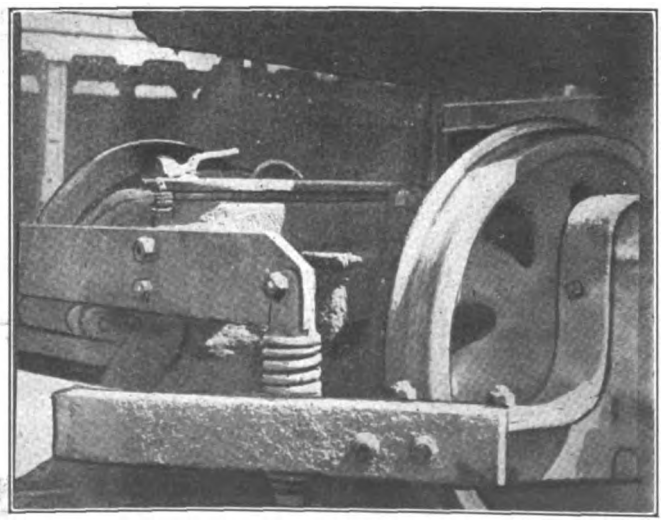
Scrap Brake-Hanger Springs Are Utilized to Raise Motor Covers

BY H. E. WURZBACH
Master Mechanic Ogden, Logan & Idaho Railway Company

The writer has been reading with interest the various articles published in the ELECTRIC RAILWAY JOURNAL in reference to the ventilation of old railway motors at a minimum cost. As Utah does not suffer a great deal from extreme heat, the ventilation of railway motors during the warm months is not as essential here as in some other parts of the country. It was felt, therefore, that we could not make any costly changes in order to ventilate our motors. They could not be left open, however, in the winter time without danger of damage by snow.

The accompanying illustration shows the method by which the necessary ventilation has been secured. The top motor lid of a GE-54 motor has been raised about an inch. It is held in this position by old brake-hanger springs which have been discarded as being too weak or too short. As nearly all of the holding clamp studs are quite long it was only necessary to unscrew the studs, place a spring with a flat washer on each side on each stud and screw the studs on again, adjusting them to the height and tension desired. If the lower handhole plates are removed from the bottom of the housing it is readily seen that the motor will be well ventilated. The air circulates from both bottom parts up through the motor and out through the cover over the commutator.

Raising the cover in the manner above described is much cheaper than providing a perforated cover over the commutator, and in the writer's opinion it is less liable to allow dirt and water to enter the motor.



TOP COVER OF MOTOR RAISED FOR SUMMER VENTILATION

Cost of Overlooking Details

Co-operation of Technical Experts and Maintenance Men Necessary to Secure Best Results

BY AN INSPECTOR OF CAR EQUIPMENT

When a railway contemplates the purchase of new rolling stock much consideration is given to the embodiment of many of the latest improvements with the idea of not only improving the general appearance, but of adding to the convenience of the passenger. In this connection the representative of the accessories manufacturer plays an important part by willingly co-operating and rendering many valuable suggestions to the designing engineer in charge. Before the order is finally placed with the car builder, the plans and specifications are generally submitted for criticism to a consulting engineer, and, in case the order is large, the opinions of several experts are obtained. After passing the muster of this array of technical and expert talent, it is remarkable to note the many points which are overlooked on the sample product from which the remainder of the order is to be constructed. While these points may seem to be of minor importance individually, in the aggregate they assume great proportion, and the ultimate cost of the equipment, such defects as are described in the following paragraphs have been finally corrected, is greatly in excess of the original estimate.

As an example of this condition, a company recently had built a number of cars which were equipped with ventilators, and to harmonize with the interior lighting fixtures and painting, all the inside port shutters were made of highly polished nickel-plated steel, each of which was held in place by a score of nickel-plated steel screws. These screws and shutters after short service became rusty from the moisture that gathered, not only presenting an unpleasant contrast, but also permanently streaking the composition head and side lining. As there are twenty-four shutters to each car, it will readily be seen that the replacing of these shutters and screws by others made of nickel-plated non-rusting material involved no small outlay, whereas had this detail been foreseen in the first instance, expense and inconvenience would have been avoided.

On side-door cars of a rapid transit system it is customary to have a bench which can be lowered when the door is not in use. Usually such a bench is supported by a collapsible leg which folds under when not in use. If a passenger should unthinkingly place his hand on the edge of this bench while the guard is hurriedly raising it upon arrival at a terminal, the folding leg would catch and crush the hand. The expense of adjusting claims arising from this source has been eliminated in a large measure by placing a bar parallel with the edge of the seat to guard the leg. During the rush-hour period this bench is raised to allow greater freedom to passengers while boarding and alighting. The original location of the bench obstructed the guard's view of persons about to board, resulting in many passengers being struck and thrown to the station platform by the premature closing of the door. The shifting of the bench to the opposite side of the doorway gave the guard a clear view, effecting a decided reduction in the number of accidents of this class.

The most profitable concession which a railroad company controls is the sale of the advertising space in its cars, and the position for which the greatest amount is readily obtained is that over the end doors, it being visible to the largest number of passengers at all times.

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This position affords accommodation for a much wider advertising card, yet in the case under discussion, the retaining molding was so spaced as to hold only the narrower regulation side card. To overcome this a number of tacks were used to hold these larger cards in place. These tacks damaged the composition backing and the vibration of the car caused them to fall out, thus allowing the cards to assume such positions as to be unreadable to anyone but a "Cubist."

No threshold plates were provided under the end doors and as a result during a rainstorm much water forced its way through the crevice, the quantity depending upon the intensity of downpour and the speed of the train. The water accumulated between the composition flooring and sheet metal base, causing the former to bulge and crack. During such storms passengers usually stood where their feet would not get wet rather than occupy the several seats in the affected area. All cars will require shopping for the installation of the plates necessary to remedy this defect.

Experience has clearly demonstrated that current derived neither from the tractive supply, nor from a set of batteries on the car is dependable for the purpose of illuminating the red tail lights of a train. Either source of supply is subject to a number of unforeseen interruptions, hence the use of oil-burning lamps is the best solution. In this particular case the batteries supplied current for a signal buzzer, a new style motor control system and an emergency lighting circuit. A derangement of any one of these features would extinguish the tail lights, yet no provision was made for the oil lamp. Soon after service was inaugurated many trains became stalled due to mechanical and various other failures. To overcome the danger of rear-end collisions, the ordinary hand lantern was hung from its handle over the top bar of the pantograph safety gate to supplement the electrically lighted tail lamps. This, however, is open to criticism, as the swaying of a rapidly moving train permitted the lantern to oscillate to such a degree as to be out of the line of vision of the motorman in charge of the following train. In many places the clearance between the car and structure was reduced to a minimum and frequently the oil lamp swung out and was broken, thus introducing a fire hazard. Finally, to eliminate this source of expense and danger, a hook was installed on the bulkhead of each car to securely hold the lantern.

The handhole covers for the inspection of the marker lights were so installed that the vibration of the car caused them to drop out of place. A passenger seated in the vicinity at the time received serious injury as a consequence. By securely hingeing at the top and latching the bottom of these covers this source of danger was overcome. The fact should not be overlooked that the cars under discussion were of all-steel construction and that holes for additional screws and bolts had to be drilled, with the resultant high cost.

The foregoing instances are but a few of a large number illustrating the advisability and importance of consulting, in addition to the technical expert, the man thoroughly familiar with maintenance work to whom such points would be immediately apparent.

Stops in the curtain guides 10 in. up from the window stools prevent the curtains of the Kansas City (Mo.) Railway cars from being used as rain shields. It has been the experience of this company that its Pantasote curtains are frequently used in place of the glass sashes to keep out the rain, after which the curtains are rolled up when wet. This moisture in the rolled curtain causes it to mold and soon destroys the curtain fabric.

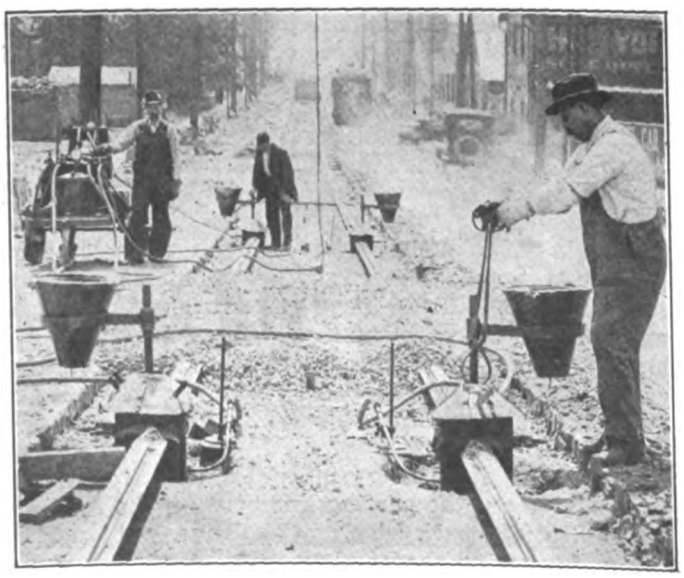
Joint Welding in Youngstown, Ohio

Rehabilitation of Track Being Undertaken by Mahoning & Shenango Railway & Light Company

The installation of Trilby 134-lb. grooved rails with welded joints and the use of steel twin ties embedded in concrete are among the interesting features of the overhauling of several miles of track of the Mahoning & Shenango Railway & Light Company in Youngstown, Ohio. The work, which is being done by a local branch of the Stone & Webster Engineering Corporation, includes the construction of 2½ miles of double track through the busiest part of the city.

The old track and pavement are being torn up by the use of heavy jacks placed under the rails, while the bricks, concrete and earth are removed by a steam shovel. International steel twin ties placed on 6-ft. centers are used, the rails being supported on the steel plates which connect the twin ties. In laying the track ¾ in. is left between the abutting ends of the rails, which are spliced with temporary plates until the concrete is poured. The concrete foundation is 19 in. thick at the rail and arched to 8 in. at the center of the track, and tile for drainage purposes is placed in the center of the devil strip along the greater part of the way. On top of the concrete foundation is a layer of sand and cement with a tar binding, forming a suitable cushion in which the paving brick is laid.

The rails are welded by the Goldschmidt thermit insert process. After the concrete has set sufficient space is dug out around each joint to permit the placing of the welding molds, and an insert of rolled steel similar in composition to the rail heads is placed between the ends of the rail. The two parts of the mold are made of sand and are formed by a foundry squeezing machine. To insure a good tight fit between the rail and the mold, strips of asbestos dipped in molasses are wrapped around each rail a few inches from the end. The mold is then clamped in position around the joint. As an added safeguard to prevent the molten steel running out, powdered fireclay is blown into the mold through the pouring gate, after the other openings have been temporarily plugged. The fireclay also gives a smooth appearance to the weld, as it forms a thin coating over the interior of the mold. This leaves the molds ready for the preheating process, which brings the rail to a high temperature, dries out the mold, and at the same time heats a small sheet-iron can which is placed on top of the mold and contains the metals to be added to the thermit to improve the quality of the steel.



WELDING RAILS AT YOUNGSTOWN, OHIO

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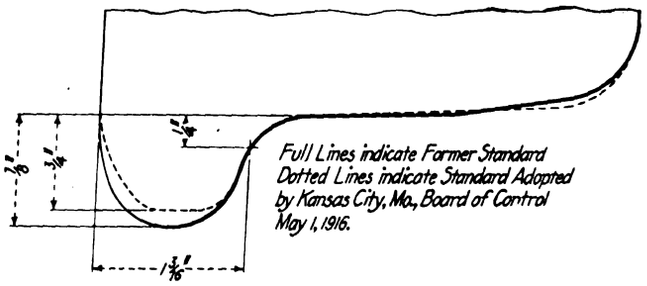
The illustration shows four molds in the process of being preheated by means of gasoline compressed air torches connected to a single Goldschmidt preheater, which is carried on a small truck. The crucibles for holding the thermit charge are shown above and at one side of the molds. After the preheating, the can of additional metals is placed in the center of the crucible and the charge ignited. The molten steel collects at the bottom of the crucible as a result of the chemical reaction between the metals of the charge. When the reaction is complete the molten steel is tapped into the mold. After cooling the molds are removed, the risers are knocked off and the rail is ground to a true running surface.

The character of the construction above described is giving a solid and permanent track, considered to be equal to any used in our other modern and progressive cities.

Change in Wheel Flange Reduces Noise and Wear

In view of the recommendation of the committee on equipment of the American Electric Railway Engineering Association regarding certain changes in flange and tread contour of standard wheels, the following information from Kansas City is of interest. The Kansas City Railways have made a change from what was virtually wheel A to the width and depth of flange specified for standard wheel B.



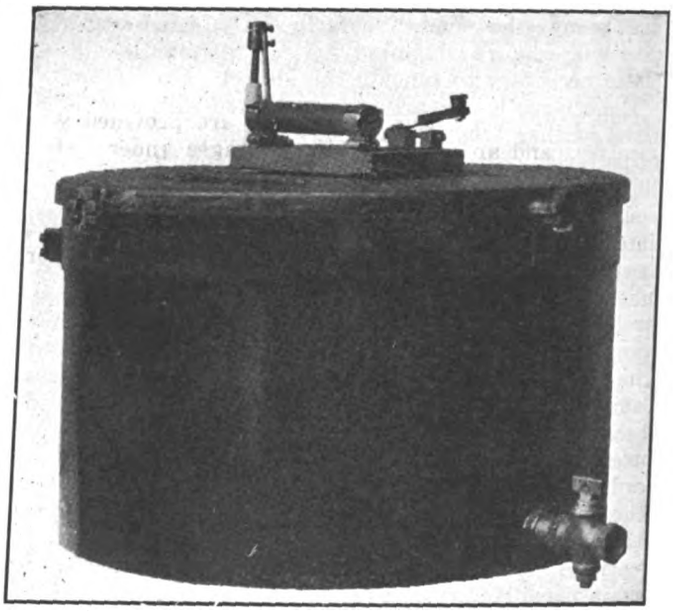
KANSAS CITY RAILWAYS' OLD AND NEW CAST IRON WHEEL FLANGES

In other words on the Kansas City Railways the depth of wheel flange has been reduced from 7/8 in. to 3/4 in. so as to reduce squealing of wheels on curves and, at the same time, to minimize the wear on the rail groove or lip. Also in accordance with standard practice, the mechanical department formerly gaged its wheels at 4 ft. 8¼ in. when they were pressed on the axle, but it found that this gage did not provide any lateral wheel play, either in special work or in grooved-rail track. On the other hand, an increase in the wheel gage to 4 ft. 8 7/16 in. produced sharp flanges. It was therefore decided that a change in the dimensions of the flange as well as the section was necessary to obviate sharp flanges, and at the same time lateral play in the wheels was obtained by returning to the 4 ft. 8¼-in. gage. The change in flange dimensions is shown in the accompanying illustration. This change, in conjunction with the return to the 4 ft. 8¼-in. gage, gave a uniform clearance on the rail guard and head sides of the wheels. It also minimized the wear on both sides of the wheel at curves and in special work and, at the same time, reduced the noise and the wear on the grooves or lips of the rails.

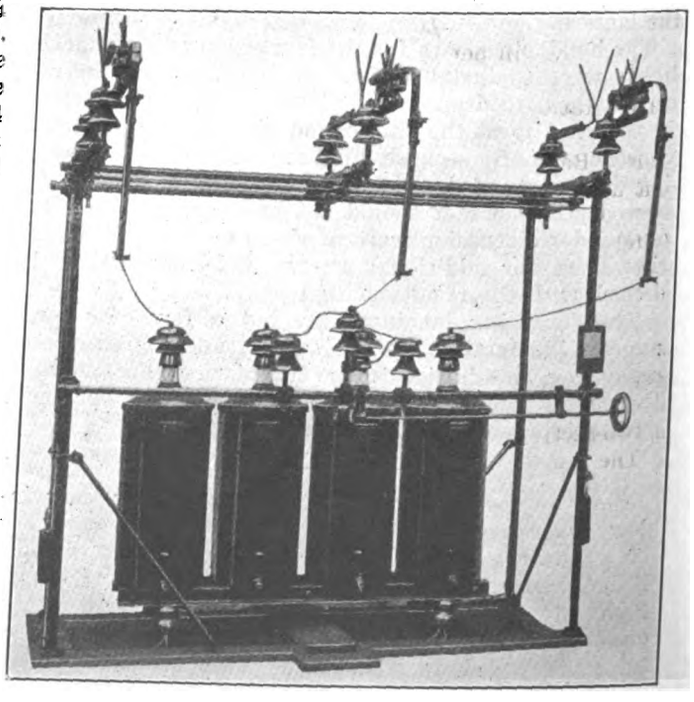
To produce this flange in chilled cast iron it was necessary to put the parting line between the sand and the chill at the back edge of the flange. The parting line of flanges on the original wheel was made at the apex of the flange, but this could not be followed in the new flanges because the chilled metal did not amalgamate with the unchilled metal. Moreover, a large percentage of the chipped flanges broke outward, hence, by placing the parting line at the back edge of the flange, a heavier section of metal was provided on the chilled side which produced a stronger flange. The flat periphery of the flange facilitates molding and casting and, at the same time, it has proved very satisfactory in operating over flange-bearing special work.

Improved Electrolytic Lightning Arresters

Two types of electrolytic lightning arresters, illustrated herewith, have recently been put on the market by the Westinghouse Electric & Manufacturing Company. The type A arrester shown here is designed for direct-current operation for voltages up to 2450 and



INDOOR TYPE OF ALUMINUM CELL ARRESTER



OUTDOOR TYPE OF ELECTROLYTIC ARRESTER

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for low voltage alternating-current service. It is used only for indoor installations. The type AK arrester is for alternating-current operation on voltages above 2000. An outside installation of this type is shown in a second illustration. The construction of the two types of arrester is similar, one of the distinctive features being the use of a new inorganic electrolyte, less affected by heat and causing less dissolution of the film between charging periods than the electrolytes previously used. Double cone-shaped aluminum trays are used, the shape being such as to give a large area exposed to the electrolyte. The trays are spaced by porcelain pieces so that they do not touch the wooden frames and the holes in the centers of the trays form a ventilating duct for additional circulation of oil. The linings of the tank are of bakelite micarta.

Horn gaps which can be adjusted to the line voltage are provided for all type AK arresters. They are arranged so that the necessary bridging for charging is readily accomplished. The outdoor and indoor arresters are similar except that the former are provided with terminals and are not made for voltages under 10,000.

A composition known as "Koppat," said to possess the quality of remaining practically uniform under all service conditions, is used for the charge and discharge resistance which is connected between the main horn gap and the arrester proper.

A New Safety First Truck-Type Switchboard

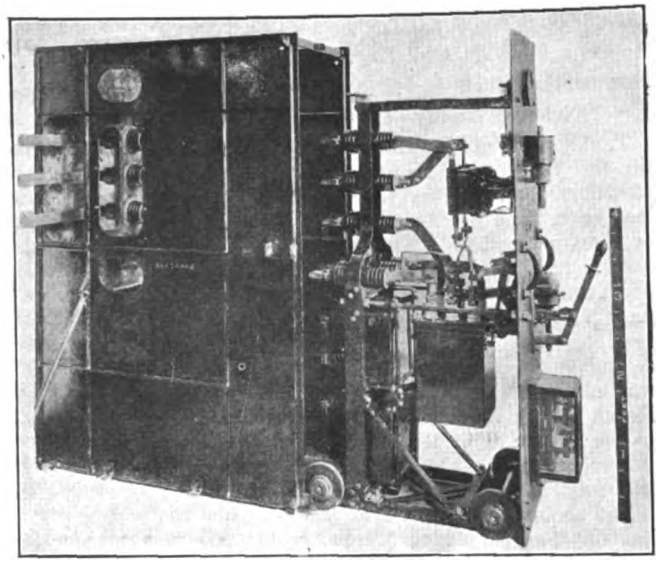
The accompanying illustration is of a new safety-first truck-type switchboard which has recently been placed on the market by the General Electric Company. All live parts are inclosed and danger of coming in contact with live circuits is practically eliminated. Oil switches and other live parts are in compartments.

Another marked advantage of this type of construction is the ease of inspection or replacement. The switchboard panel is mounted on a carriage which can readily be removed from and replaced in a stationary structure, but only when the oil switch is open. With the oil switch closed it is impossible to remove or insert the truck because of an interlock between the operating toggle of the oil switch and the stationary unit. In plants where feeders are standardized, spare panel trucks will permit systematic inspection of equipment with the least possible interruption of service.

The stationary member of the switchboard carries current and potential buses and disconnecting switch studs. Barriers between the current bus studs prevent accidental contact by anyone who enters the compartment. The rear ends of the current disconnecting switch studs run to buses and incoming or outgoing leads, the potential bus wires to small contact studs near the top of the compartment. The side walls have handholes, so that the busbars and bus wires can be continued from unit to unit. These openings when not required can be closed by removable covers. Access to the rear of a compartment can be had by means of a two-section sheet steel door.

The removable truck is mounted on wheels, and when withdrawn the equipment is dead and accessible from all sides. The fore part of the truck carries a sheet steel panel on which is mounted the instruments, meters, oil switches and other appliances as shown. The current transformers are mounted on steel brackets on the back of the instrument panel.

The field of application of standard size units is limited to 7500 volts and 2000 amp. at 60 cycles, and 3000 amp. at 25 cycles on the main bus. Special units can be obtained for use up to 15,000 volts and 300 amp.



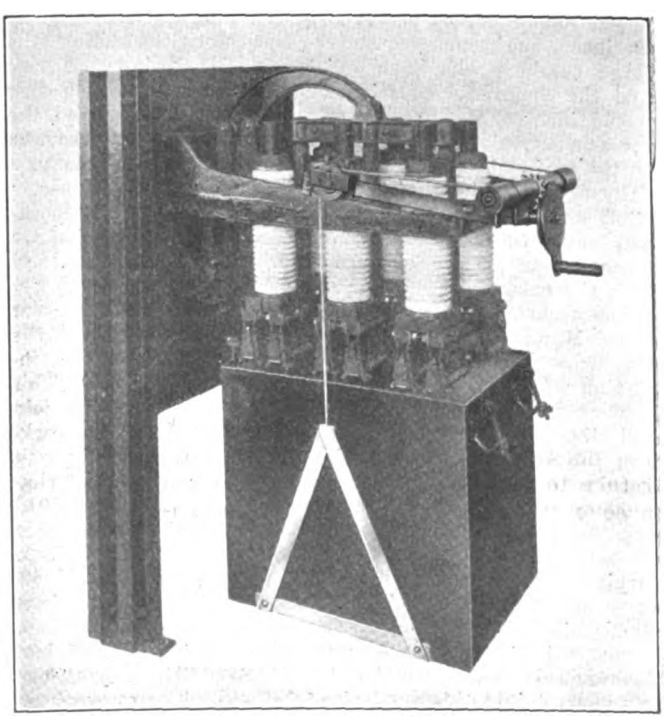
SINGLE PANEL SWITCH UNIT ROLLED OUT FROM THE CABINET

The current capacity of the removable element is limited to 500 amp. at 2300 volts and above, and 800 amp. up to 600 volts. The units illustrated are 76 in. high, 24 in. wide and 52 in. deep.

Tank Lifters for Oil Switches

The General Electric Company has recently developed a number of tank lifting arrangements for oil switches of various forms and sizes. For capacities up to 1500 amp. the lifter as herewith illustrated is employed. With it the oil tanks can be lowered the entire distance from the switch frame to the floor.

The method of removing an oil tank is as follows: The lifter is placed on the oil switch frame and fastened there by turning two winged nuts; the operating handle, connected to a worm gear, is then turned until the two triangular tank supports engage the tank, which is next unfastened from the switch frame and lowered to the floor or to any intermediate position desired.



LIFTER ATTACHED TO OIL SWITCH WITH TANK REMOVED, SHOWING SWITCH CONTACTS

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LONDON LETTER

(From Our Regular Correspondent)

Manchester, Sheffield, Brighton and London Reports Reviewed Briefly—Other Developments Noted

The report of the Manchester Corporation Tramways for the year ended March 31 shows that during the year 209,000,000 passengers were carried, 7,000,000 more than last year. The profits enabled £100,000 to be paid in relief of rates and £21,000 to be placed to reserve. The earnings per car mile were more than 1s. The growth of the parcels department is shown by the fact that in the year under review 1,225,718 parcels were carried, and that the total receipts were £14,185, compared with £13,571 for the preceding year. Beginning with the year 1902, when £20,000 was contributed, and ending with the year which closed on March 31 the Manchester tramways have helped the rates to the extent of £1,015,090. The gross capital expenditure so far has been £2,231,547. The population served by the tramways is approximately 969,900.

The report of the Sheffield tramway and motor bus services for the year ended March 25, 1916, shows that on the year's working of the tramcars there was a net profit of £95,779. This is an increase of £25,840 over the previous year. The report states that during the year the department's resources have been severely taxed to meet the demands for increases in car services required in consequence of the many extra hands employed in the munition factories. This has resulted in an increase in the workmen's traffic morning and evening, and in an increase in the ordinary traffic at all hours of the day, to such an extent that records of passengers carried and total receipts have been made and broken week by week. On Tinsley cars alone 16,408,000 passengers were carried during the year. This is an increase of 4,677,000, or 40 per cent, for the year. To enable the department to carry on its work it was necessary to secure women to act as car conductors. In fact, the only men who remain as conductors are those unfit for motormen and not eligible for the army. Women are also employed at the carhouses in cleaning cars, and are gradually replacing men on this work. More than 700 women are employed on the Sheffield Tramways. The motor-omnibus section—as distinct from the car section—shows a total income of £27,565; the gross profits are £5,516, but when deductions are made for interest and sinking fund, income tax on profits, earnings of renewals, and special reserve funds transferred, the balance on the year's working is £3,816.

The annual report of the Brighton Corporation tramway engineer and manager states that, notwithstanding the large numbers who have enlisted in His Majesty's forces and the apparent reduction in the population which this would involve, the number of passengers carried and the revenue earned (£57,936) have eclipsed all previous records. In the spring the work of arranging the service became a daily fight against the inconvenience caused by a depleted staff, and the employment of women conductors undoubtedly saved the situation and enabled the public to have a much better service of cars than would otherwise have been the case.

The accounts of the London County Council for the year ended March 31 last show that the total income from the tramways was £2,339,291, while the working expenses, including war service allowances, amount to £1,683,660. This leaves a surplus on working of £655,631. The following debt and other charges have to be set against the surplus working: Interest (gross), £326,476; redemption, £425,908; rent drawbacks, etc., £6,767; income tax, £40,000, and Parliamentary expenses, £2,260, amounting altogether to £801,442. On the other hand, a number of items, amounting in all to £72,016, such as interest on cash balances, rents from surplus property and debt charges on money advanced, have to be deducted. The gross expenditure, therefore, stands at £729,426, which leaves a deficiency of £73,795, to be met out of the general reserve fund. On March 31 last the renewals fund amounted to £329,967. There has been no payment into this fund since 1912-13. The general reserve fund, after meeting the deficiency of £73,795 on the year's working, amounted to £70,118. The total number of passengers carried during the year was 545,423,397; the number of car miles run was 47,879,675. The corresponding figures for 1914-15 were 550,497,993 and 58,978,792.

In reviewing the past year's operations at the annual meeting of the British Electric Traction Company, Emile Garcke, the chairman, said the average yield on the investments was 5.19 per cent, which was a little higher than that of the previous year. The revenue account showed an increase of £11,000 in profit balance. In view of the abnormal conditions created by the war it was preferable to strengthen the reserve and to distribute 3 per cent instead of the anticipated 4 per cent on the new ordinary stock. The amount applied to reserve is £20,300, against nothing last year. The balance carried forward was increased by £15,000.

The newly electrified mineral line between Shildon and Newport is showing good results. The service is still restricted, for the contractors have to complete certain portions, but on an average the total weight hauled in a week by electric locomotives is about 65,000 tons. Part of this Shildon-Newport track runs over a portion of the original Stockton & Darlington Railway, the first public railway on which steam locomotives were used.

At the annual meeting of the Tramways & Light Railways Association, held recently in London, the chairman, Sir Albert Stanley, general manager of the London General Omnibus Company, said that the employment of women as conductors had proved satisfactory. Also, while women were taking the place of drivers on some systems, that they would be in general use as drivers did not seem likely. Driving a tramcar, he said, is different from driving a motor car, and the strain is not one that in his opinion should be placed upon women, nor would it be to the public safety.

The Institute of Electrical Engineers has drawn up a scheme for training disabled soldiers and sailors as switchboard attendants, and has invited the co-operation of the London County Council in carrying it out. No fees will be charged to the men, and those who go through the course successfully will be sent as probationers to an electric station in London or in the provinces. If the period of probation is satisfactorily completed, they will receive appointments at the usual rate of pay.

The action taken by the petrol control committee in reducing supplies of petrol for other than war purposes is likely to cause considerable inconvenience to the public, both in the curtailment of the omnibus services and of the supply of motor cabs. The London General Omnibus Company finds it necessary to withdraw certain services entirely and to restrict the services upon others. It has, however, obtained from the commissioner of police a withdrawal of the limit of five passengers as the maximum number to be permitted to stand inside an omnibus. The present prohibition of standing on the top of an omnibus still continues in the interest of public safety.

When the contract for the construction of the London Post Office Tube Railway was placed in October, 1914, it was hoped that the work would be completed in eighteen months. That this expectation will be nearly fulfilled, in spite of the dearth of labor, is shown by the information that the tunnel is nearly completed. The purpose of the railway is to accelerate the transmission of mails and parcels, reduce the expenditure on road vans and relieve congestion in the streets. Its total length is about 6½ miles, and its depth below the surface varies from 28 ft. to 37 ft. Between stations there is a single tunnel, 9 ft. in diameter, containing two tracks of 2 ft. gage, but at stations separate tunnels of larger diameter are arranged for the up and down lines, with space between them to give accommodation for lifts, shoots, and control cabins. The trains will be operated electrically without a driver, and worked on a distant-control system. The present line is only part of the complete scheme, which in its final form provides for three other lines.

An aftermath of the Irish outbreak appears in the interim ordinary dividend announcement of the Dublin United Tramways for the first half of the current year. In 1915 and 1914 the rate was 5 per cent per annum, but now it is only 4 per cent. Traffic declined to the extent of more than £13,000 while the rebellion lasted and some damage was done to the rolling stock and plant.

A. C. S.

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NEWS OF ELECTRIC RAILWAYS

RETURN TO NORMAL CONDITIONS IN HARRISBURG

Fifty Union Men Desert the Cause in Face of Impending Collapse of Strike

While more than 130 of the Harrisburg (Pa.) Railways men were still out on strike on Aug. 2, nevertheless the company officials declared that they no longer considered that a strike exists. The usual number of cars was running, and nearly fifty of the strikers were back at work. Thousands of people are again riding the cars, and there has been a big falling off in the jitney business, although Mayor Meals has not yet ordered the jitneys off the streets.

On July 28, the strikers' committee headed by Hugh L. McLaughlin met Mayor E. S. Meals and the City Council of Harrisburg, and for the first time the men's side of the controversy was officially presented to the officials. President F. B. Musser of the railways met the Council on the afternoon of July 27. The net result of these two conferences was a request by the commissioners that Mr. Musser again meet them at 4 o'clock in the afternoon. This Mr. Musser did, and practically repeated his statement of the day before that he would have no further dealings with the strikers' committee.

John A. Moffat, commissioner of conciliation of the United States Department of Labor, left the city after his efforts to bring about arbitration failed.

J. J. Thorpe, the Amalgamated organizer, gave out a statement denying that he had instructed the men to return to work and again take up the question of organization six months later. Mr. Thorpe also wired the American Federation of Labor to send an organizer to work among the members of other unions in order to get them to stay off the cars. Following Mr. Musser's ultimatum in regard to treating with the strikers, Chairman McLaughlin and Mr. Thorpe both issued statements that they would fight to the bitter end, saying:

"We mean to fight this thing to a finish."

Mr. Thorpe in a statement entitled "Another Job for the Public Service Commission," declared the stock of the Harrisburg Railways was watered. He said that the company could double the wages of its men and still make a fair percentage of profit on the real value of the property.

Five of the strikers applied for their old positions on July 28 and two were accepted. Later on the others were accepted. Forty-six cars were operated during the day, and service on all lines was continued until midnight.

President Musser issued a lengthy statement to the afternoon newspapers of July 28 setting out the position of the company. This statement follows in part:

"The company has always considered matters presented by the men and adjusted them. This applies also to the question of wages. Notwithstanding the greatly decreased receipts and loss of revenue due to general conditions and the jitneys, an increase was made last April, with the understanding that further increase would be made as soon as conditions warranted. It may not be generally known, but the scale of wages paid by the company has been higher than that of any of the adjoining larger cities, and only exceeded by a few of the larger companies under special conditions.

"There is only one policy that the company can pursue, and that is to treat with its employees in the adjustment of any differences there may be. This it has done in an agreement which is satisfactory to both sides. The duty of the company is to operate its cars.

"The non-recognition of the union is not a sentiment, but a matter of policy in the management of the property of the company. It cannot delegate the management and control of its business to an organization which has no financial interest in its property, and which from experience has shown that it can be tyrannical and arbitrary, subjecting the public to great inconvenience and the company to great loss. The company has no issue with the union, but it cannot be subjected to the arbitrary control of its men by organizers to the detriment of its interests.

"The company has satisfactorily adjusted all matters, including wages, with its employees, and now proposes as far as it is able to operate its cars on full time with full crews, and requests from the public, whom it is endeavoring to serve, assistance and encouragement in preserving order and removal of false impressions due to false statements. It has not been the policy of the company to refute the many foolish and untruthful statements made or allegations as to the acts of the officers and stockholders. The public must expect statements of this kind. The company proposes to conduct its business in a dignified manner, confining itself strictly to the operation of its cars, serving the public and treating with its employees."

Forty-seven cars were operated on July 29 and ten more strikers reapplied for their old positions and were re-employed, all retaining their old standing with the company.

In a paid advertisement in the newspapers of July 28 entitled "This Is Final," the Harrisburg Railways said:

"The Harrisburg Railways is not bluffing.

"We have made known our position to our men and we want the public to know what it is because it is final. We believe it will benefit the city, our employees and the company. We think we should go to great lengths to uphold it and we are willing to.

"We have just entered into an agreement with our loyal employees, numbering about sixty-five. We have adjusted all questions with them satisfactorily. We will be glad to receive from the 165 former employees who left our service, applications for positions, providing they apply as individuals, and each application will be received and treated on its merits. They will not be re-employed under any other circumstances.

"We will not recognize or have any dealings with the Amalgamated Association of Street & Electric Railway Employees of America. This is final.

"We will not discharge those employees who have been loyal to the company. It may be some time before conditions are normal, but the management will do everything it can to accommodate the public. We only ask that law and order be enforced.

"The Harrisburg Railways is a Harrisburg institution. Its directors are all Harrisburg men. All but one live here. Ninety-five per cent of the stock of the Harrisburg Railways is owned in Harrisburg. We have no outside entanglements and we are responsible only to Harrisburg people. We intend to maintain this relationship.

"We feel we are doing right and acting in the best interest of the city, its people, the company and its employees when we refuse to have any dealings with any organization entirely controlled by outside parties.

"We are making a fight for Harrisburg, and it will be a winning one.

"This is final."

On July 30, there were no new developments in the situation. Nearly fifty cars were operated and many people rode. On July 31 the company in another paid newspaper advertisement announced it would use newspaper space each day to set forth facts taken from the records explaining the company's position. This ad said at one place, "We believe the readers of this paper are amply able to decide what is fair, just and right, without comment from any company or organization whether it be from Harrisburg or Detroit."

The strikers on July 31 asked Mayor Meals not to interfere with unlicensed jitneys until the settlement of the strike. Twenty-one of the strikers were back on their cars on July 31. Among these men who returned were C. C. Page, financial secretary of Amalgamated Division 709, and Harry Dalton, treasurer. It was generally conceded that this marked the breaking of the backbone of the strike. Fifty cars, just two less than normal, operated throughout the day. In dis-

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cussing the applications of strikers for their old jobs, Mr. Musser said:

"We are taking the men back with the understanding that bygones are to be bygones. Any that we re-employ are given to understand that so long as they do what is right we will treat them as if nothing had happened."

Thirty-six cars were operated on Aug. 1, but the falling off in the number of cars operated was largely due to the sending back to New York of many of the strike breakers. Mayor Meals announced that jitneys would be allowed to run until the company was able to maintain regular schedules without the aid of strike breakers.

On Aug. 2, the company placed an advertisement entitled "Thirty-four Conductors and Motormen Have Returned to Work. Only 39½ per Cent of Our Employees Went on Strike." The ad continued:

"This company regularly has 448 employees. On July 16, last, 177 of these employees walked out without notice and insisted that you stop riding on the cars, for the reason that they were not satisfied with their jobs.

"What about the remaining 271 loyal employees?

"The real truth is that you were asked to prevent the large majority of our employees (271) from working and earning an honest living under conditions and with wages that were and are satisfactory to them.

"Thirty-four of the 177 who stopped work are now at their old jobs.

"And—

"To-day only 29½ per cent or 133 men are still requesting you to prevent the large majority, 70⅓ per cent or 315 men, from working regularly when and with whom they choose to work."

CINCINNATI ACCOUNTANTS REPORT

According to the report of Edgar Briggs, an accountant employed by the city of Cincinnati to make an examination of the books of the Cincinnati Traction Company for use in revising the rate of fare under the franchise agreement, the total net income from Feb. 22, 1901, when it took over the property and franchise rights of the Cincinnati Street Railway, to Dec. 31, 1915, was $25,233,809. The annual net income varied from $1,439,130 in 1902 to $1,929,716 in 1915. The gross earnings for the period were $67,209,642 and dividends paid stockholders aggregated $1,485,753. The gross earnings have increased steadily since 1902 and in 1915 they were $5,320,568. During the period $1,356,-947,014 passengers were carried. Of this number 1,347,-305,039 paid fares, 8,242,293 rode free as employees and 1,398,682 rode on passes. Transfer passengers aggregated 450,874,476.

According to the records as shown in this report, the cost of carrying passengers has varied from 2.7 cents each in 1904 to 3.02 cents in 1913. Last year the cost was 2.86 cents per passenger. The net income per passenger was highest in 1902, 2.08 cents, and lowest in 1913, 1.69 cents. Last year the net income per passenger was 1.82 cents.

The period covered in the examination of the Cincinnati Street Railway's books was from July 1, 1889, to June 30, 1915. The original capital stock of the company was $4,500,000, but up to and including 1900 it had been increased to $20,000,000. Of this $18,511,950 had been issued. Under the lease to the Cincinnati Traction Company, the latter agreed to pay the following rentals: 1902, $982,958; 1903, $1,027,699; 1904, $1,072,441; 1905, $1,117,-182; 1906, $1,124,337. For each fiscal year after 1906 the company was to pay the same as for that year and in addition $10,000 a year for the maintenance of the lessor's organization.

Mr. Briggs' report states that the value of the properties and franchises of the Cincinnati Street Railway at the time of the transfer was $19,172,364, less the surplus credited to the Cincinnati Traction Company, $703,522, leaving the value of the leased property $18,468,841. According to the report, the balance in undivided profits on June 30, 1915, was made up of the following items: Rentals, Feb. 22, 1901, to June 30, 1915, $15,478,996; other sources, $411,465, making a total of $15,890,461. From this is deducted regular dividends paid, $15,172,233; special dividends, $37,023; bond interest, $191,625; damages, licenses, premiums on bonds and sundries, making an aggregate of $15,678,978. On June 30, 1915, the credit balance was $211,482. From 1882 to 1903 dividends were paid at the rate of 5 per cent; 1904, 5½ per cent; 1905 to 1915, 6 per cent.

The revenues of the Cincinnati Traction Company from all sources during the fifteen years are listed in the report as follows:

Passenger receipts	$65,777,303
Chartered cars	89,749
Freight inclines	215,226
U. S. mail	169,604
Advertising	342,431
Rent of land and buildings	138,617
Rent of tracks and terminals	31,169
Discounts and interest	170,501
Miscellaneous income	94,659
Freight, interurban	171,408
Other sources	8,975
Total	$67,209,642

Operating expenses during that period are classified as follows:

Ways and structures	$2,528,427
Equipment	3,537,498
Operation of power plants	5,854,623
Operation of cars	18,300,509
General expenses	4,945,134
Total	$35,176,191

The net income of the company, year by year, was as follows: 1901, $1,158,929; 1902, $1,439,130; 1903, $1,452,-938; 1904, $1,527,047; 1905, $1,637,040; 1906, $1,738,346; 1907, $1,615,478; 1908, $1,631,121; 1909, $1,794,079; 1910, $1,899,221; 1911, $1,898,365; 1912, $1,926,005; 1913, $1,741,-406; 1914, $1,852,923; 1915, $1,929,716.

The number of passengers for each year from 1901 to 1915, the gross earnings and net income per passenger are shown in the following table:

Year	No. of passengers	Gross earnings	Net income
1901	65,432,231	4.45c	1.77c
1902	69,245,274	5.08c	2.08c
1903	72,279,640	5.04c	2.01c
1904	74,629,370	5.05c	2.05c
1905	79,694,825	5.08c	2.06c
1906	85,108,148	5.09c	2.04c
1907	88,167,938	5.10c	1.83c
1908	87,381,934	5.11c	1.87c
1909	93,404,369	5.12c	1.93c
1910	98,655,444	5.10c	1.92c
1911	101,607,139	5.05c	1.87c
1912	104,831,237	5.05c	1.84c
1913	102,994,455	5.06c	1.69c
1914	105,598,382	5.03c	1.76c
1915	106,110,593	5.01c	1.82c
Total	1,347,305,039		

Operating expenses of the company increased from $1,842,553 in the year 1901, to $2,648,550 in 1915, according to the report.

MESSRS. JOSSELYN AND HILD WELCOMED HOME

A rousing "home-coming" welcome was extended to two former officials of the Portland Railway, Light & Power Company, Portland, Ore., at the fashionable Arlington Club, in that city on July 12. The function was a complimentary luncheon by Franklin T. Griffith, president of the company, in honor of B. S. Josselyn, formerly president of the Portland Railway, Light & Power Company, and Frederic W. Hild, formerly general manager of the company. Mr. Griffith had invited a group of about twenty-five of the present officers and department heads of the company to greet their former associates. It was a family reunion, and the speakers often referred to the gathering as the best evidence of the excellent feeling that existed among all those who in the past and present have been identified with the growth and development of the corporation. Mr. Josselyn, who has been spending most of his time in the East, announced that he had come back to Portland to make the city his home permanently. Mr. Hild, who is now vice-president and general manager of the Denver (Col.) Tramway, was on his first visit to his old home since he took his new post last year. Accompanied by some of his "boys" of former days he spent part of his vacation in climbing some of the difficult mountain peaks in Oregon and in other long hikes.

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CINCINNATI VALUATION HEARING RESUMED

When the hearing on the tentative valuation of the Cincinnati (Ohio) Traction Company's property was resumed before the Public Utilities Commission of Ohio, on July 26, City Solicitor Charles A. Groom placed on the stand Edgar Biggs, accountant who made an examination of the company's books for the city, and attempted to establish the book value of the stock from his figures. Counsel for the company objected and the commission decided that testimony on this point was irrelevant, but that Mr. Biggs might testify as to the earnings and surplus account. Mr. Groom insisted upon his point, and it was finally decided that he should submit briefs on the question. It is generally believed this will delay the hearing about one month. George C. Bloss, Thomas Punshon and B. S. Hughs were other witnesses who gave detailed engineering information regarding the property.

At a meeting of the committee of the Cincinnati Council on street railways during the week ended July 29 Attorney Henry Bentley said that provision should be made in the revised franchise of the company for the interchange of business between the rapid transit loop and the surface lines. He contended that this would insure outside bidders for the lease of the loop that no difficulties would arise in the transfer of passengers from one line to the other. The prevailing sentiment among the members of the committee and the Rapid Transit Commission was that the Cincinnati Traction Company was the logical company to operate the loop. Mr. Bentley insisted that the provision would make no difference in case such an arrangement was entered into.

Chairman Michael Mullen of the committee assured Price Hill residents that their appeal for an extension of the Warsaw Avenue line to Coverdale was a worthy one and would receive first consideration.

Walter Draper, vice-president of the Cincinnati Traction Company, told the committee that the views of the company on all requested extensions would be ready for its consideration at the next meeting, on Aug. 10.

PROSPECTS FOR POWER DEVELOPMENT

The conference committee of the Senate and House are endeavoring to reach a compromise agreement on a general dam bill which can be approved by both houses and become law before the end of the present session of Congress.

Both branches of Congress have passed bills for the granting of permits for power dams and plants in navigable streams. The House measure contains a number of provisions placing more drastic restrictions upon development enterprises than are provided in the Senate bill. The difference in the two measures which the conferees expect to be the most troublesome, however, is that relating to the manner in which power permits shall be granted.

The Senate bill proposes that the Secretary of War shall have authority to grant such permits, under uniform and general terms, conditions and regulations prescribed in the measure. The House bill provides terms and conditions under which dams may be built, to be administered and enforced by the Secretary of War, with the condition that before any plans shall be approved or agreements entered into for the construction of such dams, Congress shall in each case pass a special enabling act granting its consent to the location and construction. This is the procedure provided under the present general dam act. No grants of any kind have been made by Congress since 1912, while in the six years before that date in which the law was in operation, about thirty enabling acts were passed by Congress, but only four comparatively small power plants were built under them, it being impossible in most cases to finance the projects under the terms of the present law.

In view of the declaration, favoring the use of natural resources, contained in the St. Louis platform, it is believed that the President and the Democratic leaders will make every effort to secure the passage at this session of a water power bill that will bring about development, and it is expected that an agreement on such a measure will be reached by the conference committee on the navigable streams bill before adjournment.

PLEA FOR UNIFIED SYSTEM

An address made by William Cooper Proctor, a member of the Cincinnati (Ohio) Rapid Transit Commission, before the street railway committee of the City Council on July 19, is of special interest at this time, because of the hearing on the valuation of the property of the Cincinnati Traction Company before the Public Utilities Commission for the purpose of arriving at an adequate rate of fare. The subject before the Council committee at the time was the revision of the company's franchise. Mr. Proctor advocated unified transportation service, 5-cent fare and universal transfers. He said that the terms of the franchises under which the rapid transit line and the surface lines operate should be fair to the company and the city alike. This will insure the best possible service. Mr. Proctor said, in part:

"The Rapid Transit Commission believes in one unified system of transportation for the city. It is not practicable to have two. We feel that the proposed rapid transit system and the present surface lines should be operated as a unit. What I judge to be the wish of the citizens of Cincinnati is a 5-cent fare, with universal transfers. This, I believe, can be accomplished.

"I do not think the city of Cincinnati should insist on an unfair contract. It is not good business to do that. If you have an unfair contract with the company so it can not make any money, it will go into receivership.

"If you get a contract unfavorable to the city, you are going to have continuous opposition on the part of the citizens. That contract must give the citizens of Cincinnati all they are entitled to for their money.

"The general matter of extensions will follow along that line. A great many extensions will not be necessary after the loop is built. Those that are necessary can be brought up and built as they should be built. If you unify the system, you can have extensions which will be serviceable to the city and I believe fair to the company.

"No traction company is prosperous unless a city is growing. Any city that is growing rapidly has a profitable traction system. So the very fact of our building the loop, with the probable increase in population, will enable us to work out our traction problem on a much better basis than would be practicable without it."

Chief Engineer Frank S. Krug of the commission said that 100 men had been employed to begin work on the traffic survey on the morning of July 24. They will have cards printed with blanks to be filled in, showing the points where passengers board the cars, their transfer points and their final destination. These men will board the cars and secure the desired information on the cards. They will begin with the lines centering at the Walnut Hills carhouse. Mr. Krug stated that about two weeks will be required to make the survey.

A number of persons from different suburban towns were present and discussed details with regard to requested changes and improvements. A resolution was adopted requesting City Solicitor Groom to deliver to the committee the report of the examination of the company's books made by Edgar Biggs, referred to on page 344 of this issue.

TOLEDO COMMUNITY PLAN CONFERENCE

At the conference on July 22 Johnson Thurston, president of the Street Railway Commission at Toledo, Ohio, claimed to have found a joker in the plan that would destroy the possibility of municipal ownership. The commission had just agreed to a clause which provided that the city might acquire the road at any time by paying to the Community Traction Company 106 per cent of the par value of the stock. Previously the commission had submitted an amendment to the city charter which limits the authority of the city to raise money on its general credit to 15 per cent of the purchase price. There seems to be a clash between the two. Other members of the commission suggested that the proposed amendment be withdrawn until the plan is completed, so that they would know just what is needed in the way of amendments. Henry L. Doherty is reported to have offered to accept payment for the road in city bonds, if he could have them at once while there is a demand in the market for such securities.

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Thompson Investigation Cost B. R. T. $4,850.—The Brooklyn (N. Y.) Rapid Transit Company has included in the comparative statement of the results of the operation of the system for the year ended June 30, 1916, this entry, "Expenses in connection with Thompson legislative investigation of Public Service Commission, $4,850."

Free Outing for Chicago Mothers.—With the sanction of the committee on transportation of the City Council of Chicago, Ill., L. A. Busby, president of the Chicago Surface Lines, recently furnished 10,000 tickets for distribution free through the South Side Woman's Club to mothers and children in need of an outing, the tickets to be used between 9 a.m. and 4 p. m.

Detroit Student Trainmen to Be Paid.—The Detroit (Mich.) United Railway has decided upon the payment of wages to motormen and conductors during the term of their apprenticeship. Heretofore, students have exchanged their time while under training for the instruction which they received. The company now plans to pay $1.50 a day to all students provided they remain in the service more than ninety days.

Roseburg M. O. Veto.—The municipal ownership ordinance vetoed by the Mayor of Roseburg, Ore., as noted in the ELECTRIC RAILWAY JOURNAL of July 29, page 203, provided for a steam railroad. On May 22 the city was authorized by vote of the people to spend $300,000. The Oregon Supreme Court decided that the city had the right to issue the bonds and the City Council approved the plans and specifications. It was expected that bids would be opened on Sept. 5. A tentative lease of the railroad for thirty years had even been agreed upon.

Society for Electrical Development Increases Membership.—As an indication of the increased interest evinced by central stations in the work of the Society for Electrical Development it is interesting to note that recently 141 central stations have become members. The increased membership is representative of all parts of the country and includes as well the subsidiary companies of four important holding companies. Among the companies that have recently become society members are Sanderson & Porter, New York; Hagerstown & Frederick Railway, Frederick, Md.; Kanawha Traction & Electric Company, Parkersburg, W. Va.; Wilmington & Philadelphia Traction Company, Wilmington, Del., and the Reading Transit & Light Company, Reading, Pa.

Hearing in Vincennes Track Case.—The Public Service Commission of Indiana on July 24 began a hearing in the case in which the Vincennes Traction Company seeks to prevent the city of Vincennes from compelling the company to leave double tracks in Seventh and Second Streets and Fairground Avenue, Vincennes. The company is seeking to replace the double track with a single track. The city filed an injunction to prevent the company from placing single tracks in these streets, and the case was sent from Knox County to Sullivan County. The company then filed a demurrer in the civil court and filed a petition with the Public Service Commission. On July 24 the city of Vincennes filed a demurrer with the Public Service Commission on the ground that the commission has no jurisdiction until the civil court disposes of the case.

Franchise Case to Supreme Court.—Following the refusal of Judge A. W. Frater in the King County Superior Court to grant the city of Seattle's claim for $13,078, alleged due as a gross earnings tax on the franchise of the defunct Seattle, Renton & Southern Railway, preparations were made by Corporation Counsel Hugh M. Caldwell to carry the matter to the Supreme Court. Recently Judge Frater signed a decision formally denying that the city was entitled to the franchise tax for the years 1912, 1913, 1914 and the first two months of 1915, because of the city's action in attempting to revoke the franchise of the company. The franchise was revoked by the City Council in December, 1910, but the Federal Court early last year held the attempted revocation illegal. Assistant Corporation Counsel Walter F. Meigs recently filed his formal exceptions to Judge Frater's findings of fact and conclusions of law, and will perfect an appeal to the State's highest court. According to reports, an attempt will be made to have the matter heard during the fall term.

Sixteen Cars Destroyed in Buffalo.—Sixteen cars were destroyed by fire which swept the north wing of the Cold Springs carhouse of the International Railway, Buffalo, N. Y. The total loss is estimated at $106,000 by Edgar J. Dickson, vice-president of the company. Of the cars which were destroyed, thirteen were of the near-side P-A-Y-E type, valued at approximately $6,000 each; two funeral cars, valued at $10,000 each, and a private car, "Tatanka," used by President Edward G. Connette, valued at $9,000. The investigation of the fire conducted by company officials did not reveal the cause of the blaze. The rapidity with which the fire spread and the congestion of cars in the carhouse at the early morning hour prevented trainmen from saving the destroyed equipment. The work of repairing the damaged carhouse is being handled by the company. The loss is covered by insurance. The loss of the two funeral cars will temporarily prevent the company from handling local funerals, but funerals to out-of-town cemeteries will be handled with an express car.

Under River Tunnel Contract Let.—The Public Service Commission for the First District of New York has awarded to Patrick McGovern & Company, New York City, the lowest bidder, the contract for the construction of the new East River tunnel, opposite East Sixtieth Street, for $4,194,797. The Board of Estimate has appropriated the necessary funds and the contract will in all probability be executed within a few days by the Public Service Commission and the construction will start within a short time. This is the last piece of under-river tunnel construction to be let by the commission under the dual system contracts. When the work on the Sixtieth Street tunnel, which is to connect the new Queens elevated lines with the crosstown line under Fifty-ninth and Sixtieth Streets, to be operated by the New York Municipal Railway Corporation, is completed there will be eight under-river tubes in process of building, four rapid transit tunnels in all, namely, the Whitehall-Montague Street tunnel, the Old Slip-Clark Street tunnel, the Fourteenth Street-Eastern tunnel and the Sixtieth Street tunnel. Of the four, all except the Old Slip-Clark Street tunnel will be operated by the New York Municipal Railway Corporation.

Efforts to Settle Buffalo Suburban Strike Fail.—After a series of conferences between representatives of striking platform men on the Buffalo (N. Y.) Southern Railway and Nathan A. Bundy, receiver and general manager of the line, an agreement was reached on practically all points at issue with the exception of the right of the receiver to employ only those he desired. The union demanded that he select crews according to seniority of service. Failure to agree on this point has again broken off negotiations, but a partial restoration of the service between Buffalo, Orchard Park, Ebenezer and Gardenville has been effected by the employment of new crews. A maximum wage increase of 5 cents an hour, bringing the scale up from 25 cents to 30 cents an hour, was agreed upon, together with partial recognition of the union. The conference was brought about by Public Service Commissioner Devoe P. Hodson after Justice Marcus in Supreme Court denied the application of Henry Lyons and other stockholders in the road for the removal of Mr. Bundy as receiver for refusing to recognize the union. Following the rejection of the proposed agreement by the men, Mr. Bundy notified Commissioner Hodson that he considered he was released from assent to every part of the proposed agreement and would operate the road with new men.

PROGRAM OF ASSOCIATION MEETING

Pacific Claim Agents' Association

Claim agents representing the steam and electric railroads on the Pacific Coast will assemble in Tacoma, Wash., on Aug. 9, 10 and 11 for the eighth annual convention of the Pacific Claim Agents' Association. The addresses of welcome will be delivered by Dr. E. C. Wheeler, president of the Tacoma Commercial Club, and L. H. Bean, manager of the Tacoma Railway & Power Company. T. N. Henry, safety lecturer in the Tacoma Public Schools, will tell about his work there. J. W. Brown, of the Tacoma Railway & Power Company, will speak on the regulation of motor vehicles along traffic lines.

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Financial and Corporate

ANNUAL REPORT

Philadelphia Rapid Transit Company

The comparative income statement of the Philadelphia (Pa.) Rapid Transit Company for the fiscal years ended June 30, 1915, and 1916, follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Earnings				
Gross passenger earnings	$24,871,254	96.21	$22,971,594	96.38
Receipts from other sources	968,088	3.79	872,011	3.62
Total	$25,839,344	100.00	$23,843,605	100.00
Expenses				
Maintenance and renewals:				
Maintenance	$2,506,731	9.70	$2,435,415	10.21
Reserve fund for renewals	1,369,170	5.30	1,141,125	4.78
Total appropriation	$3,875,901	15.00	$3,576,540	14.99
Operation of power plant	1,441,421	5.58	1,417,239	5.94
Operation of cars	6,447,078	24.95	6,205,101	26.11
General	1,343,326	5.20	1,329,829	5.57
Taxes	1,264,701	4.89	1,348,723	5.66
Total	$14,372,427	55.62	$13,877,432	58.27
Net earnings from operation	$11,466,916	44.38	$9,966,173	41.73
Fixed Charges				
Interest	$2,308,779	8.94	$2,259,471	9.48
Rentals	7,365,433	28.51	7,364,996	32.14
Sinking fund, city contract	120,000	0.46	120,000	0.54
Total	$9,794,212	37.91	$9,744,468	42.16
Surplus	$1,672,704	6.47	$221,705	00.93

The year ended June 30, 1916, marked the end of the five-year period for which the Stotesbury management originally assumed the responsibility of directing the affairs of the company. The report therefore contains a summary of the five-year period. The Stotesbury management, upon assuming charge and control of the affairs of the company, undertook within a five-year period to furnish to the public an adequate system of transportation, to recognize the efforts of the motormen and conductors in the way of co-operation by such wages as the resulting increased efficiency makes possible, and to build up the property to the end that it might be a credit to the city of Philadelphia and produce to its owners a return upon the $30,000,000 of capital stock actually paid in. It is the opinion of the management that the improvement in service to the public is an accomplished fact.

As a matter of fact the expectation that the rehabilitated and improved property might be productive of a return upon the $30,000,000 of capital stock actually paid in has been borne out by the experience of the period, particularly during the latest fiscal year when the net earned surplus amounted to $1,672,704. The management hopes that the present earning power will rehabilitate the credit of the property, as the participation of the Philadelphia Rapid Transit Company in the plans of the city of Philadelphia for the construction and operation of an extensive system of subway and elevated lines is essentially a financial problem, the company only asking from the city such co-operation as may be necessary properly to protect it against the diversion of earnings from the present system.

The results from operation during the year ended June 30, 1916, are presented in the income account. The gross earnings show an increase of $1,995,738, or 8.37 per cent for the year. This is attributable principally to the vigorous recovery in the industrial situation, the beneficial results of which were first felt during September, 1915. The operating expenses, including taxes, show an increase of $494,994. This is brought about mainly by the larger appropriations for maintenance and renewals and to the 22 per cent fund which, being based upon fixed percentages of earnings, are therefore greater when the earnings increase. The fixed charges show an increase of $49,743, due to added interest charges. The resultant surplus for the year ended June 30, 1916, was $1,672,704, as against $221,704 for the preceding year.

At the time of the original negotiations during the winter of 1910-11, immediately preceding the Stotesbury management assuming control, an estimate of the operating results for the six-year period 1910-11 to 1915-16 was prepared. This estimate is submitted below in comparison with the actual results:

Year ended June 30	Gross Earnings Estimated	Gross Earnings Actual	Surplus—Deficit* Estimated	Surplus—Deficit* Actual
1911	$20,900,000	$21,529,469	$652,000*	$415,560*
1912	21,750,000	22,700,692	416,750*	150,489*
1913	22,625,000	23,927,179	283,625*	509,583
1914	23,525,000	24,255,813	.....	310,236
1915	24,475,000	23,843,606	382,500	221,705
1916	25,450,000	25,839,344	678,000	1,672,704

The normal increase in gross earnings has been estimated at 4 per cent per annum, and this rate of increase was estimated when the forecast of the results for this period was prepared; the gross earnings for the year ended June 30, 1908, being used as a base figure. The actual average increase in gross earnings has been 4.22 per cent per annum, the total gross earnings for the year ended June 30, 1916, being $25,839,344 as against the original estimate for that year of $25,450,000 on a basis of 4 per cent annual increase.

It was originally estimated that only the last two years would reveal a surplus which would aggregate $1,060,500. The actual results of operation, however, show surplus earnings during each of the last four years amounting in total to $2,714,228.

As a part of the policy of this management, 15 per cent of the gross earnings has been set aside for maintenance and renewals, this in order that the physical integrity of the property might be maintained out of earnings and without any increase in capital obligations. The 15 per cent appropriation was made effective for the year beginning July 1, 1910, and has therefore been in force for six years to June 30, 1916.

The renewal fund as at June 30, 1916, amounted to $1,875,000, of which $772,245 is in cash, the balance of $1,102,754 representing securities.

An accident reserve was set up in the books in respect of the liability known to exist on account of the pending suits. As at July 1, 1911, this reserve amounted to $1,311,996. Owing to liberal appropriations from earnings during the five-year period, the accident reserve shows a balance of $1,032,686, as at June 30, 1916, or a reduction of only 22 per cent, as against a decrease of over 60 per cent in the number of suits pending.

NORTHERN OHIO SALE RUMOR REVIVED

Rumors have been revived of the possible acquirement of control of the Northern Ohio Traction & Light Company, Akron, Ohio, and the Republic Railway & Light Company, Youngstown, Ohio, by eastern capitalists and the consolidation of the two. It is known that a group of New York men have inspected the Northern Ohio Traction & Light Company's properties recently and that there has been some talk in regard to the price of the stock, but this is about as far as negotiations have gone.

The newspaper accounts of inspections by engineers and accountants are largely due to the work that has been done in anticipation of placing the bonds that have recently been authorized by the Public Utilities Commission and preparations for improvements that are to be made by the Northern Ohio Traction & Light Company within a short time. Already $4,000,000 of the bonds have been sold. Half of this amount will be used in taking up underlying securities and the remainder for improvements. The road will be double-tracked between Cleveland and a point 4 miles south of Akron. A new terminal is now under construction at Akron and various lines in that city will be extended. Improvements and extensions will be made in Canton and at other points.

There is no physical connection between the Northern Ohio Traction & Light Company and any of the lines controlled by the Republic Railway & Light Company, but this would not be difficult to secure through other roads which operate between the two roads mentioned. The Stark Elec-

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tric and the Cleveland, Alliance & Mahoning Valley, now under construction, could be used for establishing connections.

The Northern Ohio Traction & Light Company is now financed in such a way that all underlying securities will be taken up as they become due and the new mortgage, recently authorized, will eventually become a first mortgage on the entire property.

According to dispatches received in New York from Cleveland on Aug. 3 a special meeting of the stockholders of the Northern Ohio Traction & Light Company has been called for Aug. 15 at Akron, when it is expected the sale of the property to Eastern bankers at $100 a share, or $9,000,000 for the entire issue of common stock of the company, will be authorized.

DEAL COMPLETED FOR LEAVENWORTH & TOPEKA RAILWAY

A syndicate, largely Kansas City men, it is said, has taken over the Leavenworth & Topeka Railway, a steam road with one locomotive and some coaches, which has been operated between Leavenworth and Topeka six days a week by the Union Pacific and the Missouri Pacific. The plan is said to be to operate the line as a steam road until such time as it can be changed to electrical operation. The project is backed by W. E. Winner, who is now building the Kansas City & Tiffany Springs Interurban Railway. Leavenworth is 8 miles from Tiffany Springs and apparently the projected interurban can with comparative ease be extended to Leavenworth and connect with an electric railway on the Leavenworth & Topeka route, providing a through route from Kansas City to Topeka north of the Missouri River to Leavenworth. It is said to be possible, however, that the Leavenworth-Topeka line may be used as a western extension of the Kansas City-Western, an interurban now operating between Kansas City and Leavenworth, which Mr. Winner built. The Winner companies have an option on a piece of steam road line between Gower and Trimble, north of Kansas City, which may be used for an extension of the property northward of the Tiffany Springs line.

BOSTON ELEVATED FINANCIAL COMMISSION ORGANIZES

A meeting to organize the special commission to investigate the finances of the Boston (Mass.) Elevated Railway was held on July 21 at the library of the Massachusetts Public Service Commission in Boston. Lieutenant-Governor Calvin Coolidge was named chairman and James B. Noyes of the Boston Transit Commission was elected secretary. Beside these and the full boards of the Public Service and the Transit Commissions the special commission includes in its membership President Wells of the Senate, Speaker Cox of the House, Senators Bates of Boston and Eldridge of Somerville, and Representatives Jewett of Lowell, Newhall of Stoneham, Lawler and J. L. Donovan of Boston. No date for beginning hearings was selected, but these will be inaugurated soon after the company prepares its case. Hearings will be held either in the State House or at the Public Service Commission's offices. The company is working vigorously on the preparation of its case.

Illinois Traction Company, Peoria, Ill.—Bodell & Company, Providence, R. I., have sold $500,000 of new 6 per cent cumulative guaranteed preferred stock of the Danville, Champaign & Decatur Railway & Light Company. This stock is preferred as to assets and dividends. The dividends are payable quarterly on Jan. 1, April 1, July 1 and Oct. 1. The stock is redeemable as a whole at 110 and the dividend. The stock and the cumulative dividends at the rate of 6 per cent are guaranteed by endorsement by the Illinois Traction Company. After allowing for depreciation the income for the twelve months ended April 30, 1916, available for dividends was more than twenty times the preferred dividend requirements on the basis of the securities outstanding on April 30, 1916.

Martinez & Concord Interurban Railway, Martinez, Cal.—The California Railroad Commission has issued an order approving a trust deed by the Martinez & Concord Interurban Railway to secure an issue of $200,000 of first mortgage 6 per cent twenty-five-year bonds.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Under the plan recently adopted for the reorganization of the Nashville-Gallatin Interurban Railway for the building of an extension from Edenwold on the present line of the company to Springfield, 90 per cent of the bonds and 85 per cent of the stock of the company have been deposited with the First Savings Bank & Trust Company. An outline of the plan for the construction of the extension, which contemplates the organization of a new company, was published in the ELECTRIC RAILWAY JOURNAL of July 1, page 34. It is proposed that a new company be organized that will own the enlarged system. The Nashville-Gallatin Interurban Railway has a capital stock of $750,000 and has $600,000 of 5 per cent first mortgage bonds outstanding. To make the proposed extension it is estimated that $600,000 will be required, and an exchange of stock of the present company for that of the new company and in equal amount is being arranged among the stockholders, and new bonds will be issued to provide funds for the extension and improvements. If the deal is successful the E. W. Clark & Company Management Corporation will have charge of the construction. An agreement is also to be made with the E. W. Clark & Company Management Corporation for the operation of the combined lines.

Toledo Traction, Light & Power Company, Toledo, Ohio.—Cities Service Company has offered to buy the outstanding stocks as represented by the voting trust certificates of Toledo Traction, Light & Power Company, issuing its own securities in payment therefor on the following basis: For each share of Toledo Traction, Light & Power Company preferred stock Cities Service Company will give in exchange one share of Cities Service Company 6 per cent preferred stock. For each share of Toledo Traction, Light & Power Company common stock Cities Service Company will give in exchange 0.35 of a share of 6 per cent preferred stock and 0.07 of a share of common stock of Cities Service Company. The privilege of making these exchanges extends until Sept. 1, 1916, and conversion will be made as of that date. The first dividend to be received on Cities Service Company preferred and common stocks issued through these exchanges will be the dividend payable on Oct. 1. The offer of Cities Service Company to make these exchanges is contingent upon the assent of the holders of a substantial majority of both classes of stock, and the company reserves the right to withdraw the offer unless the holders of 75 per cent of each class of stock assent to this exchange.

Union Electric Company, Dubuque, Iowa.—The Union Electric Company has been succeeded by a new corporation, the Dubuque Electric Company, in which I. C. Elston, Jr., senior member of Elston, Clifford & Company, investment bankers of Chicago and associates, are interested. The officers of the Dubuque Electric Company are as follows: I. C. Elston, Jr., president; H. B. Maynard, Waterloo, Iowa, and C. L. Ayling, Boston, Mass., vice-presidents; Thomas M. Levi, Chicago, Ill., secretary; A. C. Allyn, Chicago, Ill., treasurer. Elston, Clifford & Company, Chicago, Ill., and Baker, Ayling & Young, Boston, Mass., are offering at 97 and interest, yielding 5.45 per cent, $2,300,000 of first mortgage 5 per cent bonds of the Dubuque Electric Company due June 1, 1925. The bankers are also offering at 94 and the dividend to net 6.38 per cent 7,500 shares of the 6 per cent cumulative preferred stock of the company. The authorized capital of the company consists of $2,000,000 of common stock, $2,000,000 of preferred stock and $6,000,000 of first mortgage 5 per cent bonds. Of these amounts there are outstanding $600,000 of common stock, $750,000 of preferred stock and $2,300,000 of bonds.

Virginia Railway & Power Company, Richmond, Va.—The stockholders of the Virginia Railway & Power Company have approved the plan to absorb by merger the Richmond Railway & Viaduct Company and to increase the authorized preferred stock from $8,000,000 to $9,000,000. In the circular to the stockholders calling the meeting Thomas S. Wheelwright, the president of the Virginia Railway &

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Power Company, said that the committee to which the matter of the merger was referred recommended that the Richmond Railway & Viaduct Company be merged with and into the Virginia Railway & Power Company. In order to provide for the retirement of the stock and the indebtedness of the Richmond Railway & Viaduct Company held by the Virginia Railway & Power Company and to make provision for its capital charges carried as an indebtedness to the Virginia Railway & Power Company, it was determined to issue $1,000,000 of preferred stock of the Virginia Railway & Power Company in exchange for stock and indebtedness of the Richmond Railway & Viaduct Company. Under this arrangement the $1,000,000 of preferred stock so issued will pass into the treasury to be disposed of in the future by the board if it should be found desirable to do so. Mr. Wheelwright said that the plan did not contemplate the present disposition of any of this stock and would not result in any increase of the capital stock of the company in the hands of the public. It will merely increase the treasury stock of the company by $1,000,000 par value. In the spring of 1915 the properties and franchises of the Richmond & Henrico Railway, consisting of a street railway and toll viaduct in the city of Richmond, were sold under foreclosure proceedings and acquired by the Richmond Railway & Viaduct Company. At the time of the sale the Virginia Railway & Power Company had acquired all of the outstanding bonds and stocks of the Richmond & Henrico Railway and thereby acquired all of the stock of the Richmond Railway & Viaduct Company and advanced to that company the money or securities necessary to pay for its properties and to discharge its capital obligations. The property has since been operated in connection with the system of the Virginia Railway & Power Company.

Visalia (Cal.) Electric Railroad.—The California Railroad Commission has authorized the Visalia Electric Railroad to issue 460 shares of its common stock of a par value of $100 a share to the Southern Pacific Company.

DIVIDENDS DECLARED

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Illinois Traction Company, Champaign, Ill., quarterly, three-quarters of 1 per cent, common.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1¾ per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

United Power & Transportation Company, Camden, N. J., $1.43.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, ME.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '16	$28,422	*$27,222	$1,200		
1" " '15	28,455	*30,536	†2,081		

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., June, '16	$740,848	$16,520	$724,328	$28,858	$695,470
1" " '15	294,520	14,023	280,497	40,843	293,663
12" " '16	6,459,297	203,841	6,255,456	491,479	5,763,977
12" " '15	3,977,733	148,171	3,829,562	490,000	3,339,562

EL PASO (TEX.) ELECTRIC COMPANY

1m., May, '16	$84,029	*$45,025	$39,004	$4,671	$34,333
1" " '15	71,624	*42,642	28,982	4,187	24,795
12" " '16	1,036,343	*534,684	501,659	52,913	448,746
12" " '15	1,004,534	*550,173	454,361	50,337	404,024

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., June, '16	$438,871	$268,048	$170,823	$49,343	$121,480
1" " '15	331,976	200,878	131,098	52,504	78,594
6" " '16	2,379,499	1,432,575	946,924	306,365	640,559
6" " '15	1,756,651	1,101,646	655,005	308,465	346,540

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m., June, '16	$853,190	$511,481	$341,709	$140,000	$201,709
1" " '15	770,717	490,359	280,358	139,445	140,913
6" " '16	5,009,415	3,142,623	1,866,792	853,388	1,013,404
6" " '15	4,604,536	3,035,016	1,569,520	841,482	728,038

*Includes taxes. †Deficit.

Traffic and Transportation

AUTOMOBILISTS STILL RECKLESS

Warnings and Prosecutions on Long Island No Deterrent to Mad Drivers

In a statement made on July 31 by J. A. McCrea, general manager of the Long Island Railroad, emphasis is placed upon the fact that reckless driving of automobiles and other vehicles over Long Island grade crossings is increasing rather than diminishing. Mr. McCrea said:

"It is very difficult to believe that we are making any headway in the prevention of accidents at our grade crossings. We have records of 140 distinct cases of recklessness which have occurred in the last seven months, and if drivers continue to violate the safety rules at this rate for the remainder of the year the record for recklessness in 1916 will exceed that of 1915.

"This year sixty-one automobiles ran through lowered gates and twenty-two horse-drawn vehicles broke through, making a total of eighty-three broken gates. So far this year there have been twelve collisions between trains and automobiles. In some cases automobiles actually ran into the trains. Seven wagons were struck by trains at crossings.

"Last February two persons were killed and there have been seventeen people injured at crossings. In the past seven months some sixteen automobiles have been destroyed or damaged.

"All of the above accidents have happened at crossings where we have crossing watchmen who operate gates or use signals. In addition, we have a record of nineteen drivers of automobiles and wagons who drove over railroad tracks ahead of trains, with apparently no desire to exercise caution. These are cases which have been reported to us by our employees.

"On July 27 the company prosecuted, in the Magistrate's Court at Hempstead, a boy who drove a farm automobile truck into the side of a train. The train did not strike the auto truck, but the truck did hit the middle of the locomotive. This was the first trip for the boy in the new auto truck. The jury found him not guilty, but there is no question that if he had been driving carefully and was competent to control his car, he certainly would not have run against the train. The railroad company can seldom get a conviction in a case of this kind, but it can demonstrate to the public that they cannot run into our trains with impunity, and whenever they do it we propose to make them prove themselves not guilty.

"We have a set of crossing gates at Locust Avenue, Springfield. They are operated day and night, painted with black and white stripes, and protect a perfectly straight piece of highway. Since July 1 these gates have been broken down twice. To the best of our knowledge and belief, there is no let-up in the recklessness that is being shown by a certain class of drivers. They should heed our oft-repeated warning before it is too late."

BUFFALO PASSENGER RECORDS BROKEN

More passengers were handled by the International Railway, Buffalo, N. Y., during the week of July 9 than during any other single week in the company's history. The annual conclave of the Ancient Arabic Order Nobles of the Mystic Shrine, being held in Buffalo, brought to the city more than 500,000 visitors from every section of the United States and Canada and from the islands of the Pacific. Special events were on each day's program and the problem of handling the immense throngs of visitors together with Buffalo's riding population of more than 400,000 was the most difficult ever handled by the company officials. On the night of July 12, when the illuminated parade of the Shriners was held, the police officials estimated there were 700,000 persons along the line of march with more than 40,000 men in line.

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From an especially constructed platform built out of his office window in the Ellicott Square Building, eight stories above the street, N. H. Brown, general superintendent of transportation of the International Railway, directed the movement of traffic in every section of the down-town district from the time the parade started to move until after the bulk of the riders were being moved toward their homes. Prior to the parade Mr. Brown had a long conference with his assistants and thirty uniformed supervisors. Each of these men was assigned to a position during the progress of the parade and was in constant communication with Mr. Brown by telephone. In his lofty position eight stories above the street Mr. Brown watched the progress of the parade, directed the movement of cars and received reports from supervisors whom he could not see and who were stationed at distant points along the line of march. Cars were kept moving in the down-town district until a few minutes before the parade reached the section and sixty cars were held in South Main Street bound from points in the north end and forty cars were held in the northerly terminus of the parade, bound for points in the south end of the city. East and west side car lines were connected as through routes whenever possible, and interurban cars made their terminus just north of the northerly end of the parade route. Other cars were stored in side streets and at no time was service on east side lines interrupted.

Warning of the immense throngs expected was posted in all carhouses and no platform men were allowed special time off during the week. On the night of the big parade day-run men who are usually relieved between 5.30 and 6 p. m. were not relieved until 3.30 the following morning. Every man was employed on this night and every type of car was pressed into service.

T. W. Connette, superintendent of the Buffalo City lines, and Edward Slant, assistant superintendent, were kept occupied in the street directing the routeing of cars on side streets so that there would be a sufficient number of cars on each line.

Figures compiled by Mr. Brown show that during the week a total of 4,265,311 passengers was carried as compared with 3,695,631 for an average during a week in the summer. There were no delays, no congestion before or after the parade and no serious accidents.

NEW YORK TRAFFIC QUICKLY TAXES NEW FACILITIES

Express service on the new third tracks of the elevated railway in New York controlled by the Interborough Rapid Transit Company was established on Jan. 17. The number of passengers carried for six years prior to that time was 294,000,000 in 1910, 301,000,000 in 1911, 304,000,000 in 1912, 307,000,000 in 1913, 311,000,000 in 1914, and 302,000,000 in the year ended June 30, 1915, an average of 303,000,000 a year. In February, 1916, the first full month the new elevated lines were in operation, there was an immediate jump in traffic, which resulted in an increase in passenger receipts over February, 1915, of 7.96 per cent; March had an increase of 8.75 per cent, April 8.23 per cent, May 10.36 per cent and June 7.04 per cent.

Interest on the cost of the new elevated lines was charged to construction until they were put into operation; after that this rent was charged to operating expenses. The amount of the company's 5 per cent bonds issued to provide for the third-tracking improvements placed in service Jan. 17, and for the improvements in the power station and substations of the elevated lines, was $14,758,000, the interest on which is $61,491 a month. The increase in operating revenue for February, 1916, was $136,350; March, $152,413; April, $141,536; May, $165,022, and June, $11,897.

The significant feature of this increase in traffic on the elevated is that it was not taken from the subway. For the year ended on June 30, during five and one-half months of which the new service was in operation, passenger earnings of the elevated increased $521,525, or about 3½ per cent over the previous year, while the subway showed an increase of $1,293,876, or approximately 7½ per cent. Every additional transit facility in New York appears to develop new traffic, while the old lines soon regain what is lost by competition with the new lines and continue to carry a constantly increasing number of people. This was true when the elevated lines were largely extended in the late seventies; it was true when the subway was opened in 1904, and again when the third tracks on the elevated were brought into service early this year.

Records of the street railways show that in 1904 the receipts from passengers were $19,415,750, while in 1905, the first full year the subway was in operation, receipts from passengers were $18,663,605, a decrease of about $750,000. In just one year, however, the street car lines showed passenger revenues of $19,530,533, an actual increase of $100,000 over 1904, before the subway had been opened.

The compilation also shows that during the year ended June 30, 1905, when the subway was first opened, the traffic on the elevated lines fell from 286,000,000 in 1904 to 266,000,000. In 1906 it it was 257,000,000; in 1907, 283,000,000; in 1908, 283,000,000, and in 1909, 276,000,000, and in 1910, 294,000,000 passengers, exceeding the traffic carried before the opening of the subway lines.

EFFECT OF RAISING FARES ON MASSACHUSETTS STREET RAILWAYS

In the presentation of evidence in the Bay State Street Railway fare case before the Massachusetts Public Service Commission, the company recently filed an exhibit showing the effect of fare increases on four systems within the State whose rates were permitted to be raised after investigation by the board. On the lines of the Middlesex & Boston Street Railway affected by the increase from a 5-cent to a 6-cent fare, the number of revenue passengers carried decreased 10.6 per cent and the revenue increased 3.1 per cent in the first twelve months following the new rate application, compared with the last twelve months under the old rates. On the Blue Hill Street Railway the passengers carried in ten months increased 19 per cent and the revenue increased 3.0 per cent; on the New Bedford & Onset Street Railway, the number of passengers in eight months fell off 9.4 per cent and the revenue increased 3.3 per cent; and on the Norfolk & Bristol the traffic in 8.5 months decreased 6 per cent and the revenue increased 9.2 per cent. A summary of the exhibit is given in the accompanying table.

RESULTS OF FARE INCREASE, MASSACHUSETTS

	Middlesex & Boston Ry.	Blue Hill St. Ry.	New Bedford & Onset Ry.	Norfolk & Bristol Ry.
Date of increase	10/28/14	7/31/15	9/8/15	9/18/15
Period, months	12*	10	8	8.5
Revenue passengers:				
Before	9,463,093	1,141,868	1,424,046	1,257,720
Since	8,454,506	1,358,317	1,290,240	1,182,828
Passenger revenue:				
Before	$475,723.44	$66,891.90	$65,552.65	$58,211.50
Since	$490,679.85	$68,901.36	$67,739.90	$63,596.69
Passenger increase	.....	216,449	.....	.....
Passenger per cent increase	.....	19.0	.....	.....
Passenger decrease	1,008,587	.....	133,806	74,892
Passenger per cent decrease	10.6	.....	9.4	6.0
Revenue increase	$14,956.41	$2,009.46	$2,187.25	$5,385.19
Revenue per cent increase	3.1	3.0	3.3	9.2

*Lines affected by fare increase only: Newton St. Ry. 5 months only.

General increase, 5 cents to 6 cents fare, by authority Massachusetts Public Service Commission.

Car Tax in Kansas City.—The Kansas City (Mo.) Railways and the finance committee of the upper house of the City Council have agreed on a tax of $50 on each street car used in Kansas City, Mo. The Council had considered an ordinance imposing a tax of $100. It is said that 560 cars will be taxed this year.

Serious Accident on Queensboro Bridge.—Eighteen persons, three of them women, were injured when two heavy steel cars of the Manhattan & Queens Traction Corporation demolished a small wooden car on the incline of the Long Island approach of the Queensboro Bridge at the beginning of the evening rush hour on Aug. 1.

Suggestions for New Kansas City Director.—Mayor Edwards of Kansas City, Mo., has submitted to the Kansas City Court of Appeals the following names, from among which the court will appoint the city member of the board of directors of the Kansas City Railways, to succeed F. C. Niles: Frederick D. Whiting, vice-president and general manager of the City Ice & Storage Company; Charles L.

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Merry, president of the Merry Optical Company; Frank J. Moss, president of the American Sash & Door Company.

Coatless Trainmen in St. Louis.—Bruce Cameron, superintendent of transportation of the United Railways, St. Louis, Mo., announced recently that motormen and conductors of the company would be permitted to abandon their coats for comfort during August. He explained that before the opening of the summer season, the United Railways had contemplated substituting for the coat a uniform shirtwaist to be worn by the carmen, but had been unable to obtain enough material of any one kind because of the war. The present "drive" of summer convinced officers of the company that coats were all but intolerable.

Service Complaint in St. Louis.—Members of the Civic League of St. Louis, Mo., have filed a new complaint with the Public Service Commission of Missouri in the matter of alleged overcrowding of cars of the United Railways. The commission in the new complaint is asked to check up the number of passengers carried and to take steps to enforce its order issued about a year ago. Richard McCulloch, president and general manager of the company, says the company is complying with the order of the commission, and should it be found that the service is not what it should be, it is for the commission to change the order.

Birmingham's Attractions Advertised.—The Birmingham Railway, Light & Power Company, Birmingham, Ala., has issued an attractive folder of Birmingham, which it describes as "The City of Natural Beauty, Good Climate, Healthful Conditions, Hospitable People, and a Pay Roll of $1,000,000 a Week." The folder contains a map of the lines of the company, and points out that these lines serve 220,000 people in the Birmingham and Bessemer districts. Many photographs of interesting spots in Birmingham, including the skyline, East Lake, West Lake, Avondale and several of the local clubs are reproduced in the folder. A list of places of interest along the railway lines operated by the company also is given.

Statistics of Surface Car Delays in New York.—According to a report just compiled by the New York (N. Y.) Railways, vehicles getting in the way of street cars, fires and other obstructions beyond the control of the company, delayed street cars 15,349 times for five minutes or more during the year ended June 30, 1916. This was 64 per cent of all detentions. During the year street cars were delayed 23,824 times for five minutes or longer. These detentions, many of which held up long lines of cars, cost 197 106 minutes, or 137 days. Vehicles blocked the cars 7495 times, when the detention lasted five minutes or more. In actual time these delays consumed 62,727 minutes, or about forty-four days. Two thousand seven hundred and fifty-seven detentions were due to accidents of various kinds, 3365 to car troubles, 1075 to track conditions, and 372 to power trouble. The cars of the New York Railways covered altogether 24,360,986 miles, so that for every delay for which the company was in any way responsible, the cars of the city covered 4500 miles.

Committee to Investigate Seattle Jitneys.—A committee of forty citizens of Seattle, Wash., consisting of presidents of the improvement clubs of the city, has been appointed to consider thoroughly the transportation problem of the city, and a smaller committee of five has been delegated to confer with the City Council at a meeting of representatives of the improvement clubs of the city at the Chamber of Commerce rooms in the Central Building. Those who will present the matter of jitney and street railway transportation to the City Council and urge a postponement of a final decision relative to jitney traffic in the city until investigations may be made are A. V. Pouillion, L. Frank Brown, D. M. Taggart, J. Payne and E. J. Wright. L. Frank Brown said: "The traffic situation is the most important matter facing the city body politic. It is more important than the situation on the water front, for it concerns more persons. The irresponsibility of the jitney service and its irregularity are considerations that must be faced at once. The resolution which the committee of five was to present to the City Council is a follows: Resolved, That transportation under just and adequate regulation is essential to the properly developed community, and therefore we urge the City Council to regulate the jitney service of Seattle, after deliberate consideration."

Personal Mention

James S. Clark, auditor of the Marion & Bluffton Traction Company, Bluffton, Ind., has been elected secretary and acting general manager of the Marion & Bluffton Traction Company, to succeed W. A. Patton, resigned.

J. H. Leary, who has been superintendent of transportation for the Oakland, Antioch & Eastern Railroad, Oakland, Cal., for the last three years, has resigned to become assistant superintendent of transportation of the Western Pacific Railroad, with headquarters at Oakland.

George A. Chapman has been appointed assistant general claim attorney of the Detroit (Mich.) United Lines with office in Detroit. Mr. Chapman has been claim agent for the Pere Marquette Railroad for the last eight years with headquarters at Saginaw, Mich. Prior to that time he was connected with the claim department of the Cincinnati, Hamilton & Dayton Railroad at Dayton, Ohio.

W. R. McCann, after serving for a year as private secretary to Commissioner Walter A. Shaw, has been appointed by the State Public Utilities Commission of Illinois as its valuation engineer. Prior to going with the Illinois Commission, Mr. McCann spent several years on the Panama canal work, in charge of electrical design and construction, reporting to Edward Schildhauer, electrical and mechanical engineer.

W. C. Callaghan has been appointed general manager with offices at Norwich, Conn., for the J. G. White Management Corporation, which has taken over the management of the operating department of the Shore Line Electric Railway. Since 1913 Mr. Callaghan has been superintendent of the Helena Light & Railway Company, Helena, Mont. Before that he was superintendent of transportation of the city lines of the New York State Railways (Rochester Lines).

John I. Mange has been elected vice-president of the J. G. White Management Corporation, New York, N. Y. Mr. Mange has been associated with the J. G. White Management Corporation since 1912, at which time he was elected vice-president of the Associated Gas & Electric Company, a holding company of electric and gas properties in New York, Kentucky, Ohio and Tennessee, managed by the J. G. White Management Corporation. Mr. Mange was born in Pembroke, Me., in 1876. He attended the public schools in Pembroke and in Kingston, Mass., and was graduated in 1899 from Tufts College, with the degree of Bachelor of Science. He has been connected at various times with the following companies: Charleston Consolidated Railway, Gas & Electric Company, at Charleston, S. C., as chief electrician; General Electric Company, Switchboard Department, at Schenectady, N. Y.; Lachine Rapids Hydraulic & Land Company, at Montreal, as electrical engineer; Oneonta, Cooperstown & Richfield Springs Railway, at Hartwick, N. Y., as electrical engineer and superintendent; Plattsburgh Light, Heat & Power Company, at Plattsburgh, N. Y., as secretary and superintendent; Watertown Light, Heat & Power Company, at Watertown, N. Y., as general manager.

J. I. MANGE

T. G. Kelly, who has been appointed superintendent of transportation of the Fort Smith Light & Traction Company, Fort Smith, Ark., entered electric railway work with the United Railroads, San Francisco, Cal., in April, 1908. He worked for the company for some time as a motorman and then went to Fort Smith, where he entered the service of the

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Fort Smith Light & Traction Company as a motorman. On July 10, 1911, he was promoted to inspector. He also acted as trainmaster and assistant claim agent of the company.

Samuel Anderson, who has been general manager of the Shore Line Electric Railway, Norwich, Conn., has been appointed assistant to the president of the company. Mr. Anderson entered railroad work in 1883 with the New England Car Service Association. At one time he was superintendent of the electric railway through to Worcester, Mass., from Connecticut and of the Worcester & Southbridge line. He was also for a time superintendent of the Connecticut Company's lines between Central Village and the Massachusetts line. Later he was made superintendent of the Connecticut Company's lines in New London and Norwich and to Central Village. These properties are now part of the Shore Line Electric Railway system.

W. R. Armstrong, general manager and chief engineer of the Salt Lake & Utah Railroad, Salt Lake City, Utah, has accepted the position of maintenance engineer on the Union Pacific Railroad, in charge of the maintenance of roadway and structures of all operated lines of the company. Mr. Armstrong has held the position of general manager and chief engineer of the Salt Lake & Utah Railroad since May, 1913, at which time that company was just inaugurating the construction of its line. He was graduated from the University of Kansas in 1890, and started as chainman on an engineering corps of the Kansas City Southern Railroad in June, 1892, and worked through various positions in the engineering department of that company to that of superintendent of construction in 1895. On Jan. 1, 1898, he was made division superintendent in the operating department of the same line, which place he held until February, 1900, when he went with the newly-organized Kansas City, Mexico & Orient Railroad as locating engineer. In 1905 he took employment with the Oregon Short Line Railroad, and was assigned by that company to build the Yellowstone Park branch from St. Anthony, Idaho, to the park, and later he constructed a branch for the Northwestern Railway from Huntington, Ore., down Snake River Canyon to Homestead. In November, 1908, he was made superintendent in the operating department of the Montana division of the Oregon Short Line Railroad, which position he resigned to go with the Salt Lake & Utah Railroad. A farewell luncheon was tendered to Mr. Armstrong by the Utah Electric Club at the Newhouse Hotel on July 27. Julian Bamberger, president of the Salt Lake & Oregon Railroad, presented Mr. Armstrong, on behalf of the club, a set of gold cuff links. W. C. Orem, president of the Salt Lake & Utah Railroad, expressed his appreciation of the faithful and efficient service which Mr. Armstrong had rendered his company. He announces that for the present no successor to Mr. Armstrong as manager will be appointed. F. D. Nauman, division engineer of the Southern Pacific Railroad, with headquarters at San Francisco, has been appointed superintendent and chief engineer. The duties of general manager will be assumed by Mr. Orem.

W. R. ARMSTRONG

OBITUARY

H. S. Manning, connected with the sales department of the Puget Sound Traction, Light & Power Company, Seattle, Wash., for thirteen years, died at his home in that city on July, 15 at the age of fifty-one years, from cerebro-spinal meningitis. Mr. Manning was born in Salem, Mass., and was graduated from the Massachusetts Institute of Technology. He was with the General Electric Company in Chicago for several years, but in 1897 participated in the Klondike rush and remained in Alaska for five years before returning to Seattle.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.—Chartered to construct a line between Womelsdorf and Myerstown, via Newmanstown, Sheridan and Richland, 8 miles, connecting at both ends with the lines of the Reading Transit & Light Company. Incorporators: L. R. Valentine and J. H. Mays, Womelsdorf; A. C. Klopp, Sheridan; John L. Shultz and Frank Rader, Newmanstown. [May 13, '16.]

FRANCHISES

Newport, Ky.—The South Covington & Cincinnati Traction Company has received a twenty-year franchise in Newport. The company will pay the city $6,000 a year as rental for use of the city streets, and proposes to put an additional number of cars on its lines. The company agrees to pave between the tracks and 18 in. on the outside.

Buffalo, N. Y.—Practically no opposition developed at the hearing before the City Council on the application of the International Railway for a franchise to lay tracks and operate cars through Franklin Street from Chippewa to Allen Streets, ½ mile. Porter Norton, of counsel for the railway, submitted a model franchise whereby the company will start work on the improvement within a year and have the line in operation in three years. The franchise will be submitted at the next general election.

Tonawanda, N. Y.—The International Railway has received a one-year's extension of time on its franchise in which to complete its new fast service line between Buffalo and Niagara Falls through the city of Tonawanda. Under the amendment granted by the Tonawanda City Council the line must be in operation by Dec. 31, 1917.

Cleveland, Ohio.—The Cleveland Railway has received a franchise from the Cuyahoga County Commissioners for a single-track extension on Pearl Road from the city limits to Parma Road. Permission for double track will be given after the completion of the sewers. The extension must be completed within one year.

Blackwell, Okla.—The Oklahoma Railway has asked the Council of Blackwell for a franchise to construct a line from the American Metal Company's smelter to the business district and thence to the oil field northeast.

TRACK AND ROADWAY

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala.—Work has been begun by this company on the reconstruction of its tracks on Tuscaloosa Avenue to conform to the street grade.

Visalia Electric Railroad, Exeter, Cal.—Application has been made to Commissioner Thelan of the Railroad Commission of California by the Visalia Electric Railroad to build a line from Visalia to Porterville, Strathmore, Lindsey, El Mirado and Ducor, 46 miles. The first construction will be to Porterville. The application asks permission to change the articles of incorporation and to release about $50,000 worth of stock from the $1,000,000 stock already authorized by the Commission. This $50,000 is for the purpose of paying the preliminary expenses.

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by this company reconstructing its track on Garey Avenue from Bertle to Orange Grove Avenue, Pomona. Standard weight rails will be laid on creosoted ties. The work will cost about $20,000.

Martinez & Concord Interurban Railway, Martinez, Cal.—The Railroad Commission of California has approved a trust deed by the Martinez & Concord Interurban Railway to secure an issue of $200,000 of first mortgage 6 per cent twenty-five-year bonds. The permission to issue these securities was given by the Commission May 13. [July 22, '16.]

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Pekin (Ill.) Railway.—Repairs are being made to this company's tracks on Washington Avenue to the end of the line in the Rosedale Addition.

Bay State Street Railway, Boston, Mass. — The Cedar Street line of this company has been abandoned from Eleventh Avenue to White Street.

Boston (Mass.) Elevated Railway.—The Public Service Commission of Massachusetts has authorized the construction of a new bridge over the tracks of the Boston & Albany Railroad at Brookline Avenue, near Fenway Park. The city of Boston, the Boston & Albany Railroad and the Boston Elevated Railway will pay a part of the cost and work will be begun as soon as the proportionate amount is determined.

Springfield (Mass.) Street Railway.—Work has been begun by the Springfield Street Railway on the construction of 3100 ft. of double track on Park, River and Baldwin Streets, West Springfield. The engineering department of the company has been instructed to prepare plans and descriptions immediately for the Carew Street extension and a petition for a franchise will soon be submitted to the City Council. The extension will be built next year.

Kansas City (Mo.) Railways.—Plans for the Troost Avenue bridge over Brush Creek have been completed by the city engineer and the contract may be let as soon as a decision is reached as to how the expense will be proportioned between the city and the railway company.

Interborough Rapid Transit Company, New York, N. Y.—Inquiries have been sent out by the Interborough Rapid Transit Company for 21,000 rail bonds, including a large quantity of contact rail bonds for use on 150-lb. rail, and a number of track bonds.

New York & Queens County Railway, New York, N. Y.—Borough President Connelly of Queens, at a hearing before the Public Service Commission for the First District of New York on July 26, opposed the application of the New York & Queens County Railway for an extension of time to discontinue its service between Corona and Flushing. This service, under a permit issued by the commission, was stopped over a year ago on account of the filling in of the meadows through which the cars were operated on a trestle, an undertaking which is still in progress, and which, according to the company, cannot be completed for another twelve months. Meanwhile the new tracks cannot be laid down. The commission ordered the company to construct a temporary detour road, provided it could secure a permit from the Board of Estimate.

Piedmont & Northern Railway, Charlotte, N. C.—This Company will reconstruct its bridges damaged by the recent flood.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—A new right-of-way has been secured in and near Berea by the Cleveland, Southwestern & Columbus Railway that will enable it to reduce its running time to all points south of that town ten minutes. By practically skirting the town several stops will be eliminated. Its franchise through the town expires in December and the plans provide for the completion of the new tracks by that date.

Columbus, Urbana & Western Electric Railway, Columbus, Ohio.—This company reports that it is opening a new park at Fishingers' Bridge, north of Storage Dam.

Blackwell, Okla.—Plans are being considered by a Chicago concern headed by George W. Knox, general manager of the Oklahoma Railway, for the construction of an electric line in Blackwell.

London & Port Stanley Railway, London, Ont.—The London Railway Commission plans to double-track its electric railway to Port Stanley, 30 miles, and install new equipment to cost about $500,000.

Canadian Northern Railway, Toronto, Ont.—It is reported that plans are being considered to electrify the Grand Beach line of this company.

Roseburg & Eastern Railroad, Roseburg, Ore. — R. L. Whipple, City Recorder of Roseburg, reports that the proposed line to be built by the municipality will be operated by steam. [July 22, '16.]

Beaver Valley Traction Company, New Brighton, Pa.—This company reports that it expects to reconstruct 3800 ft. of track.

Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.—Work will be begun by this company within the next month on the construction of its proposed line between Womelsdorf and Myerstown, and it is expected that the line will be completed in about a year at a cost of about $200,000. It will be a high-speed line and will be constructed mostly through private right-of-way. L. R. Valentine, Womelsdorf, president. [May 13, '16.]

Saskatoon (Sask.) Municipal Railway.—Bids will be received by the Board of Highway Commissioners, Regina, Sask., until Aug. 7, for the paving of the concrete traffic bridge over the Saskatchewan River at Twenty-fifth Street, Saskatoon. In conjunction with the paving of the bridge, separate bids will be received on behalf of the City of Saskatoon for the construction of street car tracks and the erection of trolley standards for the car line.

Nashville & Eastern Electric Railway, Smithville, Tenn.—A proposed bond issue of $150,000 to aid in the construction of the proposed Nashville & Eastern Electric Railway is to be voted on in Wilson County on Aug. 24. Charles Edwards, Smithville, is interested. [April 1, '16.]

Cleburne (Tex.) Traction Company.—Operation has been resumed by this company in Cleburne.

San Antonio (Tex.) Traction Company.—This company has begun track improvements and paving to cost about $100,000.

Tacoma Railway & Power Company, Tacoma, Wash.—L. H. Bean, manager of the Tacoma Railway & Power Company, reports the old Steilacoom carline, which has been operated by the Tacoma Railway & Power Company between Tacoma and Steilacoom for twenty-five years, was abandoned on July 26. Communication with Steilacoom will be had by means of a new line running from the hospital at Fort Steilacoom to the Sound. Since July 26 the Steilacoom cars, which formerly ran from Eleventh and K Streets, have been operated over the American Lake line to the Steilacoom Junction, and from there to Steilacoom over the new line. Mr. Bean states the town of Steilacoom can be better served by the new line, which avoids a steep hill just east of the town, and which operates through a more thickly settled territory. The old Steilacoom line was constructed in 1889. The portion abandoned by the Tacoma Railway & Power Company is approximately 6½ miles long.

SHOPS AND BUILDINGS

International Railway, Buffalo, N. Y.—This company's carhouse at Cold Springs was recently damaged by fire, in which sixteen cars were destroyed. Work of repairing the carhouse is being handled by the company. Further reference to the loss is made on page 246 of this issue.

Paris (Tex.) Transit Company.—It is reported that this company will construct a steel carhouse at Warlick Park.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—This company is building a new 7500-kw. plant in Canon City. Orders have been placed for all material.

Louisville (Ky.) Railway.—The storage battery at the old Campbell Street power plant of the Louisville Railway is being dismantled. Before the new High Street power house of the company was put into service the storage battery was utilized for peak loads and in emergencies.

Omaha & Lincoln Railway & Light Company, Omaha, Neb.—This company has purchased the electric transmission line extending from Louisville to Plattsmouth, where a line crosses the Missouri River, joining with the Mills County Company, enabling the Omaha & Lincoln Railway & Light Company to transmit energy to Glenwood, Iowa, via Plattsmouth.

Ohio Electric Railway, Springfield, Ohio.—This company has been awarded the contract for street lighting in South Zanesville.

Beaver Valley Traction Company, New Brighton, Pa.—A report from this company states that it expects to construct two substations.

Appalachian Power Company, Bluefield, W. Va.—This company reports that it expects to place an order this fall for one 500-kw. motor generator set.

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Manufactures and Supplies

REPAIR SHOP APPLIANCES IN GREAT DEMAND

The reports from various manufacturers of repair shop equipment indicate that electric railway repair shops are exceedingly busy and that electric railways are now preparing for future needs in this department. As is the case with most manufacturers, these companies are hindered in making deliveries by the scarcity of raw material. Many companies advise that they are unable to secure enough raw material to complete orders received by them. One manufacturer reports that when he does receive shipments of steel, it is in lengths double that received in normal times before the war, and as is apparent, the cost of handling is greatly increased.

One of the leading manufacturers of repair shop equipment and carhouse supplies, in a recent interview, stated that business had increased 50 per cent over the corresponding period of last year, although this company found it necessary to raise prices 20 per cent, due to the increased cost of raw material and labor. It is expected that this increased business will continue until the end of the year and possibly may extend into 1917.

ROLLING STOCK

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., will build one line car during the next six months.

Appalachian Power Company, Railway Department, Bluefield, W. Va., is in the market for one all-steel single-truck pay-as-you-enter car.

Beaver Valley Traction Company, New Brighton, Pa., is in the market for twelve double-truck side entrance cars of the Pittsburgh type.

Anaconda Copper Mining Company, Electric Light and Railway Department, Anaconda, Mont., is in the market for two motor cars and one trail car.

Nashville Railway & Light Company, Nashville, Tenn., is building nine double-truck cars which it expects to place in service about the middle of October.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has ordered one 36 ft. overhead line construction car from the Niles Car & Manufacturing Company.

International Railway, Buffalo, N. Y., lost sixteen cars in a fire which swept the north wing of the Cold Springs carhouse. The loss is estimated at $106,000. Thirteen of the cars destroyed were near-side, pay-as-you-enter type, valued at approximately $6,000 each; two funeral cars, valued at $10,000 each, and a private car, "Tatanka," used by President E. G. Connette, valued at $9,000. The order for the replacement of the funeral cars has been placed with The J. G. Brill Company. The order for new near-side cars has not been late.

TRADE NOTES

Roller-Smith Company, New York, N. Y., has appointed Eugene F. Lenoir, Franklin Bank Building, Philadelphia, Pa., to handle its products in the Philadelphia territory.

Railway Improvement Company, New York, N. Y., has received an order for 208 type No. 2 straps for the thirteen cars of the Toronto Civic Railway being built by the Preston Car & Coach Company.

Pyrene Manufacturing Company, New York, N. Y., has appointed T. F. Flanagan as general sales and advertising manager. Mr. Flanagan was assistant to C. Louis Allen, who held this position until a few months ago, when he was elected president of the company.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has appointed R. S. Wakefield, 1312 Busch Bldg., Dallas, Texas, as selling agent for its electric railway, light, power and gas materials in the state of Texas. C. E. A. Carr, Toronto, Ont., has been appointed in like capacity to cover the provinces of Toronto and Quebec.

General Electric Company, Schenectady, N. Y., on Aug. 1, paid out more than $550,000 as the first wage dividend to 19,000 employees who had worked for the company for at least five years and who received a sum equivalent to 5 per cent of their earnings for the six months ending June 30. The second dividend covering the last six months of 1916 will be paid on or before Feb. 1, 1917.

Curtain Supply Company, Chicago, Ill., reports the receipt of orders for curtains with ring 88 fixtures and Rex rollers for six interurban and ten city cars of the Schenectady Railway and sixteen city cars of the Binghamton Railway which are being built by the Cincinnati Car Company, and ring 89 fixtures for eight cars of the Pottstown & Phoenixville Railway being built by The J. G. Brill Company.

Halsey, Stuart & Company, Chicago, Ill., have succeeded N. W. Halsey & Company in conducting the investment banking business of the Halsey organization in the Central West. The business under the new name will be conducted under the same management and with the same organization as heretofore. The Chicago business was founded by the late N. W. Halsey in 1903 and for several years has been conducted by H. L. Stuart, who is president of Halsey, Stuart & Company. The New York house of N. W. Halsey & Company, which previously has been a separate organization, will continue to operate under the old name.

SIGNAL COMPANIES MAKE CROSS-LICENSING AGREEMENT

The Union Switch & Signal Company, General Railway Signal Company, Federal Signal Company and Hall Switch & Signal Company have entered into a cross-licensing agreement under the several patents, applications for patents and inventions owned by them respectively, copies of which agreement have been filed with the Department of Justice and the Federal Trade Commission. The purpose of the agreement is to end all patent litigation between the several companies and to put each in a position to make the safest and most effective types of signaling and interlocking systems and apparatus. By the production of such systems and apparatus the interests of the manufacturers, railroads and the traveling public will be promoted.

ELECTRIC HEATER ORDERS OF THE PETER SMITH HEATER COMPANY

Within the past few months the Peter Smith Heater Company, Detroit, Mich., has sold an extraordinary number of its new electric heaters. The New York Municipal Railway heads the list with 6000 two-coil panel type heaters for rapid transit cars. The Bay State Street Railway, Boston, Mass., has ordered 3200 truss plank heaters, 1600 panel heaters, 800 cab heaters and 200 automatic switches with thermostats for 200 cars to go into combined city and cross-country service. The Boston Elevated Railway has ordered 200 double coil panel heaters for the vestibules of fifty additional articulated cars and 2800 cross-seat and 400 panel heaters for 100 new surface cars. The Connecticut Company has ordered 1200 cross-seat heaters, 400 truss plank heaters, 100 automatic switches and thermostats for its latest 100 cars.

Other orders follow: Tri-City Railway, 380 cross-seat and fifty-two panel heaters for twenty present and three new cars, together with a separate order for fifty-eight platform heaters, five of which are to operate in 1200-volt service; Philadelphia & Wilmington Electric Railway, 496 truss plank heaters for thirty-one cars; Mahoning & Shenango Railway & Light Company, 340 double-coil truss plank heaters, ten automatic switches and thermostats for ten new trail cars; Hershey Transit Company, thirty-two cross-seat heaters for two cars; Iowa & Illinois Railway, thirty-two cross-seat heaters, eight panel heaters, four automatic switches and thermostats for four cars; Pottstown & Phoenixville Railway, sixty-four truss plank heaters and sixteen platform heaters for eight cars; Jersey Central Traction Company, seventy-eight truss plank heaters and twelve platform heaters for six cars; Chambersburg, Greencastle & Waynesboro Electric Railway, forty-four cross-seat heaters for two cars; Westchester Street Railway, thirty-two cross-seat and four platform heaters for two cars; Monongahela Valley Traction Company, sixty-four panel heaters for eight cars; Rutland Railway & Light Company, sixteen cross-seat heaters for one car.

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Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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A CREDITABLE STRIKE SETTLEMENT

The power of public opinion was forcibly exemplified in the settlement of the street railway strike in New York City this week. In enforcing its opinion the public assumed certain responsibilities for the future which it cannot evade without disaster. The companies have materially improved their position before the people, and the employees, by the logic of events, are committed to a policy of fair play and sobriety of conduct that will mean much for the industry if honestly carried out. Two issues were involved in the strike, the right of the men to join the union and the demand for more pay. In defending its position on the union question the company was at a disadvantage because it was not able to get before the public for discussion the larger issue of possible union domination through the closed shop if the amalgamated association should get control of its labor and insist upon the employment of union men and none other. The discussion was cunningly confined to the right of the individual to join a union. In the public mind that was a question of individual liberty to which there was but one answer. It would be about as easy to gain support for a rule that no employee should join a debating society, or the Republican party or the Methodist church.

THE FUTURE RESPONSIBILITY OF THE PUBLIC

The companies took the only wise course open to them in yielding their original position on this point. They were equally wise, as were the mediators, Mayor Mitchel and Chairman Straus, in seeing to it that the terms of settlement were so drawn as to establish a basis on which it may be made very clear to the public that while the men were freely accorded their natural rights in the matter of organizing themselves, the union was not recognized as the dominating and controlling authority in the relations of the companies with their employees. The public authorities who did such excellent work in bringing about the adjustment of this trouble will, we hope and believe, appreciate to the fullest extent the obligation which by implication they have assumed to protect both the public and the transit companies from the intolerable consequences which will follow if Mr. Mahon and his associates are permitted to accomplish their full purpose of bringing the traction lines of the city under the absolute dominion of an arrogant, irresponsible and unregulated labor trust. It is the duty of the authorities to recognize that the personal liberty of a non-union man is just as precious and inviolable as the personal liberty of a unionist and that the public interest may be in greater peril from the recalcitrancy of a labor monopoly than from any aggressions of a monopoly of capital.

THE MONEY FOR INCREASED WAGES

Under the terms of settlement it is more than probable that the question of increased pay for the men will go before arbitrators. If an advance is made the money with which to meet it can come from only one source—the pockets of the people served. Here is the point at which the employees have a great opportunity. If they can see that they and the companies are working for the same employers—the people who ride in their cars—and that like good business men, whose costs of production have risen, it is necessary for them to show the customers frankly and candidly that the price of the goods must go up to keep pace with the advance in costs, it will be much easier to get the needed money through either increased fares or relaxation of restrictions which now absorb much of the revenues of the companies. The man in the street will of course smile a smile of derision at the first suggestion of this nature. He will not take the first step to banish the myth that utility profits are fabulous and unfailing. The utility employee will simply act in his own interest by helping to make the man in the street understand the facts.

SOLIDARITY OF EMPLOYEES AND COMPANIES

The employees should be the best friends of the companies in creating that change in public sentiment which must come in order that the companies may live and develop their services in accordance with the rapidly growing needs of the community. The reservoir of funds from which all expenditures of the traction lines must come is not in some magical and inexhaustible treasury reserve. If every cent now paid in interest and dividends were diverted to the payrolls the difference to the individual employee would seem to him to be amazingly small. Increased wages can be obtained and continued only by bringing the public to a more intelligent and a more liberal attitude toward traction interests. At heart the public no more wants underpaid traction companies than it wants underpaid traction employees. The rank and file of employees must bear their part in the task of bringing out and driving home the facts to effect the needed change in the public mind. We recommend to the New York companies and their employees careful consideration of some remarks by Jesse W. Lilienthal of San Francisco, printed on another page on the solidarity of interest and sentiment which has been developed between his company and its men.

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POPULARIZING UTILITY OWNERSHIP

A movement which has gained considerable impetus during the last year or more is the partial mutualization of utility ownership through the direct sale of securities to patrons. Thus far the innovation has mostly been found in the electric light and gas industries, but the reported success here has at least made other utility operators keenly alive to the fact that such a policy could perhaps be used to advantage in their fields. To enable electric railway officials, therefore, better to judge the adaptability of the movement, we are publishing this week an article on the security-selling work of H. M. Byllesby & Company, an organization which has carried the plan to a commendable development of general detail for various lighting properties.

The chief object of selling securities to patrons is not to raise funds but to create better public relations for the company. The basic idea, of course, is that the thing which touches a man's pocketbook directly is the thing that interests him vitally. The patron who is a security holder is not nearly so likely to listen to the demagog, to formulate incessant objections to and criticisms of the company's practices and to hinder the expansion of its business, as is the patron who has not this direct interest in the company. In other words, the indifference or even hostility of the mere patron tends through security ownership to be transformed into an active co-operation to advance the company's prosperity. The experience of the Byllesby properties shows that this is not at all an unobtainable ideal, and the advisability of adopting the plan for electric railways can not, we think, be questioned upon very strong grounds.

It will be said, of course, that electric railways, unlike the electric lighting and gas utilities, have no definitely listed clientele for security sales. This is true, but it is a minor point. It makes an individual appeal to prospective purchasers more difficult, but the intrinsic merits of security ownership are such that a general systematic advertising of the security-selling plan would undoubtedly bring to light many people of small incomes who would be glad to use their local railway as a combined vehicle for saving and investment. The securities offered would have to be of small denomination, and a partial-payment plan might be necessary, but the extra trouble and expense caused thereby would be negligible in comparison to the results to be gained. Moreover, as to the probable assertion that small denomination securities have been discredited on account of their use in "get-rich-quick" schemes, we feel that any prejudice arising from such a cause would be dispelled when the securities are issued by a reputable management upon a property under the immediate personal observation of the buyers.

Furthermore, it will be pointed out that if electric railways take up direct-security selling, they will be obliged to overcome the opposition of investment banks. These live on security commissions and profits, and it would not be unnatural for them at first glance to oppose any plan whereby a utility would deal with local investors directly. There are reasons, however, why this obstacle should not prove serious. In the first place, the bankers may enter the case only to buy in old securities for resale locally, in which event they are not in position to dictate regarding the disposition of the securities. In the second place, in comparison to the amount of new securities handled by the investment bankers, the absorptive power of the local community is almost invariably small, and the bankers ought to be most willing that the company should reserve a small part of new offerings for sale to its patrons at the syndicate or market price. The successful carrying out of its security-selling policy would have a beneficial effect upon the company's public relations that would sooner or later redound to the financial benefit of the bankers themselves. The bankers should not even desire to handle the local sales themselves, inasmuch as the work can be sufficiently well done by the local company, with the possible assistance of the local banks in partial payment matters. Indeed, in view of the desire to create better public relations, it is quite essential for the railway to make the sales, for it rather than the investment bankers will make paramount a wide diffusion of the securities instead of a quick placing of the whole amount.

Another objection to selling electric railway securities to patrons will arise in connection with the fundamental question of market popularity. While utilities have sold and will probably still sell some bonds and notes to customers and patrons, the direct-selling plan fundamentally is based upon the local distribution of stock issues, for it is the stockholder rather than the bondholder who has the most keen interest in every detail of operation and through whom the idea of having the utility and its patrons partners in financial matters and community advancement can best be carried out. Moreover, as the offer of stock is made on an investment basis, it goes without saying that the issue should be of an investment character, that is to say, fundamentally good and with security of principal and of return more important than speculative value. In a broad sense, these are the characteristics which a public utility security should naturally possess, because while regulation will prevent large returns, its tendency is equally to protect existing investments from competition and confiscatory legislation. If the common stock does not possess the requirements outlined above, an issue of preferred stock can often be made to advantage, or an issue of debenture bonds with convertible features.

The sale of stocks to patrons is not by any means an immediate panacea for all railway ills, but it is a valuable aid for putting a portion of the public in a position where they will understand and see the injustice of many such ills. It may be thought that the amount of stock absorbed locally will not be enough to enable the holders to influence very much the community feeling, but the amount is a secondary matter. The vital point is the number of stockholders, for the more local holders there are for the allotted block of stock, the stronger will be the effect upon the general public. The basic theory of local stock ownership is sound, and the movement deserves a fair trial at the hands of railway operators. Thus to bring about a more popular ownership

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of electric railways, combined with the operating efficiency that now characterizes privately owned lines, would be to attain the aim without all the attendant evils of municipal ownership.

IS A NEW UNIT FOR COMPARING TRACK MAINTENANCE COSTS DESIRABLE?

Track maintenance costs varying from $86 to $2,200 per mile per year, or from 0.42 cent to 16.11 cents per revenue car-mile, are listed in the 1914 report of the Public Service Commission for the Second District of the State of New York. Equipment costs for the same period do not show any such marked differences, and while energy production costs are not recorded, it is safe to assume that they, too, would not vary between such wide limits. What, then, are the causes for the wide variations in track maintenance costs? Differences in maintenance standards? Yes, to a certain extent, but the trouble is largely with the bases of comparison which certainly are far from just. Way engineers have long realized this and as a result have not been induced, by comparative figures, to study each other's results with a view to improving methods and practices, setting up proper standards of maintenance and reducing costs.

That studies of unit costs have been found fruitful in other fields of endeavor, the remarkable progress made by manufacturing companies during the last few years in the way of improved methods of manufacture and the scientific selection and utilization of materials, bear witness: Are not the same principles of engineering and economics applicable to railway work?

In average figures the cost of the track of a street railway system is about 40 per cent of the total plant cost, and the cost of track maintenance, according to the United States Bureau of the Census, is about 11 per cent of the total operating expense. Track maintenance, therefore, is an important item in the annual expense budget, and every facility should be afforded for obtaining comparative cost data because it is by comparison that one strives to improve. An accepted basis of comparison would bring about the standardization of a method of arriving at comparative costs and engineers would find greater use for such costs than they do now. For example, if his cost of maintenance seemed unduly high, in comparison with standard figures, the engineer would be interested in discovering the cause and providing a remedy. High unit costs might be due to a number of causes, such as the selection of an improper type of track for the service, inefficient methods, or to a low standard of maintenance, and premature renewals owing to the fact that the paving in the street was to be renewed and it seemed desirable to relay the track at the same time. With track maintained in standard condition, low unit costs extending over a long period of time would indicate efficient management. There are very few properties on which a scientific study of reliable comparative costs would not result in improved methods and decreased annual charges.

As railways are usually managed, the track is called upon to withstand the brunt of a retrenchment policy oftener than any other part of the railway physical property. And this, despite the facts that it, as much as any other element in the railway equipment, is affected by neglect, and that for each road there must be some condition of roadway which will require the minimum average annual outlay to maintain. If, therefore, more or less uniform standards of track maintenance would result from the adoption of a suitable unit for the comparison of maintenance costs, the price of compiling the necessary data would be more than repaid. Such standards would also be extremely valuable in comparing different types of track construction on the same system, for even with the modern accepted types the lack of comparative data is felt, and there is some question as to whether the increased cost represents a judicious expenditure or whether increased life is being obtained only at more than a proportionately increased cost.

But, it is argued, there are so many local conditions and special situations affecting maintenance costs that comparative costs are useless! Quite true, about the local conditions, but such factors also have entered into the unit costs for equipment and have not seriously detracted from their value. Further, it is interesting to note in this connection that the electrical and mechanical departments have far outstripped the way department in perfecting practices and equipment through the use of comparative unit costs.

In this connection it must be remembered, however, that the successful use of any sort of unit cost depends on the accuracy of the accounting methods used in the determination of that cost. From the engineering point of view, cost accounting systems are valuable only in so far as they permit an intelligent analysis to be made of their results. When an accounting system only serves as a record of expenditures made, its greatest value, namely, that of affording incentive for improvement, is lost. In other words the accounting system should be to the way department what the recording meter is to the electrical department. It must further be remembered that it is the average annual cost that is of value as a comparative unit. Deferred maintenance must always be paid for in the end by a growing concern, and a correct standard may be determined only by a painstaking analysis of expenditures and by comparisons with other railways on a standard unit basis.

In conclusion, we feel that a more satisfactory basis for the comparison of track maintenance costs would promote a more scientific study of track maintenance, which in turn would result in improved methods and practices, standards of track maintenance and greater efficiency of the way department. These things, in their turn, would result in increased safety, greater reliability of service and reduced costs. In a later issue we expect to present a brief discussion of the relative merits and demerits of some of the bases of comparison now in use or proposed for use.

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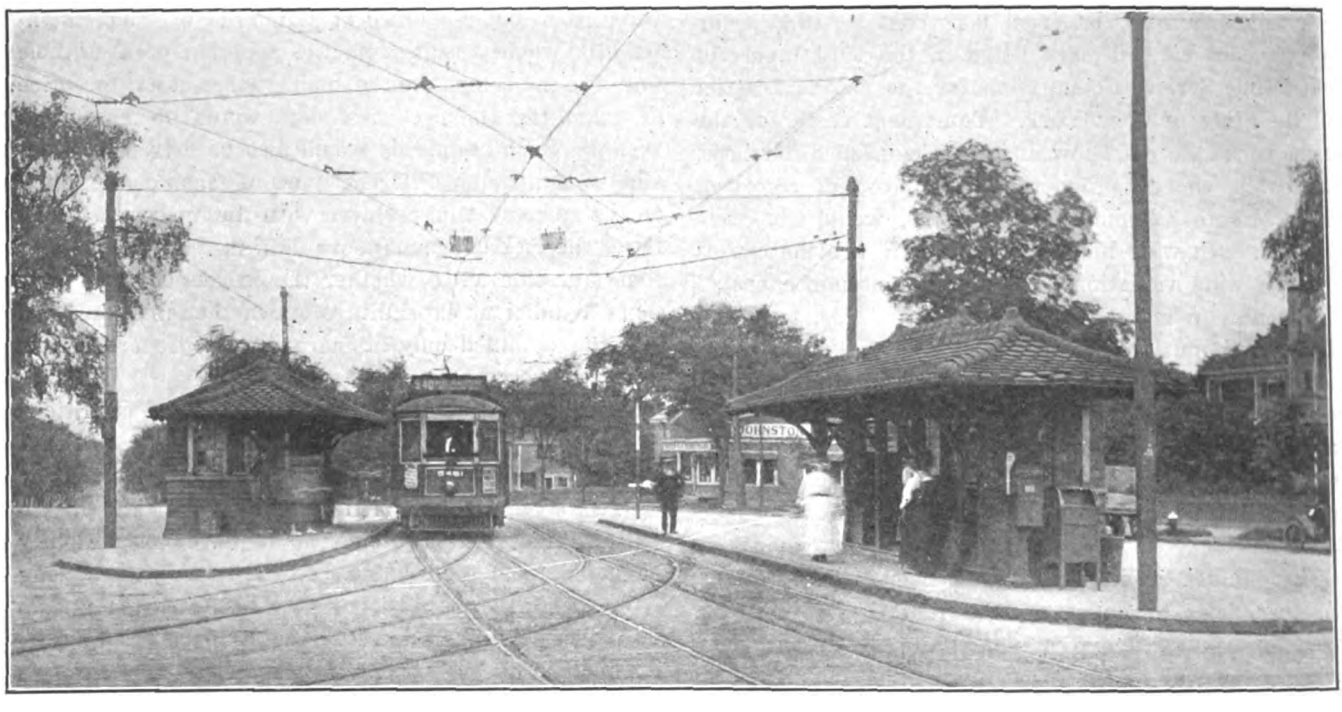
Boston Profits by Elevated Railway Station Improvements



BOSTON STATION IMPROVEMENTS—COOLIDGE CORNER CAR STATION

Recent betterments on the Boston (Mass.) Elevated Railway include the reconstruction of several important passenger stations and arrangement of loop tracks to relieve congestion at other points on the system, the establishment of terminal storage yards for trailers, and a short but essential extension of the East Boston tunnel to the West End district, with extended studies of possible improvements in handling traffic. One hundred new center-entrance Brill and Laconia motor cars have been ordered by the company, with forty-two new pressed steel cars for the rapid transit elevated lines and one hundred Laconia center sections for articulated surface cars. These and other improvements are described in the accompanying article.

PROBABLY the most important station improvement now under way by the Boston Elevated Railway is the reconstruction of the Egleston Square station in the Jamaica Plain district for the relief of congestion at the Dudley Street station of the rapid transit lines in Roxbury. Dudley Street station was formerly the southerly terminus of the rapid transit lines. Later these lines were extended to Forest Hills by elevated structure, Dudley Street station still remaining the terminus of a large number of surface car lines operating in the Roxbury-Dorchester district. It is still the principal transfer point between these lines and the rapid transit system. About 85,000 passengers, both inbound and outbound, transfer daily in this station and about 40 per cent of these transfer in the rush hours. This large volume of travel overtaxes present facilities, especially on the east loop of the station, where about 40,000 passengers per day transfer in each direction between surface and rapid transit cars.

To relieve the congestion at this loop, the Egleston Square station is now being enlarged to permit the diversion of certain surface car lines from Dudley Street to the rapid transit station at the former point, and the transfer under the new arrangements will be made within a prepayment area and without the use of paper checks. The enlarged station, which is illustrated in plan and sections, will be provided with a loading and unloading platform for surface cars, ticket office for passengers entering on foot from the street, an escalator and suitable shelter from the weather. There will also be short stairway connections between the rapid transit platforms and the outbound surface car loading platform. All surface cars passing the intersection of Washington Street and Columbus Avenue will be routed through the surface portion of the station, and the withdrawal of the present Mattapan motor-trailer service from the east loop at Dudley Street will not only reduce congestion there but will in many cases shorten the running time from Dorchester points into the business center of Boston through the making of an earlier connection with the rapid transit system farther away from the downtown district.

About 10,000 passengers now transfer daily at Dudley Street to and from the Mattapan line, which is one

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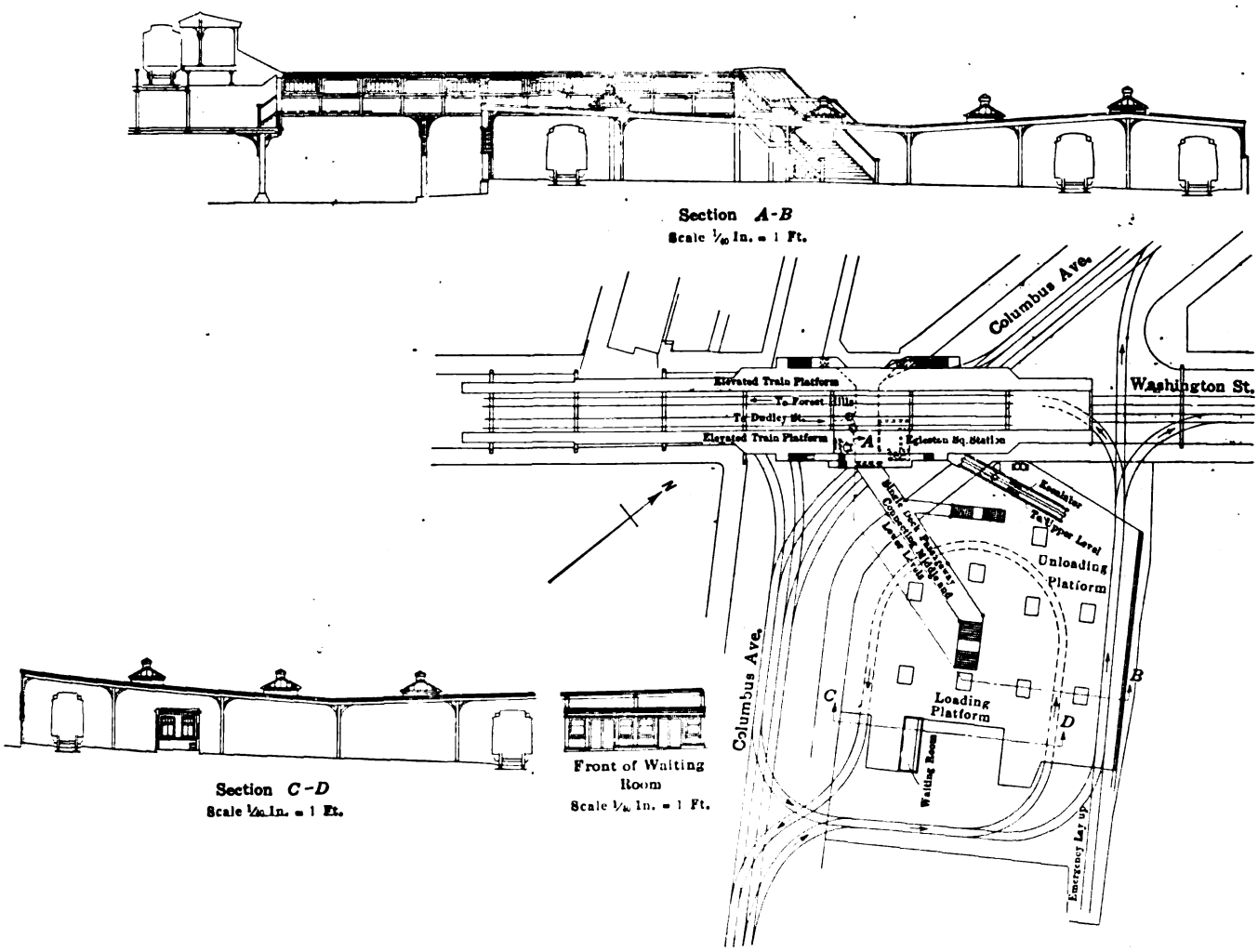
of the most important of the surface trunk lines on the south side of Boston. The enlarged Egleston Square station will enable other lines to be diverted to the rapid transit system at this point, if necessary, and affords the prospect of considerable future as well as early relief of conditions at Dudley Street. It is expected that the enlarged station, with its prepayment area and surface car trackage, will be completed in about three months. The track layout enables surface cars to be routed through the station or reversed inside the prepayment area as the case requires. Short and quick connection is afforded by a double-file escalator between the unloading surface car platform and the elevated train platform, and the separation of inbound and outbound traffic is assured by the location of loading and discharge berths. On a smaller scale and with little modification of its original design for train service other than the addition required in connection with surface car service, the Egleston Square station is being equipped to perform similar functions as the larger station at Dudley Street.



BOSTON STATION IMPROVEMENTS—PLANS AND SECTIONS OF EGLESTON SQUARE STATION WHICH PROVIDES BODILY TRANSFER WITHIN PREPAYMENT AREA

SURFACE TRANSFER STATION AT WATERTOWN

Station improvements on the surface lines of the company at Watertown, Mass., are illustrated in another plan, and also by a half-tone engraving. Watertown is now the terminus of important lines operated from North Cambridge through the Harvard Square station of the Cambridge subway and Mount Auburn district westward, and from Park Street subway station in Boston through Allston, Brighton and Newton, with corresponding return service. Formerly Newton Corner was the terminus of these lines, and as connection is made there with the suburban cars of the Middlesex & Boston Street Railway, there was considerable congestion at Newton during layovers, due also in part to heavy automobile traffic and the use of Newton Corner by pedestrians. Service was rearranged by the company so that the through lines mentioned above terminate at the Watertown carhouse, and in place of the paper transfers previously issued, a free bodily transfer now enables through passengers to continue their journeys between Cambridge and Newton by a change at Watertown under shelter and within an area located on the company's property instead of in the street as formerly. Conditions at Newton have been greatly improved by this change, and the facilities for operating both normal and rush-hour service on short headway lines leading into Boston via Newton and via the Cambridge subway connection have been much improved.

On these main surface lines terminating at Watertown, trailer cars are operated during rush hours on four-minute headway, the normal headway being four and six minutes. The inconvenience of the change is thus offset by the close connections scheduled between cars; transferring is effected under safe conditions without the annoyance and abuses of paper checks, and flexibility of operation is enhanced. Despite the peculiar layout of the Watertown property, a storage yard with six parallel stub tracks and a main line loop have been completed and utilized for some months to great advantage. Nearly 1200 ft. of storage is available on the stubs outside the carhouse, there also being three main-line tracks in the yard, giving ample space for the storage of trailer cars during normal and night hours, as shown in the half-tone engraving. Passengers

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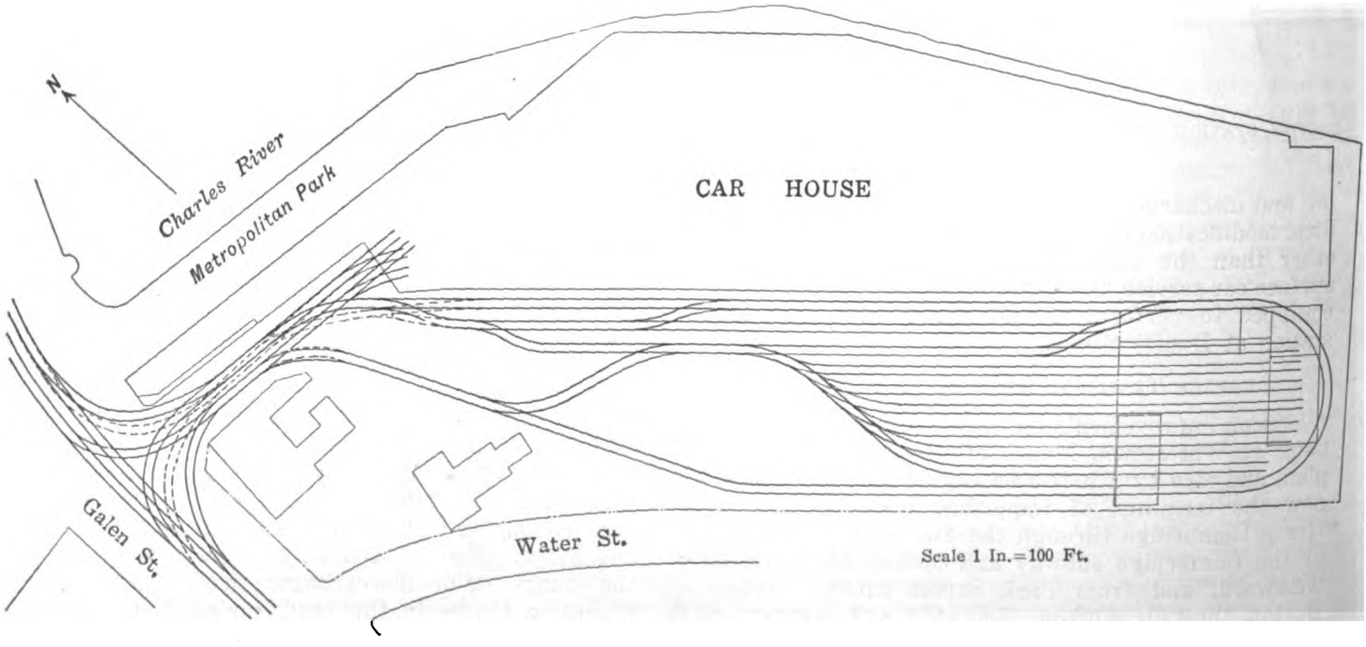
BOSTON STATION IMPROVEMENTS—WATERTOWN TRANSFER STATION, SHOWING LOOP FOR MOTOR CAR AND TRAIN OPERATIONS, YARD FOR TRAILER AND OTHER STORAGE, WAITING ROOM AND SHELTER WITH FACILITIES FOR BODILY TRANSFER

boarding cars outside the station in this case do so at the nearest stops on the street in front of the carhouse entrance, no ticket office being required as the transfer space at the north end of the yard is not a prepayment area except as regards through traffic.

In connection with the Watertown station facilities as now operated, it is noteworthy that the Massachusetts Public Service Commission not long since refused upon petition of certain patrons of the road to order the company to restore the former through service between Newton and Cambridge, the decision of the board pointing out the advantages of the new plan of operation in relation to the main flow of traffic in and out of Boston, the improvement of conditions at Newton Corner, and the better control secured by the company over its service as a result of the terminal loop installation at Watertown and the shortening of the length of trips to and from North Cambridge, with improved carhouse and yard facilities for the Brighton lines previously terminating at Newton. The commission emphasized the part which close connections at Watertown station play in the maintenance of a satisfactory through service, and since opening the new trackage the company has paid particular attention to this point.

TERMINAL STORAGE YARDS

Terminal storage yards for trailers and other cars have also been laid out by the company recently at Mattapan, Arlington Heights and Jamaica Plain, the usual layout providing a loop for convenient turning of trains, with stub tracks inside for off-peak storage of rolling stock. At Jamaica Plain facilities for transfer without checks similar to those at Watertown are provided between West Roxbury cars and Center Street (trunk line) cars terminating at Jamaica Plain. The plans also include the operation of trailer cars between Jamaica Plain and Dudley Street station, an important manufacturing district being served by these lines. The looping of suburban cars at this carhouse is a step toward the betterment of service in the outlying portions



BOSTON STATION IMPROVEMENTS—WATERTOWN TRANSFER STATION. A GENERAL VIEW OF THIS STATION IS SHOWN IN THE HALF-TONE VIEW ON THIS PAGE

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of the system, since irregular operation is proportional to the length of the line involved, and the shortening of routes insures better maintenance of schedules.

IMPROVEMENTS IN EAST BOSTON SERVICE

The termination of the East Boston tunnel at Court Street, Boston, virtually under Scollay Square, with stub-track and cross-over facilities instead of a loop, has handicapped the Boston Elevated Railway for many years. The 1911 Legislature authorized the extension of this tunnel (for surface cars) westward to North Russel Street in the West End. There are two stations provided, one at "Scollay Under," and the other at Bowdoin Square, each being of the island platform type. The extension was opened for service in March of this year, and includes a loop at Bowdoin Square for the turning back of East Boston cars, all lines except one being terminated at this point. The westerly end of the extension connects with surface tracks leading to Kendall Square, Cambridge, where connections may be made with the train service of the Cambridge subway. A switchback east of Scollay Square enables Cambridge cars to be reversed as required.

The extension was constructed by the Boston Transit Commission and the equipment was installed by the Boston Elevated Railway. The tunnel is a double-track tube and is equipped with 85-lb. A. S. C. E. rail laid on 6-in. x 8-in. x 8-ft. hard pine creosoted ties with tie plates and screw spikes. The joints are four-holed Duquesne joints, and the guard rails are of special section weighing about 90 lb. per yard. The inner rail on the Bowdoin Square loop is of the "frictionless" type to reduce flange wear, and the radius of the loop is 75 ft. The maximum depth of rail below the surface is about 40 ft., the minimum inside width of the tunnel for two tracks being 23.67 ft. The maximum grade is 4 per cent, and the interior height above the top of the rail is 14.25 ft. The length of the tunnel is about 2610 ft.

The platform of the "Scollay Under" station extends about 300 ft. along each track and varies from 16 to 52 ft. in width. It is from 38 to 40 ft. below the surface and is connected with the latter by a double-file escalator with each file independently motor-driven. The platform of the Bowdoin Square station is about 260 ft. long and from 8 to 52 ft. wide, being about 24 ft. below the surface of the street. The station walls in each case are finished with a wainscot of white terrazzo with colored tile border. The walls above the wainscot and ceiling are finished in white cement plaster. There are no floors, partitions or sheathings of wood, and with the exception of hand rails no part of the structure is inflammable. Track is laid in broken stone ballast and is equipped with Vaughn rail anchors. The station pits and platforms are of the sanitary type and are designed for flushing at frequent intervals. The space between the edge of the platform and the inner rail is filled with an anti-slipping composition forming a slight slope from the platform to the rail.

Besides affording quick connection between East Boston and the West End of Boston, as well as to and from Cambridge, the extension enables quick connections to be made between points in eastern Cambridge and the north and south Tremont Street subway lines in Boston proper and gives the Charles Street district of Boston, bordering the Charles River Basin on the east, greatly improved connections with the underground and rapid transit lines of the down-town section.

The improvement of service in the East Boston tunnel has received much attention by the company within the past year and has also been considered at length by the Public Service Commission. The problems encountered in the operation of the tunnel, especially in the face of increasing traffic following the abolition last winter of the penny tolls charged by the city of Boston, are of more than local interest. All the East Boston service of the company is operated through the tunnel

BOSTON STATION IMPROVEMENTS—INCLINE IN CAMBRIDGE STREET AT WESTERLY END OF THE EAST BOSTON TUNNEL EXTENSION

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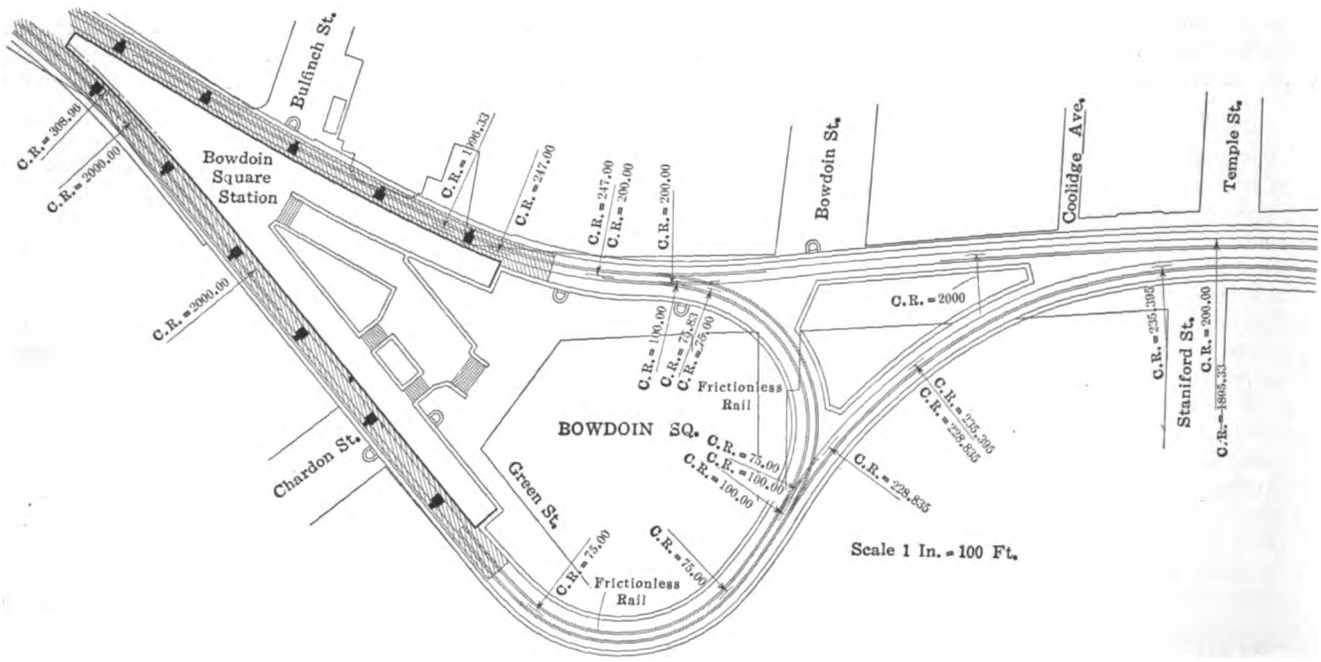
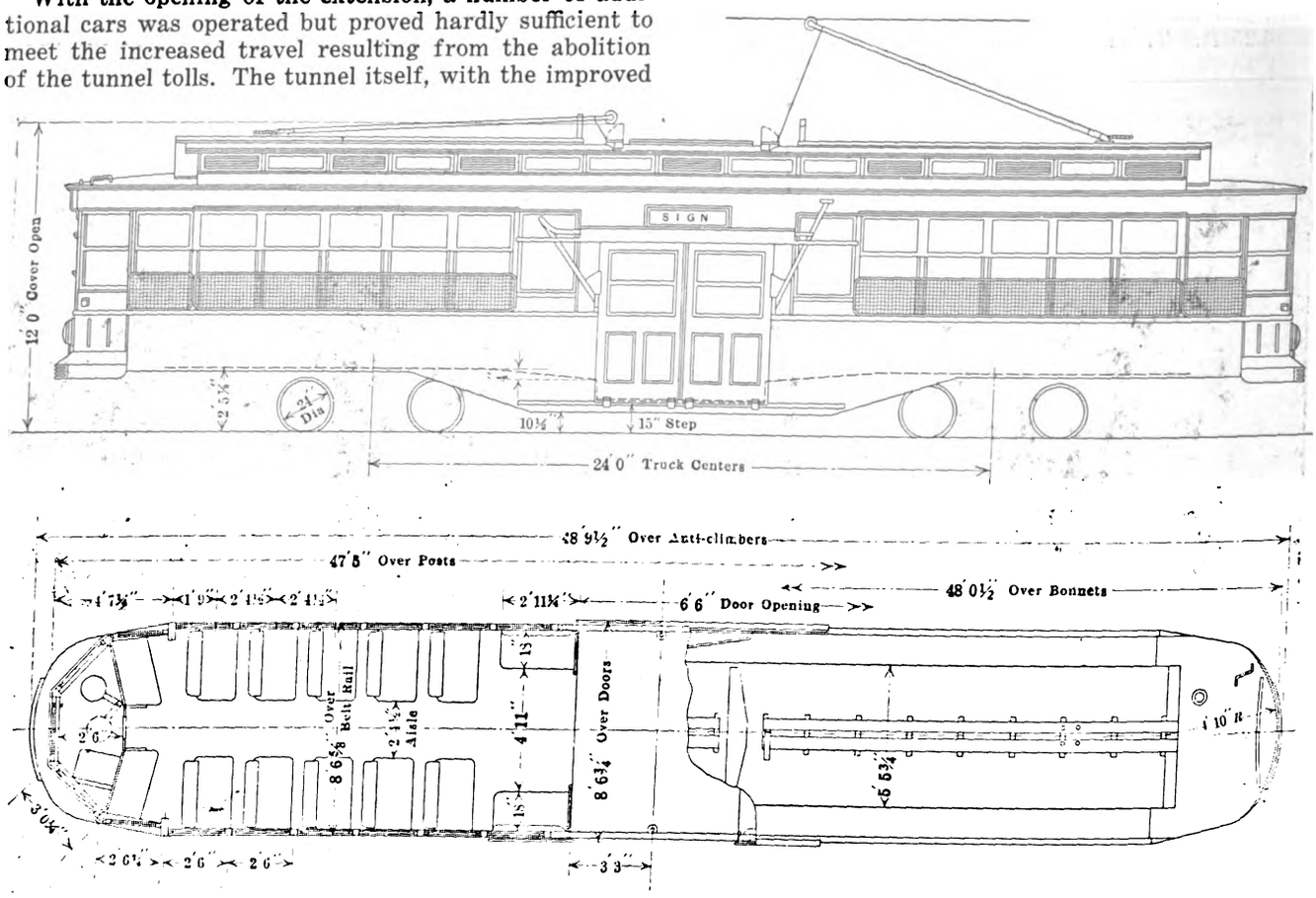


BOSTON STATION IMPROVEMENTS—BOWDOIN STATION, LOOP AND A THROUGH TRACK, ON EAST BOSTON TUNNEL EXTENSION

beneath Boston Harbor to the business district of Boston, and the service that can be rendered to this island ward of the city is limited by the capacity of the tunnel. So long as Scollay Square remained the westerly terminus, the capacity of the tunnel was limited to the number of single-unit cars per hour that could be operated to and turned back on the stub-end tracks at that point. This number proved to be inadequate for rush-hour service.

With the opening of the extension, a number of additional cars was operated but proved hardly sufficient to meet the increased travel resulting from the abolition of the tunnel tolls. The tunnel itself, with the improved general railway and indication signal system recently installed and the Bowdoin Square loop in service, will accommodate from 125 to 150 units per hour, but on account of street conditions in East Boston a maximum of eighty cars per hour is about the limiting number which can be handled at present. This number is unequal to the demands of rush hour service. Accordingly, fifty additional cars of the trailer type have been purchased



BOSTON STATION IMPROVEMENTS—PLAN AND ELEVATION OF CENTER-ENTRANCE MOTOR CAR FOR SURFACE LINE AND TUNNEL OPERATION

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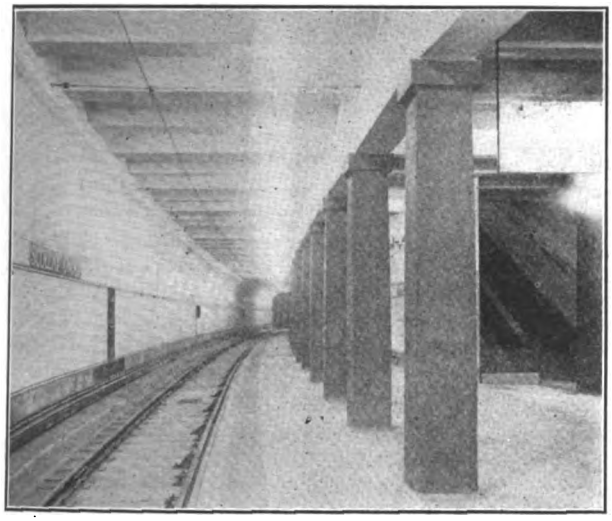
by the company and during the present summer some of these will be operated through the tunnel from the Bowdoin Square loop through East Boston to Chelsea. To relieve the present congestion of traffic, additional cars will be run on other surface lines in East Boston.

To provide for the necessary increase of service it is estimated that at least sixteen trailers and sixteen additional semi-convertible cars will be needed. As the equipment now assigned to the company's East Boston division, exclusive of two small cars on a shuttle line between the North Ferry and Maverick Square, totals but seventy-nine, the additional cars to be provided will increase present car facilities by about 40 per cent and present seat facilities by about 45 per cent.

The institution of spacing stations on some of the company's surface lines has been described in an article by Edward Dana, "Dispatching Cars on City Lines," in the issue of this paper for April 24, 1915. One of the latest of these stations is illustrated herewith in view of the facility with which it was built into an existing passenger shelter at Coolidge Corner, Brookline. At this point two double-track lines cross, and as



BOSTON STATION IMPROVEMENTS—SCOLLAY UNDER STATION ON EAST BOSTON TUNNEL EXTENSION

the station is an important transfer center, good connections between cars are particularly desirable. Over the inbound Beacon Street, inbound and outbound Harvard Avenue tracks at this point a bullseye lamp signal is provided, controlled by a starter in the spacing station, so that any car can be held for connections or spacing as required.

CENTER-ENTRANCE MOTOR CARS

While this additional equipment is the best that can be provided in the immediate future, multiple-unit cars are considered preferable to trailers for use on the tunnel grades, and their availability for service permits a more flexible operation. The company has purchased 100 center-entrance motor cars and these will be placed in service as required in the tunnel and elsewhere, upon delivery. One of these new cars is shown in plan and elevation. In general appearance they resemble the trailer cars already in service at Boston. Each end is to be arranged for operation as a motorman's cab, and in each end are to be placed two seats, one of the folding and the other of the swinging type, which can be used by passengers when the compartment is not being used as a cab. These cars will be of steel construction and will seat sixty persons. Various other improvements are contemplated for the East Boston service, including the construction of a prepayment station at the mouth of the tunnel in Maverick Square and the relocation of certain surface car routes. A new double-track surface line will be built in the reservation on Bennington Street and ultimately a cut-off line is planned on Chelsea Street from Bay Square westward. The Orient Heights line formerly operated to Central Square, Cambridge, is now operated only to the Bowdoin Square loop, the earlier service not having been satisfactory on account of the length of the line, grade crossing delays, surface obstructions and the lack of convenient carhouse facilities at the terminal points. In a recent discussion of the future of East Boston the Public Service Commission suggested that ultimately the traffic conditions in East Boston and Chelsea may require the extension of the tunnel from Maverick Square to Day Square, East Boston, and to Central Square, Chelsea. For the present, the commission does not approve the addition of service to the tunnel from Chelsea by cars of the Bay State Street Railway.

ENLARGEMENT OF PARK STREET STATION

Brief reference has been made in this journal to the enlargement of the Park Street station of the Tremont Street subway in Boston, one of the most important traffic centers on the entire system. These have now been fully completed, and the reduction in congestion resulting from the increase in platform length and area (from 15,258 sq. ft. to 23,672 sq. ft.) is noteworthy.

Traffic in Frankfort-on-Main

The annual statistical report of the city of Frankfort-on-Main, Germany, states that 104,731,494 persons were carried by the municipal street railways during the fiscal year 1914-15. This number includes 5,000,000 military persons, who were carried for half fare. The mileage for the city lines is 57.19 miles. The total number of miles covered during the year was 15,330,060. The incomes from the ordinary fares amounted to $1,620,607. The income derived from the sale of weekly, monthly, and school children's tickets amounted to $471,071. From the line operated jointly between Frankfort and Offenbach $57,552 was realized. The total income from all sources amounted to $2,149,468.

The fares are charged in accordance with a zone system, the most common charge being $0.023. A reduction is now made in the case of military persons, who are being carried for $0.011. Special inducements are offered to persons who purchase tickets, of which there are two general kinds—for one week and for one month. The former are chiefly for workmen and may be used only before 7.30 a. m. and after 4 p. m. They are not valid on Sundays or holidays. They are sold to be used either once or twice daily. The cost of this ticket depends on the distance traveled. A ticket good for one month and valid on all lines within the city proper at all times is sold for $4.38.

For persons who wish only to ride over one special route, a somewhat complicated system of tickets has been arranged, the price depending upon the distance. A schedule on file at the general ticket office of the company enables the person desiring such a ticket to ascertain the price for the route chosen. A reduction is made in certain cases to disabled persons. Tickets for school children are sold each month at prices varying from $0.71 to $1.07.

It was announced recently that the Kansas City (Mo.) Railways was paying $1,105 a month to men in militia companies now in camp. The company pays the difference between the men's wages while at work and the amounts they receive from the government.

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Selling Securities to Patrons

Partial Mutualization in the Lighting Industry Is Well Exemplified by the Practices of the Byllesby Properties—The Plan Has an Excellent Influence Upon the Improvement of Public Relations

AN innovation which has aroused considerable interest in financial and utility circles during the last year is the partial mutualization of public utilities through the sale of security issues in small denominations under a partial-payment plan to the patrons of the companies or the general public in the communities served, instead of placing the securities upon the usual distant market. Heretofore, the sale of securities upon a partial-payment basis has been a venture carried on only by brokerage houses, but the experiment thus far in the hands of various utilities seems to have proved successful. The progress recently made in selling securities direct to customers by companies such as the Northern States Power Company, the Pacific Gas & Electric Company, the Baltimore Consolidated Gas & Electric Company, the Standard Gas & Electric Company and others indicates the practicability of partial mutualization in the electric lighting and power industry. Through the means adopted by these companies, people of very small income have been enabled to use their local utilities as a combined vehicle for saving and investment and to do so with no more red tape than that required to order service or to pay monthly bills. In general the plan has elicited widespread interest, not only from the utility operators themselves but also from those to whom investment under the new policy has been made a possibility.

DIRECT SECURITY SELLING—COVER OF BOOKLET OF VIEWS SENT OUT IN RESPONSE TO REQUESTS FOR INFORMATION

WORK OF THE BYLLESBY PROPERTIES

In order to bring to the attention of electric railway operators the details of this plan, the ELECTRIC RAILWAY JOURNAL has made an investigation of the movement along this line by the properties under the management of H. M. Byllesby & Co., Chicago, Ill., the work here by virtue of its scope, diversity and outcome being a good illustration of the possibilities involved. The principal effort by the Byllesby properties has been in the field served by the Northern States Power Company, but there has been something of the kind done at the majority of the properties and the policy is one to which the managers are fully committed.

The management first endeavored in June, 1915, to interest the citizens served by the Northern States Power Company's operating units, offering them the 7 per cent preferred stock of the company, which has paid dividends regularly since its organization in 1909. This is the stock of the Delaware corporation, the owning and operating company being the Northern States Power Company of Minnesota. All of the capital stock of the Minnesota company is owned by the Delaware company, which has no funded or other debt. The subsidiaries consist of ten central stations, five gas works, four steam-heating plants and one street railway property, in the cities of Minneapolis, St. Paul, Stillwater, Mankato and Faribault, Minn.; Fargo, Grand Forks and Minot, N. D.; Sioux Falls, S. D., and Galena, Ill.

THEORY OF THE PLAN

The purpose of the management in selling this preferred stock among consumers served by the subsidiary companies was not primarily to raise funds but to take the customers into partnership and make them feel a greater interest in the local utilities. The idea back of the work was the principle that what a man owns becomes of interest and of value to him, whether it be personal possessions bought and carried home or ten shares in the local utility, and that the sale of securities among the small investors of the community would be a most effective means of strengthening the bond of sympathy between the public and the company. In other words, he who felt a share of ownership in the utility would have a more intelligent appreciation of the service rendered and would defend it against unjust criticism by those who did not understand. In short, it was believed that such a distribution of the securities would serve five useful purposes:

1. It would make the public and the utility actual partners in financial matters as well as partners in community advancement.
2. It would offer to citizens sound investment for surplus capital and savings in stable enterprises under their immediate personal observation.
3. It would gain a long step forward toward the popularizing of utilities that were seen to be doing their work creditably, honestly and efficiently.
4. It would bring about a practical distribution of profits among consumers.
5. It would assist in obtaining at lowest cost any part of the funds for construction purposes which it might be necessary for utilities to secure from time to time in the general investment markets.

When the sale of the stock was begun in June, 1915, no new issue of securities was available for the purpose.

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For this reason, in order to meet the demand that was created, outstanding stock was purchased by the company for resale to the consumers who applied for it. As the first step in the work, a circular letter was sent out to the customers of each company, written on that company's letterhead and signed by the resident manager. This explained the desirability of making an investment under holding company management and the general purpose of the Northern States Power Company offer.

This circular letter was followed up by advertisements in the local newspapers of each community, some of which are shown in the accompanying illustrations. Moreover, a special notice was printed on the back of the consumer's bills on the stub to be returned to the company, a space being provided, as shown elsewhere, for the consumer to indicate that he desired complete information in regard to the stock offer. The companies also distributed a leaflet showing pictures of a number of the Northern States Power Company plants with statistics in regard to the operating utilities, the purpose being to give the public a concrete idea of the magnitude of the properties. With every letter sent out a return postal card was inclosed, and to those consumers who desired further information an excellently engraved twenty-page book of views (7 in. x 8½ in.) of the various properties was forwarded. The front of this is shown in the accompanying illustration. Along with this booklet was sent the following courteous and appealing letter:

Dear Sir:

We wish to thank you for your inquiry of ——— and the interest you have in our new booklet "Back of the Investment," which we are sending you under this cover.

When you have looked through this booklet I am sure that you will be impressed with the modern, substantial and well-maintained character of these large properties, and will feel like investing in enterprises indispensable to the communities served, now numbering more than 100.

We trust you will thoroughly analyze the investment merit of the proposition in the light of the figures and information set forth in the company's complete annual report, and the descriptive circular which we are prepared to supply you. We know that the investment is thoroughly sound, and you can easily confirm our statement by a brief analysis.

Please let me know whether I shall send you copies of the last annual report and financial circular or whether you will call at my office, where I have all information at hand to answer any special questions upon which you may wish detailed information. If you can arrange to call, it probably would be more satisfactory than if I attempted to transmit the information by letter.

We are glad to receive either large or small investments in the 7 per cent preferred stock, which may be purchased either for cash or on partial payments at the rate of $5 per share per month.

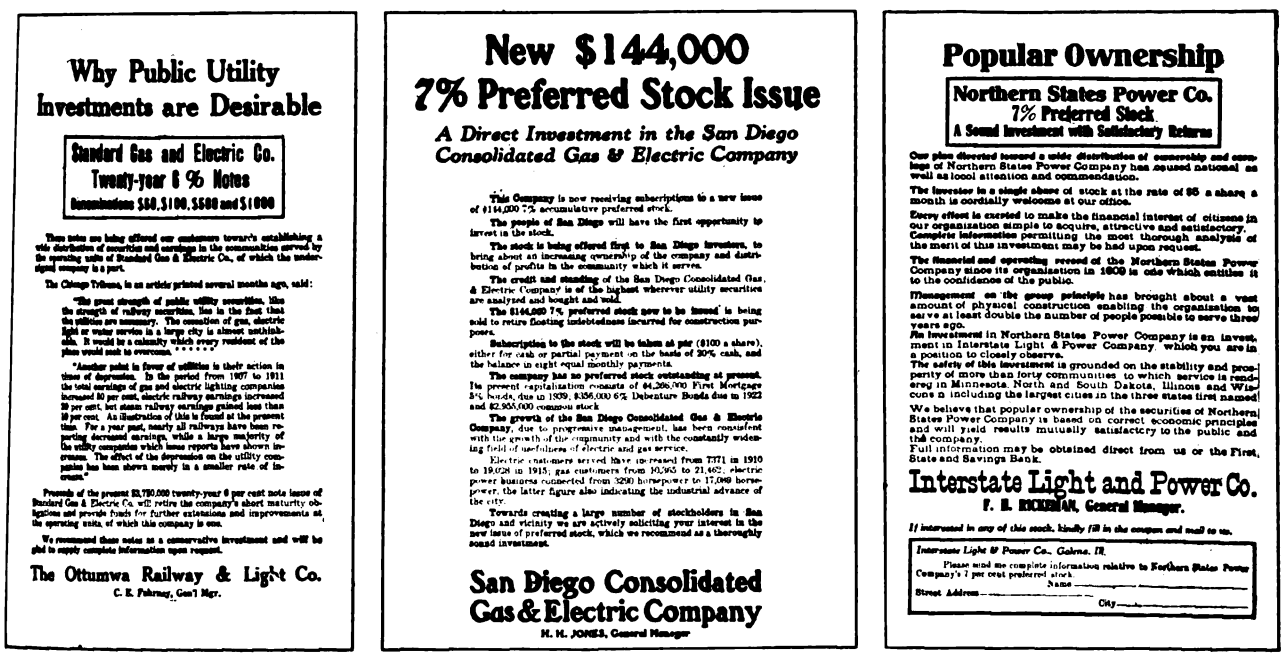
Please let me know whether you wish me to send the financial reports or whether you will call, and if so, at what time, so that I will be sure to be at the office.

Again thanking you for your inquiry,

Yours truly, ———

THE PARTIAL-PAYMENT PLAN ADOPTED

Shortly after the first circular letter was sent out, the management decided to facilitate the sale of the stock by offering it on an installment basis, and a second letter was written to announce the plan. This feature was, of course, tied up with the newspaper advertisements, as is shown in the accompanying illustration. Under the new arrangement, the investors were offered the choice of purchasing the preferred stock for cash or for payment of $5 per share per month. Subscriptions could be made for from one to ten shares, the latter being the maximum limit under the partial-payment plan.



DIRECT SECURITY SELLING—SPECIMEN NEWSPAPER ADVERTISEMENTS USED BY VARIOUS BYLLESBY COMPANIES

The complete terms and conditions for stock issuance under the partial-payment plan were stated on the temporary receipt issued to buyers, as shown in the accompanying illustration. The holder of the receipt was cautioned to guard it safely and in the case of loss to report immediately to the company. He was also instructed to present the receipt monthly when making installment payments in order that such payments might be indorsed on the back. According to the agreement, the holder was not entitled to any dividends on the preferred stock and had no right or interest in such stock until all the installments were paid and the preferred stock was delivered in exchange for the receipt. If all installments were duly paid, interest at the rate of 6 per cent per annum would be allowed on the installments from the date of payment to the date of the exchange of the receipt for the preferred stock. In

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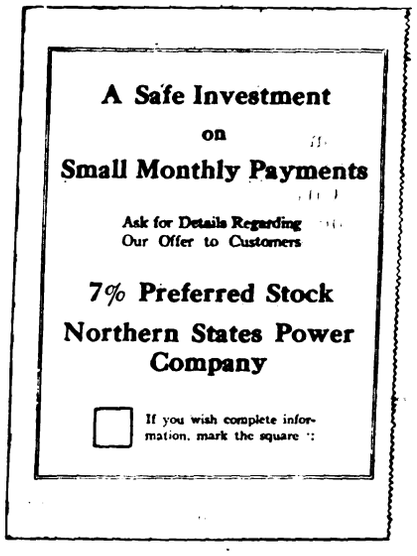
case any installment was not paid when due, at the election of the company all rights to receive preferred stock should cease, and the company might on or before the date for payment of the final installment under the contract declare the subscription in default and return to the subscriber the sum of all installments paid, together with interest at the rate of 3 per cent per annum from the date of payment of installment to the date of return payment to the subscriber. The holder might at any time anticipate the payment of future installments.



ADVERTISEMENT ON BACK OF CASHIER'S STUB ON MONTHLY BILLS

RECENT CIRCULARIZING

As a sort of follow-up scheme to keep the stock and partial-payment offers before the eyes of the consumers, the companies began on May 20 to send out a circular letter with the monthly bills, a return card asking for further information and the illustrated booklet being inclosed. This follow-up letter reads as follows:

THE MINNEAPOLIS GENERAL ELECTRIC COMPANY
MINNEAPOLIS, MINN., ——, 1916.
Partnership

To Our Customers:

We are again calling your attention to the opportunity afforded to become financially interested and a partner in this company.

You do not need a large sum of money to do this.

You can use this company as a medium for saving and investing at the same time.

The Northern States Power Company, of which The Minneapolis General Electric Company is a part, serves more than 81,000 customers in more than 100 separate communities.

When you pay $5 a month for preferred stock in this company you really pay the money to yourself.

In a comparatively short time you will have saved approximately $100 and will own a share of preferred stock which will pay you $7 a year cash dividends. While you are acquiring the stock you receive 6 per cent on your payments. If you withdraw your funds you receive 3 per cent interest.

If you wish to invest $10 a month, buy two shares of stock; $15 a month, three shares, and so on up to ten shares, which is the limit for a single subscription.

You are dealing with a large, responsible concern, which could not afford to treat you other than honorably and fairly.

Large banks, institutions and experienced investors eagerly purchase the securities of the Northern States Power Company. The preferred stock has paid twenty-five consecutive dividends regularly every three months since organization in 1909.

It is not at all necessary for us to come to our customers for funds. We offer you partnership on the easiest practicable terms because we want to mutualize the ownership of this company, and to have our customers share in the wages paid to the capital employed in usefully serving them.

We certainly expect to add to the popularity of our company as more and more customers become partners and security owners. We are, therefore, giving you every opportunity to share in the reasonable earnings properly following efficient and progressive management and the expenditure of large amounts for physical property.

Please consider this matter carefully. Let us answer your questions and convince you that what we propose is directly to your financial interest, and for the best interests of the whole community. Fill out the inclosed card if you do not have time to come and see us personally. You will be pleased with our new booklet, which we will send you promptly.

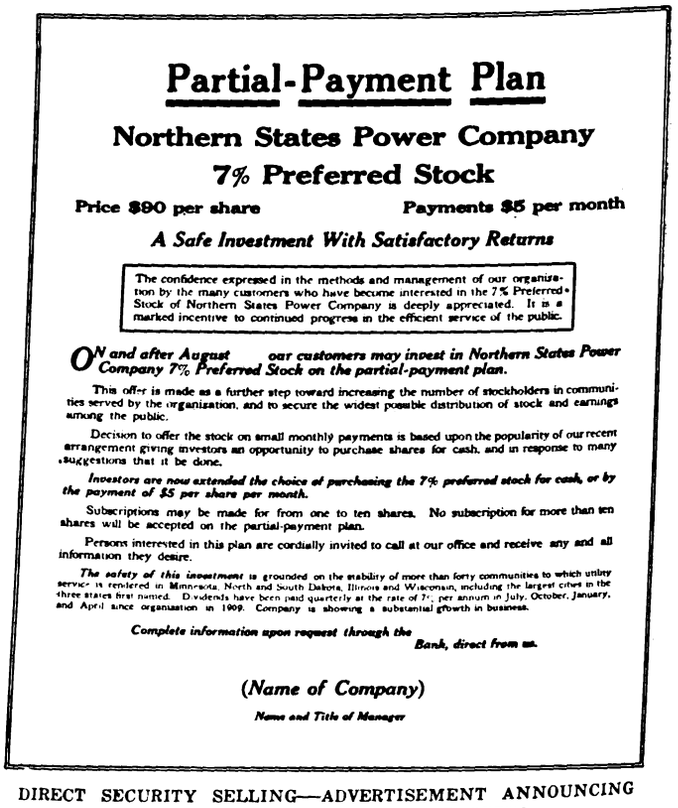
Yours truly,
————, General Manager.

Before leaving this subject of circularizing, etc., it should be stated that all of the advertising matter, circulars, booklets, etc., have been prepared by the publicity department of H. M. Byllesby & Co., and the work has been of very great assistance in interesting prospects and also in formulating the favorable public opinion which the partnership offer has stimulated. W. H. Hodge, publicity agent, has participated quite actively in the movement and has given it considerable thought and application, keeping close watch on its development and making various suggestions from time to time. The department hopes to be able to devote several weeks this summer to personal investigation among the people at the Northern States Power Company properties, and will then work out further details for the plan.

HOW THE SELLING WAS DONE

From the very beginning the work of placing securities in the hands of customers was handled in a very conservative fashion. The management felt its way very cautiously and did not attempt to make any campaign or drive. There was not the slightest effort to speed up sales, inasmuch as the whole plan was to lay the foundation for a permanent source of financing which would at the same time secure the active interest of an increasing number of people in each home territory. The advertising was moderate in tone and very conservative as to earnings, prospects, etc., and, in fact, prospective earnings were dwelt upon scarcely at all.

Most of the sales were made by the company's own representatives, although in nearly every city some bank or other financial institution also had the stock for sale. In general, however, the sales procedure was somewhat varied. At first, the plan was to sell the stock through the resident manager and one bank in each.



Partial-Payment Plan

Northern States Power Company

7% Preferred Stock

Price $90 per share **Payments $5 per month**

A Safe Investment With Satisfactory Returns

The confidence expressed in the methods and management of our organization by the many customers who have become interested in the 7% Preferred Stock of Northern States Power Company is deeply appreciated. It is a marked incentive to continued progress in the efficient service of the public.

ON and after August our customers may invest in Northern States Power Company 7% Preferred Stock on the partial-payment plan.

This offer is made as a further step toward increasing the number of stockholders in communities served by the organization, and to secure the widest possible distribution of stock and earnings among the public.

Decision to offer the stock on small monthly payments is based upon the popularity of our recent arrangement giving investors an opportunity to purchase shares for cash, and in response to many suggestions that it be done.

Investors are now extended the choice of purchasing the 7% preferred stock for cash, or by the payment of $5 per share per month.

Subscriptions may be made for from one to ten shares. No subscription for more than ten shares will be accepted on the partial-payment plan.

Persons interested in this plan are cordially invited to call at our office and receive any and all information they desire.

The safety of this investment is grounded on the stability of more than forty communities to which utility service is rendered in Minnesota, North and South Dakota, Illinois and Wisconsin, including the largest cities in the three states first named. Dividends have been paid quarterly at the rate of 7% per annum in July, October, January, and April since organization in 1909. Company is showing a substantial growth in business.

Complete information upon request through the Bank, direct from us.

(Name of Company)

Name and Title of Manager

DIRECT SECURITY SELLING—ADVERTISEMENT ANNOUNCING DETAILS OF PARTIAL-PAYMENT OFFER

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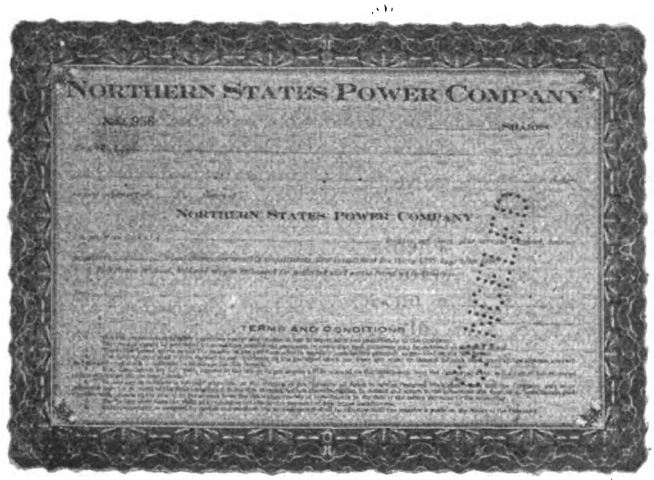
of the ten principal cities. This was found absolutely impracticable in St. Paul and Minneapolis, for the handling of inquiries would more than absorb the time of the managers if they attempted to do this work personally. Therefore, a securities department, in charge of R. A. Wortman, an experienced securities salesman, was established in the Twin Cities, and this now consists of the manager and five assistants. It has been found both in large and small cities that most of the inquiries come direct to the company rather than to the local bank or investment house specified in the advertisements as a joint sales agency. It has also been found advisable to assist the resident managers by occasional visits of securities salesmen, and the sales work for the entire territory is now in charge of the manager of the securities department. The work, of course, has been and still is supervised by the bond department of H. M. Byllesby & Co. in Chicago, of which W. H. Clarke is manager. It was initiated by O. E. Osthoff, vice-president and chief engineer of the company, and has the active interest of all the company's officers.

The securities department in the Twin Cities has become a very busy one. From June 1 to Dec. 31, for instance, 951 inquiries were received in writing, and in addition to these there were quite a number of inquiries by telephone and in person. These inquiries arose in the majority of cases from the newspaper advertisements, even though not many of these were published. Many answers, however, were received after the mailing of the letters from the managers. The advertising on the reverse side of the stubs of the monthly bills has also proved exceedingly productive, and the fact that the consumer is required to sign his name has automatically weeded out the curiosity seekers. These stubs are bringing in inquiries at the rate of from four to ten a day in some of the larger cities.



DIRECT SECURITY SELLING—STOCK RECEIPT ISSUED TO PARTIAL-PAYMENT BUYERS

AMOUNT OF SECURITIES SOLD

Up to June 15 there had been in excess of $600,000 par value of the Northern States Power Company stock sold to approximately 1000 residents, and of this amount only about 10 per cent was sold on the partial-payment plan. This plan for some reason did not seem to gain much popularity at first, although lately it has been growing steadily in favor as it has become more generally understood by the interested public. In the examination of the territory which the publicity department hopes to make this summer, it is expected that some plan will be formulated for building up the partial-payment response. The price for the sale of the securities has been governed by the market price prevailing in New York and Chicago, plus a nominal amount for handling, and has ranged from $86 to $98 per share.

OTHER SECURITIES OFFERED BY BYLLESBY COMPANIES

Before discussing the general result of the sale of Northern States Power Company stock to customers, brief mention will be made of other security sales. To complete the story of the Northern States Power Company first, it may be noted that the funded debt of the subsidiary companies was consolidated and refinanced in April of the present year. At this time large advertisements were published at all the properties, giving the residents the opportunity of participating in the purchase of the new 5 per cent bonds and 6 per cent notes, and explaining just what the financing was and its bearing upon the company and the communities served. The point was made that customers might obtain the new securities direct from the company at its various offices on the same terms offered investors elsewhere, subject to the same conditions as to prior sale, etc. The response to this advertising, so far as investment in the bonds and the notes was concerned, was not heavy, it must be said, but a considerable amount of the securities was sold in the Twin Cities by investment houses.

Some readers may wonder why the bonds or notes were not selected, instead of the preferred stock, as the particular Northern States Power Company security to be recommended to the public. The reason lies in the facts that the favorite and established investment in these states is farm mortgages, generally yielding from 6 per cent to 8 per cent, and that a public utility security to compete with these farm mortgages must return at least 7 per cent. There is, of course, a considerable and growing bond market in the Twin Cities, but this is not true in the smaller cities. Moreover, the partnership or profit-sharing idea is wholly consistent only with equity ownership, or through stock. As regards common versus preferred stock issues, it may be said that while the common stock of the Northern States Power Company was placed on a dividend paying basis in June, 1916, it has not been thought advisable to advocate it as an investment by customers, and there is no intention of departing from this policy. If a customer or any other interested citizen desires to buy common stock, his order is taken, but no sales or advertising effort is directed toward this end. There has been, as a matter of fact, a considerable amount of common stock purchased in home territory during the last year, invariably, as far as is known, by individuals entirely familiar with security values and competent to make what is usually termed a "business man's" investment.

Last autumn the Standard Gas & Electric Company, Chicago, Ill., which is purely a holding company and which has investments in all of the properties managed by H. M. Byllesby & Co., issued several million dollars of twenty-year 6 per cent notes. These notes were offered to the public at eight or nine of the properties, outside of the Northern States Power Company field, at which it was felt some investment demand could be cultivated. The management realized that it was rather difficult to expect an investment response for this kind of a security in communities where interest rates were high and farm mortgages at 8 per cent and even better were the favorite form of investment. A special effort, however, was made to interest the banks, and to secure from local investing bankers interviews in regard to the company's mutualization plan and the investment advantages of the notes offered. Moreover, a letter of suggestion was sent to the managers of the properties at Mobile, Enid, San Diego, Oklahoma City,

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Pueblo, Stockton, El Reno, Ottumwa and Eureka, together with four pieces of advertising copy intended to be run in the order given during the last four weeks in December. That the time element was well considered in connection with these advertisements may be judged from the fact that the first and second played up the Christmas feature, suggesting that the Standard Gas & Electric Company notes were the most desirable and substantial of Christmas gifts and one which should appeal to thoughtful people who desired to present friends or relatives with something of permanent and recurring annual benefit. The notes were offered in denominations of $50, $100, $500 and $1,000, and at a price of $91 and accrued interest to yield 6.75 per cent. While exact figures have not been compiled, it is believed that more than $75,000 par value of the notes have been sold in communities in which they were advertised. This was the first time that securities of this sort were offered to the resident public, and the management believes a good impression was made, as it is still receiving inquiries from prospective investors although there has been no advertising since December.

The San Diego Consolidated Gas & Electric Company, San Diego, Cal., whose common stock is entirely owned by the Standard Gas & Electric Company, formerly had no preferred stock outstanding. Recently, however, a 7 per cent preferred stock issue was authorized by the California Railroad Commission, and $144,000 of this preferred stock was near the end of last April offered at par to the public of San Diego by means of newspaper advertising. The local public had the first opportunity to invest in the stock, and the advertisements, as shown by the accompanying specimen, explained the advantages of the offer and the earnest effort being made by the company to build up a large local ownership of stock and other securities. The stock might be purchased for cash or for partial payments on the basis of 20 per cent cash and 10 per cent a month. Arrangements were made with the banks of San Diego to carry partial-payment accounts. Although the two advertisements have been published, the number of inquiries and sales justifies the expectation that the entire amount of stock will be taken in San Diego within a very short time. In fact, on May 24 it was reported that more than half of the issue had already been sold to the residents of the community, the sales during the first two weeks being $74,200. There were fifty-one investors, only three of whom availed themselves of the partial-payment feature. On June 2, $105,000 of stock had been sold to seventy-nine people. By the end of the month the entire issue had been subscribed for, and more than 100 subscribers could not be satisfied because of the limited amount.

As a last example of Byllesby activity along this line, it may be said that it is proposed within a short time to offer the preferred stock of the Western States Gas & Electric Company in communities in which it had utilities, namely, Stockton, Richmond and Eureka, Cal. The advertising matter has been prepared but has not yet been published. In this case no new stock is being issued, that offered for sale having been purchased for the purpose in the Eastern markets.

The Byllesby management proposes to carry out this security-selling policy in general at all of its properties where it is possible to do so, and it believes that within two or three years the resident ownership of the majority of the companies will be very substantial. No effort has thus far been made to sell street railway securities directly to the local public in the four communities served (Fort Smith, Ark.; Ottumwa, Iowa; Fargo, N. D., and Pueblo, Col.), and the management is not prepared to suggest methods for such companies. In connection with the street railway in Pueblo, however, it is recalled that early in the present year $450,000 of three and one-half year 6 per cent gold notes were issued by the Arkansas Valley Railway, Light & Power Company, which owns and operates the Pueblo railway and an extensive electric service property. These notes found a ready market, more than $100,000 being sold in and near Pueblo through one of the Pueblo investment firms and the resident manager.

General Results Secured

While the management is not prepared to say just what points of appeal in this effort have been most effective, it is inclined to believe that the real investment merit of the securities offered has been the point of prime importance. It has been proved satisfactorily that the public is alive to the investment value of the local public service enterprises, and is disposed to have a hand in them if some one brings the matter to their notice and makes it easy for them to buy securities. It has also been demonstrated that there is ample opportunity for any central station doing business in the right way to obtain funds easily and in somewhat surprising volume by the offer of appropriate securities to the small investors numbered among the customers. In the case of the Northern States Power Company it is interesting to note that it was the holding company stock that was sold and not the better-known local stock, which, of course, was not available. If the initial offers have worked out as well as noted above, the response in years to come ought to be much greater when the investors, if satisfied, will have led others to feel disposed to buy. Should there come another issue of securities of an attractive character backed by energetic sales and advertising methods, it will undoubtedly be found that among the cities already canvassed there will be a ready and receptive market waiting to provide the funds.

Secondary to this investment feature in tangibility and amount but not in importance is the partnership or profit-sharing feature of the plan. In the mind of the management there is no question at all but that the work has been of a very decided benefit from the point of view of better public relations. The interest of the customers in the welfare of the company in which they have become actively associated has been aroused. With more than the half-hearted interest of mere customers, they have now the welfare of their company at heart, and the tendency is toward co-operation instead of criticism. The indifference of the customer has vanished, and in its place is the desire of the stockholder to advance the company's prosperity and the quality of the service offered.

To many who have studied public utility problems, the management notes, the movement seems destined to have far-reaching and important results and to provide a fundamental solution of the question as to whether utility properties should be privately or publicly owned. It is believed that if the financial interests of a great part of the consumers can be linked with those of the public service corporation by such a plan, the result will be popular but not municipal ownership, with a retention of the engineering ability and commercial efficiency which have made American utility service rank so high. In this way, a partial mutualization plan may tend toward a solution of one of the most difficult problems confronting utility operators, that of municipal ownership.

The Managers Are Enthusiastic

In order to emphasize the foregoing general statements, it may be interesting to insert herewith some remarks concerning the attitude of both the managers of the properties that have used the security-selling plan, and of particular customers who have purchased

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securities. In the first place, the good influence of the sales made in the oldest and most developed part of the work, that of the Northern States Power Company, has been so conspicuous and spectacular that the managers have been moved to enthusiasm. They have observed case after case where the man or woman who purchased the stock was so impressed with the information gained about the local company that a new friend was made. The following quoted remarks by one official of the company well show the feelings of the managers:

"Recently I visited every one of the Northern States Power Company properties on matters having nothing to do with the sale of stock, but incidentally I found every manager enthusiastic over his experience and emphatic in declaring that the plan has 'made a hit with the people.' I made an effort to find out whether it had been a subject of derision or uncomplimentary remarks, but I was unable to learn of a single instance of this sort. On the contrary, I learned that hundreds of people had taken occasion to tell the managers that they thought the company was doing something of great importance and value both for itself and for the public."

INCIDENTS OF THE WORK

The attitude of the purchasers of securities is best exemplified by incidents that have been reported by salesmen engaged in the actual selling of the Northern States Power Company stock. The salesmen and managers, of course, have encountered prospective purchasers of every type and description. A great many of the purchasers have been women.

A leading business man in one of the cities made a liberal purchase of stock after carefully inspecting the properties of the company in the immediate vicinity. He looked these over simply as a guest and with no intimation that he wished to invest, but later he called for a salesman, stating that he understood it was the desire of the company to have a substantial local interest in its affairs and that this was the principal reason for the placing of his order. After the shares were delivered to him, subsequent orders were placed for a number of the members of his family. There is little doubt of the future interest of this family in the organization.

In order to meet and sell to the people who have expressed an interest in the company, it has often been necessary for the representatives to make appointments at odd hours, and very frequently to call upon the prospect in the evening. One instance is recorded where the family withdrew several hundred dollars from a postal savings bank and paid for its stock at the conclusion of an evening's call, and the company's representative went downtown with his pockets fairly stuffed with money. He was somewhat worried about its delivery, but finally deposited it in the safe of the leading hotel until the following morning. He felt quite sure that the father and daughter who thus paid for their stock invested their entire savings therein.

In one city, immediately after the announcement of the partial-payment plan was made to the public, the company received an inquiry from a hard-working citizen quite prominent in an outlying community composed mostly of foreigners. This man said that he had been instrumental in inducing the company to extend its service to his neighborhood that he had been the first customer for electricity signed up there and that he intended to have the honor of being the first purchaser of stock on the partial-payment plan. He took three shares for his wife.

Around the holidays quite a number of shares of stock were purchased for Christmas and New Year's presents, and sums received as Christmas presents were similarly invested. Up to the first of the year, there was only one instance where stock purchased either on the cash or partial-payment plan was resold. This instance concerned a woman who resold three of her seven shares in order to raise funds on account of sickness in the family.

EXPLAINING THE PROPOSITION

It often requires a great deal of patience on the part of the salesman to explain carefully the whole proposition to the prospective buyers, inasmuch as many of them are entirely without knowledge of the fundamental principles of investment. One salesman remarked that in a number of cases "the prospects did not know the difference between a stock certificate and a newspaper." On the other hand, a great many experienced people had to be satisfied on many points of information. Most of the investors seemed to act upon a general confidence in the company, in the character of its management and in the apparent stability of the property, as well as upon their conception of the future of the utility. It was necessary from time to time for the salesmen to call upon lawyers representing people who thought that they would like to buy the stock. In such cases these legal advisers themselves were frequently found to be incompetent to pass judgment upon the merits of the investment. Painstaking work in situations of this kind often led to a double sale.

WINNING THE CRITIC

One citizen who purchased ten shares of stock had previously been considered quite a critic of the electric lighting and power service rates, and on one occasion he even had a controversy with the manager regarding the manner in which service should be rendered. Nevertheless he made inquiry regarding the stock and invested therein, since which time his entire attitude toward the company and its affairs has changed.

Moreover, one of the managers was greatly surprised one day to receive an inquiry from the most prominent socialist in the community, who stopped the manager on the street and asked for a copy of the company's last annual report. Much to the socialist's surprise, the manager said that he had no objection to sending him a report and would be glad even to have him make a careful investigation of the affairs of the company and, if he cared to, become a stockholder. After carefully reviewing the annual report, this man announced that he would shortly have $1,000 to invest and he would certainly place it in the stock of the company. He furthermore volunteered the opinion that the security-selling policy of the company would accomplish more to prevent injury from critical agitation than anything else that it could do.

Census Report on Wire Production

According to a preliminary statement of the general results of the 1914 census of manufactures with respect to the wire industry issued by the Bureau of Census, Department of Commerce, Washington, the total production of wire in 1909 and 1914, whether made for consumption or for sale, was as follows:

	1914	1909	Per Cent of Increase or Decrease, 1909-1914
Iron and steel wire, tons	2,418,331	2,389,136	+1.2
Copper wire, tons	131,484	147,156	—10.6
Brass wire, pounds	38,988,613		
German-silver wire, pounds	749,021		
Wire of other metals and alloys copper-clad steel, zinc, bronze, bronze, nickel and nickel alloys, etc.), pounds	6,175,393	34,822,000	+31.9

The United States Census Bureau recently stated that the result of its 1914 census shows there were operating in 1914 nearly five times as many touring cars and ten times as many auto trucks as in 1909.

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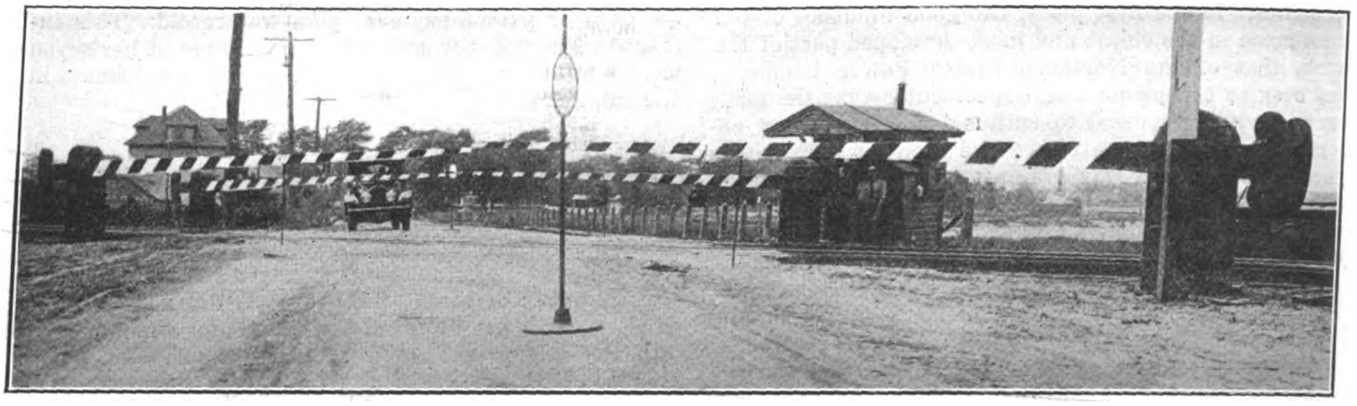

PROPOSED STANDARD COLORING FOR CROSSING GATES

Joint Grade Crossing Report

A. R. A. Committee and Representatives of National Association of Railway Commissioners Meet in Chicago and Adopt Resolutions Incorporating Safety Recommendations

A JOINT meeting of the American Railway Association committee on the prevention of accidents at grade crossings and representatives of the National Association of Railway Commissioners was held at Chicago recently and the following resolutions were adopted:

Whereas in the opinion of this joint meeting of the Committee on Grade Crossings and Trespassing on Railroads of the National Association of Railway Commissioners and the Special Committee on the Prevention of Accidents at Grade Crossings of the American Railway Association the time has come for the establishment of uniform methods of protecting all grade crossings of railroads, after a full discussion of the matter the members of both said committees have agreed upon and adopted the following recommendations:

(1) That every grade crossing should be protected by an approach warning sign, to be placed in the highway at a distance not less than 300 ft. on each side of the railroad tracks, the sign to be a circular disk not less than 24 in. in diameter painted white with a black border and black

Fig. 1

Fig. 2

FIG. 1—PROPOSED DISTANT SIGNAL ON HIGHWAYS FOR AUTOMOBILISTS; FIG. 2—HAND SIGNAL FOR USE AT HIGHWAY CROSSINGS

cross lines with the letters "R R"—as shown in the accompanying drawing. Where deemed necessary this approach warning sign to be properly lighted at night.

(2) That the railroad companies maintain, within the limits of their rights-of-way, proper cautionary signs such as are now in use or authorized by law, and where deemed necessary such signs shall be equipped with a red light at night.

(3) That all lights displayed at night toward the highway at grade crossings shall be red.

(4) That all crossing flagmen use during the day a uniform disk 16 in. in diameter painted white with a black border and the word "STOP" painted thereon in black letters about 5 in. high, instead of the vari-colored flags which are now being used.

(5) The uniform painting of all crossing gates with alternate diagonal stripes of black and white.

(6) That the railroad companies, wherever practicable, be required to maintain their property at grade crossings free of obstructions to vision; also that the highway approaches to crossings shall be so graded that the free passage of vehicles shall not be impeded.

(7) That the National Association of Railway Commissioners, the American Railway Association, and the American Automobile Association, consider the advisability of agreeing upon whatever legislation may be necessary in the several states to make thoroughly effective the protection of grade crossings; and that it is our opinion that a uniform law requiring vehicles approaching such a crossing to reduce speed to a safe limit at the warning approach sign is advisable.

The accompanying illustrations explain the descriptive matter in resolutions 1, 4 and 5. The letters on the disks are 5 in. high, those in the 24-in. disk being 3¾ in. wide, and those in the 16-in. disk 3 in. wide. The back of the larger disk is painted black; the smaller is the same on both sides. The photographic view of the crossing gate has a poor background, but the introduction of this feature was perhaps intentional to show the effectiveness of the stripes in making the gates visible at a distance.

The discussion developed a feeling that the American Automobile Association ought to have a prominent voice in anything that is done toward legislation or in relation to uniformity in any respect, and James B. Walker, secretary Public Service Commission of the First District of New York, and J. A. McCrea, general manager Long Island Railroad, were appointed a subcommittee to meet a committee of that association as soon as practicable.

Outings for Utility Employees

Employees of public utility corporations in the Northwest, during the past few weeks, have participated in picnics and excursions for one day held by the companies which employ them. Perhaps the most active in this regard have been the Stone & Webster subsidiary companies, which have held picnics for employees in Bellingham, Seattle and Tacoma. The usual diversions, such as ball games, athletic events, dancing, and huge picnic lunches, were enjoyed by all the employees who could be spared from the service with their families and friends. On July 25 the Washington Water Power Company, Spokane, held its first annual picnic.

Owing to the difficulties in obtaining the necessary electrical plant, the electrification of the part of the North London Railway which is involved in the greater scheme for the electrification of the London & North-Western suburban lines is being delayed. It is hoped that by September electric service may be run between Broad Street and Kew and Richmond Streets.

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Chicago's Congestion Problem

After an Analysis of the Causes of the Delays to Traffic in the Loop District, a Series of Remedies Is Suggested—Recommendations Are Also Made as to Desirable Service Standards Under the Conditions

TWO abstracts of sections of the report of the Board of Supervising Engineers, Chicago Traction, on traffic conditions and track capacity have been published in recent issues of this paper.* In this concluding abstract the subjects of performance of equipment, reservoir service, sources of traffic, vehicle parking, rate of car movement and service regulations are considered.

PERFORMANCE OF EQUIPMENT

To ascertain definitely whether the car equipment is doing its full share in utilizing the streets most efficiently, a series of tests of both accelerating and braking rates was made with a recording graphic acceleration instrument for both the free running and congested districts. The average results obtained, summarized in Table I, clearly indicate that the rates of acceleration and braking are not only carried at times to the maximum dictated by convenience to passengers, but that the average through the free running and outside districts is fairly high, viz., around 2.0 m.p.h.p.s. In the congested zone vehicle obstruction reduces this to about 1.5 m.p.h.p.s., but many motormen, at times, are obliged to use as high a rate as 3.5 m.p.h.p.s., mean acceleration and braking. A similar record taken upon a multiple unit elevated railway train indicated an average rate of about 1.5 m.p.h.p.s. Thus the surface line cars may be regarded as having reached the limit of personal convenience of passengers, *i.e.* about 2.0 to 2.5 m.p.h.p.s., depending upon how uniformly the power is applied.

TABLE I.—ACCELERATION RATES
Compiled from Accelerometer Readings.—Miles Per Hour Per Second.

Average		Congested Zone	Outside Zone	Total 2-Mile Zone
Milwaukee Ave. Line	Accel.	1.02	1.44	1.23
	Braking	1.59	2.20	1.89
Through Route No. 1	Accel.	1.42	1.83	1.63
	Braking	1.87	2.31	2.09
Through Route No. 22	Accel.	1.21	1.67	1.44
	Braking	1.79	2.23	2.01
Averages	Accel.	1.21	1.65	1.43
	Braking	1.71	2.25	2.00
Grand Average		1.46	1.95	1.71 m.p.h.p.s.

The same observation clearly indicated the difficulties of surface operation in the number of extra accelerations recorded over that required for normal stops. For example, on the Milwaukee and Through Route No. 22 lines the average number of stops and accelerations per block was found to be as given in Table II. Both trips were taken during the maximum rush hour, and the results indicate that from three to four times the number of stops were recorded than are necessary from obstruction to free car movement.

SPEED AS AFFECTED BY VEHICLE CONGESTION AND PLATFORM DESIGN

It was found that on these rush hour trips, while the speed within the entire 2-mile zone averages about 7 to 8 m.p.h. this became reduced through the loading district to an average of about 3.5 m.p.h., for the Loop routes. The speed on through routes averaged about 5.0 m. p. h. In the free running zones a speed of about 9.0 m.p.h. was realized except on such continuously congested outside streets as Milwaukee Avenue, where the speed was reduced to not more than 6.5 m.p.h. during rush hours in either direction.

The cumulative effect of delays due to increased loading and to passenger and vehicle interference, during various periods of the rush hour, is clearly indicated by the sag in speed of cars in transit through the loading district immediately following the 5—5.30 p. m. and 6 o'clock peaks. Thus, for the first half-mile outbound on South State Street the speed of cars dropped to 4.5 m.p.h., as compared with 7.5 m.p.h. at 6.30 p. m. Observations on Wabash Avenue showed the result of using the inbound track as a reservoir track immediately preceding the maximum rush. The average speed between Harrison and Madison Streets, just after 5 p. m. dropped as low as 2.5 m.p.h. and held down below 4.5 m.p.h. for the hour, then rose rapidly to 9 m.p.h. around 6.30 p. m. As a number of through routes are operated on Wabash Avenue this meant that these through cars had to be delayed by the Loop trippers.

The great effect of good platform design in reducing cumulative delay during rush hours was also shown by these observations. Standard Chicago equipment has been found exceptionally rapid in loading, due to the large platform and wide and unobstructed entrance.

TABLE II.—NUMBER OF STOPS AND ACCELERATIONS PER BLOCK
Milwaukee Avenue Route

	Regular Stops	Total Accelerations
Inbound—North to Washington	0.5	3.3
Inbound—Desplaines to State	0.75	4.5
Outbound—State to Desplaines	0.7	2.0
Outbound—Desplaines to North	0.6	3.0
Through Route No. 22.		
Northbound—From Harrison to Lake	1.0	3.75
Southbound—From Lake to Harrison	1.0	6.0

Here, the problem of speed of loading is entirely one of reservoir capacity of platform. This had already been determined for various groups of boarding passengers with reasonable accuracy in the fifth annual report of the board. Thus, the accompanying diagram shows for a 40-in. entrance width an average speed of less than one second per passenger for groups of ten passengers or less. With shorter platforms the speed is correspondingly less. This phase of the congestion problem may, therefore, be regarded as more fully met than in any other large city using the prevailing types of equipment.

ANALYSIS OF TRIP DELAYS

To determine the responsibility for these delays and transit congestion, complete operating records of all evident sources of delay were made for several rush hour trips through the terminal district. At the same time the corresponding speed of all cars preceding and following, for a total period of 10 minutes, was observed. By this means it was possible to determine whether these trips were typical or otherwise. The results for through routes Nos. 1 and 22, and for the Milwaukee Avenue line, for the one-mile (Loop) zone may be summarized in per cent of total running time as shown in Table III on page 272.

This loss is over and above the rush hour delays ordinarily encountered within the adjacent 2-mile zone outside of which is fairly free running territory, except

*See ELECTRIC RAILWAY JOURNAL for July 29 and Aug. 5.

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TABLE III.—SHOWING SUMMARY OF DELAYS IN LOOP DISTRICT ON TYPICAL LINES AND RUNS

Total time for stops	25 to 29%
Useful stop time	12 to 22%
Extra loading and unloading time over that required for normal service in outer zone	7 to 14%
Total extra stop line over that required for normal service in outer zone	16 to 24%
Time loss due to line congestion	19 to 28%
Total loss, line congestion and delays at stops, not including extra time for loading passengers downtown	20 to 44%

in individual instances such as North Clark Street and Milwaukee Avenue.

Therefore, it may be said that perhaps one-third of the delays in the downtown running time is traceable to congestion entirely outside of the control of the railway company. The delay due to holding cars on off-signal is also significant as it is considerably greater than that due to other cars, vehicles, or pedestrians obstructing free movement. This plainly shows the importance of the proper handling of the signal system.

As between Loop and through routes, further analysis of picked trips is required for dependable results, although the indications are clearly in favor of the through routeing as furnishing the quickest transit through the loading zone, as would be expected in cases of interlocking routes.

Similar detailed analysis of the causes of slow-downs on these rush hour trips indicates that vehicles on the track immediately ahead of cars are responsible for practically half of the extra controller and brake applications. Another serious delay encountered is the present method of parking vehicles in the streets.

The rate of loading at the most important loading points downtown, as distributed through the rush period, is well shown in the second diagram. The Madison Street loop represented is typical. The 5.30 p. m. peak is noticeable at most points, also a 6 o'clock peak at State Street points only.

VEHICLE PARKING

A systematic survey of the method and extent of vehicle parking downtown was made morning and evening, partly within the rush hour and partly without, the periods chosen corresponding to the maximum combined movement of vehicles on the streets as well as car movement. This maximum vehicle movement, as indicated by observations at bridge entrances, would appear to be between 9 and 11 a. m. and 3 and 5 p. m. A summary of this vehicle survey for car line streets within the elevated loop is given in Table IV.

TABLE IV.—SHOWING VEHICLE PARKING IN DOWNTOWN STREETS

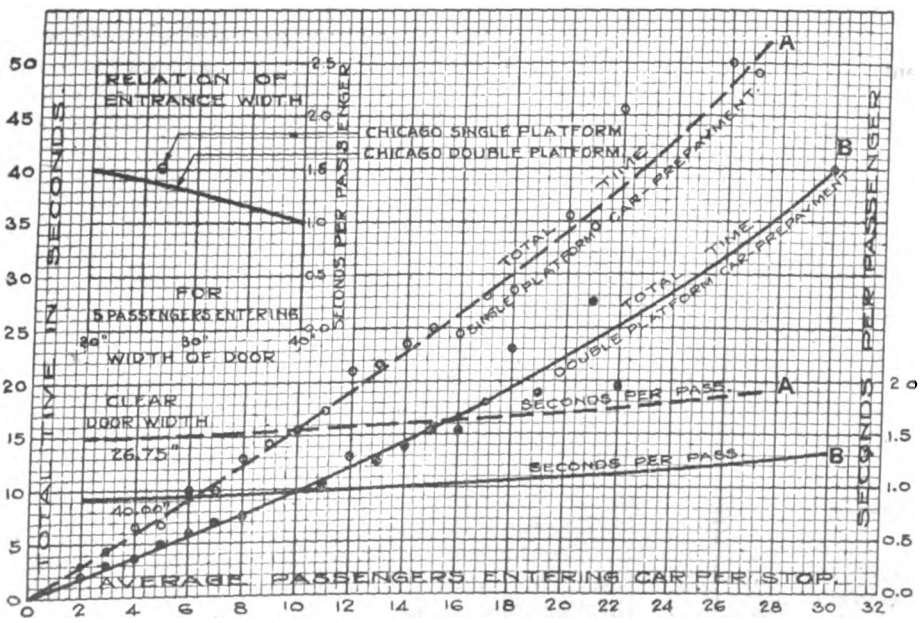
Number	Total	Ave. Per Block	Max. Any Block
City blocks traversed	332	..	..
Vehicles parked at any one time	1,029	13	52
Horse-drawn	360	4	24
Motor-driven	669	9	28
Vehicles properly parked*	716	9	31
Vehicles improperly parked	313	4	..
Vehicles parked within 2-car loading berth	216	3	20
Vehicles parked 1 hr. or more in 2-car berth	24	..	..
Vehicles parked within 5 ft. of fire hydrant	22	..	..
Per cent of total vehicles			
Improperly parked		30%	100%
Idle vehicles		89	100
Parked within 2-car berth		21	47

*Note—Proper parking here means when a vehicle is parallel and close to the curb so as not to obstruct the second line of traffic, and also when not parked within any 2-car loading berth or nearer than 5 ft. to a fire hydrant. Idle vehicles are those not in charge of driver or evidently in process of loading or unloading.

The usual 80-ft. downtown street will conveniently accommodate on each side of the car track two lines of vehicle traffic, when not over 70-75 in. in width. However, vehicles were found on the principal thoroughfares parked or moving past congested points which were from 80 to 90 in. or more in width. Of special significance is the fact that out of over one thousand vehicles observed 89 per cent were idle, *i.e.* were not in charge of a chauffeur or driver or evidently loading or unloading.

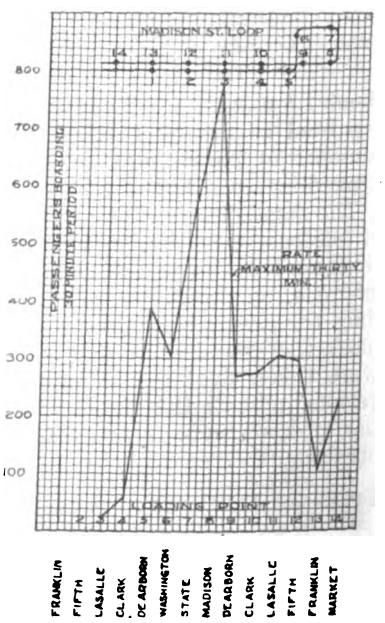
VARIATION IN RATE OF CAR MOVEMENT

While the study indicates that in certain blocks cars move at as high a rate as 150-175 per hour for 30-minute periods, this is not a true measure of the pressure of movement at certain shorter periods. For as the period of observation is shortened, the relative variation increases. The third engraving shows the 30-minute variation in total car and passenger movement at the maximum traffic during rush hours for all lines leaving the loop. The hours taken were from 4.40 p. m. to 7.10 p. m. The delay in arrival of cars in the second period resulted in a relative deficit in service in Period II, and, relatively, a surplus in Period IV. This will always



CHICAGO TRAFFIC REPORT—RELATIVE PLATFORM LOADING SPEED

A comparative study of the actual rate of loading in the single platform type prepayment car as compared with the standard double platform car of approximately the same platform dimensions. The observations were made under practically identical conditions and the results show clearly the advantages of double exit and large platform storage capacity where the most rapid handling of passengers is essential.



ORIGIN OF PASSENGER TRAFFIC ON MADISON AVENUE LOOP

These observations were taken May 24, 1915. This curve shows the observed maximum 30-minute rate and the proportion of passengers boarding at the various loading points.

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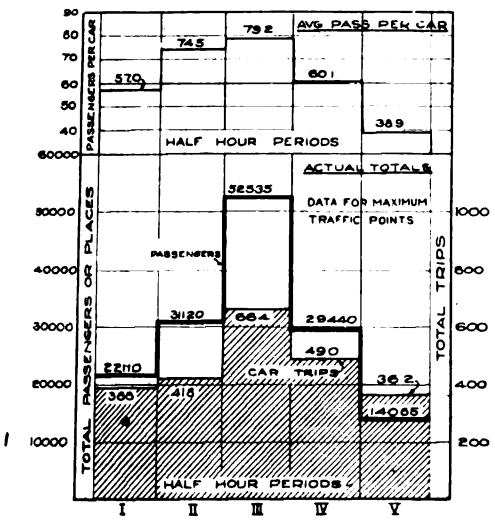
occur if the car peak and traffic do not coincide. An extension of this study to 5-minute periods shows that the total variation in movement within a 5-minute period may be as great as the entire average movement during the 30-minute period which emphasizes one of the variable factors in track capacity, *i.e.* a time period must be assumed long enough for erratic movements, due to other causes than dispatching, to be smoothed out.

VARIATION IN RATE OF VEHICLE AND PEDESTRIAN MOVEMENT

Observation by hours of the composite result of all west side car and vehicle movement at the bridges shows that while the maximum vehicle peak falls for the most part outside of the rush hour, nevertheless a heavy movement is apparent during the last half of the morning and especially the first half of the evening rush, which clearly accounts for the congestion observed on the main streets. On the other hand, the morning and evening pedestrian peaks are exceedingly prominent, due to steam commuter traffic to some extent. Pedestrian movement is maximum when vehicle movement is minimum, and vice versa, except that the latter tends to hold over into the evening rush. The pedestrian traffic within the Loop being so difficult of measurement was considered in the report only in regard to its actual effect upon observed car movement.



CHICAGO TRAFFIC REPORT—RUSH-HOUR CAR AND PASSENGER TRAFFIC

This graph shows the 30-minute variation total car and passenger movement during the maximum evening rush hours for all lines leaving the Loop. Observations of January, 1915.

In connection with signal observations, the exact vehicle movement at important crossings was also obtained. Considering typical congested locations at the intersection of Dearborn with Madison and Washington Streets, it appears that in round numbers from 500 to 700 vehicles per hour move across these intersections in various directions in addition to from 300 to 400 cars per hour. And at these points, from 10 per cent to 20 per cent of the cars were interfered with by this vehicle traffic, largely on curve movements. Furthermore, from 15 per cent to 20 per cent of the cars berthing in the "near-side" stop were obstructed in their berths by vehicles in the way. Analysis of these signal operations indicates also that not only the duration but the proportion of the signal interval as between the two directions of flow is dictated practically as much by vehicles as by car movement although cars are supposed to have the right-of-way by virtue of the existing city ordinances.

In justice to the traffic police entrusted with this extremely complicated downtown movement of cars and vehicles, it must be said that in general they are conducting the signal system with intelligence and dispatch under extremely trying conditions. It is plain that when cars and vehicles are moving through an intersection in both directions at the rate of over 1100 per hour, any violation of the rules under which the crossing is operated will produce instant congestion that may require several minutes to smooth out. This condition was observed repeatedly, especially from vehicles attempting to cross on the wrong signal and thereby interrupting proper car movement. Also, sudden congestion developed when a heavy crossing was left in charge of a single officer, when several had been in charge.

It has become apparent from these studies that the duration and uniformity of signal intervals is the key to the problem of realizing maximum crossing capacity. While the personal element enters greatly into the dispatching, it is found that in the long run the relative interval is fairly well apportioned to the pressure of waiting cars and vehicles, considering always the plan of car movement.

The whole operation of the crossing signal system finds its mechanical analogy in that of a two-way valve or a clock escapement and has an important bearing upon crossing capacity and Loop operation. Practically all other considerations of motive power, number of cars to satisfy a given service standard, or speed of entrance into the terminal district vanish before this one determinant.

SUMMARY

Transit operations during the past year appear to have been practically at a standstill owing to prevalent conditions traceable to the European War. However, if the few years just preceding 1915 be considered as typical of the normal in Chicago, then the fact is clear that not only is the general travel and traffic throughout Chicago increasing but that a continued and rapid increase in cars, vehicles, pedestrians and passengers must in all probability be dealt with. The results of the capacity study indicate how limited a margin of capacity remains in the downtown streets, what important parts have been exhausted and how soon the remainder will be absorbed under the normal rate of growth. The only available remedies for this situation appear to be rerouteing, more efficient traffic regulation and subways.

SERVICE STANDARDS

One of the objects of this study was to determine the possibilities of so operating the downtown surface lines as to satisfy a given service standard. Obviously, this depends upon the method of routeing employed to a large degree. The surface lines are now operating under an ordinance of April 8, 1915, requiring during non-rush hours as many seats as passengers (in the aggregate) for any count interval of fifteen minutes. No specified standard for the rush hour was acceptable other than that determined by what is generally known as the "limitations of track capacity downtown."

Prior to its passage, an ordinance for a rush hour standard and the various elements involved was given long and detailed consideration by the board, the companies and the city authorities.

In these proceedings it was made clear by the results of traffic counts that it would be impossible under existing conditions to satisfy the demands of the public authorities for a rush hour standard without necessitating considerable standing in the cars during the peak periods. And the important fact was brought out that had not been fully appreciated, viz., that the application of the service standard to Loop routes at the boundaries

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of the Loop would fall far short of realizing the standard desired at the points of heaviest traffic on the various lines, which usually occurred a mile or so distant from the Loop. Thus, passenger counts for the evening rush hour made during April and May, 1914, to determine the existing standards of the surface lines showed that the loading was about 18 per cent higher at these maximum points than at the Loop boundaries, thus:

	Half Mile Zone	Maximum Zone
Passengers	74,600	88,450
Cars	1,120	1,130
Passengers per car	66.6	78.2

Further, it appeared that the attempt to operate the large number of extra cars required on these Loop routes to satisfy these public demands would create conditions at all congested points which would largely defeat the purpose in view, either by making it impossible to pass this volume of traffic, or by reducing the running speed unreasonably.

PROPOSED STANDARDS

In the negotiations over the proposed service standard the chairman of the board presented a suggestion for a standard, based upon a definite amount of net floor area per standing passenger and 30-minute maximum and transition periods, to be applicable at points of maximum traffic.

	30-Minute Period	Sq Ft. per Pass.	Pass. per Car*
	III. Maximum	3.5	70
II.	IV. Transition	4.25	60
I.	V. Transition	6.5	50

*Equivalent passenger per standard 40 seat car.

It was discovered in the counts that some of the excess car loading was due to trippers arriving too late or too early to meet the demand, resulting in excess loading at times and under-loading at other times. The above standard, therefore, was believed to be applicable when improvements in this regard, in details of rerouteing and subways, were carried out.

The suggestion, however, was not fully concurred in by the companies, which considered it too drastic without subways. At the close of the discussion in City Council it became apparent that the standard was unacceptable under present conditions as it was regarded as too easy by the public authorities, and as too drastic by the surface lines. Therefore, in view of the impending action of the new Public Service Commission, only the non-rush standard was finally adopted by Council, which has little bearing upon this study as conditions of congestion are not generally incurred during non-rush hours.

Consideration of service improvement by the Public Utility Commission of Illinois was concluded on Oct. 4, 1915, by an order jointly imposed upon the Chicago Surface Lines and the City of Chicago, which may be briefly reviewed as follows: During non-rush hours at least as many seats must be furnished in the aggregate as passengers carried during any 15-minute interval at any point on any line or route. During rush hours (6 a. m. to 12 p. m.) eighty-five seats per 100 passengers are to be furnished during any maximum 30-minute period and ninety seats per 100 passengers during any 30-minute transition period at any point on any line or route. Turn-back service is to be instituted outside of the Loop district and trailers universally adopted.

The Commission anticipated the submission of a rerouteing plan by means of which the standard could be carried out, not indicating, however, any definite means of accomplishing this except that Washington Street should be reserved as a boulevard and all Madison and Randolph Street cars (which now include Lake Street) should be diverted to the Washington Street tunnel. The Commission recommended that subways be begun at once, and that vehicle traffic and parking be placed under more stringent control, particularly that a clear track should be reserved for cars during rush hours. However, sixty days were allowed for the equipment of trailers and the submission of a rerouteing plan.

This order is now being contested by the railway companies with the object of determining their relative responsibilities under the terms of (1) the 1907 contract ordinances with the City of Chicago and (2) the Public Utility Commission's law of 1912 respectively.

LEGAL CONSIDERATIONS

Before reaching conclusions as to the possibilities of improvement with respect to the various phases of the problem in mind, the existing ordinances and restrictions were reviewed in detail and also, in some cases, the history of successive modifications that have led up to ordinances now in force. This was considered necessary to a proper understanding of the conditions now encountered and the improvements to be recommended. Traffic regulations and ordinances for Chicago and other cities are cited.

Time-Saving Transfer Used by Louisville (Ky.) Railway

A time-saving transfer slip shown herewith is being used by the Louisville Railway on the Seventh Street line for the convenience of patrons returning from the baseball games at the local American Association park. This transfer is similar in size and in other respects to many other transfers but instead of being arranged for punching at stipulated crossings it entitles the passenger to transfer to any of the lines crossing Seventh Street from Broadway to Main Street. It saves the time of the

LOUISVILLE RAILWAY'S TIME-SAVING TRANSFER

conductor and obviates the necessity of putting more than one conductor on each car. The baseball fans leave the park in throngs immediately after the game and crowd onto the waiting cars. The cars start immediately and with only three squares to the first transfer point, Broadway, the conductor would be unable to make out the usual transfer slips and at the same time collect the fares. With these slips it is only necessary to tear off the transfer slips, already punched as to date and hour, and give them out to the passengers. The plan is an exceedingly good one for handling crowds where the run to transfer points is a short one.

Some time ago the underground railways, London, England, exhibited in their cars a series of photographs of places of interest in and around London. This scheme has since been greatly extended, states the *Electric Railway and Tramway Journal*, so that photographs now form part of the permanent decorations of the car. The practice is to take some place served by the underground system and make known to the public the actual attractions of the place by means of an excellent enlarged photograph, the original snapshot being also shown.

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Organization Allowed—Union Not Recognized

Strikes in Westchester County and Four New York Boroughs Settled on Compromise Basis by Public Officials—Wages and Working Conditions to Be Adjusted by Mutual Agreement or Arbitrated

THE general tie-up of electric railway transportation that was threatened by union agitators in New York City when this paper went to press last week developed during Friday night and Saturday into strikes upon all surface lines in the metropolitan district with the exception of those of the Brooklyn Rapid Transit Company. The companies involved were the New York Railways or "green-car" system and the Second Avenue Railroad or "blue-car" line, which with the Third Avenue Railway or "red-car" system comprise all surface lines in Manhattan; the Union Railway or Third Avenue Bronx lines; the New York & Queens County Railway in Queens, and the Richmond Light & Railroad Company in Richmond. Thus only the elevated and subway lines of the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company and the surface lines of the latter were left in regular service to serve the more than 5,000,000 riders of the city.

This condition lasted through Monday, with the strike-affected companies in the meantime doing their best to operate with loyal employees and furnishing from 40 to 60 per cent normal service. On Monday night the efforts of Mayor Mitchel and Oscar S. Straus, chairman of the Public Service Commission for the First District, resulted in the ratification of an agreement that brought a complete restoration of service to the New York Railways and the Third Avenue Railway, and on the following morning negotiations brought a similar result on the other lines.

Under the terms of the first settlement, that between the New York Railways and its employees, the right of the men to organize without molestation was freely acknowledged, but the right of the company to treat with a committee of its employees without recognizing the domination of the union was also provided for. Thus the company granted the first issue, the right of organization, while the employees backed down on the second issue, the question of recognizing an alien organization, the Amalgamated Association of Street and Electric Railway Employees of America. The third issue, that of adjusting wages and working conditions, was settled on the basis of mutual adjustment or arbitration. The full text of this agreement, which formed the basis for the settlements on all the other railways, is reproduced herewith.

How the Strike Spread in New York

On Friday evening, Aug. 4, after the refusal of the New York Railways and the New York & Queens County Railway to treat with the union leaders, a strike by a number of malcontents was declared on each line. At about the same time some employees of the Second Avenue Railroad began to leave their cars, although no demands had been presented to the company. About 6

TERMS OF STRIKE SETTLEMENT IN NEW YORK

1. The employees shall have the legal and moral right to organize, and the company pledges that it will not interfere with the employees in their exercise of these rights. Nor shall employees interfere with other employees in exercising their rights to decline to organize, either by intimidation or coercion, and that this applies as well to members of the Amalgamated Association of Street and Electric Railway Employees, whether they be employees of the New York Railways or not.

2. The company shall receive and treat with a committee of the employees upon any and all questions that may arise between them. This committee to select such spokesmen or advisers as they may choose to represent them, without any objections on the part of the company, and the company will in no way interfere with the selection of the committees of employees, it being understood that if the committee shall select to represent it the officers or other representatives of any particular organization, their appearance on behalf of the committee shall not be deemed to be a recognition on the part of the company of the organizations of which they are the officers or representatives.

3. That the question of wages and working conditions between the employees and the company shall be taken up by and through a committee of the employees with the officials of the company on a date to be agreed upon between them—such date not to be later than Aug. 20, 1916.

The committee and the company, in conference, shall attempt to reach a satisfactory settlement upon all questions of wages and working conditions, and upon such points as they may fail to reach an agreement they shall submit to a board of arbitrators—the board of arbitrators to be composed of three disinterested persons, one to be selected by the officials of the company, one to be selected by the committee representing the employees, and these two arbitrators to select a third.

In case the arbitrator selected by the officials of the company and the arbitrator selected by the committee representing the employees shall fail within ten days to select the third arbitrator, then such third arbitrator shall be selected by the Hon. Oscar S. Straus.

Both sides shall be given full opportunity to present all evidence and argument in connection with their points submitted to arbitration, and the award of the majority of the arbitrators, in writing, shall be final and binding.

It is also agreed that all disputes that may arise between the company and the employees in the future, on which they cannot mutually agree, shall be submitted to arbitration as herein provided.

4. In the interest of public safety and public service, the company wants it clearly understood that the direction and control of employees in all matters looking to efficiency in the service remains with the company and is not to be the subject of conference or arbitration, but if a dispute should arise as to whether a particular case falls within the above class, that question shall be subject to conference and arbitration as above provided for.

5. If the above is agreed to and accepted, it is further agreed that the employees shall declare off the strike and return to work immediately, in the positions they occupied prior to the time of going on strike, without prejudice.

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p. m. Saturday the employees of the Richmond Light & Railroad Company, which serves Staten Island, joined the strike. By Saturday night, therefore, all the important transportation lines in the metropolitan district were affected by the strike with the exception of the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company.

Although the number of employees of the companies involved in the strike was approximately 6500, a much smaller number would represent the actual strikers. A large majority of the employees of the New York Railways and the New York & Queens County Railway had pledged their loyalty to the companies, and most of these were ready to operate cars if adequate protection was provided by the police. Officials of the New York Railways estimated that about 20 per cent of the men had struck because they wanted to strike, and about 20 per cent more because of fear or intimidation. On the New York & Queens County Railway only 200 out of the expected 560 employees failed to report on Saturday. The trouble on the Second Avenue Railroad was caused by about a dozen men, the others being restrained from operation only because of fear.

SERVICE KEPT UP WELL

Some violence was displayed after the strike declarations on Friday night, and service was mostly suspended during the night. It was resumed in the morning, however, and in general it held up well during the day. Police figures on the number of cars in operation, together with the normal number of cars in service, were reported as follows for Saturday:

	Normal	9 a. m.	3 p. m.	6 p. m.
New York Railways	1,291	536	398	401
Union Railway (Bronx)	252	109	103	99
Third Avenue Railway (Manhattan)	505	73	90	46
Second Avenue Railroad	115	100	27	22
New York & Queens County Railway	131	81	69	84
*Richmond Light & Railroad Company	...	..	..	..

*Men struck at 6.15 p. m., all traffic ceasing until Monday.

As Saturday passed it became apparent that the entire problem of restoring normal traffic on the lines of the New York Railways was a matter of police protection. Early in the morning the company had resumed service with 62 per cent of its cars in operation. It gradually became evident, however, that one uniformed policeman to a car was not sufficient, for he protected only the motorman. The number of cars sent out depended entirely upon the number of motormen and conductors who were willing to take cars out, and the decrease in operation during the day came from the success which attended the efforts of the strikers to terrorize those remaining loyal. The company therefore asked for two policemen to a car, so that the conductors would be protected against intimidation and violence.

On Saturday, after a meeting of the principal officers of the company, double pay was announced for all loyal employees. Motormen, conductors, starters and inspectors, commencing that day, were to receive double pay for each day they remained on duty, and all other employees in other departments who went to work were to be compensated with substantial amounts in addition to their regular wages.

On Saturday evening the traction officials called in their cars, fearing violence and intimidation of men. As a result, no surface cars were in operation during the night in Manhattan, the Bronx, Queens and Richmond. On Sunday morning service was generally resumed, though naturally not to so great an extent as on the preceding week day. Police figures on the number of cars in operation on Sunday, together with the normal number of cars in service on such a day, were as follows:

	Normal	9 a. m.	3 p. m.	7 p. m.
New York Railways	328	197	286	98
Union Railway (Bronx)	260	95	104	..
Third Avenue Railway (Manhattan)	160	81	80	62
Second Avenue Railroad	100	16	29	..
New York & Queens County Railway	155	31	61	..

On Sunday two uniformed policemen were placed on each car instead of on cars in only the worst zones. They were instructed to prevent all disorder, but not to take sides in the strike or to prevent lawful picketing. Some persons were injured and considerable damage was done to rolling stock on some of the lines, mostly the crosstown ones, but as a rule the police at all times kept the situation well in hand. At night the cars were stopped as before.

INTERVENTION OF PUBLIC OFFICIALS SUCCEEDS

The first break in the situation came on Sunday as a result of efforts by public officials to relieve the public of any transportation inconvenience whatsoever, and to secure a settlement of the strike situation before the trouble could spread to the rapid transit lines. All day conferences were held by Mayor Mitchel and Mr. Straus with William D. Mahon and William B. Fitzgerald, the union leaders, and Theodore P. Shonts, president New York Railways. In the evening the Mayor and Mr. Straus announced that they had submitted to both sides certain proposals for a settlement, and that these would be recommended by Mr. Shonts to his board of directors and by the union leaders to the strikers for ratification. Upon ratification of the proposed settlement by both sides, the men were to return to work immediately.

After various sessions that took up most of Monday, the street car strikes in Manhattan, the Bronx and Westchester County were settled in the evening by the ratification of the agreement proposed by the Mayor and Mr. Straus. The discussion of the board of directors of the New York Railways was long, but after a further conference with the Mayor and interpretations of certain points by the union leaders, the tentative agreement was accepted at 9.35 p. m. Shortly thereafter Edward A. Maher, Sr., vice-president and general manager Third Avenue Railway, who had earlier in the day been authorized by his board of directors to act in the matter, signed a similar agreement for his company. The striking employees immediately began to return to work, and the lines began more complete operation with the expectation of having a normal amount of rolling stock in motion by early morning. As a rule little confusion marked the resumption of full service.

STATEMENTS ISSUED BY THE NEW YORK RAILWAYS

After the ratification of the agreement, the officials of the New York Railways issued a communication to the employees stating their belief that the interests of the employees, the company and the public would in the long run be better served if all matters of common interest were settled without outside intervention. The plan of settlement, it was said, left such a method of procedure open to the men, and it would be the policy of the company to make the procedure so attractive to every man that no one would want to deviate from it.

At the same time the board of directors of the New York Railways issued the following statement, in part, to the public:

"In the interests of public order and convenience this board has agreed to the plan of settlement. We have protected the rights of the men to join as well as not to join any organization. While conceding the privileges of the men collectively to take any steps to improve their wages and working conditions, we have felt and still feel that it is contrary to the interests of the transportation of this city that employees engaged in that service should be affiliated with organizations with

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interests in other cities and not responsible, as we and our employees are, to this community.

"We believed and still believe that a majority of our men want to be loyal to the company and to settle their relations with the company without the intervention of outsiders. Under this agreement the men will have ample opportunity to make felt their real desires on this subject.

"We have asked the co-operation of the Mayor and the Public Service Commission in assisting us to meet such increased expenses as may be due to carrying out the agreement now arrived at."

LAST OF THE STRIKES SETTLED

The last of the strikes was settled on Tuesday morning, when the New York & Queens County Railway, the Second Avenue Railroad and the Richmond Light & Railroad Company signed agreements of the same terms as the New York Railways settlement. The officials of these companies, with the exception of President William O. Wood of the Queens road, who was ill, appeared in the office of Mayor Mitchel to affix their signatures. Mr. Wood signed the agreement at his home. The employees promptly ratified the agreements, and normal service on all the lines was gradually restored.

Following the announcement of the actions of the strikers President Wood issued a statement to the public which said, in part:

"The men are free to join any organization or not join any organization, as they please. We propose to run an open shop as far as this question is concerned. Our opinion is that the public is best served by the men not joining any outside organization, and we think the late unpleasantness has demonstrated that our belief is correct. We wish to assure the public that we have not officially recognized any unions.

"This settlement will probably place a severe additional financial burden on this company, which has for years done a pioneer work without profit. The public and the public officials, the latter of whom assisted in bringing about this settlement, will, we trust, aid the company to meet these increased expenses if a way be found for reasonable readjustment of existing burdens."

PUBLIC SHOULD HELP PAY

On Tuesday evening Mr. Shonts, in amplication of his previous reference to the desired assistance of public officials in meeting increased expenses arising from the settlement, gave out the following:

"The Mayor and the chairman of the Public Service Commission were very insistent upon the point that the interests of the public of New York demanded immediate settlement of the controversy. But we recognized very clearly that settlement upon the terms they proposed would probably involve increased financial burden upon this company.

"The New York Railways has outstanding approximately $18,000,000 of 4 per cent bonds and approximately $30,000,000 of 5 per cent income bonds. Under the terms of the mortgage the company must pay out all of its net earnings after necessary working reserves, in the form of interest on these 5 per cent income bonds. Yet in no year since the reorganization of the New York Railways has it paid or earned full interest on such bonds. No dividends whatever are paid on the company's stock. The property, as a matter of fact, has never yet yielded a fair interest on its conservative bond issue.

"We felt it only fair, therefore, to bring the financial aspects of the situation immediately to the attention of these officers representing the public. If wages are to be increased somebody must pay the bill and that fact ought to be candidly considered when the obligation is being incurred.

"Though the company is absolutely limited to charging a 5-cent fare, the purchasing power of that nickel is constantly decreasing. The price of nearly everything we buy is going up. Nor does the street railway actually receive a 5-cent fare for every passenger carried. The New York Railways in 1915 carried 251,000,000 passengers who paid full fare and 100,000,000 passengers who traveled on free transfers. The result was that our actual receipts per passenger instead of being 5 cents per trip were actually a little under 3.5 cents per trip.

"It being impossible to increase the 5-cent fare, one possible other way by which the company can meet increased financial burdens is through relaxation by the city of some of the burdens it imposes upon the company. We are required by the city to pay out, for instance, every year, approximately $400,000 to $500,000 for paving the streets inside and alongside our tracks. We are also required to remove the snow on the streets where our tracks run. That expense averages over $100,000 a year. We also pay the city as a license fee for running our cars approximately $20,000 a year. Our taxes amount to more than $1,000,000 a year. That is required of us by the public.

"If, therefore, public officials, in their capacity as representing the broad interests and convenience of the public, place upon us additional burdens, we do not think it is asking too much to request the co-operation of these officials in assisting us to meet the increased expenses incident to carrying out the strike settlement which, in the public interest, they urged us to accept."

SITUATION ON I. R. T. AND B. R. T.

Although during the strikes numerous predictions were made as to the spread of trouble to the subway and elevated lines of the Interborough Rapid Transit Company and the surface and other lines of the Brooklyn Rapid Transit Company, no demands were made upon the employees of these lines and no tieup was attempted. It was asserted that some employees of the former company had drawn up demands covering the right to organize, the recognition of the union and an increase in wages of from 10 to 30 cents a day over the new scale voluntarily granted by the company on Aug. 2, but no demands were received. On Sunday, Aug. 6, before it was known that a settlement of the surface car strikes might be effected, the Interborough company announced that, owing to traffic on the subway and elevated lines being temporarily increased by disturbed surface railway conditions, thereby putting extra burdens on the employees, all men in every department would receive $1 a day extra pay until further notice. This was continued in force for three days.

Contrary to union claims of organization, T. S. Williams, president Brooklyn Rapid Transit Company, on Aug. 4 gave out a statement asserting that 98 per cent of the motormen and conductors had signed pledges of loyalty. On Aug. 8 Mr. Williams announced a new policy for the adjustment of differences between the company and its employees, and promised to recommend a substantial increase in wages to all transportation employees. Mr. Williams said in part:

"Our superintendents have made considerable progress in ascertaining the sentiments of the men as to time tables, and as rapidly as the ideas of the men are gathered new time tables will be announced, which, so far as consistent with the requirements of public service, will recognize what now appears to be a general sentiment in favor of shorter swings.

"In order that there may be continuous co-operation

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between the workers of our system and in order that officers may be kept more closely in touch with the feelings of the men, we will propose a modification of the organization of the Employees' Benefit Association, whereby each department in the system will by secret ballot elect an additional number of trustees, and the representatives of each department thus elected will form a committee to voice any changes in conditions desired by the men of such department. In case of any failure to agree as to the proper method of adjusting differences between such committees and the head of the department, the president of the company will give a hearing to both sides and will determine the matter in a fair and impartial manner.

"I do not expect that resort to his decision will ever be necessary. Inasmuch as the constitution and by-laws of the association cannot be altered except by a two-thirds vote at a special meeting, the making of the changes herein suggested will, of course, be entirely subject to the approval or disapproval of its members, who now number more than 10,000 men."

The proposed increase in wages has been ratified by the executive committee of the board of directors. The matter will be submitted to the full board of directors and then to the directorates of the various subsidiaries when they meet later this month.

COMMISSION BLAMES MR. WHITRIDGE

On Friday, Aug. 4, the Public Service Commission stated in a preliminary finding on the strike situation that Frederick W. Whitridge, president Third Avenue Railway, was to blame for the strikes in New York. The commission found that Mr. Whitridge "either intentionally violated" an agreement he had made in 1913 to arbitrate all future labor troubles with his Yonkers employees, "or that he was so negligent in his duties to his stockholders, his employees and the public as to forget entirely his important agreement." But for this oversight or negligence on Mr. Whitridge's part the city would not have been confronted with the present transit situation resulting from the spread of the strike from Westchester County.

Alfred A. Cook, special counsel for the company, protested against the finding as unfair in the absence of Mr. Whitridge. He thought that if any such agreement had been made, Mr. Whitridge misunderstood it, and he called attention to the fact that the committees of employees which recently called on Mr. Whitridge never recalled any such agreement, and mentioned it for the first time only after he had left for Europe. On Aug. 6 Mr. Whitridge, through the Associated Press, from Scotland denied that he had at any time made any such agreement as the commission charged him with having violated or forgotten.

An examination made by this journal into the official minutes of the hearing before the Second District Commission in the Yonkers strike case in 1913 shows that Mr. Whitridge then informally agreed to allow the strikers to return to work without prejudice, promised to arbitrate the questions in dispute, and said that he would take the conclusion of Mr. Stevens, chairman of the commission, as to whether or not the disputed questions should be deemed arbitrable. The labor leader at the time insisted upon a formal arbitration agreement applicable to all future disputes, but Mr. Stevens failed to press the point explicitly, and in drafting an informal agreement gave no conclusive evidence of an intent to provide for arbitration covering any other matters than the "conditions and matters in dispute which now exist." Likewise Mr. Whitridge seemed to make no specific promise regarding the arbitration of all future questions. The impression one gets in reading the record is that there was much diplomatic fencing without any desire on the part of either the commission or Mr. Whitridge boldly to face the future and to extend the arbitration arrangement definitely over more than the settlement of the questions then in dispute. As the summary of the commission in regard to the hearing contained no reference to future disputes, it was not questioned by Mr. Whitridge, except as to the statement that he had agreed that the determination of what qustions were arbitrable should be submitted to arbitration. On this point, according to a telegram now given out by Mr. Cook, he called Mr. Stevens' attention to the fact that this was an erroneous conclusion to which he did not assent.

COMMUNICATIONS

Power-Driven Devices in Maintenance Work

THE CONNECTICUT COMPANY

NEW HAVEN, CONN., July 31, 1916.

TO THE EDITORS:

I have read with great interest the description, by S. L. Foster, chief electrician of the United Railroads of San Francisco, of the admirable machine which he modestly calls a reeling machine, although as a matter of fact "general utilities machine" would express more clearly its broad field.

It was my privilege last fall to be shown this machine by Mr. Foster, who also showed me many other exceedingly interesting labor saving devices in use on the United Railroads, where he has more successfully made the available forces about him do his work than has been done on any other railway property with which I am familiar. The trolley wire offers in maintenance an almost unlimited power supply. The engines of the automobiles of a railway system provide another fruitful source of power and one entirely independent of the "overhead"; but for some unknown reason the large majority of the trolley companies seem to prefer to let the men do the work.

Mr. Foster has been generously describing many of his special devices in the columns of the ELECTRIC RAILWAY JOURNAL. Quite a few of these obviously were developed to meet the extraordinary conditions resulting from the great fire, but these special devices are to a large extent, with some slight modifications, applicable to less unusual service. The reeling machine would "earn its bread and butter" on almost any road of any size, used purely as a reeling device, to say nothing of the possibilities of combining it with a pole-setting device and thus getting sufficient service from it to warrant its purchase for many of the smaller lines.

CHARLES RUFUS HARTE,
Construction Engineer.

Button-End Axles Reduce Wear

ROCKFORD & INTERURBAN RAILWAY COMPANY,
ROCKFORD, ILL., Aug. 2, 1916.

To the Editors:

In the ELECTRIC RAILWAY JOURNAL of July 29, page 193, I noticed the article by J. S. Mills, foreman Electrical Department Morris Park Shops, Long Island Railroad, on reclaiming worn button-end axles. The Peckham Manufacturing Company used to make trucks with check plates similar to the one he describes.

I agree with Mr. Mills that this is a great deal better

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plate to use, as far as the check plate itself and the axle are concerned, than the one with the button-end axle and the U-shaped check plate. However, it was my experience while employed by the Fort Wayne & Northern Indiana Traction Company, where we used a great many of the Peckham No. 11 and No. 14 trucks which had the plain-end axles, that the thrust of the axle was only on one check plate at a time, while with the button-end axles and the U-shaped check plates the thrust was on both check plates at all times.

The principle is the same with button-end axles as with the standard M. C. B. axle, where there is a button on the outer end of the journal and a shoulder on the inner end. Where the plain-end axle and the solid check plate are used all of the wear is on the inner guides of the journal boxes and the inner side of the truck pedestals, whereas with the button-end axles the wear is divided and, as the wearing surface of both journal box and truck pedestal is doubled, the journal boxes will last twice as long. Using my scheme described in your issue of Jan. 8, page 89, after the axles are once bored and tapped it is a very small job to renew the buttons, thus assuring a maximum of life of the journal boxes.

J. N. GRAHAM,
Master Mechanic.

Various Values of a Nickel

Baltimore Railway Gives Interesting Data on the Size of a Five-cent Piece

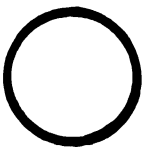
THE service which a passenger now gets for his nickel as compared with what he got a few years ago and the present purchasing power of the nickel in the hands of the company as compared with what it was formerly, are strikingly brought out by the circular printed below which was recently issued by the United Railways & Electric Company, Baltimore, Md.

Everyone has heard the old adage about money growing on trees, but who has actually seen money grow?

Yet money has really grown in at least one instance, the particular coin which assumes greater proportions being the ordinary nickel—Uncle Sam's 5-cent piece.

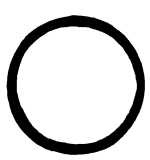
A few years ago the distance you were carried on the street cars for your nickel might have been represented as of this size—

To-day 5 cents will give you a ride much longer, so you can readily see that your nickel has grown to this size—



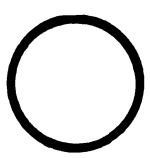
A few years ago you were carried as fast as the horses could go, or at the uniform rate of the cable, for your nickel, which could have been considered this size—

To-day you are whisked along by electricity at many more miles per hour. Time is money, and in time saving your nickel has reached these dimensions—



A few years ago accommodations that were well worth it were bought for your nickel of this size—

To-day you have cars of the most modern type, with the latest approved appointments and many times as comfortable and convenient as those of the olden days, so your nickel, in service purchasing power, has become even bigger than this—



Is there anything else of which you get more for your nickel than you did five, ten, fifteen or twenty years ago?

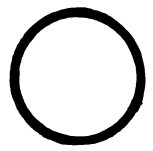
No, but on the contrary, there has been a tremendous increase in the price of practically everything but postage stamps and the United Railways & Electric Company's charge for carfare.

II

Now let us take a look at the nickel from another angle and see it fade away, all of which emphasizes the magic character of the little coin.

The nickel you pay the railways company is used by it to purchase labor, material and equipment for its lines.

A few years ago your nickel purchased labor for the railways company to the extent represented by this circle—



But the price of labor has gone up, and to-day your nickel buys for the railways company, as compared with a few years ago, this much labor—

A few years ago your nickel bought this much material—

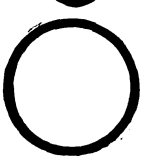
But the price of material and equipment of every character has increased, so that the nickel now buys only this much—

And that certainly makes it very clear that a nickel may shrink as well as expand.

Now we will take a last look at the magic nickel. Viewing it in every light

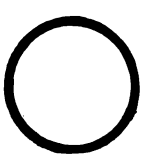
the coin whose value to you in carfare a few years ago may be represented by—

has now assumed this size for you when spent for the same purpose—



And by the same token—

the nickel that meant to the street car company a few years ago a value represented by—



has, through the increased cost of labor, material and equipment, been reduced in value to the company to this size—

In other words, your five-cent piece buys for you more than ever in distance traveled, in time saved, and in comfort and convenience, and safety, and—

It buys less for the company that has given you improved facilities for travel in and around the city.

And that's the whole story of the magic nickel.

Decision in Double-Liability Case

The Travelers Insurance Company, Hartford, Conn., has paid $11,000 to the estate of Samuel A. Rockwell, who was killed on May 20 when the jitney running between Hartford and Willimantic struck a car of the Shore Line Electric Railway on Main Street in Willimantic. This case raised the question of whether a jitney is a public conveyance under the double indemnity clause of accident policies. The first case of this sort arose in Los Angeles, Cal., and was decided by D. N. Case, chief adjuster of the Travelers, in favor of the beneficiary. Mr. Rockwell had an accident policy for $5,500. In the collision he received a compound fracture of the skull and died in twelve hours without recovering consciousness.

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1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

ASSOCIATION NEWS

1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

Secretary Burritt Announces a Provisional Program for the American Association—The Atlantic City Train Committee Met in Chicago and Tentatively Decided Upon a Schedule for the Convention Special—A List of Companies to Which Exhibit Space Has Been Assigned Is Published

Program of the American Association

The 1916 convention of the association will be held as in 1914 on Young's million-dollar pier at Atlantic City, N. J. Secretary E. B. Burritt has announced the provisional program as given below of the American Association, those of the other associations being not yet quite complete.

Convention Activities

The Chicago Atlantic City train committee met in Chicago on Aug. 10 with the following in attendance: G. T. Seely, Metropolitan West Side Elevated Railway, Chicago, Ill., chairman; R. B. Stearns, Milwaukee Electric Railway & Light Company; J. V. Sullivan, Chicago Surface Lines; E. E. Soules, Illinois Traction System, Peoria, Ill., and L. E. Gould, ELECTRIC RAILWAY JOURNAL, Chicago, Ill.

It was tentatively decided to run a counterpart of the Broadway Limited over the Pennsylvania Lines, leaving Chicago at 5 p. m., Saturday, Oct. 7, arriving in Atlantic City Sunday at 4 p. m. Excursion rates will be in effect and there are prospects of a big train.

Secretary E. B. Burritt reports the list given below of companies which have definitely engaged exhibit space. A number of others are planning to exhibit, but have not yet "signed up." Mr. Burritt states that he anticipates a record exhibit partly on account of the improving business conditions, and partly because he expects an unusually large number of railway men, many of whom could not get to the convention at San Francisco. Order blanks for furniture and flowers have been sent out, and the secretary is particularly concerned about the former, as this year's contract has been made with a new dealer.

MEMBER COMPANIES WHICH HAVE BEEN ASSIGNED EXHIBIT SPACE FOR THE 1916 CONVENTION

Acme Supply Company
American Abrasive Metals Company
American Brake Shoe & Foundry Company
American Engineering Company
American Mason Safety Tread Company
American Railway Guide Company
American Railway Supply Company
American Steel Foundries
Albert & J. M. Anderson Manufacturing Company
E. C. Atkins & Company
Atlas Railway Supply Company

Baldwin Locomotive Works
Bayonet Trolley Harp Company.
J. G. Brill Company
Buda Company

Carnegie Steel Company
Cheatham Electric Switching Device Company
Chicago Varnish Company
Chicago Pneumatic Tool Company
Columbia Machine Works & Malleable Iron Company
Cooper Heater Company
Consolidated Car Fender Company
Consolidated Car Heating Company
Corliss Carbon Company
Curtain Supply Company

Davis-Bournonville Company
Dayton Fare Recorder Company
Drew Electric & Manufacturing Company
G. Drouvè Company
Duff Manufacturing Company
Du Pont Fabrikoid Company

Eclipse Railway Supply Company
O. M. Edwards Company
Electric Railway Improvement Company
ELECTRIC RAILWAY JOURNAL

Provisional Program for 1916 Convention, American Association

TUESDAY, OCT. 10.

Convention called to order at 9:30 a. m.
Annual Address of the President.
Annual Report of Executive Committee.
Annual Report of the Secretary-Treasurer.
Appointment of Convention Committees.
- (a) Resolutions.
- (b) Nominations.
- (c) Recommendations in President's Address.

Reports of Committees.
- (a) Subjects.
- (b) Education.

ADDRESSES—"Electric Railways and Preparedness."
- (a) Major-General Leonard A. Wood, U. S. A., Commanding the Department of the East.
- (b) Brigadier-General Erasmus M. Weaver, U. S. A., Chief of Coast Artillery.

Reports of Committees (Continued).
- (c) Representing Association at American Good Roads Congress.
- (d) National Joint Committee on Overhead and Underground Line Construction.
- (e) Company Membership.
- (f) Valuation.

PAPER—"Unit Costs and Overhead Charges." Prepared by the Committee on Valuation and presented by a member thereof.

Reports of Committees (Continued).
- (g) Federal Relations.
- (h) Compensation for carrying United States Mail.

WEDNESDAY, OCT. 11.

Reports of Committees.
- (a) Electrolysis.
- (b) Company Sections and Individual Membership.
- (c) Award of Company Section Medal.
- (d) Conditions of Award of Anthony N. Brady Medal.
- (e) Public Relations.

ADDRESS—"Publicity"—Ivy L. Lee, New York, N. Y.

Reports of Committees (Continued).
- (f) *Aera* Advisory Board.
- (g) Changes in Constitution and By-Laws.
- (h) Operation of Motor Vehicles.
- (i) Insurance.
- (j) Standards for Car Loading.

THURSDAY, OCT. 12.

Reports of Committees.
- (a) Taxation Matters.

ADDRESS—"The Physical Development of Electric Railways."—(Speaker to be announced).

ADDRESS—"The Financial Development of Electric Railways."—(Speaker to be announced).

Reports of Convention Committees.
- (a) On Recommendations in President's Message.
- (b) Resolutions.
- (c) Nominations.

Unfinished Business.
Election of Officers.
Installation of Officers.
Adjournment.

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Electric Service Supplies Company
Ellcon Company
Galena Signal Oil Company
General Electric Company
Globe Ticket Company
Gold Car Heating & Lighting Company
Goldschmidt Thermit Company
Griffin Wheel Company
Hale & Kilburn Company
Heywood Brothers & Wakefield Company
Holden & White
Imperial Car Cleaner Company
Indianapolis Switch & Frog Company
International Register Company
International Steel Tie Company
Jennison-Wright Company
Johns-Manville Company
Johnson Fare Box Company
Kenfield - Davis Publishing Company
Lackawanna Steel Company
Laconia Car Company
Lord Manufacturing Company
Midvale Steel Company
McQuay-Norris Manufacturing Company
Nachod Signal Company
National Brake Company
National Car Wheel Company
National Lock Washer Company
New Haven Trolley Supply Company
R. D. Nuttall Company
Ohio Brass Company
Ohmer Fare Register Company
Oxweld Acetylene Company
The Pantasote Company
Pratt & Lambert, Inc.
The Q. & C. Company
Rail Joint Company
Railway Improvement Company
Railway Materials Company
Railway Roller Bearing Company
Railway Signal Engineer
Railway Track-work Company
Railway Utility Company
Rooke Automatic Register Company
St. Louis Car Company
Sangamo Electric Company
E. P. Seymour Portable Rail Grinder Company
Sherwin-Williams Company
Simmen Automatic Railway Signal Company
Peter Smith Heater Company
Smith Ward Brake Company
L. Sonneborn & Sons
Southern Exchange Company
Standard Underground Cable Company
Star Brass Works
Taylor Electric Truck Company
Trigger Lock Reversible Controller Finger Company
Trolley Supply Company
United States Electric Signal Company
Universal Lubricating Company
Valentine & Company
Van Dorn Coupler Company
Western Electric Company
Westinghouse Electric & Manufacturing Company
Wheel Truing Brake Shoe Company
The White Company

Canadian Association Holds Annual Meeting in Toronto

Acton Burrows Gave Exhaustive Report on the Activities of the Association During Past Year—Officers for Ensuing Year Elected

The Canadian Electric Railway Association held its annual meeting at the Royal Canadian Yacht Club, Toronto, Ont., July 26 and 27. President James D. Fraser, director and secretary-treasurer Ottawa (Ont.) Electric Railway, presided. A detailed report covering the work of the association during the past year was presented in an able manner by Secretary-Treasurer Acton Burrows, managing director, *Canadian Railway & Marine World.*

Papers which are copyrighted by the association, to be distributed only to officials of member companies, were read as follows:

Traffic Conditions in Vancouver and Their Relation to Street Car Traffic, by W. G. Murrin, general superintendent, British Columbia Electric Railway; Gearing and Gear Ratio for Railway Motors, by W. G. Gordon, transportation engineer, Canadian General Electric Company; Dispensing with Juries in Damage Actions Against Railways, by F. B. Griffith, superintendent, Interurban Railway Division & Claims Agent, Dominion Power & Transmission Company; Problems Confronting Electric Railway Officials, by F. S. Livingston, traffic manager, Toronto & York Radial Railway.

Officers for the ensuing year were elected as follows: President, E. P. Coleman, general manager, Dominion Power & Transmission Company, Ltd., Hamilton, Ont.; vice-president, C. L. Wilson, assistant manager, Toronto & York Radial Railway, Toronto; honorary secretary-treasurer, Acton Burrows, re-elected for the tenth consecutive year.

Executive committee, the president, the vice-president, the immediate past president, J. D. Fraser, the honorary secretary-treasurer, and the following: A. Eastman, vice-president and general manager, Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.; H. G. Matthews, general manager, Quebec Railway, Light, Heat & Power Company, Quebec, Que.; G. Gordon Gale, general manager, Hull Electric Company, Hull, Que.; A. Gaboury, superintendent, Montreal Tramways Company, Montreal; J. S. Mackenzie, purchasing agent, Winnipeg Electric Railway, Winnipeg.

Solving Problems by Graphics

Graphical Solutions of Some Familiar Railway Problems Are Described in New University of Illinois Bulletin

Bulletin No. 90 entitled "Some Graphical Solutions of Electric Railway Problems," published by the Engineering Experiment Station of the University of Illinois, and written by A. M. Buck, assistant professor of Railway Electrical Engineering at that university, contains matter that should be of interest to electric railway engineers. Graphical solutions of a number of the more familiar problems of electric railway engineering are presented. While some of the solutions have been published before, the majority of them have been developed by the author in connection with his classroom work. The collection of the solutions into a single volume makes them convenient for reference and of particular value to the engineer who prefers graphical methods.

The author points out that in the solution of railway problems involving the characteristics of the motive power, it is sometimes difficult to use analytical methods, principally because it is impossible to obtain a satisfactory equation for the curves of the motor. In a series motor, for instance, the relation between speed and tractive effort is so involved that any attempt to obtain a formula leads to assumptions that are sometimes far from true. It is suggested that graphical methods, in contrast with analytical, form an easy and at the same time accurate means of attack applicable to almost any combination of characteristics and range of conditions which may be met with in practice.

The various solutions are grouped under the headings, motor performance with varying potential, motor performance with resistance, starting resistance for series motors with rheostatic control, series-parallel control, starting resistance for shunt motors, plotting speed-time curves, plotting distance-time curves and the heating value of a variable current. The methods of solving problems dealing with motor performance are those described by the author in an article in the ELECTRIC RAILWAY JOURNAL for Sept. 18, 1915, page 595, and the solutions of starting resistance problems were described in part on page 330 of the Feb. 13, 1915, issue of the same publication.

Copies of this bulletin may be obtained for a nominal sum by addressing the Engineering Experiment Station, Urbana, Ill.

The twentieth anniversary of the opening of the Milford & Uxbridge Street Railway, Milford, Mass., between Framingham and Milford, was celebrated recently by a group of veteran employees who were in the service of the company on May 13, 1896, the day the first car was run over the road.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

New Type Bond for Third Rail — Standard Weights for Electric Cars
Change of Wheels Adapts Automobile for Railway Use
Fan Ventilation of Old-Type Motors — Insulation Test on Feeders
Other Articles of Interest and Value

New Type Bond for Third Rail

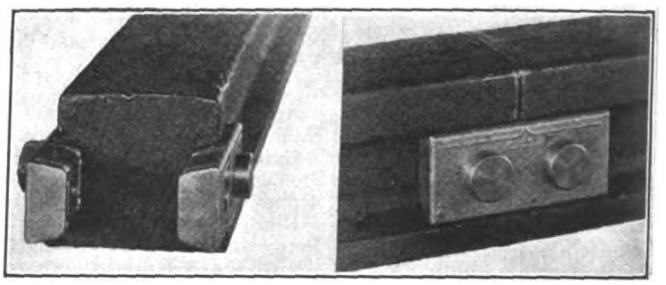
Joint of Excellent Conductance and Strength Developed for New Rapid Transit Lines of Brooklyn, N. Y.

BY H. H. FEBREY
Engineer, American Steel & Wire Company

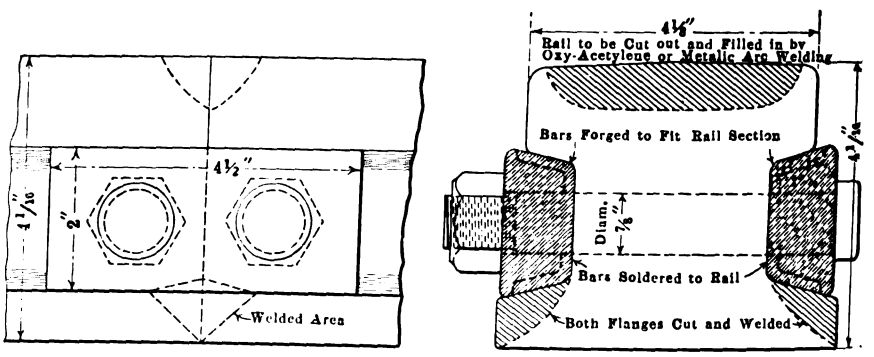
A NOVEL type of third rail joint has been developed for the New York Municipal Railway Corporation for use on the 150-lb. third rail which is being installed on its portion of the Dual System of rapid transit for New York City and Brooklyn. The new joints have been installed on the New Utrecht Avenue elevated line between Thirty-ninth Street and Coney Island. Excellent results are being obtained, tests made after subjection to actual service showing that they are maintaining a conductance equal to that of the rail.

This railway has adopted a type of third rail construction which differs from that commonly used in that the rail is divided into 1000-ft. rigid sections, expansion joints being provided between sections. Each section is anchored at the center in order to provide uniform movement at the expansion joints.

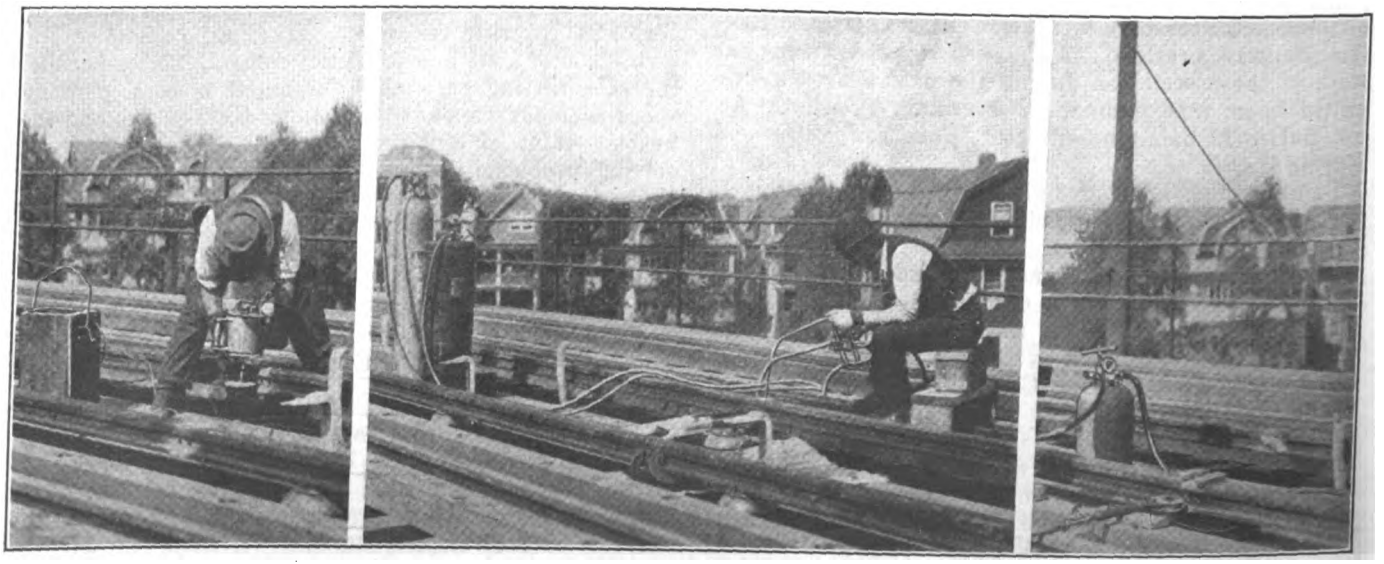
The new joint consists of two drop forged copper splice bars bolted and soldered to the rail. In addition, a portion of the railhead and both flanges is cut out and welded by means of an oxy-acetylene flame, or metallic arc. The gas-welding outfit consists of the usual oxy-acetylene blowpipe connected by about 15 ft. of hose to the oxygen and acetylene tanks. The acetylene used is that manufactured by the Prest-O-Lite Company, Indianapolis, Ind. The gas is generated at a central charging station and is washed, dried and purified to remove any elements which would be injurious to the weld, and is then compressed into the steel cylinders in which the contractor receives it. The removal of the impurities is an important matter as they not only weaken the weld but also clog the welding torch. This welding of the rails imparts to the joint the requisite amount of rigidity to resist flexure stresses. No part of the rail is shunted by the bonds so that the current distribution is practically as uniform throughout the joint as in the solid rail. This adds materially to the conductance and is accomplished with the use of a small weight of copper.



THIRD RAIL JOINT SHOWING DETAILS AND POSITION OF SPLICE BARS—WELDING AND SOLDERING OF JOINT ARE NOT SHOWN



SIDE VIEW AND CROSS-SECTION OF THIRD RAIL SPLICE AND BOND



BONDING OF NEW YORK MUNICIPAL RAILWAY CORPORATION THIRD RAIL NEAR CONEY ISLAND—SHOWING OPERATIONS OF GRINDING, WELDING AND SOLDERING

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The rail has a cross section equivalent to approximately 2,700,000 circ. mils of copper. The fact that the conductance of this joint is more than 100 per cent of the conductance of an equal length of continuous third rail and that this result is obtained by the use of only 5 lb. of copper are striking features of the new bond.

It is essential in this third-rail system that there be no projections below the base of the rail so that there shall be nothing at the joints to interfere with the movement of the rail on the insulators. This feature is of marked advantage in the erection of the rail, as the joints may occur at the insulators without any interference. Where the bonds project below the base of the rail, care is necessary in erecting the rail to have the insulators clear the bonds, and this necessitates cutting of the rail or relocating the insulators. The new joint keeps well within the limiting dimensions of the rail itself, and at the same time provides maximum conductance.

The joint has the advantage of being easily repaired with small portable equipments which are in the possession of the maintenance department. There is complete salvage of the copper bars and bolts in the case of failure of the solder or rail changes. If the welds break, the bars are sufficiently strong to hold the joint in place. If for any reason it is necessary to break the joint this can be done readily by using the oxy-acetylene cutting flame.

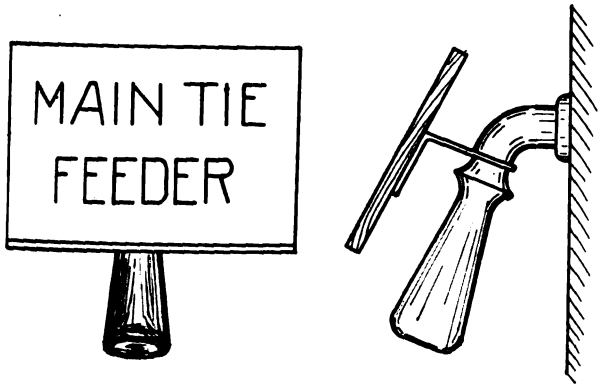
The soldered and bolted contact is an excellent one, and has been used with marked success on the B. R. T. system for over fifteen years for connecting jumpers and feeders to both the third and running rails.

Details of the new splice and bond and views of the bonding operations are shown in the accompanying illustrations.

Safety First at the Switchboard

BY G. B. TANIS

The accompanying illustration shows an exceedingly safe method of labeling a high-tension feeder which has been observed by the writer. Switches controlling feeders are usually designated by either names or numbers painted on the switchboard. With this method there is always a chance of an operator looking at the



NAME PLATE FOR REMOTE CONTROL HIGH-TENSION SWITCH HANDLES

wrong name or number sometimes causing the most dire consequences. The name plate shown here is attached to a remote control switch-handle, making it impossible to operate this circuit without seeing its name.

Another safety scheme is the numbering of the machine panels controlling the rotary converters. The rotaries are numbered consecutively and the corresponding numbers painted on the machine panels in large figures on a white circular background 5 in. in diameter. These methods are by no means too precautionary to keep operators from accidentally operating the wrong switch.

Standard Weights for Electric Cars

Operating Companies Should Consider Standards for Different Classes of Service

BY W. J. CLARDY

Engineer, Westinghouse Electric & Manufacturing Company

The possibility of establishing standard weights for electric cars in city, suburban and interurban service is something to be considered seriously, because there can be no doubt that such a move would represent a distinct advance in electric traction. Probably it lies with the operators to make the first move toward establishing standard cars, since it has always been the aim of railway men to work for standardization. Considerable initiative has been shown on their part to make such a move, but the work has been done individually rather than collectively, and each manager seems to desire to keep his local standards.

At present practically every electric railway has a different type of car, and is either indifferent to the question of standards or prefers to maintain its own. If a manager is asked why he does not accept some improvement developed by another company, he usually states that it is not suitable for his local conditions. In some instances when a railway company adheres to a certain type car, it may be that the ideas of only one man are entirely responsible for such practice. Fads and personal likes or dislikes have proved to be expensive, and so long as railway men continue to be influenced by them the price of rolling stock will be high and any effort to obtain standardization of cars will not be successful.

However, some electric railways are beginning to realize that it is to their advantage to accept designs of other companies. Recently a large number of low-floor center-door cars of very similar construction have been put in operation in different sections of the country for city and combined city and suburban service. These cars represent one of the latest designs, and show a remarkable reduction in weight below those which were common a few years ago. They have proved to be entirely successful under widely different service conditions, and there seems to be no definite reason why cars generally similar to this type should not be made an established standard for this class of service. Interurban cars necessarily differ considerably from city cars, but it should be possible to establish standards for them, with one general type serving for average conditions and a second type for conditions approaching steam railroad service.

Standardization of car types and weights would result in quite a number of economies and advantages to the operator, car builder and electrical manufacturer. If only a few types of cars were built and the weights of each type were fixed within comparatively narrow limits, car building would be put on a more efficient basis and there would no doubt be a reduction in the cost of manufacturing cars. Car builders could work together and standardize the details of car designs, for such matters as side post spacing, roof contour and the like are not of vital importance to any one car.

It is likely that some operators might desire to adhere to special designs, but since the car builders would be in a position to offer a standard car at a lower price, it is almost certain that operators eventually would cast aside any prejudices they might have. Standard cars could be built on comparatively short notice from stock

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parts, and thus railway companies would be able to secure them in much less time than is required to build cars to conform to special designs.

The electrical manufacturer, especially, would welcome the establishment of standard-weight cars. This would put an end to the expense required to design and build electrical equipments for the numerous special designs. Specialization on a few standards would enable motors and electrical equipment to be manufactured with greater efficiency, and without doubt this would reduce the cost of their production.

That it is entirely practicable to establish standard cars is shown by what the steam railways and the Pullman Company have done. Electric railways can do likewise, and though their standards would have to be more flexible they could take care of all classes of service with about five standard cars. It is obvious that no exact figures can be taken for car weights, but standards could still require the weight of a car for certain service to be within reasonable fixed limits.

In general, there are three classes of electric railway service, namely, city, suburban and interurban. In many cases the same cars that are used in the city are also operated through suburban sections, so these two classes may be considered together. For such service a classification of car weights would include three types, as follows: First, 5 tons to 8 tons; second, 9 tons to 13 tons, and third, 14 tons to 19 tons. The lighter cars would, of course, be single-truck, while the heavier double-truck cars could be similar to the new low-floor, center-door designs, which represent the latest successful developments where weight has been reduced to a minimum.

For the average interurban service there would be a fourth class with weight between 20 tons and 28 tons. Many interurban cars are now considerably larger and heavier than necessary, and by giving particular attention to design the weight could be kept within the limits indicated. The fifth type of car would weigh from 38 tons to 45 tons, and this would be applicable to high-speed service where traffic demands accommodations and service equal to or better than those given by competing steam lines.

With cars of such standard weights the question of motor equipment would be greatly simplified. Conditions as they are at present force electrical manufacturers to build a multiplicity of motors, which vary more or less in design and size, and this means that it is necessary to have an excessive variety of motors in order to meet demands of the trade. If car weights were standardized according to the five classes given the different cars could be handled by only five types of motors. The sizes required would be 25 hp., 40 hp., 50 hp., 65 hp. and 120 hp., at 600 volts, and these equipments could be operated under the most severe conditions likely to be found anywhere in this country.

The following tabulation indicates the classes and weights for cars and suitable motor equipments for each class:

Class	Weight, Tons	Double Equipment	Quadruple Equipment
A	5—8	25 hp.	.....
B	9—13	40 hp.	25 hp.
C	14—19	50 hp.	40 hp.
D	20—28	120 hp.	65 hp.
E	38—45	.....	120 hp.

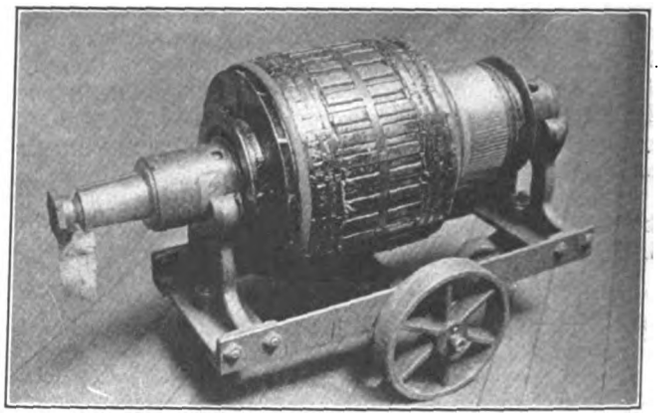
Doubtless in the future, railway men will take fuller advantage of what is being done by others and will confine themselves less to their own ideas, thus accomplishing more toward standardization. The railway companies will, unquestionably, reap the greatest benefit from the establishment of standard cars, and they should work together and combine their forces to encourage such a movement. The successful operation of light-weight, center-door cars in New York, Brooklyn, Pittsburgh, Denver, Cleveland and other cities serves as a guide to railway men when purchasing new equipments, and provides a basis for making an initial move toward standard equipment, because all of these cars have shown remarkable savings in operating expense.

Fan Ventilation of Old-Type Motors

Simple Device Lowers Temperature 10 Per Cent on Old Motors Used on Heavy Grades

BY F. P. MAIZE
Master Mechanic Portland Railway, Light & Power Company, Portland, Ore.

The illustration herewith shows a ventilating fan attached to a GE-58 armature. This fan is composed of a plate of No. 22 gage sheet steel, 14 in. in diameter with a 8¼-in. hole, riveted to the back head of the armature with twelve vanes ¼ in. thick, 2⅞ in long, with an axial width 9/32 in. at the bottom and 7/32 in. at the top. The inside corner has a 5/16 in. fillet. The air is taken from the inside of the shield and from the



VENTILATING FAN EQUIPMENT ON OLD ARMATURE

clearance between the armature and the frame, and is thrown over the top of the armature, coming out of either the commutator well or the inspection hole on the commutator end of the motor. Tests made on motors with commutator covers on showed a considerable suction of air around the pinion bearing end. The air was discharged through the commutator end handhole with the armature making 500 r.p.m.

Armatures were placed in motors on a car weighing 39,460 lb., equipped with magnetic brakes and running on the hardest service grades up to 10 per cent. A test was made after the car had been in service from 5.38 a. m. to 9.03 p. m. The first motor on No. 1 circuit, not equipped with the fan but with both handhole plate and commutator cover removed, showed a temperature of 100 deg. C. on top of the armature. The first motor on No. 2 circuit equipped with a fan with both handhole plate and commutator covers removed, showed a temperature of 90 deg. C. on top of the armature, the fan lowering the temperature on the motors 10 deg. Other tests showed that in all cases the temperature was lowered.

The Long Island Railroad has been ordered by the Public Service Commission for the First District of New York, to install immediately a non-automatic emergency lighting system in its passenger cars operated on the Atlantic Avenue division from Flatbush Avenue, Brooklyn, to Jamaica. The lights must have at least 8 cp. each, and three lights are to be installed in each car.

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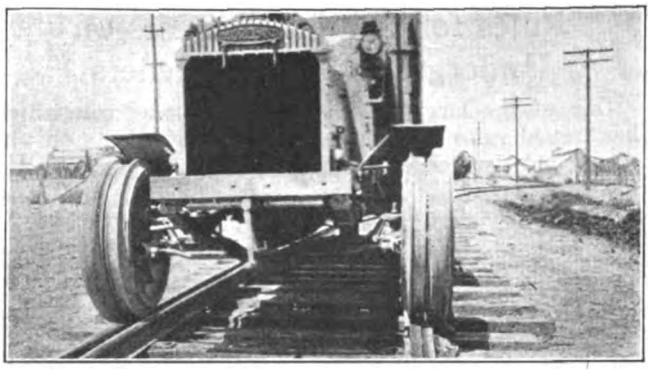
AUTO TRUCK USED ON HOLTON INTERURBAN RAILWAY IN COMMON ROAD OPERATION



AUTO TRUCK AS OPERATED ON RAILS BY HOLTON INTERURBAN RAILWAY

Change of Wheels Adapts Automobile for Railway Use

Touring Cars and Auto Trucks Equipped with Flanged Wheels Promise Success on California Railways in Combating the Jitney

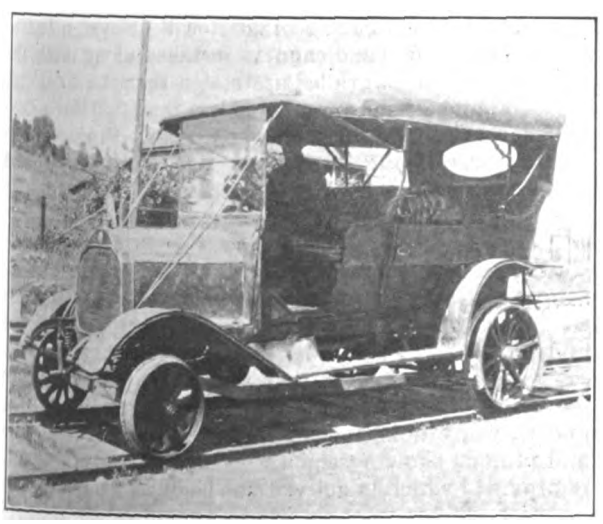
Automobiles adapted for operation on steel rails have long been in use in the West for emergencies and official inspection service, particularly on steam roads. Several California railroads and electric railways, in casting about for some means of effectively meeting jitney competition, seized upon this idea, fitted automobiles with special wheels and are now operating them over the company's tracks in passenger service. Interest therefore attaches to the cost of operating such vehicles and the mechanical changes which are necessary in converting the ordinary automobile.

The Amador Central Railroad, a steam line in northern California, has been using a 1909 model Studebaker-Garford car in passenger service for about a year. This car makes a daily round trip between the two principal cities on the company's system. The rear wheels of the car are the original rims on which were shrunk tires from a Shay engine that had first been turned down to a suitable thickness. The front wheels and axle were taken from a Buda push car.

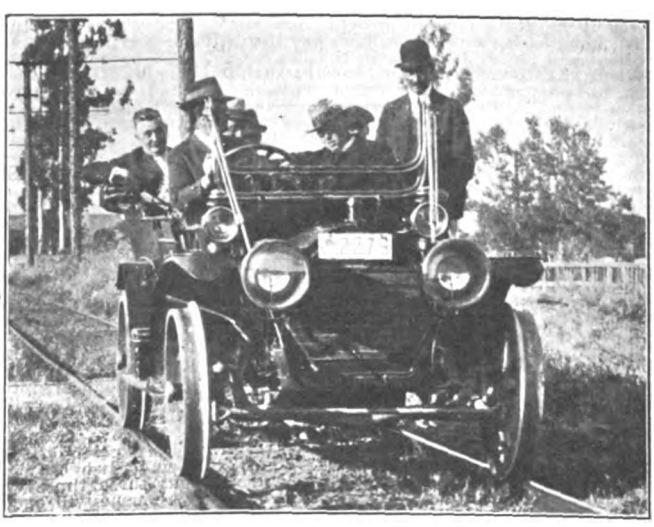
When this car was first put in service there was considerable difficulty with the ball bearings in the hubs of the rear wheels as they frequently broke. After some study it was decided to take out the differential and put in a solid axle which the master gear could directly engage. This necessitated the use of a sub-frame to which the journal boxes were riveted, and in making this readjustment the rear wheels were fixed firmly to the axle. Since these changes were made the operation of the car is reported as entirely satisfactory.

More recently experiments have been made by F. E. Chapin, general manager of the Peninsular Railway Company, who attached a set of steel flanged rims to an automobile in such a way that they could be changed back to regular automobile wheels in thirty minutes. The experimental car so equipped is reported to have made its first round trip to Alum Rock Park, 8 miles from San José, on 1½ pints of gasoline and 1 pint of oil.

On the Holton Interurban Railway in southern California an automobile equipped with steel-tired wheels has been in use for several years. It was believed, however, that no vehicle limited to operation on rails could adequately compete with jitneys and motor trucks. W. F. Holt, president and general manager of the company, pointed out that the urgent need was for a vehicle that could pick up passengers or freight at any point about town, get onto the company's track at the nearest point, and after arriving at the next town leave passengers or freight at any point in the town. To accomplish this he developed the wheels shown in the accompanying illustrations, which are designed for running on both railroad tracks and highways without any change. An earlier type of wheel designed by Mr. Holt for this purpose was described in the ELECTRIC RAILWAY JOURNAL of May 27, page 1007. Although there has not yet been time for trying out these wheels very fully under service conditions, the officials of the road state that thus far they have been able to do successfully the work for which they are designed.



AUTOMOBILE USED ON AMADOR CENTRAL RAILROAD—SHOWING SUBFRAME AND TYPES OF WHEELS USED



TRACK AUTOMOBILE WITH STEEL FLANGE-RIMMED WHEELS OPERATED BY PENINSULAR RAILWAY

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Rules for Insulation Tests on Underground D.C. Feeders

One of the large Eastern street railway companies has issued rules for conducting insulation tests on underground d.c. feeders as follows:

1. The underground d.c. feeder cable tests will be made by the power and substation foreman or operator under the direction of the line department.
2. In making insulation tests of d.c. underground feeder cables where several cables from one station terminate in the same switchbox, a pilot or signal feeder will be used to signal the man stationed at the switchbox that the station foreman or operator is ready to test certain feeder cables in accordance with a schedule to be furnished him by a representative of the line department.
3. Upon arriving at the station the line department representative will deliver to the station foreman or operator a schedule showing the feeders to be tested, and this schedule will give the pilot feeder of each group and the order in which the test is to be conducted.
4. The line department representative will then call the chief operator and notify him that he desires to test the underground cables from that station. The chief operator having received a schedule showing the manner in which tests are to be conducted

Electrical Department
TEST OF UNDERGROUND FEEDERS

Station 191

Cable Number	RUNNING TO	VOLTS	Cable Number	RUNNING TO	VOLTS
1			36		
2			37		
3			38		
4			39		
32			67		
33			68		
34			69		
35			70		

Remarks:

Voltmeter No. . . . . Tested by . . . . .
" Resistance . . . . . ohms. . . . . Station
Station Voltage . . . . . .
Weather past 24 hours . . . . . Line Dept.

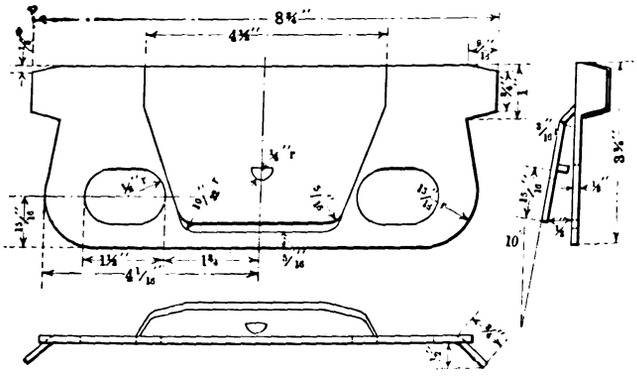
FORM FOR RECORDING UNDERGROUND TENDER TESTS

after having checked the date of issue of the schedule will, if conditions are normal, instruct the station foreman or operator to proceed with the tests in accordance with the schedule.

5. Before proceeding with the test the station foreman or operator should notify the chief operator and receive his permission to proceed with the test as shown in the schedule furnished by the line department representative.
6. After permission to conduct the test has been granted by the chief operator the line department representative will go to the first location on the list and proceed according to the rules as stated below in paragraph 9.
7. As soon as the line department representative leaves the station for the first switchbox, the station foreman or operator will open the breaker on the pilot feeder, then open the switch and hang a test cluster or circuit (one end of the test cluster or circuit being connected to the ground) on to the switch blade. When the lamps go out it will be the signal that the line department representative has opened the switch in the box at which the cable terminates. The station foreman or operator will then remove the lamp cluster or test circuit and test the pilot feeder with the portable voltmeter, the positive lead from the meter being connected to the positive 550-600-volt station bus, and the negative lead of the voltmeter connected to the switch blade of the feeder to be tested. After making the voltmeter test on the pilot feeder the station operator will open the second switch on the list, hanging the cluster on it. He will then close the pilot switch, which will signal the man in the box to open the second switch. When the foreman or operator sees the lamps on the second switch go dead he will test it with the voltmeter. The third switch on the list is opened next. He will then open the pilot switch three times, leaving it closed after signaling. When the second switch becomes alive, he will pick up the load on it. After the third switch goes dead, voltmeter test is made. He will open the fourth switch on the list and will then signal for the third switch to be picked up at the switchbox, etc. After the last switch is tested he will open the pilot switch six times. Before closing it the last time, he will wait until the switch becomes alive before finally closing it. In all cases except single-fed feeders the station operator will wait until the feeder is made alive before picking it up. Single-fed feeder switches should be closed immediately after making the voltmeter test.
8. After all feeders in one group have been tested the station foreman or operator will immediately open the pilot switch for the test of the next group of feeders.
9. The line department representative at the switchbox before opening up the pilot switch will hang a lamp cluster on the knife of the switch, the other end of the cluster being connected to ground. He will pull the switch and if lamps go dead he will lift the lead to give the man in the station a chance to test it. He will tap the knife of the switch at intervals of five seconds. When the lamps light he will hang the lead of the cluster on the knife of the switch, leaving the pilot switch open. Then he will pull the second switch. After the lamps go out three times on the pilot switch he will close the second switch, then he will open the third switch on list, etc. After the last switch in the box has been tested and the lamp circuit is opened up six times, he will close the last switch. The pilot switch will then be closed.
10. Before leaving the switchbox the line department representative will check the switches in this box to see that all of the switches which he has opened have been closed again. He will then go to the next switchbox on the list and proceed immediately with the test of the second group.
11. Under no conditions will single-fed feeder switches either in the station or in the switchbox be left open for more than one minute.
12. Any exceptions to the general method of testing as outlined in paragraphs 7 and 8 will be noted on the individual station sheets issued before the test by the line department.
13. Should there be any mix-up in signaling due to station trouble or any other cause, the man at the switchbox will close all switches and return immediately to the station. At the station the foreman or operator will close all switches and wait until the line department representative returns to the station.
14. After the test on a group of feeders has been completed the operator will note the ammeters on the feeders, and in case the ammeter on any feeder indicates no load the foreman or operator will open the breaker and the switch on this feeder and test with the bank of lamps to make sure that the switch on the other end of the feeder is closed. In case of single-fed feeders, if the ammeter indicates no load, the ammeter should be watched for one minute, and if the ammeter still continues to read zero the chief operator should be notified at once. Also in case any switch is found open or in case of any abnormal conditions the same should be reported to the chief operator at once.
15. After testing all cables in accordance with the schedule, the line department representative will return to the station, receive the print from the foreman, and will return it with his copy to the line department. The station foreman or operator should notify the line department representative of all leaks on cables, and if there are any cables that need immediate attention, the line department representative should in turn notify his superintendent. Before leaving the station the line department representative shall notify the chief operator that the tests have been completed and that conditions are the same as before the tests were made, which also should be verified by the foreman or operator of the station.
16. A record of these tests shall be made on a form and sent to the superintendent of the line department.

Inexpensive Anti-Theft Bond Shield

A sheet steel bond shield is being used on the lines of the Illinois Traction System to prevent the theft of exposed rail bonds. The accompanying drawing shows the design and dimensions of this shield which the engineers of the road have made at a cost of 12½ cents



DESIGN OF BOND SHIELD WHICH IS USED ON ILLINOIS TRACTION SYSTEM

each. These shields are held in place by two track bolts and they are used on outside bonds in territory where trouble has been experienced on account of stolen bonds. The shield is designed so that it will fit over a brazed or a gas-welded bond, and is installed along with the regular bonding work. It is stated that the total cost for bond and shield complete is less than that for a concealed bond placed under the splice bar. Practically all of the bonds being applied are the rail-head type and this shield is reported to render them practically safe from theft.

The mechanical department of the Springfield Consolidated Railway Company, Springfield, Ill., has found that it is of extreme importance to mate worn gears and pinions when it is necessary to replace armatures. Experience has shown that where the pinion is worn more than the gear, the life of both is greatly reduced, and they are noisy. To obviate these difficulties gears and pinions showing equal wear are mated, or a pinion is provided which is not worn as badly as the gear. This practice applies to cases where armatures are repaired without removing the pinions, or where the pinions are pressed on the armature shafts immediately following repairs.

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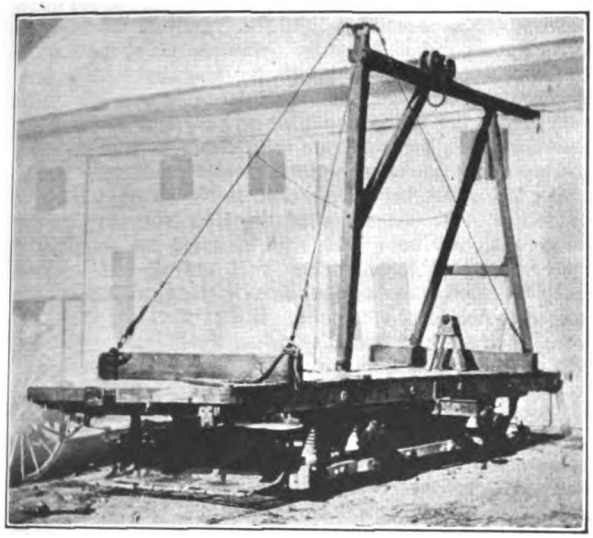
A Home-Made Derrick Car Makes Good in Yard and Shop Work

In the Sacramento, Cal., shops of the Pacific Gas & Electric Company's railway department it was found desirable to construct from scrap material a small derrick car which could handle the heavy loads that it was occasionally necessary to move around the shops, more particularly old wheels and heavier scrap material.

The car shown in the accompanying illustration was



PRACTICAL DERRICK CAR FOR YARD AND SHOP USE

therefore built up and has proved to be a great labor saver. The picture does not show the differential block which is supported from the loop under the trolley that operates on the boom. The A-frame supporting the boom is used only for very heavy weights that would threaten the strength of the rig if operated as a cantilever. The mast is pivoted at top and bottom to give free play in swinging the boom from side to side.

The Sacramento railway department of the Pacific Gas & Electric Company is operated under the supervision of N. J. Hullin. G. C. Snider is master mechanic.

Coal Rate Controversy Up to I.C.C.

The Kansas City (Mo.) Railways and other large users of steam coal in Kansas City are urging the Interstate Commerce Commission to disregard protests against a low rate for coal recently filed by the Chicago & Alton Railroad effective on Aug. 22 between Springfield, Ill., and Kansas City. The rate is $1.25, against the former rate of $1.90, and against 75 cents from the Kansas field and 60 cents from the Missouri mines. The granting of this rate would allow of the Illinois steam coal being sold considerably below Kansas and Missouri coal at the mines, to be landed in Kansas City at attractive prices to the users. Nearly all the largest industrial companies have signed a petition to the commission, asking for the retention of the rate, and urging that Missouri operators have not in the past taken advantage of their proximity to Kansas City to supply the steam coal desired. They say, too, that Kansas operators have had contracts under which they could supply any kind of coal they had available, and when steam coal was lacking the industrial users have had to buy other coal at high prices to keep going. Kansas City has had a perilous experience the past winter and spring, when strikes, shutdowns due to storms, car shortage and other causes have resulted in sharp stringency in coal supplies, and lump and Arkansas anthracite slack had to be purchased to make steam.

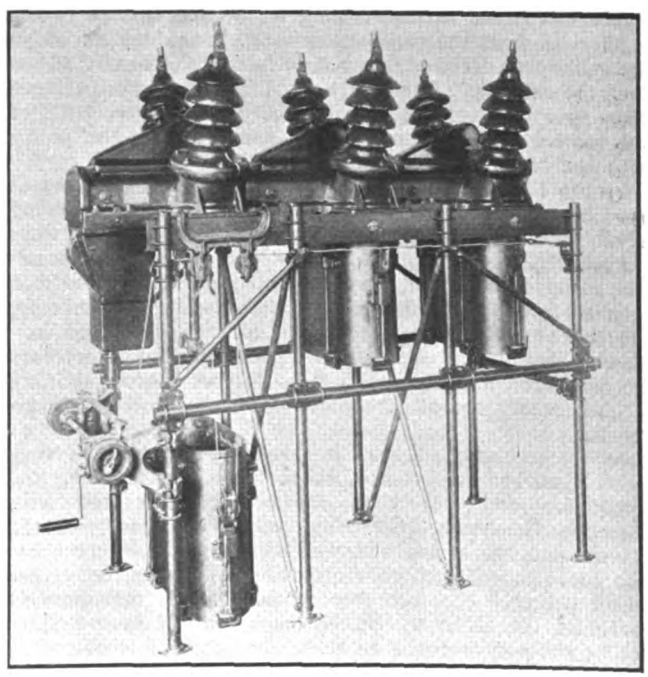
Large Capacity Tank Type Circuit Breakers

The illustration herewith is of a 22,000 volt, 300-amp. oil circuit breaker which has recently been put on the market by the General Electric Company, Schenectady, N. Y.

The main changes that have been made recently in tank type oil circuit breakers have been introduced to make the circuit breakers more accessible for inspection and repairs. The tank lifter, which was noted in the Aug. 5 issue of the ELECTRIC RAILWAY JOURNAL, consists of a detachable frame with shaft, handles, worm gear and winding and unwinding drums. This device is readily detached and can be moved by one man from one switch to another, thus making it a very simple operation to lower or raise an oil tank, and also making it easy to align, inspect oil and contacts and replace contacts if necessary.

The oil circuit breaker shown is of the outdoor type. It differs from the indoor type in the addition of a few parts to render it mechanically and electrically serviceable under all weather conditions. The operating mechanism and bushings are secured to the cast-iron cover of the heavy sheet steel tank. Each bushing extends through the switch cover into the oil and is so clamped to the cover that the throwing of oil is impossible. These bushings are so constructed as to be easily removable and interchangeable.

There are two fixed contacts in each switch element between which one phase of the circuit is made and



OIL CIRCUIT BREAKER MOUNTED ON PIPE FRAMEWORK WITH TANK LIFTER

broken by a horizontal contact blade. Each contact blade is connected to the operating mechanism by a specially tested hard wooden rod, which passes through the cover of the switch in an insulated bushing. The stationary contacts consist of widely flared fingers and long arcing tips of drop-forged copper, secured to the contact block by flat steel springs, copper laminations and screws. This breaker can be closed by hand, solenoid or air.

When they are solenoid or air operated, the breaker may be located where desired and controlled from the switchboard or other convenient place by a pull control switch or air valve.

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NEWS OF ELECTRIC RAILWAYS

300 PHILADELPHIA MEN STRIKE

Places of Disturbing Element Quickly Filled—Full Service Continued Without Interruption

On Aug. 7 approximately 300 men of the Philadelphia (Pa.) Rapid Transit Company holding regular runs signified that they were not satisfied with the conditions of employment by going out on strike. The other 5900 conductors and motormen refused to leave the service of the company, thereby expressing their satisfaction with the so-called co-operative plan under which they participate in the increased earnings of the company by corresponding increase in their wages, and in addition have direct representation through their own accredited representatives selected by secret ballot.

As is generally known, the management of the company is working with its motormen and conductors under the terms of the co-operative plan, by which wages have been increased 35 per cent during the last five years and working conditions improved to the limit consistent with affording adequate service to the public. Approximately 6200 conductors and motormen are employed, of which number about 5000 have regular runs with pay ranging from $18 to $26 a week. The remaining 1200 are "extra" men who are guaranteed a minimum wage of $12 a week, but who on occasion earn as high as $20 a week and are eligible for regular runs as vacancies occur.

The company has had no difficulty at any time since the strike was called in maintaining its normal service to the public. In fact, the earnings on Aug. 7, the day on which the strike was declared, showed an increase of nearly $6,000 over the earnings of the corresponding day of the previous year, thus conclusively showing the public appreciation of the service rendered and lack of sympathy by the public with the cause of the strike.

Of the 1200 extra men in the employ of the company at the time the strike was called, 300 have benefited by being advanced to the regular runs vacated by the men who went out on strike. The places of the 300 extra men so advanced have been filled by competent and experienced men selected from the numerous applicants desirous of entering the service. The company's force of motormen and conductors is full and complete and the strike may therefore be considered a closed incident so far as the maintaining of satisfactory operating conditions on all the lines is concerned.

At the incoming of the Stotesbury management a very much disturbed condition of labor was evident among the conductors and motormen. Strikes had occurred with alarming frequency, destroying both the efficiency of the service and the peace and well-being of the community. The men responsible for the agitation provoking the strikes which preceded the incoming of the present management continued thereafter to show a disposition of fault finding and stirring up unrest. In fact, they made themselves so obnoxious as to bring forth repeated requests from those men who were satisfied with conditions that these dissatisfied men be dismissed for the good of the service. The management, however, persevered in its efforts to convert these men by fair treatment and increased wages, but without avail. These dissatisfied men have now by their own voluntary act in going on strike eliminated themselves.

The management of the company felt that it had borne with these dissatisfied men during the past five years beyond a point of reasonable forbearance and that it would not be just or fair to the owners of the property or to the public if it permitted this nucleus of discontent and strike disorder to re-enter its system. The officers of the company, therefore, after careful consideration, determined not to permit the dissatisfied men to re-enter the service and concluded that their jobs should be retained by those who were so well satisfied to receive them.

MR. LILIENTHAL REWARDED

His Liberal Policy Toward Employees Accepted as Reason for Failure to Stampede a Strike

The work of Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., in behalf of the employees of that company is familiar to the readers of the ELECTRIC RAILWAY JOURNAL through the articles that have appeared dealing with his activities in instituting pensions for the men, arranging plans under which they may own their own homes, releasing them from the machinations of the money lenders and otherwise bettering their conditions. In February, 1915, Mr. Lilienthal, then in New York, told for the first time in an interview in the New York *Evening Post* the conditions under which he accepted the presidency of the company. He said then that the offer of the presidency tempted him because he saw the possibilities of running a public service corporation that would stand as a pattern. He accepted the position on condition that he was to have, without any question, a free hand in the management and operation of the corporation. The interview was republished substantially in full in the ELECTRIC RAILWAY JOURNAL of Feb. 20, 1915, page 398. Mr. Lilienthal justly feels that the policies which he instituted have paid, and paid well, in increased loyalty and efficiency among the men, and in substantiation of this has written a letter to the editor of the *Post* citing the attitude of his men in the recent attempt to stampede them into a strike noted in the ELECTRIC RAILWAY JOURNAL of July 29, page 203. In his communication to the editor of the *Post* Mr. Lilienthal said:

"Recently an effort was made by outside agitators to induce the men to form a union, and to strike. At an appointed time the agitators, assisted by employees of the municipal lines and by members of the union of carmen operating across the bay, endeavored to stampede our men. Municipal cars were thrown across our own rails, temporarily blockading traffic, and for nearly an hour everything was in confusion, but our employees stood by their cars to a man. It was a unique example of loyalty to an employer and appreciation of considerate treatment, and one that has been so characterized in all directions throughout the community.

"That this is a correct interpretation of the outcome of the fracas is confirmed by the fact that, when it was announced in the press that at the appointed time 90 per cent of our men would quit, representatives of our employees asked permission to hold a mass meeting at which they would be able to make it plain to the public how unfounded this contention was. I deemed it advisable to disapprove the holding of such a meeting, because I feared that it would be said that it had been inspired by the company itself. The men then signed a memorial addressed to me which is almost monumental in the history of labor disputes, in which they declared that they were absolutely satisfied with the conditions of their employment, that they did not need a union, and would not have one.

"This was followed up by a call from a committee of employees, who earnestly requested that this memorial be given publicity in justice to the men themselves. Under these circumstances I deemed it my duty to advertise this address, and the sincerity of its words was amply vindicated by what transpired when the stampede was attempted.

"I should be glad to have this communication or the substance of it published in the *Evening Post*, because of the evidence which it affords that the conventional labor union organization is not essential to the welfare of employees, and perhaps not the best form of securing it.

"As already stated, the things that we have been doing for our men have been done without any organization of the men, and, therefore, under no compulsion whatever."

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In the *United Railroads' Magazine* for August Mr. Lilienthal said:

"At about 9 o'clock of the evening of July 14, the day on which Mooney and his wife, assisted by employees of the municipal lines and members of the Oakland carmen's union, attempted by threats and by the actual show of force to stampede our platform men into abandoning their cars, I received this telephone message from the office of one of our prominent daily newspapers:

"'We are sitting around the table here wondering if you realize what a demonstration of loyalty to the company and appreciation of considerate treatment this stand of your men represents.'

"I told them that I did realize what it meant, but was glad to see that others interpreted it in the same way. Since then I have been assured by dozens of people that nothing of the kind had ever occurred in San Francisco before, and that it marked the beginning of a new era for the city—an era of good-will and sympathetic co-operation. In this time of strikes and disorder, dynamiting and other violence, the incident stands out with special prominence and significance.

"I do not believe that the attempt to pull off our men failed because the men believed that the company had taken such precautions as would make the walkout unsuccessful. On the contrary, I believe that the men meant just what they said in their memorial to me—that they were satisfied with existing conditions; that they did not need a union; that they did not want one, because they were better off without any.

"No man with any heart in him could fail to respond to such a pledge of loyalty. The presidency of this company, during the three years that I have filled the office, has not been any bed of roses, because the company has been beset by one trouble after another. But I felt on that night of July 14 that I had been repaid for everything. Not alone that, but that to the extent of our ability the conduct of the men deserved some recognition and reward.

"We are now engaged in reorganizing the financial affairs of the company. One of the things that I hope for, if such reorganization should succeed, is still further improvement of the treatment of our employees, and that a way may be found to allow them to participate, as they should, in any improvement in the earnings of the company. You may be assured that that hope is as near to my heart as it can be to your own.

"And once again, I thank all of you who stood by the company for your loyalty and courage."

CONTROVERSY OVER BRIDGE APPROACHES

A three-cornered controversy has developed at Cleveland, Ohio, which may delay the completion of the subway approaches to the new bridge across the Cuyahoga River, connecting Superior Avenue and Detroit Street. Both the County Commissioners and the city officials refuse to pay the expense of relocating the tracks of the Cleveland Railway in order to begin construction, and J. J. Stanley, president of the company, says that it would be impossible for the company to stand the expense under the Tayler grant. Street Railway Commissioner Sanders is opposed to the company assuming the expense, because it would endanger the 3-cent fare. The cost is estimated at $168,000.

Mr. Stanley declared that it was up to the county to lay the tracks in the subway and across the bridge. Assistant Prosecuting Attorney Green said that if the county was forced to lay the tracks the company would be charged a rental for the use of the subways and the bridge. He said, however, that the county was under no obligation to pay for relocating the tracks. It is claimed the city agreed to see that all obstacles in the way should be removed at the expense of the owner or at least to release the county from any obligation.

Following the payment of taxes on the valuations made by the State Tax Commission recently, that body has announced the addition of $2,744,620 to the tax valuation of the Cleveland Railway's property, making the total $27,219,970. Henry J. Davies, secretary of the company, and T. P. Kilfoyle, auditor, went to Columbus on Aug. 3 and again requested the commission to explain its methods of arriving at the valuation of the property, but as usual they did not get the information. The company resisted the payment on the basis fixed by the commission for the last three years, but was defeated in the lower courts. As the company preferred to pay the amount instead of carrying the suits to the Supreme Court, it recently forwarded a check for the net amount, which was accepted.

A PLEA FOR THE PUBLIC UTILITY CORPORATION

The La Grande, Ore., *Evening Observer* contained recently the following excellent editorial presentation of the case of the public service corporation:

"Someone has very truthfully said, 'time works wonderful changes.'

"Not long ago to be at the head of a public service corporation was an ace-high position; it was a position that elevated one in the public mind; made the man holding that position a ruler, a dictator, a community guide post, to a large extent. But that was in the days when it was considered a high honor to ride on a railroad pass.

"Now, how is it? The head of the public service corporation is a servant in every sense of the term. He is straining every nerve to please his patrons. 'No public be d——d' with him. Some of his predecessors might have been sufficiently entrenched to utter such a remark, but not the corporation man of to-day. He gets up in the morning feeling his hold slipping. Many times it is through wilful misrepresentations by the demagogue who wants to build his own popularity by tearing down others with untruths. He goes to lunch with a troubled look fearing that his position to a committee of patrons has been misunderstood. He trudges home to his family at night time feeling that he has done the best he could on all problems during the day, and still there is a lurking feeling that unjustifiable clouds hang over his administration.

"We are speaking now of the square, manly men who are directing honest corporations and not the guilty 'slip-one-over on the public' kind, of which there are some still in existence.

"Who is to blame for this condition?

"No, not the public—not the consumer.

"Not the honest corporation, nor the honest man who directs the honest corporation.

"It is first of all, the selfish politician and selfish agitator who points to crooked work on the part of some particularly dishonest corporation and then classes all public utilities with the dishonest one. The public finds upon investigation of the dishonest corporation that the charges of the agitator are true and without further investigation places everything under corporate seal in the same class. The fireworks start, the howl grows louder and finally public opinion gets in its work and honest investment is shattered. Earnings are decreased, damage suits of every description follow. And this is why the head that directs the public utility corporation of to-day rests uneasy.

"Very recently we received a letter from a good friend who is a man among men; who directs an honest corporation. And in that letter he said, 'Being a public utility man nowadays is very much like being a prize fighter placed in the ring with both hands and feet tied, and called upon to meet all comers with the principal rules of the game being that no restrictions be placed upon the character of the attack, but the hog-tied defender must fight according to schedule made for him by others.' He is right to a very great extent.

"The only thing for the corporations of Oregon to do is to join with the honest people who are not seeking office, nor trying to run party organizations and make a clean cut, open-handed fight against the selfish politician, the blatant demagogue. Take the public into confidence and defy the traducers to produce proof of the inflammatory statements made against all public service corporations, forcing them to specify just which one they mean.

"We believe the people are fair, and when once the situation is correctly understood capital will be perfectly safe in Oregon and permitted to earn a proper return on the investment.

"There never will be an improvement until the agitator is squelched and the corporations openly appeal to the public for the fair play that is due them."

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FIRST-AID KITS FOR BOSTON EMPLOYEES

The Boston (Mass.) Elevated Railway on Aug. 7 began the distribution of first-aid kits to each of its employees. More than 10,000 of the kits are to be distributed. The kits contain a small rolled bandage and tube of ointment and a bottle of alcohol-iodine solution inclosed in a box small enough to be carried in a pocket and provided with a hanger by means of which it may be hung upon a wall. Inside of the cover are printed instructions for the use of the materials in connection with minor injuries. The distribution of these first-aid kits is made in connection with the safety and welfare work of the company. Many serious and sometimes fatal accidents originate in trifling cuts, scratches and other injuries that would not be serious or even troublesome if properly treated at the time of the occurrence. The kit places in the hands of employees the facilities for taking care of such minor injuries and giving first-aid treatment until a physician may be called when more serious injuries occur. A circular signed by Russell A. Sears, general attorney, accompanies each outfit. This circular is concluded as follows:

"We have a two-fold duty: first, for our own sakes and for the sakes of our families not to get hurt ourselves, and, secondly, not to hurt others through our thoughtlessness or carelessness.

"The first: We are operating a great railway and there are 9000 of us trying to do it with *credit* to ourselves. We must necessarily at times be in places of some danger—that goes with almost every occupation. When we are at work or at home or on the streets we must *look after ourselves*, and in all places use common sense and keep from being injured. In the carhouses, the shops, the power houses, in track and wire work, and in the offices we should be at first thoughtful and careful about being injured, and by making it a point to do this continuously we soon get the safety habit—one of the *best* habits a man can have.

"The second: And while we are operating this great railway we have not only ourselves to look after, but thousands, yes, millions, of others who are passengers on our cars, pedestrians, people riding or driving in vehicles and our fellow employees. Others are apt to be more careless than we; at least all do not have the advantages of safety committees and safety instruction, so we are often called upon to do more than our share. Selfish, careless or ignorant drivers of vehicles may act the hog on the street and cause us to be irritated, and right here is the situation when the capable motorman proves himself the gentleman and a man worthy of his responsibilities; he can be the careful one. Thoughtless men and women attempt to leave or board the car before it comes to a stop. Here is the opportunity for the conductor to do a good turn—and he knows it is a good turn even if the other person doesn't. The careful man in the shop who sees a thing likely to cause injury to some of his fellows and who removes or guards that danger is living in the safety spirit.

"In the future when you receive any communications from the company concerning safety, remember there is a reason —and not a selfish reason—why all should be interested in the safety subject and each earnestly try to do his part.

"During the year just finished there were nine employees killed, 1814 employees injured who lost 18,864 days to date, not including the death cases.

"Use the safety devices. Take no chances."

WOMEN EMPLOYED IN POWER HOUSES ABROAD

Women are being used in the tramway department of the Glasgow Corporation, not only as drivers and conductors, but as assistants in the power station. Several months ago four women were employed to assist the electrical engineer in the power station and they are now in full charge of a substation, while four others are at work on the power station switchboard. Women are also being employed for cleaning the electrical switch-pillars in the streets. The Glasgow tramways department in addition employs about 100 women as drivers, and they have been found to be very keen and enthusiastic, standing up to the work after a very short time as coolly and confidently as the most experienced motormen. At present it is impossible to say whether the employment of women has affected the current consumption and repairs, but the general impression is that women are, if anything, more careful in their driving than the men.

Interesting and highly satisfactory statistics indicating the steady expansion of the Liverpool tramways service have been submitted to the tramways committee by C. W. Mallins, the general manager. Despite the prevailing war conditions, necessitating the withdrawal of thousands of men from the city, there were increases in every branch of the service. Taking the period from Jan. 1 to June 24, the statistics were very satisfactory. The passengers carried numbered 73,358,533, an increase of 2,334,862 over the same period last year. The receipts amounted to £341,787, as compared with £326,863, an increase of £14,923. In this period the number of miles run decreased to 6,113,547 from 6,166,817.

The Ashton Town Council has decided to promote a bill in the next session of Parliament to obtain powers to enable the corporation to acquire the tramways belonging to the Oldham, Ashton & Hyde Electric Tramway within the areas of Waterloo and Bardsley. It is not necessary to get powers to purchase the lines in the borough. By acquiring the line in Waterloo and Bardsley it will be possible to open out to Oldham. This will benefit both towns.

A reply has been received from the Edinburgh Tramways to the Edinburgh Town Council's demands for extensive improvements. The demands included the relaying of some 33 miles of track. The company's reply is understood to fall considerably short of the Town Council's requisition. The relaying of some 6 miles of track is all that the company is understood to have offered under this heading. It also expresses a willingness to effect repairs and improvements on other portions of the tramway lines referred to in the Council's communication. The communication is of interest chiefly in relation to the larger question of the determination of the company's tenure of the tramway system, and the arrangements for the new control. The company's reply is regarded by those intimately associated with the negotiations as affording small hope of progress toward an amicable and satisfactory agreement. It is likely that before the situation reaches a point of development where such an agreement is possible, the Town Council's powers under the lease may have to be brought home to the company by such effective means as are available under the contract. It is obvious that some arrangement, advantageous to both sides, might be made, under which regard would be had not only for obligations under existing documents, but for the transformation of the system, which is inevitable on the expiration of the lease on June 30, 1919.

NEWSPAPER PRAISES JOLIET SERVICE

An editorial which appeared in the Joliet (Ill.) *Herald* concerning the Chicago & Joliet Electric Railway follows in full:

"The Chicago & Joliet Electric Railway and its management are in need of attention. Corporations, especially those corporations engaged in the work of public service, are more or less the target for the ire of a populace. It's a relief to let loose a stream of criticism at something or somebody at intervals, and the public service corporations usually are the handiest.

"So it would appear to be with the street railway. During the last two years we find the Joliet company doing the following things which deserve the attention of the public: Operating a new class of cars that are clean, sanitary and comfortable. Maintaining a time schedule that is scrupulously exact. Laying better tracks and paving the intervening space in the street in the most approved fashion, giving the motorists some very badly needed strips of good pavement for driving. Attempting to operate (at a loss) one of the finest amusement parks in northern Illinois. Keeping up a standard of equipment and maintenance supremacy second to none in the country.

"For these, and many other things, the Chicago & Joliet Electric Railway is deserving of many thanks from Joliet. And Joliet must give these thanks either willingly or grudgingly. Why not give them willingly and give some little attention to the work this company is doing in Joliet to make the life of the street car patron more bearable and the pleasures of the motorists who must use car tracks for smooth riding more keen?"

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FULL SERVICE IN HARRISBURG

There has been little change in the strike situation in Harrisburg, Pa. Cars of the Harrisburg Railways are now running on nearly regular schedule, and few out-of-town men are being employed in their operation. J. J. Thorp of the Amalgamated Association claims that there are still 171 men on strike. At the onset of the strike 218 men quit work.

On Aug. 5 Patrick Gilday, chief of the Bureau of Mediation of the State Department of Labor and Industry, wrote letters to F. B. Musser, president of the railway, and to the strikers, urging mediation. On Aug. 7 Mayor Meals endeavored to get the opposing sides together. The following day Mr. Gilday met Mr. Musser, who informed him that the company "had no strike on" and that it had sufficient men working to operate all cars.

During the week both the company and the strikers caused paid advertisements to be printed in all Harrisburg dailies. The company pointed out that a few of its employees were trying to prevent the majority from earning a living and were causing the public much inconvenience and expense. The strikers urged people to use the jitneys, and also replied to statements made by the company. The State Federation of Labor ran paid advertisements declaring that the company's stock was watered and that action against the company would be taken before the Public Service Commission. No such action, however, has yet been started. One of the company's feature advertisements gave in detail the wages paid to the members of the strikers' committee, and pointed out how fair these wages were compared with those of other classes of workmen.

On Aug. 9 the situation remained unchanged. The cars are being well patronized, and indications are that little trouble will be experienced when the jitneys are taken off the streets.

The company declared on Aug. 8 that no men on strike after noon on Aug. 9 would be re-employed.

Mayor Meals has ordered the police to arrest all jitney operators who continue to operate after Aug. 10 without a license.

On Aug. 3 the labor leaders called on Governor Martin G. Brumbaugh and asked him to help adjust the differences. The Governor promised to use his influence to get the men and the company officials together for a conference.

The Valley Railways, Lemoyne, which operate in Cumberland County and run over certain tracks of the Harrisburg Railways in Harrisburg, announced on Aug. 3 an increase in wages of 2 cents an hour. The Amalgamated has been making efforts to unionize the employees of this line. The men, however, have agreed to deal with Superintendent Sensemen through a grievance committee. The company has agreed at all times to arbitrate grievances with this committee.

Loans to Kansas City Employees.—The Kansas City (Mo.) Railways has established a loan fund as part of its welfare department work, through which employees may borrow money without interest.

New Albany Employees Ask Increase in Pay.—Representatives of the employees of the Louisville & Southern Indiana, Louisville & Northern Railway & Lighting Company and the city railways of Jeffersonville and New Albany, Ind., have presented a petition to the company asking for an increase in pay averaging 5 cents an hour.

Increase in Wages on Maine Road.—The Rockland, Thomaston & Camden Street Railway, Rockland, Me., has granted another increase of wages. First-year men are to receive $1.90 a day instead of $1.80; second-year men are advanced from $2 to $2.10, and third-year men are advanced from $2.10 to $2.25. The raise was made voluntarily, as was the increase granted by the corporation last February.

Trenton Wage Agreement Signed.—The agreement between the New Jersey & Pennsylvania Traction Company, Trenton, N. J., and Local No. 564 of the Amalgamated Association has been signed after several conferences. The men asked for an increase in wages from 27 to 34 cents an hour and the company granted 29 cents. A few minor changes were made in the working conditions. The agreement runs for three years. The company issued a statement in which it praised the men for the manner in which they performed their duties, and stated that following a "check up" not a fare was found to be missing.

Survey Completed for Cincinnati Loop.—The survey made for the purpose of fixing the location of the line of the rapid transit loop at Cincinnati, Ohio, was completed on Aug. 2 and James A. Stewart, assistant engineer, in charge of the field work, reported to Frank S. Krug, chief engineer, that it varies only slightly from the preliminary survey which was submitted to the voters at the April election. The work of taking the levels has also been started, and this will be followed by a property survey. The line will be approximately 16 miles in length. A model of the rapid transit loop will be exhibited at the Sinton Hotel during the convention of the Investment Bankers' Association of America Oct. 1-5, inclusive. It will include a detailed map of the proposed loop, drawings showing sections of subway and elevated construction and plans of the proposed stations.

Memphis Wage Readjustment Terms.—On Aug. 1 the Memphis (Tenn.) Street Railway made a new contract with its employees, establishing a ten-hour day, with time and a half for overtime; establishing a standard wage scale of 21 to 28 cents an hour, the maximum to be reached in the seventh year; granting a flat increase of 1½ cents an hour for shopmen; providing for arbitration of future differences and for various minor improvements in working conditions. A closed shop is not specified in the contract, but one article provides that a probationary employee may be admitted to the union after or during his first ninety days in the service. The agreement is to continue for three years from Aug. 1, 1916, but any time prior to sixty days before Aug. 1, 1918, either party may demand a readjustment. The old scale follows: First six months, 18 cents an hour; second six months, 20 cents; second year, 21 cents; third year, 22 cents; fourth year, 23 cents; fifth year, 24 cents; sixth year, 25 cents; seventh year and thereafter, 26 cents.

Injunction to Prevent Stirring Up of Damage Suits.—Application of the San Antonio (Tex.) Traction Company for an injunction has been granted by District Judge W. F. Ezell restraining an individual from "stirring up" damage suits against the company. Testimony showed that about 60 per cent of the claims presented the company were made by the defendant. Many of the witnesses testified that after receiving slight injuries on the cars of the company they were approached by the defendant, who promised them large indemnities for the privilege of handling a suit against the company. It was announced by the defendant that appeal would immediately be made to the Fourth Court of Civil Appeals. Judge Ezell said: "I do not believe that it can be successfully contended that the defendant has the right to engage in and carry on the scheme of going out, either by himself or through his agents, and soliciting, instigating and encouraging or stirring up presentation of claims and the bringing of suits thereon, and of trying to induce the claimants to present claims for exaggerated injuries or feigned injuries which do not exist in fact, and to that extent the plaintiff is entitled to the relief sought."

PROGRAM OF ASSOCIATION MEETING

Railway Signal Association

The twenty-first annual convention of the Railway Signal Association will be held at the Grand Hotel, Mackinac Island, Mich., Sept. 12-15, 1916. Reports from the following committees will be presented and discussed: Signaling practice, mechanical interlocking, power interlocking, direct-current automatic block signals, standard designs, wires and cables, storage battery and charging equipment, maintenance and operation, direct current relays, electric railway and alternating current signalling, electrical testing, and harmonization of specifications. In addition, there will be considered a proposed amendment to Article IV, Section 1, of the constitution, covering dues of members of the association. During the convention the Grand Hotel will be closed to the public, all rooms being reserved for the exclusive use of the members of the association and their guests, and arrangements have been made for an elaborate entertainment program, including, on Sept. 15, a boat trip to Sault Ste. Marie to visit the government locks there.

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Financial and Corporate

ANNUAL REPORT

United Light & Railways Company

The statement of income, profit and loss of the United Light & Railways Company, Grand Rapids, Mich., and its subsidiaries for the year ended Dec. 31, 1915, follows:

Gross subsidiary earnings (including $804,466 of inter-company business)	$6,308,776
Operating expenses and taxes (including $804.466 inter-company charges)	3,827,262
Net subsidiary earnings	$2,481,514
Interest and dividends on subsidiary bonds, preferred stocks and notes	1,387,155
Net earnings on stocks	$1,094,359
Net earnings due others than United Light & Railways Company	14,794
Earnings available on stocks owned by United Light & Railways Company	$1,079,565
Dividends and interest receivable	424,115
Miscellaneous earnings	122,511
Gross earnings—United Light & Railways Company	$1,626,192
Expenses and taxes	127,315
Net earnings—United Light & Railways Company	$1,498,876
Interest	520,136
Balance available for dividends	$978,740
Dividends—first preferred stock—6 per cent	525,789
	$452,951
Dividends—second preferred stock—3 per cent	31,630
Surplus earnings	$421,321

From the surplus $265,519 was credited to the depreciation reserve (of which the United Light & Railways Company proportion prorated on its stock holdings of its subsidiaries was $260,235), and in addition the subsidiary companies expended or set aside from maintenance the sum of $394,903. This was carried directly to operating expenses, making the total expended or set aside for maintenance and depreciation $660,423 or more than 12.5 per cent of the gross earnings received from the sale of gas, electricity, heat and transportation. The operating expense of the subsidiaries included $261,374 accrued for payment of general federal taxes, an increase of $11 421 for the fiscal year. They also included substantial increases in wages paid to the street and interurban railway employees.

During 1915 the business in the gas and electric departments showed satisfactory increases, but on account of the industrial depression and the jitney competition during the spring and summer months of the year, the railway department showed a decrease in receipts. The gas sales for the twelve months were 1,369,004,700 cu. ft., an increase of 6.07 per cent. Electric sales amounted to 93,276,013 kw.-hr., an increase of 2.66 per cent. In the railway department, however, revenue passengers of all classes totaled 33,528,933, a decrease of 5.88 per cent. Yet during the last quarter of the fiscal year the railway receipts showed substantial increases over the same period of the preceding year. The following table presents a full comparison of the sources of revenue, both gross and net, and the percentage that each class of service bore to the total during 1915 and 1914:

	1915	Per Cent of Total	1914	Per Cent of Total
Gross earnings:				
Gas	$1,318,922	20.91	$1.267,019	20.55
Residuals	122,934	1.95	199,174	3.23
Electric	2,322,983	36.82	2.079,145	33.71
Railway—city lines	1,599,459	25.35	1,690,660	27.41
Railway—interurban	791,361	12.55	790,392	12.82
Heat	81,004	1.28	86,533	1.40
Miscellaneous	72,109	1.14	54,033	.88
Total	$6,308,776	100.00	$6,166,959	100.00
Net earnings:				
Gas	$611,353	24.64	$538,101	22.71
Electric	1,101,701	44.40	1,004,568	42.40
Railway—city lines	439,867	17.73	523,676	22.10
Railway—interurban	254,143	10.24	237,499	10.03
Heat	19,732	.79	26,996	1.13
Miscellaneous	54,714	2.20	38,582	1.63
Total	$2,481,514	100.00	$2,369,425	100.00

During the year $826,104 was expended for additions to properties and extensions of service. Of this total, $171,814 was expended on gas properties, $318,816 on electric properties, $321,292 on railway properties and $14,181 on steam properties. Expenditures on the railway lines completed all the requirements of franchise provisions previously agreed to, and the expenditures for this department will in the future be normal.

A comparative statement for the year ended March 31, 1916, shows that the gross and net earnings of the subsidiary companies are increasing over the calendar year 1915 and over the year ended March 31, 1915. The share of the various divisions, however, in regard to making up this increase is not stated. The comparative figures for the three periods follow:

	Twelve Months Ended— March 31, 1916	Dec. 31, 1915	March 31, 1915
Gross earnings	$6,502,663	$6,308,776	$6,163.865
Operating expenses and taxes	3,913,441	3,827,262	3,777.619
Net earnings	$2,589,222	$2,481,514	$2,386,246
Interest and preferred stock dividends	1,394,014	1,387,155	1,330.740
Net profit	$1,195,208	$1,094,358	$1.055,506

PLANS FOR MEETING MATURING OBLIGATIONS

Chairman of San Francisco Committee Outlines Financial Needs of United Railroads

Frank B. Anderson of the Bank of California, who has been elected chairman of the committee of local bankers at San Francisco, Cal., to protect the holders of the securities of the United Railroads, made a statement recently, as follows:

"William H. Crocker, Herbert Fleishhacker, I. W. Hellman, Jr., J. D. McKee and myself have been approached by a great number of the security holders of the United Railroads to investigate the situation and undertake a reorganization. These bankers have consented to serve in the capacity of a protective or reorganization committee, and will send out a circular letter explaining the necessity for a reorganization and requesting the holders of the United Railroads 4 per cent bonds to deposit their bonds with the Union Trust Company or its agents in New York.

"There are approximately $24,000,000 of these bonds now in the hands of the public. It will be necessary for the holders of these securities to respond promptly to the circular request of the committee, for the reason that on Oct. 15, 1916, $1,800 000 of Market Street Cable Railway 6s will mature, and on Dec. 20, 1916, $400,000 of Ferries & Cliff House Railway 6s also will fall due. These underlying bonds have been extended from time to time and cannot be extended further on account of the statute of limitations, and the United Railroads has no money with which to pay this maturing indebtedness, together with its interest, nor any means, under existing conditions, to raise such money. On Oct. 1, 1916, $470,800 of interest on the United Railroads 4s also will fall due.

"The Market Street Cable Railway 6s and the Ferries & Cliff House bonds are a first lien upon the properties, and unless they are paid, a receivership would seem inevitable.

"The bonded and other indebtedness of the United Railroads and its constituent companies is as follows:

Market Street Cable 6s	$1,800,000
Ferries & Cliff House 6s	400,000
Omnibus Cable Company 6s	2,000,000
Sutter Street Railway 6s	1,000,000
Market Street Railway 6s	7,098,000
San Francisco Electric Railway 5s	329,000
Gough Street Railway 6s	45,000
Equipment notes	280,000
United Railroad 4s	23,542,000
Notes and bills payable	3,665,000
Total	$40,159,000

"After making a careful study of the affairs of the company, the purpose of the committee is to propose a reorganization that will do justice to the present holders of the company's bonds and other securities, and at the same time place the company in a sound financial position. It goes, of course, without saying, that any final plan of reorganization must be approved by the Railroad Commission before it can become operative.

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"In any event, the Market Street Cable Railway 6s and the Ferries & Cliff House Railway 6s will have to be paid in cash, and the transaction will have to be financed through the issuance of bonds, which will be junior to any of the present outstanding underlying bonds."

American Railways, Philadelphia, Pa.—The Board of Public Utility Commissioners of New Jersey has approved the application filed some weeks ago by the American Railways to purchase all the capital stock of the Electric Company of New Jersey, of the Pennsgrove Electric Lighting & Power Company, the Clementon Township United Electric Improvement Company, the Williamstown Electric Company and the Woodstown Ice & Coal Company, with a combined capitalization of $157,500.

Boston (Mass.) Elevated Railway.—A quarterly dividend of 1½ per cent has been declared on the $23,879,400 of stock of the Boston Elevated Railway, payable on Aug. 15 to holders of record of Aug. 4, contrasting with one-half of 1 per cent paid last May.

Chicago (Ill.) Elevated Railways.—The plan for the extension of the two-year notes of the Chicago Elevated Railways, which matured on July 1, 1916, for a period of three years, has been declared effective by the trustees, a large percentage of noteholders having deposited their notes under the plan. Owing to the advantages offered to noteholders to accept the extension, it is declared that noteholders who have not yet assented will find it to their advantage to do so. No provision has been made for the payment of such notes. Deposited notes stamped as "extended" and with new 6 per cent coupon attached will be returned to depositors with checks covering $15 for each note deposited.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has been granted permission to purchase the Commonwealth Power Company of Milwaukee for $1,100,000. It has also been authorized to sell $300,000 of its notes to pay part of the purchase price and $1,000,000 of notes to reimburse the treasury for cash used in the purchase. The notes are to be secured by bonds of the Milwaukee Electric Railway & Light Company.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—A report of the Oakland, Antioch & Eastern Railway for the eleven months ended May 31, 1915 and 1916, shows that this company has not suffered adversely from the suspension of exposition traffic in the San Francisco districts. The gross revenue for the eleven months ended May 31, 1916, amounted to $568,457, an increase of $73,065, or 12.85 per cent, over the corresponding period for 1915, while the operating expenses of $389,032 showed an increase of only $10,112, or 2.6 per cent, so that the net earnings of $179,425 gained $62,953, or 35.1 per cent. For the month of May, 1916, the gross revenue at $51,526 displayed an increase of $5,589, or 10.84 per cent, over the same month in 1915, while the net earnings at $15,454 increased $3,205, or 20.7 per cent.

Ogdensburg (N. Y.) Street Railway.—Interests connected with the Aluminum Company of America are reported to have taken over the Ogdensburg Street Railway, the Ogdensburg Power & Light Company and the Ogdensburg Gas Company.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio.—The annual meeting of the stockholders of the Toledo, Bowling Green & Southern Traction Company was held at Findlay on Aug. 1. The directors chosen were as follows: F. H. Rothier, F. C. Lawson, B. L. Kilgour, A. J. Becht, Charles Kilgour, Charles F. Smith, Morris McGrew, C. H. Blackburn and H. J. Buvinger. The gross earnings of the company were $431,739, as against $393,878 for the previous year. The operating expenses were $230,941, while for the previous year they were $223,016. The gross earnings were greater than for any previous year, but the operating expenses also showed an increase. At the close of the year, however, a surplus of $72,194 was shown. A portion of this was used for improvements, betterments and equipment. The revenue for the period from Jan. 1, 1916, to June 30 showed a gain of $24,821 over the same period last year, which indicates that the results for the present year will be much better than last. The passenger revenue for the year was $267,510, as compared with $249,651 for the previous year; the freight revenue was $46,579, as against $41,061, and the express revenue was $10,952, as against $8,868 for the previous year. The sale of power for commercial purposes was $5,599, while the year before it amounted to $1,027. The receipts from electric light service were $68,986, as against $64,328 the year before, while the revenue from the hot-water service amounted to $23,062, as compared with $19,732. The floating debt was reduced from $68,000 to $53,000 during the year.

West Penn Traction Company, Pittsburgh, Pa. — The West Penn Traction Company has called for payment on Sept. 1 at par and interest the entire issue of $6,000,000 of 6 per cent collateral trust gold notes of March 2, 1914, payable at the office of the Continental & Commercial Trust & Savings Bank, Chicago, Ill.; Kountze Brothers, New York, N. Y., or at the London City & Midland Bank, Ltd., London, England. The cash was provided for by the sale of bonds of the West Penn Power Company last March.

Youngstown & Southern Railway, Youngstown, Ohio.—Randall Montgomery, Harry Hamilton and J. W. Fawcett, appraisers appointed by the court, have placed a value of $975,000 on the property of the Youngstown & Southern Railway, now in the hands of a receiver. The property will be offered for sale on Sept. 2. The road operates between Youngstown and Leetonia, where it connects with the Youngstown & Ohio River Railroad. The court action was brought by the New York Trust Company, representing holders of the company's bonds.

DIVIDENDS DECLARED

Boston (Mass.) Elevated Railway, quarterly, 1½ per cent.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, original preferred; quarterly, 1½ per cent, first preferred.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	June,	'16	$102,680	*$63,375	$39,305	$29.992	$9,313
1 "	"	'15	87,846	*60,831	27,015	30,371	†3,356
12 "	"	'16	1,182.352	*748.054	434.298	357,341	76,957
12 "	"	'15	1.042,100	*707,321	334,779	349,613	†14,834

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m.,	June,	'16	$43,527	*$22,519	$21,008	$11,467	$9,541
1 "	"	'15	40,750	*22,612	18,138	10,952	7,186
6 "	"	'16	210,615	*122,061	88,554	68,163	20.391
6 "	"	'15	189,937	*112,096	77,841	65,724	12,117

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m.,	June,	'16	$280.350	*$160.497	$119.853	$42.875	$76,978
1 "	"	'15	244,059	*150,250	93.809	39,341	54,468
12 "	"	'16	3,307,057	*1,934,061	1,372,996	501,734	871,262
12 "	"	'15	3,059,929	*1,826,643	1,233,286	468,369	764,917

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m.,	June,	'16	$1,322,295	*$742,346	$579,949	$419,968	$159.981
1 "	"	'15	1,115,495	*623,533	491,962	360,096	131,866
12 "	"	'16	15,841,539	*8,445,477	7,396,062	4,847,814	2,548,248
12 "	"	'15	14,033,334	*7,536,389	6,496,945	4,321,269	2,175,676

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m.,	June,	'16	$244.082	*$142,965	$101,117	$62,714	$38,403
1 "	"	'15	193,293	*118,402	74,891	63,906	10,985
12 "	"	'16	2,702,763	*1,612,650	1,090,113	752,601	337,512
12 "	"	'15	2,466,923	*1,460,641	1,006,282	755,812	250,470

GRAND RAPIDS (MICH.) RAILWAY

1m.,	June,	'16	$108,702	*$72,645	$36,057	$13,036	$23.021
1 "	"	'15	92.411	*70,399	22,012	13,961	8,051
12 "	"	'16	1,255,468	*834,096	421,372	166,667	254,705
12 "	"	'15	1,226,269	*834,703	391,566	163,156	228,410

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m.,	June,	'16	$190.109	*$123,400	$66,709	$42.512	$24,197
1 "	"	'15	165,511	*102,583	62.928	42,101	20,827
12 "	"	'16	2,251,525	*1,393,930	857,595	515,237	342,358
12 "	"	'15	2,180,942	*1,282,296	898,646	492,793	405,853

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	June,	'16	$473,664	*$262,100	$211,564	$181,032	$30,532
1 "	"	'15	474,569	*256,295	218,274	185,589	32,685
12 "	"	'16	5,456,967	*3,074,746	2,382,221	2,192,060	190,161
12 "	"	'15	5,737,866	*3,122,692	2,615,174	2,208,889	406,285

*Includes taxes. †Deficit.

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Traffic and Transportation

REVIEW OF JITNEY CONDITIONS IN CALIFORNIA

Forty-one Out of Forty-six Editorials Favorable to Electric Railways—Jitney Ordinances Reviewed

W. V. Hill, manager of the California Electric Railway Association, has reviewed the jitney situation in California in a communication to members of that body. He said that out of a total of forty-six editorials appearing in papers throughout the State from June 18 to July 20, forty-one were favorable to the electric railways, most of them calling for state regulation and taxation of motor vehicles to meet the losses in state revenue due to jitney operation. He reviewed very briefly the terms of the new jitney regulatory ordinances in Redondo Beach, Alameda, Oakland, Santa Barbara and San Francisco. The ordinance in San Francisco, noted previously in the ELECTRIC RAILWAY JOURNAL, excludes the jitneys from Market Street in the congested districts between 10.30 a. m. and 4 p. m., cuts the number to 700, requires the cars to operate to the end of their routes and establishes two points within each block to take on and discharge passengers. It is said that Superior Court Judge Works has sustained the Santa Monica ordinance, which had been attacked by the interurban jitney bus operators on the ground that the emergency clause was unlawful and the license fee of $100 prohibitory. Mr. Hill also said that the validity of the San Joaquin County ordinance had been sustained by Superior Court Judge Young, and that the plaintiff had been denied the right to amend his complaint. This ordinance required a definite route to be followed, fixed the fare, provided for a $50 deposit and made obligatory the payment of 5 per cent of the gross receipts as taxes. It also required the execution of a $10,000 maximum bond satisfactory to the Board of Supervisors.

In Los Angeles on April 24 there were 364 cars and on June 27 there were 403 cars in that city. Mr. Hill gave the number of passengers carried in jitneys in Los Angeles on April 24 as 21,026 and the earnings as $2,051, and the number of passengers on June 27 as 46,675, and the earnings as $2,233. Of the 403 cars operating in Los Angeles 104 were of the large bus type with a seating capacity ranging from ten to fifteen passengers. He said that Los Angeles was practically the only place in the State where the large bus was becoming a factor. Notwithstanding that no regulatory ordinances were sought in Sacramento, the number of jitneys there had decreased about 33 per cent in three months. Mr. Hill also reviewed the states which had placed the jitneys under the jurisdiction of their Public Service Commissions. With respect to California, he said that State had been petitioned to exercise jurisdiction over the jitneys, but that the Supreme Court of California had not yet rendered its decision on the question on whether or not the Railroad Commission had such jurisdiction under the present act.

HEARING HELD ON JITNEY REGULATION

Meeting in Seattle to Consider Regulatory Measures Adjourns Without Action

The City Council of Seattle, Wash., at a recent hearing on the proposed regulation of jitney operators in that city, voted six to three to continue the hearing until Aug. 21. The Council reported progress on the petition of sundry citizens asking for the imposition of regulatory measures and set the date above named for further hearing. The petition asked that jitneys be prevented from operating longitudinally on streets upon which street cars are now operating; that the jitneys pay into the city treasury a proportion of their gross receipts; that passengers be prohibited from riding on the doors of jitneys, and that the cars should operate between the hours of 6 a. m. and midnight. None of the members of the Council favored such legislation that would tend to drive the jitney entirely out of competition with the street railway. Councilman R. H. Thomson, former city engineer of Seattle, stated at the hearing:

"What we had hoped for was a fair presentation of both sides. The Council does not desire to destroy the jitney. No one who has studied the problem of transportation will deny that the omnibus will be the urban passenger carrier of the future. The legislation aimed at is to remove any reasonable complaint that the city is not adequately protecting itself by the fair and proper regulation of the jitney. I express the hope that the representatives of the improvement clubs may come back and make a report that is fair to all parties concerned."

The petition calling for jitney regulation was signed by 1700 people, and the counter petition protesting against regulation by about 21,000. The petition asking for regulation of jitneys was filed six weeks ago, and the jitney drivers and owners, and friends, filed a counter petition about five weeks later.

ANOTHER COMPANY PUBLICATION

The Memphis (Tenn.) Street Railway has begun the publication of *Safety First Topics* in the interest of its employees. The first issue is dated August. It contains thirty-two pages including the cover. The paper is 6 in. wide by 9 in. high. The editor is C. B. Proctor, chairman of the safety committee. The paper will be issued the first of each month in the interest of the safety first movement. The columns are open to all the employees of the company for the discussion of topics of interest to them. The editorial foreword follows:

"In this, the first issue of *Safety First Topics*, we think it not amiss to state fully to the employees of The Memphis Street Railway the purposes of this magazine. These purposes are:

"First—To keep all employees fully advised as to the workings of our safety committees.

"Second—To give to all the benefits of the papers read and talks had at these meetings.

"Third—To make known to all the results of our campaign for safety first.

"Fourth—To provide a medium for the discussion (by all employees) of matters of interest to this company, particularly those referring to our safety first campaign.

"We have long felt the need of such a magazine, and hope to make this one supply that need. We urgently request the aid and co-operation of every employee of this company to that end.

"This issue of the *Safety First Topics* may well be treated as a souvenir number. On account of our banquet it probably will be larger and may contain more matter than subsequent issues."

STATE-WIDE APPEAL FOR SAFETY

A circular addressed to automobilists is being sent out to all of the members of the California Electric Railway Association by W. V. Hill, manager of the association, with the idea that it can be used most effectively by making it a personal appeal from the local company addressed to local automobile owners, their addresses being secured, presumably, through the State automobile license bureau. Primarily, the letter conveys a message and gives some real information in an interesting way, instead of being simply a placard or warning. Secondarily, it is developing the idea and then showing the individual member companies how they can use it as a personal appeal addressed to so-called "classified circulation." The letter, addressed "To drivers of 200,000 automobiles in California," follows:

"We want to save the lives of your family, your friends, yourself and the public in general. The record of accidents at grade crossings is increasing, according to the Railroad Commission's report for 1915. This report says:

" 'The record of accidents at highway crossings continues to require attention, and notwithstanding the great number of protective devices that have been installed by the railroads, both on their own initiative and upon the recommendation of the commission, the number of fatalities and injuries is increasing. The investigation of the accidents in which automobiles or motor driven vehicles have been in-

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volved at highway grade crossings since such investigations have been instituted by the commission and covering a period of over two and one-half years, has not revealed a single instance where a fatality has occurred due to negligence on the part of the railroad.'

"The same report shows that during the three-year period 249 persons were killed and 1093 persons were injured at grade crossings in this State.

"We are doing our part by abolishing grade crossings as rapidly as practicable, employing crossing flagmen, installing automatic signals and devices, gates and signs at enormous cost.

"In a recent address, Commissioner Gordon said:

"'We are horrified at the waste of life going on in Europe, but we hardly give a thought to the absolute waste of life which is going on around us unless we happen, in a measure, to be charged with responsibility for it.'

"We are doing our part. Won't you do yours?

"Stop! Look! Listen!

"California Electric Railway Association."

Trade-mark Wanted by Ohio Road.—The Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has offered prizes to its employees for the best suggestion for a trade-mark to be used by the company as representing its various activities, railway, light and power branches. The ideas are to be submitted either in drawings or carefully worded descriptions. The road has been known by various names, but the designation "Em-an-Ess" system has been most frequently used of late.

New Denver Traffic Circulars.—The Denver (Col.) Tramway has issued "What to See in Denver" and "Prize Picnic Places," designed to encourage a more liberal use of the facilities of the company. Each circular is 4 in. wide by 7 in. high. "What to See in Denver" contains forty pages. "Prize Picnic Places" contains fourteen pages. Forty-four different trips are listed in the first-mentioned circular. In addition there are included many facts about the city of great help to both the occasional visitor and the resident.

Traffic Check Made in Seattle.—A check of traffic in the Capitol Hill and Broadway districts of Seattle, Wash., served by the Puget Sound Traction, Light & Power Company, made by the Public Utilities Department of the city of Seattle on Aug. 2, showed that street cars carried 523 passengers to the down-town districts, while the jitneys carried 747. This check covered a three-hour period, from 9 a. m. to 12 noon. In the same period, the street cars carried 440 outbound passengers, and the jitneys 402. The average number of passengers on each street car during the three-hour period was fifteen. The company recently reduced service on the Capitol Hill line.

Traffic Semaphores Supplied in Louisville.—The police department of Louisville, Ky., has supplied semaphores at the various street intersections attended by traffic officers. These are of the stamped metal type, with sockets providing for lamps with red and green lights and using the words "Stop" and "Go." They are portable, in sections, the base and hollow upright being surmounted by the revolving standard. A specially designed wagon gathers the signal arms as well as the safety zone flags at night. The use of the semaphores has been attended by one accident. A boy who put his head out a window of a car was struck by a semaphore and suffered a gash on the head.

Election Asked on Houston Jitney Ordinance.—Jitneymen of Houston, Tex., have presented to the City Council a petition for an election on an ordinance regulating jitney traffic. The ordinance was prepared by the attorney of the jitney association. The petition bears the names of the necessary 15 per cent of the qualified voters of the city. In the ordinance submitted provision is made for the creation of a $20,000 fund out of which damages, both personal and property, caused by the jitney operators will be paid. The fund is to be collected by charging each operator $30 a month; the city is guaranteed $4,000 yearly in taxes; the employment of a board of examiners and physicians is provided for; jitneys are restrained from operating near restricted districts; persons not in good health are prohibited from operating buses.

Personal Mention

E. K. Pedler has been elected secretary and treasurer of the Northern Electric Railway, Chico, Cal., to succeed Harold Jewell.

J. B. Rowray, who has been superintendent of the Northern Electric Railway, Chico, Cal., has been appointed general manager of the company to succeed W. A. McGovern, deceased.

Wallace W. Brendel has been appointed chief clerk to C. E. Morgan, general superintendent of the Michigan United Traction Company, with headquarters at Jackson, Mich. Mr. Brendel has been serving as chief train dispatcher of the Union Traction Company of Indiana, Anderson, Ind.

C. A. Werber, formerly purchasing agent of the Atlanta (Ga.) Gas Light Company, has been appointed general storekeeper of the Georgia Railway & Power Company, Atlanta, and allied companies, including the gas company. W. H. Smaw, heretofore purchasing agent of the Georgia Railway & Power Company, has been appointed general purchasing agent, and from now on will do all the buying of supplies for the gas company as well as the power company and its allied companies. This change in the duties of Mr. Werber, who has been identified solely with the gas company until now, will give him supervision of the stores and supplies on hand in all the stockrooms in Atlanta and the north Georgia territory covered by the company. For the last five years Mr. Werber has been purchasing agent of the gas company, and for four years before that was assistant in that office. He has been connected with the Atlanta Gas Light Company for the last twenty-five years and is its oldest employee.

E. P. Coleman, general manager of the Dominion Power & Transmission Company, Ltd., Hamilton, Ont., was elected president of the Canadian Electric Railway Association at its meeting at the Royal Canadian Yacht Club, Toronto, on July 26 and 27. Mr. Coleman was born in Taunton, Mass., on June 14, 1867, and was educated at the public schools in Taunton. From Feb. 9, 1885, to Feb. 9, 1896, he was employed in the Huber Printing Press Company's drafting office at the Taunton Locomotive Manufacturing Company's shops. From Jan. 1, 1896, to Sept. 1, 1900, he was treasurer and general manager of the Attleboro Steam & Electric Company, Attleboro, Mass. During the Spanish-American war he served as second lieutenant and battalion adjutant in the Fifth Massachusetts Infantry. From July 1, 1899, to Sept. 1, 1900, he was general manager of the Plymouth (Mass.) Electric Light Company, and from Sept. 1, 1900, to June 1, 1905, he was vice-president and general manager of the Consolidated Lighting Company, Montpelier, Vt. From June 1, 1905, to March 1, 1907, he practised as consulting engineer in electric light, power, railway and quarry work and served as treasurer and manager of the Wetmore & Morse Granite Company, Montpelier, Vt. From March 1, 1907, to Jan. 1, 1909, he was general manager of the Great Northern Power Company, Duluth, Minn. He has been manager of the Dominion Power & Transmission Company, Hamilton, Ont., since March 1, 1909.

OBITUARY

Will Christy, vice-president of the Northern Ohio Traction & Light Company, Akron, Ohio, died on Aug. 9, following an operation for relief from appendicitis. He had been ill only two days. Mr. Christy was one of the most prominent men in electric railway work in the State. With his brother James, Ira Miller, W. M. Morlin and others, Mr. Christy started the first horse railway in Akron. He was also interested in the Cleveland Construction Company, Cleveland, which has built a number of electric railways. Mr. Christy was president of the Central Savings & Trust Company, Akron, and a director of the Citizens' Savings & Trust Company, Cleveland. He was born in 1859 and was educated in the public schools of Akron. For ten years he was interested in the tanning and leather business. He then turned his attention to transportation matters.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Hot Springs, Ark.—The Little Rock & Hot Springs Electric Railway has received from the Council of Hot Springs an extension of time on its franchise in which to begin construction until July 1, 1917, and the time for completion until Feb. 26, 1921. [Feb. 5, '16.]

Long Beach, Cal.—The Pacific Electric Railway has asked the City Commission for permission to abandon its line on Seventh Street.

Nampa, Idaho.—The Boise Valley Traction Company has received a franchise from the Council to construct a line on Third and other streets.

East Liverpool, Ohio.—The East Liverpool Traction & Light Company has received permission from the Council to construct a cable line from First Street and back of Chester to Fairview to supply electrical service in that vicinity. The company also plans to extend the cable line to Weirton via Fairview and New Cumberland.

TRACK AND ROADWAY

San Diego & South Eastern Railway, San Diego, Cal.—Work has been resumed by this company on the construction of an extension to Chula Vista via Potash and Marmarosa. The cost of the extension will be about $70,000.

Pacific Electric Railway, Los Angeles, Cal.—Work on this company's elevated line from Sixth and Main Streets to San Pedro Street will be completed by Sept. 1. The line, which is being constructed at a cost of $350,000, will be the chief unit in a loop system to relieve the congestion on Main and Seventh Streets. The elevated will carry seven tracks from the station to Maple Avenue and two tracks from there on to San Pedro Street. A dirt fill will be laid on top of the steel and concrete and tracks will be laid on this fill, thus eliminating noise. A bridge is to be constructed across Los Angeles Street from the waiting room. A tunnel will be built under the tracks at the present point of departure at the Sixth and Main Streets station with a view to making it easier to handle passengers both going and coming.

Visalia Electric Railroad, Exeter, Cal.—Locating engineers are now in the field and it is expected that construction will be started at an early date on a 43.6-mile extension of the Visalia Electric Railroad which will serve the orange districts of Exeter, Porterville and Lindsay.

Denver & Interurban Railway, Denver, Col.—This company is laying three blocks of new single-track construction at Fort Collins, using a 65-lb. T-rail.

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—This company reports that it expects to build 1200 ft. of double track, material for which is already on hand.

St. Petersburg-Tampa Railway, St. Petersburg, Fla.—This company plans to construct a 3½-mile bridge across Old Tampa Bay. George S. Gandy, Sr., St. Petersburg, president. [July 22, '16.]

Jacksonville (Fla.) Traction Company.—It is reported that this company will construct a 1½-mile extension on Eighth Street and Talleyrand Avenue.

Miami (Fla.) Traction Company.—Surveys have been begun by this company for an extension on Waddell Street and Biscayne Drive.

Aurora, Mendota & Western Traction Company, Aurora, Ill.—This company is now laying ties in the concrete bedding of the new pavement on South Broadway, Aurora, so that it will be necessary to remove only the brick surfacing when the company is ready to lay its rails. [July 15, '16.]

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—This company will lay new rails on its North Center Street line.

Urbana & Champaign Railway, Gas & Electric Company, Champaign, Ill.—This company is reconstructing the track on its Walnut Street line, an entire new track being laid.

Galesburg Railway, Lighting & Power Company, Galesburg, Ill.—It is reported that this company plans to construct a new line between Galesburg and Rock Island via Alexis and the northern part of Warren County.

Illinois Traction System, Peoria, Ill.—This company has reopened its gravel pit at Mackinaw, Ill., and is reballasting the right-of-way between Springfield and Peoria and between Bloomington and Peoria. The maintenance of way department of the company is rapidly replacing all wooden trestles with steel and concrete structures. One of these replacements has just been completed at King's Bridge, between Bloomington and Danvers, where the wooden trestle has been superseded by 45 ft. steel girders on concrete abutments and carrying a concrete and ballast deck. The work of wrecking the wooden trestle and rolling the girders into place on the concrete abutments was done in three hours without interfering with traffic. Similar replacements are under construction at Sugar Creek, between Lincoln and Mackinaw; and also at a point between Edwardsville and Granite City. Ten smaller wooden bridges are being taken out and replaced with concrete arches.

Tri-City Railway, Rock Island, Ill.—This company will soon begin work on the construction of new track on Forty-third Street for the arsenal stub line.

***Fort Madison, Iowa.**—C. W. Petsch, St. Paul, Minn., is interested in the construction of a line from Fort Madison, Iowa, to Nauvoo, Ill.

Tri-City Railway Company of Iowa, Davenport, Ia.—This company will lay double track between Center Station and Sears, Ill.

Joplin & Pittsburg Electric Railway, Pittsburg, Kan.—This company is considering the construction of an extension from Columbus to Commerce, Okla.

Cumberland & Manchester Railroad, Manchester, Ky.—The first section of 12 miles on this company's proposed line from Barbourville to Manchester has been opened for freight traffic. M. E. S. Posey, Barbourville, chief engineer. [July 29, '16.]

Newport & Alexandria Interurban Electric Railway, Newport, Ky.—The Newport & Alexandria Interurban Electric Railway has secured the right-of-way over Grand Avenue, Newport, and purchased 0.8 mile of the Alexandria Pike between Fort Thomas Avenue and Main Avenue. Right-of-way will be secured on the roads at Fort Thomas to join these two sections. It is said that work on the line will be begun within a short time. [June 3, '16.]

Detroit (Mich.) United Railway.—Progress is being made in the construction of several street railway extensions within the one-fare zone in Detroit. On the Grand Belt line excavating has been completed as far west as Riopelle Street and the concreting is complete to Chene Street. All the work between Mt. Elliott and Chene is expected to be finished by Aug. 15. On the Forest Avenue extension grading is finished and the line is completed from Gratiot to Baldwin. The lower bed of concrete has been laid practically the whole distance and one track is in position. Construction of the foundation on the Kercheval extension, which on Kercheval Avenue is built by the city, has been started.

Butte (Mont.) Electric Railway.—J. R. Wharton, vice-president and manager of the Butte Electric Railway, reports that with the completion of about 150 yards of double-tracking the Walkerville line residents will be afforded a ten-minute service during the hours when the travel is heaviest. The Walkerville line is being double-tracked from Dewey's Point around the hill and under the Eveline mine to the Northern Pacific Railway crossing. This section of the city is now receiving a twenty-minute service, and the ten-minute service promised will be a welcome innovation. Mr. Wharton announces also that his company contemplates double-tracking the line from Waukesha

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Street, down Excelsior Street. This work will not be carried out until next year, because of urgent need of other changes.

Auburn & Syracuse Electric Railroad, Auburn, N. Y.—A report from the Auburn & Syracuse Electric Railroad states that it has purchased twelve Nachod type N automatic block signals.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—George Bullock, receiver for the Buffalo & Lake Erie Traction Company, has received an order from Supreme Court authorizing him to negotiate with the city of Dunkirk, through which the line passes, for the abandonment of the belt line. The order also provides that the receiver, in the event of being unable to make satisfactory arrangements with the city, may construct a connecting line from Fredonia to Sheridan, thus cutting Dunkirk off the direct main line service. The belt line around Dunkirk has been a losing venture for many years.

Tulsa, Okla.—It is reported that plans are being contemplated for the construction of an electric railway to connect Tulsa with Oklahoma City, Okmulgee, Henryetta and McAlester. The Chamber of Commerce of Tulsa may be able to give further information.

Houston (Tex.) Electric Company.—The Houston Electric Company will begin work within a few days paving between its tracks on Houston Heights Boulevard for a distance of about 1 mile.

Dallas Consolidated Street Railway, Dallas, Tex.—This company has announced that it will soon begin laying new rails on Tremont Street, as ordered by the City Commission of Dallas. The reason this had not been done earlier was due to the fact that the company was unable to get steel rails. It has been able to purchase enough rails in Fort Worth from the Northern Texas Traction Company to relay its tracks on Tremont Street.

SHOPS AND BUILDINGS

Douglas Traction & Light Company, Douglas, Ariz.—This company plans to construct a new ice and cold storage plant in Douglas. The proposed plant will have an output of 100 tons daily and will cost about $100,000.

Tri-City Railway Company of Iowa, Davenport, Ia.—The Central Engineering Company, Davenport, has been awarded the contract for the construction of the new carhouse of the Tri-City Railway, at Fifth Avenue and Thirty-fifth Street, Rock Island, Ill. The actual cost of the four new bays which will be erected will be $70,000. New equipment will be added to the amount of $19,000.

International Railway, Buffalo, N. Y.—Plans and specifications for the construction of a new passenger terminal at Lockport, N. Y., have been completed by the International Railway, Buffalo, N. Y., and will be submitted to the City Council for approval, according to E. J. Dickson, vice-president of the International Railway. The new station will replace the present frame structure used by the Buffalo & Lockport and Lockport & Olcott divisions and by the Buffalo, Lockport & Rochester Railway. The new terminal will be of brick and will be two stories high.

Hershey (Pa.) Transit Company.—The carhouse being erected by the Hershey Transit Company at Hershey is rapidly nearing completion. It is a concrete and steel structure, 96 ft. by 275 ft., with room for forty cars. Included in its features are rest rooms for the employees, shower baths, private offices, etc. The building is located at the central point of the Hershey lines now constructed and others planned.

Pittsburgh (Pa.) Railways.—This company will construct a new brick and steel carhouse at Carrick at an approximate cost of $83,000.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Plans have been drawn by Thomas W. Gardener, Stahlman Building, Nashville, Tenn., for remodeling the station of this company.

Montreal & Southern Counties Railway, Montreal, Que.—Work has been begun by this company on the construction of a carhouse at Granby. The building will be 230 ft. x 62 ft., of concrete, steel and brick construction, with a storage capacity for six cars.

Manufactures and Supplies

WHAT IS DELAYING WIRE AND CABLE PURCHASES?

Scrap Copper Wire and Aluminum Feeders Sold at High Prices

According to the observations of the electrical engineer of one of the largest city systems, the purchase of new trolley wire and heavy feeder cables is being delayed just as long as possible in anticipation of a possible break in the copper market. The delivery on 500,000 circ. mil rubber-insulated 600-volt armored railway feeder cable was placed at sixteen weeks by one manufacturer.

The electrical engineer quoted above bought in July, 1915, a relatively large quantity of trolley wire. The wire was not installed until the winter months of 1915 and 1916, and then it replaced old copper. The copper which was replaced was sold at a scrap value of more than the first cost of the new wire. Now this road is holding off on the purchase of 8 to 14 miles of trolley wire to see if the reported break in the copper ingot price is followed by a reduction in trolley-wire prices.

When the price of copper began to rise abruptly in July, 1915, this road sold about $30,000 worth of old copper cable. Then the increase in the price of scrap aluminum came, and it sold $68,000 worth of aluminum feeders at 55 cents a pound. These feeders had been in service for seventeen years, and cost originally but 30 cents a pound. It is pointed out, however, that at the present prices the differential between the values of copper and aluminum, when the relative electrical conductivities are considered, will hardly justify scrapping old aluminum and installing new copper.

ROLLING STOCK

Gary & Interurban Railroad, Gary, Ind., is contemplating the purchase of ten or twenty cars.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., is considering purchasing ten interurban cars.

Ottumwa Railway & Light Company, Ottumwa, Iowa, has ordered five all-steel, front-entrance, light-weight, semi-convertible cars from the American Car Company.

International Railway, Buffalo, N. Y., as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 5, has ordered two funeral cars from The J. G. Brill Company. These cars are to be delivered about Oct. 15 and will be 36 ft. 6 in. long, 8 ft. 6 in. wide with eight transfer seats on each side of the main compartment of the car. This will provide seating capacity for forty persons. The casket compartment will seat six passengers. The seating will be covered with dark green Fabricoid. The cars will be equipped with four 1000-hp. G. E. motors and K-6 control, Brill 27-A trucks with a 5 ft. 10 in. wheelbase and 30 in. wheels. Contracts for thirteen cars of the near-side pay-as-you-enter type, duplicating those recently destroyed by fire, will be let within the next few weeks. President Connette's private car Tatonka will not be rebuilt at present. The contract for the all-steel coaches for the new Buffalo-Niagara Falls line will not be awarded until fall.

TRADE NOTES

F. M. Murphy, formerly sales manager of the Bates Expanded Steel Truss Company, Chicago, Ill., has resigned to enter other business.

Standard Forgings Company, Chicago, Ill., announces that E. W. Richey has been appointed assistant to the president with headquarters at Chicago.

Philadelphia Holding Company, Philadelphia, Pa., has recently received orders for Radial trucks from the Elmira Water, Light & Railroad Company and the Chambersburg, Greencastle & Waynesboro Street Railway.

The Pullman Company, Chicago, Ill., has started on a reconstruction program which will extend over five years, and contemplates the replacement of its older building with modern shop structures of increased size. This means practically a remodeling of the entire plant, gradually and without disturbance to business.

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Sangamo Electric Company, Springfield, Ill., is distributing Bulletin No. 44 devoted to the mercury-type d.c. watthour meter. This thirty-two-page book is of interest to the railway electrical engineer because it presents a detailed illustrated description and discussion of the principle of the mercury-motor watthour meter. This supplements the technical description of the meter itself.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., reports the receipt of a number of orders for switchboard apparatus for the initial equipment of new generating stations and also some orders for additional equipment, among which is one from the Northern Ohio Traction & Light Company, Akron, Ohio, for the Gorge generating station, additional capacity 44,400 kva, equipment for three control desk sections, two type E-4 and one type C-1 oil circuit breakers.

Lord Manufacturing Company, New York, N. Y., reports the receipt of orders for air cleaners from the Westinghouse Electric & Manufacturing Company for the cars being built for the Cortlandt Traction Company and the Union Street Railway of New Bedford, Mass., and orders for Giant brakes from the Washington-Virginia Railway and the American Car Company for the cars they are building for the Southwestern Interurban Railway. This company has also received an order for ratchet handles for the seventy storage-battery cars being built for the New York Railways by the Southern Car Company.

Acme Supply Company, Chicago, Ill., announces the opening of its own offices in Eastern and Southwestern territory on Aug. 15. William M. Wampler has been appointed Eastern sales manager and Franklin M. Nicholl Eastern and Canadian sales representative, with headquarters at 50 Church Street, New York City. F. N. Grigg has been appointed Southeastern sales manager with headquarters in the Virginia Railway and Power Building, Richmond, Va. E. S. Sullivan, Monadnock Building, San Francisco, Cal.; Bell & Jamison, Hellman Building, Los Angeles, Cal., and W. F. McKenney, 54 First Street, Portland, Ore., have also been appointed the official sales representatives of this company on the Pacific Coast.

Peter Smith Heater Company, Detroit, Mich., announces that there are now in use over 8000 of its forced ventilation hot-air stove heaters. The following are a few of the users of this type of heater: Cleveland Railway, 1430; United Railways of St. Louis, 1419; Detroit United Railway, 1198; Cincinnati Traction Company, 289; Milwaukee Electric Railway & Light Company, 279; Louisville Railway, 242; Winnipeg Electric Railway, 230; Toledo Railways & Light Company, 185; New York State Railways-Rochester, Syracuse and Utica Lines, 172; Des Moines City Railway, 171; Northern Ohio Traction & Light Company, 116; Lehigh Valley Traction Company, 108; Calgary Municipal Railway, eighty-five; Edmonton Radial Railway, eighty-two; Indianapolis Traction & Terminal Company, seventy-eight; Pittsburgh Railways, seventy-five; Sioux City Service Company, sixty-nine; Schenectady Railway, fifty-two; Empire United Railways, fifty-two; Ohio Valley Electric Railway, forty-seven; Tri-State Railway & Electric Company, forty-seven; Washington, Baltimore & Annapolis Electric Railroad, forty-seven; Regina Municipal Railway, thirty-nine; Toronto Civic Railway, thirty-eight; Oklahoma Railway, thirty-eight; Omaha & Council Bluffs Street Railway, thirty-six; Saginaw-Bay City Railway, thirty; Port Arthur & Fort William Street Railway, twenty-six; Rockford & Interurban Railway, twenty-five; Texas Traction Company, fifteen. The Peter Smith hot-air forced ventilation heater was brought out in 1908, and the first installation was made Jan. 26, 1909, on the Cleveland Railway.

ADVERTISING LITERATURE

American Electrical Works, Phillipsdale, R. I., has issued a new price list dated Aug. 2.

Haese Track Sander Company, Milwaukee, Wis., has issued a circular which describes and illustrates its sander.

Laclede-Christy Clay Products Company, St. Louis, Mo., has issued an illustrated circular which lists the uses for the five brands of fire brick made by it.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued bulletin 34 N. This booklet illustrates and gives the details of construction of its steam and power driven single compressors.

New Jersey Foundry & Machine Company, New York, N. Y., has issued catalog 88, which describes and illustrates its varied line of hand and electric cranes, monorails, trolleys, hoists and other overhead carrying devices. A number of illustrations show installations of this company's products.

Griffin Wheel Company, Chicago, Ill., has issued a pamphlet entitled "Five Minutes on Chilled-Iron Car Wheels," which tells of the safety, low cost, maintenance cost and guarantee of the chilled-iron wheel and also of its effect on brake efficiency, brake-shoe wear, rail wear and flange wear.

Prest-O-Lite Company, Inc., Indianapolis, Ind., has issued an instruction book which presents in non-technical language a brief description of the practical applications of oxy-acetylene welding and cutting. Only such facts are given that were considered necessary to give the welding operator a clear understanding of the process with the least amount of reading.

Western Electric Company, New York, N. Y., prints an article entitled "Guiding Trains by Telephone" in the August issue of *Western Electric News*. This briefly tells of train dispatching by telegraph from 1850 to 1907, at which time the telephone and selector were first introduced for this work. A detailed description of the selector and its work is then given, and finally the article points out the advantages of the telephone over the telegraph for train dispatching.

Edison Storage Battery Company, Orange, N. J., has just issued a booklet on storage batteries in railroad service entitled "Train Lighting Batteries, Edison." This booklet is profusely illustrated with photographs showing the battery in actual service and as well the construction of the individual cells. The text gives a thorough description of the manufacture of the cells, their characteristics, battery troubles and their elimination and gives special attention to the chemical changes involved on charge and discharge.

Joseph Dixon Crucible Company, Jersey City, N. J., in a recent issue of *Graphite* shows the power plant of the Indianapolis & Cincinnati Traction Company, Rushville, Ind., where Dixon's silica-graphite paint has been in service for six years. A testimonial letter from S. C. Waggoner, chief engineer, is also given. The Dixon Company reports that it is having a world-wide success in manufacturing and furnishing a protective paint for metal work. This paint is an American product, based on a flake silica-graphite mined by them and prepared as a paint film for over fifty years.

N. W. Halsey & Company, New York, N. Y., have issued a booklet entitled "Essentials of a Standard Public Utility Bond." They discuss as qualifications of a well selected or standard issue the questions of the community in which the utility operates, the value of the property, the earnings, maintenance, escrow provisions, the sinking fund, the management and control and the franchises. As meeting all the requirements which they lay down under these various heads, Halsey & Company cite the case of the bonds of the Topeka Railway & Light Company, an Illinois Traction Company property, handled by them. They are in denomination of $1,000, $500 and $100, and are due in 1933.

Robert W. Hunt & Company, Chicago, Ill., have just issued a pamphlet containing all of the standard specifications for steel rails, so arranged and indexed that they are in readily usable form. The specifications of some twenty-six associations and manufacturers are condensed into five specifications known as the American Railway Association Specifications for Carbon Steel Rails; the American Society for Testing Materials, Standard Specifications for Carbon Steel Rails; the Manufacturers' Standard Specifications for Open Hearth Rails; the Manufacturers' Standard Specifications for Bessemer Steel Rails, and the Colorado Fuel & Iron Company Standard Specifications for Open Hearth Steel Rails. The specification of the American Society for Testing Materials is the same as that of the American Electric Railway Engineering Association covering plain and grooved girder rails.

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Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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AS TO THE HONOR OF MR. WHITRIDGE

The brilliant and valiant president of the Third Avenue Railway has had much fun at the expense of the Public Service Commission for the First District of New York, but it has been honest fun, with all the rules of fairness strictly observed, in spite of the fact that his flashing rapier was sure to make him an object of counter attack. One would expect the commission scrupulously to obey the same rules in taking a thrust at Mr. Whitridge. An incident of the recent New York strike, however, arouses the suspicion that the commission's desire to retort overcame its usual sobriety and impartiality. On the basis of an informal record of the Second District Commission, Chairman Straus accused Mr. Whitridge of causing the general strike by intentionally violating or negligently forgetting an arbitration agreement made in settlement of the Yonkers strike in 1913. The newspapers teemed with reflections on Mr. Whitridge's honor, with no apparent effort to ascertain the facts. A careful investigation of the official minutes shows a preponderance of evidence against interpreting the informal 1913 agreement as binding the parties to arbitrate all future disputes. The labor leader undoubtedly desired a permanent agreement, but Chairman Stevens, clearly wishing to repress too extensive union demands, diplomatically avoided any reference in the agreement to general future disputes, and Mr. Whitridge accepted the proposal as verbally expressed by the chairman, with a qualification regarding non-arbitrable matters. Moreover, the allegation that the 1913 agreement was to extend beyond the questions then in dispute was not made until after Mr. Whitridge left for Europe, although he met committees of the men before he left. In short, the construction now placed upon the agreement by the First District Commission is unwarranted, and the fact that the company's counsel was not allowed to enter evidence in the matter makes the arraignment of Mr. Whitridge the more unjustifiable.

AGREEMENTS SHOULD BE FORMAL

While we insist that the informal 1913 Yonkers agreement affords no ground for impugning the probity of Mr. Whitridge, we must add that Mr. Whitridge is not blameless. The incident has a very important lesson for both commissions and corporations. Matters that call for formal and complete records should not be handled in a loose and informal manner. Public utilities and their officers must have a repute for candor, straightforwardness and fair dealing. To earn this repute it is essential that as far as the responsibility rests with them all records of their acts should be clear, positive and conclusive. It is a good plan to have all such agreements in writing, and they should be neither evasive nor indefinite. Those just reached in the New York strike, as published last week, are good examples of the proper forms of settlement. It is pertinent to mention the recommendation now made by Chairman Straus that the law be amended so that voluntary arbitration agreements between utilities and their employees shall be recorded with the commission and enforced by it in the event of a breach. If such a law would give the commission full power to hold employees as well as utilities to these agreements, it would be a blessing. The public authorities must in time have as much power to control the acts of organized labor as they now have power to control organized capital. The public is traditionally supposed to sympathize with the under dog, and the corporations are the under dogs to-day.

A LARGE JOB OF REMODELING

The remodeling job which is now going through the shops of the United Railway & Electric Company in Baltimore, Md., involves the revestibuling of 560 cars, with other improvements. The way in which the work has been organized is described and illustrated in a leading article in this week's issue. The cars are to be turned out at the rate of a dozen a month, so that the work will be in the shops for some time. The organization is such, however, that as far as interference with the routine work is concerned it could be continued indefinitely. While it would at first sight appear that the superimposing of such a large remodeling job upon the regular maintenance work would cause confusion, it has not done so for these reasons: First, the details of the changes were all worked out well in advance by means of a sample experimental car end. Next, the designs were prepared so that large quantities of parts could be ordered from manufacturers. Again, much of the work was detailed to a special force of men, who have become expert at the individual tasks involved. While no data as to costs are available at this time, these costs must be reasonable, for waste in labor and material has been minimized in every possible way. While the aggregate expense of the work will, of course, be large, there is no doubt that it will be a paying proposition in reduction of maintenance costs through standardization and improvement in general condition of the rolling stock, minimizing of boarding and alighting accidents, and generally better facilities for handling passenger traffic on the platforms of the cars.

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HUMANIZING RAILWAY OFFICIALDOM

When the officers of a railway can forget formalities and address each other by their first names, it is one evidence that they understand each other, a vital factor in the satisfactory solution of all departmental problems. Of late in connection with welfare work much attention has been directed toward bringing together the employees in the rank and file of electric railways, but this phase of activity may well be extended into the official ranks. Rubbing elbows on common ground is perhaps more important to a railway's officials than it is to the departmental employees. While the committee plan of company organization tends to accomplish this end, not many railways are operating on that plan. Even committee organization work fails to humanize the railway business, whereas periodical social meetings of the officers of both large and small railway companies purely bent on pleasure, bring about personal understandings that facilitate official business. Nothing is more detrimental to successful operation than internal friction, and close personal acquaintance developed through social gatherings of department heads and their immediate subordinates tends to eliminate this by bringing about a genuine appreciation of the other fellow's problems and an understanding of his point of view. In other words, we believe, after observing the results obtained by occasional social gatherings of railway officials on a number of roads, that this is a movement which may well be fostered. The railway industry must be humanized within before it can be expected to be humanized without, and the social gathering of the officers is a step in this important direction.

MOTOR BUSES FOR PACIFIC COAST SYSTEMS

Electric railways on the Pacific Coast have suffered to a very serious extent from jitney bus competition, and despite convincing evidence that the jitney operates at a loss to State and city, and even to the operator himself, yet it survives and in some cases even thrives. The number operating in Los Angeles, for example, is still increasing, as shown in a report printed in last week's issue. This also reviews the status of the jitney question in all important California cities. The report shows that jitneys have been legislated out of existence in many cities and that the general trend of events is toward their suppression. Still the fact remains that two years after their advent they are operating on a more extensive scale than ever in the largest two Pacific Coast cities, and that in several cities where they are now forbidden by law they were patronized extensively until discontinued.

One conclusion which must be drawn from these conditions is that where there is no car service there is a demand for this class of urban transportation. After all, the primary function of the street railway company is not to operate cars, but to carry passengers. If a demand can be adequately and profitably served by certain forms of auto bus service, the street railway companies are the ones to supply that service. The ELECTRIC RAILWAY JOURNAL does not believe that auto buses will ever replace the electric car operating on rails, but it is evident that the auxiliary services which auto buses can render deserve careful study. When a suburban district needs transportation facilities, but cannot offer enough traffic to warrant an extension of the electric railway system, it would seem wise for the traction company to consider establishing an auto bus feeder service to that district and so hold the trade until an extension is warranted.

Again, on those lines of an electric railway system where the ordinary cars are needed for rush-hour traffic—and the auto bus can never adequately serve this need—these same heavy, expensive cars are operated for long periods between rush hours with an average load of much less than full capacity. This is an expensive waste if these few passengers could be served by auto buses. It may be that in some districts an auto bus could parallel the electric lines and collect passengers to be transferred to the street cars at stations, thus materially cutting down the operating schedule of the electric line and improving the service, or it may be that the auto bus-to-be will operate by trolley to the limits of the zone which it was profitable to electrify, and beyond that run on storage battery charged during off peak. No entirely satisfactory plan has yet been worked out and, of course, no one plan could be applied universally. However, the fact that the foregoing schemes and many others have been recently suggested in Pacific Coast cities indicates the interest and activity there along these lines, and it is natural to expect interesting developments in the near future in the use of auto buses by the street railway companies.

Heretofore experiments with automobiles and auto bus feeders have usually been carried on the company's books at a loss—witness the competition jitney buses established by the Puget Sound Traction, Light & Power Company or the San Joaquin Light & Power Company (ELECTRIC RAILWAY JOURNAL for July 1, page 39). But these did not represent business ventures *per se*. In the light of recent developments the attitude has become rather "How can we profitably utilize the auto bus as an auxiliary and feeder?" and no answer to this question will be found by putting on a fleet of automobiles with the primary purpose of crowding out independent jitneys or by experimenting with cheap runabouts using factory bodies. The new basis of investigation, rather, is typified by the experiments recently made on several California systems with automobiles adapted to service on rails, and more particularly by the twelve and twenty-passenger auto buses (described elsewhere in this issue) recently built by the Pacific Electric Railway for feeder service. In commenting on the latter, Paul Shoup, president of the Pacific Electric Railway, is quoted as saying, "Such a car (and this one indicates possibilities of success) is destined to be at least a pioneer for standard car service, and it may have an even greater field in the world of transportation."

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UNITS FOR COMPARING TRACK UPKEEP COSTS

Of the various bases which have been proposed for making comparisons of way department efficiency, efficacy of type of track construction and quality of maintenance work, the units, cost per mile of track, cost per car-mile and cost per ton-mile per mile of track, possibly deserve most consideration. While each of these units possesses certain advantages, none of them is entirely satisfactory for the purpose of comparison, because they do not take into account all of the variable elements which affect track maintenance costs.

Roughly, these elements may be grouped into three classes, legal or community requirements, destructive forces of nature and of vehicular traffic, and destructive forces which originate in the conduct of transportation. Evidently, the costs chargeable to the first class of elements will be different in different communities. Sometimes such charges as those necessary to keep a certain amount of paving in repair are imposed. While they have to be carried by the way department they do not in any way affect the value of the track as a piece of railway equipment, and it would seem, therefore, that they should not be included in unit costs. Of equal character are the renewals made before they are actually required by the condition of the track, simply because the municipality is about to repave that particular street, and as the life of the paving to be laid will exceed considerably that of the existing track, it becomes necessary to install new rails and perhaps new ties as well. The elements of the second class, of course, vary with location. Some of them, as decay, corrosion and freezing and thawing, are the cause of charges properly classed as maintenance charges, as are also the wear to which the rails are subjected by passing vehicles. On the other hand, it does not appear that flood damages should be included in a track upkeep unit. The last class of destructive forces, due directly to the conduct of transportation, causes charges which, evidently, should be included in any unit used for track maintenance comparison.

Of the units named above, the cost per mile of track is most commonly used. It has to commend it, simplicity in bookkeeping, and its wide use is no doubt partly due to this fact because way departments are not often blessed with an adequate supply of clerical help. It will be noted that no specific conditions of any kind enter into this unit cost. With a sort of "blanket sum" it attempts to include all of the variable cost items. It has the advantage that the destructive elements mentioned in class two are roughly comparable on the "mile of track" basis, but weight and number of cars and type of construction are given consideration only as they are "lumped" into the total sum. There is nothing about the unit itself which differentiates between the mile of track that forms part of a fair ground spur and is used only a few days each year and the mile of track located in a congested city district.

The second unit, cost per car-mile, has been used in many reports of public service commissions. Because the car-mile is used as a unit in some other equipment charges it, likewise, has some bookkeeping advantages. It gives some consideration to the number and speed of cars, thus avoiding in part one of the most important objections urged against the cost per mile of track as a unit. No distinction, however, is made between the car-mile of a 60-ton car and that of a 6-ton car, and one would naturally expect that they would produce different effects on the track.

The cost per ton-mile per mile of track, or to use a more convenient unit, the cost per 1000 ton-miles per mile of track, has also been proposed as a basis of comparison. It takes into account all that the car-mile does and in addition gives some consideration to car weight. If number, weight and speed of cars were the only factors which affected track upkeep costs the unit would appear to have some value for comparative purposes. However, it involves more bookkeeping than the car-mile and with the latter gives no consideration to such important items as destructive forces of nature and vehicle traffic. The latter is becoming of increasing importance on paved streets owing to growing street congestion and increased use of the tracks by heavy trucks.

Finally, of the three units, none gives any consideration to the type of track construction. A mile, a car-mile and a ton-mile are the same whether measured on exposed or paved track and with 50-lb. or 141-lb. rail. As one of the important advantages of a suitable comparative unit is the ability to compare the efficacy of a given type of track construction under different conditions of traffic and location, it would seem to be worth while, even with the present units, to make some distinction as between different types of track construction. It seems to us that it would be a marked step in advance to classify tracks into at least three groups, namely, open construction, subsurface unpaved construction and subsurface paved construction. If this classification were generally made it might be possible to deduce by comparison some new unit for track maintenance which would include in a satisfactory way the more important of the variables. If not attended by such good fortune, it would at least help to determine which of the three units above named is best suited for practical use.

Taking everything into consideration, it must be admitted that the effect of any standard unit basis for making track maintenance cost comparisons would become evident only after a number of years. However, as was pointed out in these columns in a recent issue, some more suitable basis of comparison is highly desirable, indeed, is necessary if efficiency in way methods and practices is to be increased, and definite data relating to the merits of different types of track under different conditions of service are to be obtained. The problem is one that merits the serious attention of railway men and is one which could well be considered by the engineering-accounting committee of the American Electric Railway Association, through a subcommittee including as members from the Engineering Association representatives of the way department.

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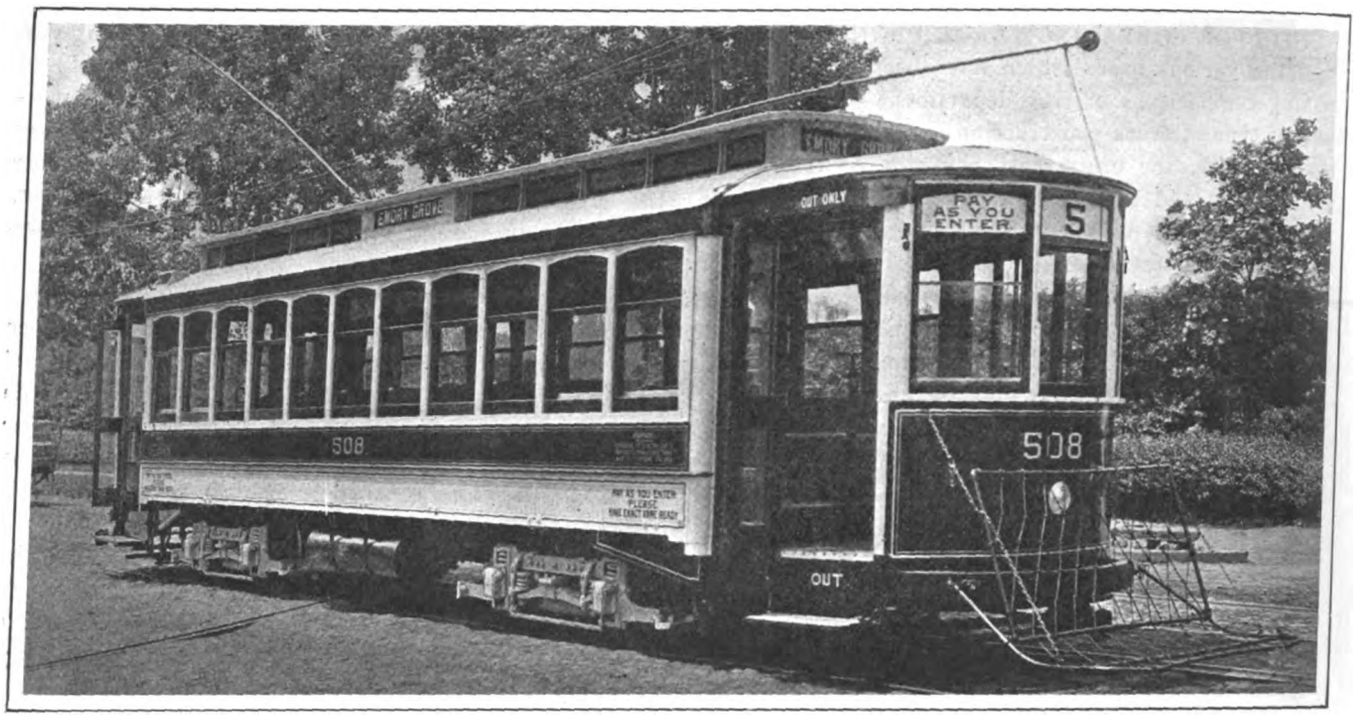

REMODELING BALTIMORE CARS
COMPLETE REMODELED CAR, DOUBLE-TRUCK, SEMI-CONVERTIBLE, CITY TYPE

Vestibuling 560 Semi-Convertible Cars

The United Railways & Electric Company of Baltimore, Md., Is Standardizing Its Rolling Stock by Remodeling Vestibules—Economical Adapting of Removed Parts to New Work Is a Feature

DURING the latter part of the year 1915 the United Railways & Electric Company of Baltimore, Md., decided to vestibule 560 double-truck semi-convertible cars These cars are of the open platform type, which was previously standard with the company, provided with portable vestibules to protect the motormen from inclement weather, as are all the cars in Baltimore. The decision involved the addition of folding doors and steps, the lengthening of the platform in a considerable number of cases, the removal of the end bulkhead, and other related changes. The opportunity was also utilized to make a number of minor improvements.

1914 CARS TAKEN AS MODELS

About two years ago the company purchased eighty-five cars provided with enclosed vestibules and folding doors and steps. As these cars had proved very satisfactory, they were taken as the models for the vestibuling job. These cars were fully described in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 9, 1915, page 86.

The platforms of the 1914 cars are 5 ft. 8½ in. in length, and between the vestibule and the car body is an open archway finished in cherry. The entrance doors are in four sections, each glazed with two panes of clear wired plate glass. The doors are hung in two sections and fold outward, providing a 47½-in. clear opening. As is shown in the line drawing reproduced herewith, special provision is made to render the doors weather-tight when closed, by the use of interlocking joints and rubber packing. The inside door of each pair is guided by means of a case-hardened steel roller, and the doors are hung on 1-in. round steel rods, as shown in the drawing.

The exit opening on the side of the vestibule opposite from the entrance opening is about one-half the width of the latter, and is closed by one door of two sections. A stationary panel, with glass above, closes one-half of the exit side of the vestibule. The folding step for the entrance is 4 ft. long and 12 in. wide, while that for the exit is 25 in. long and 12 in. wide. These are operated in synchronism with the doors, both being controlled by the motorman's door operating handle located about 1 ft. to the right of the air-brake valve and on the level of the vestibule belt rail. The front of the vestibule from belt rail to floor is lined with removable panels of cherry.

While the general pattern described above has been followed in the remodeling, numerous changes in small details have been made in order to eliminate those elements of the design which were the source of repair costs. For example, the door brackets were enlarged so as to increase the bearing surface on the wood, thus assisting in holding the door frame together. The door shaft top bearing was strengthened in a similar manner. Among the interesting features is the scheme used for permitting the raising of part of the right-hand, front vestibule sash. As is shown in the illustration on this page, a metal frame is mounted inside the wood sash frame, and in a groove in the metal frame slides the lower pane of glass.

EQUIPMENT WHICH IS BEING STANDARDIZED

The cars which are now in process of remodeling, 560 in number, are divided into four groups as follows: (1) 228 non-prepayment semi-convertible cars with 5-ft. platforms, city type; (2) 212 P.A.Y.E. semi-convertible cars with 5-ft. 8½-in. platforms, city type; (3) ninety non-prepayment semi-convertible cars, high speed, sub-

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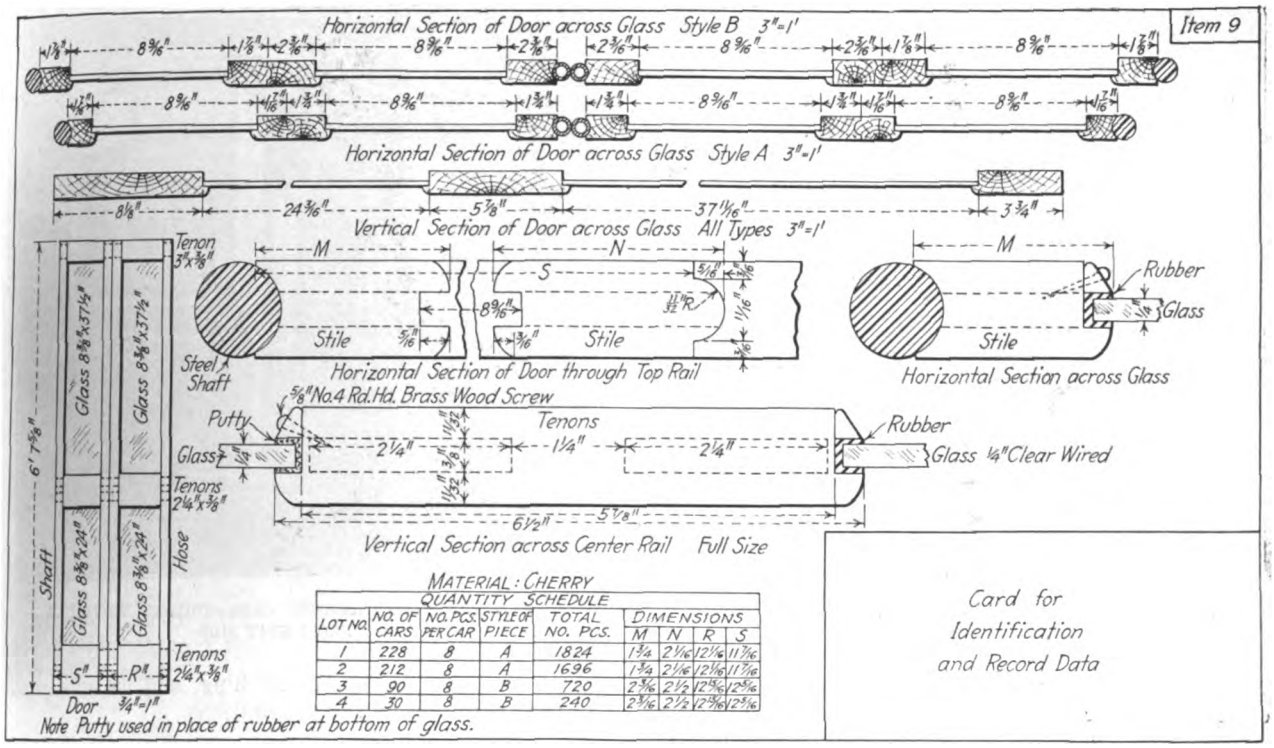


LOT No.	NO. OF CARS	NO. PCS. PER CAR	STYLE OF PIECE	TOTAL NO. PCS.	DIMENSIONS M	N	R	S
1	228	8	A	1824	1 3/4	2 1/16	12 1/16	11 7/16
2	212	8	A	1696	1 3/4	2 1/16	12 1/16	11 7/16
3	90	8	B	720	2 3/16	2 1/2	12 5/16	12 5/16
4	30	8	B	240	2 3/16	2 1/2	12 5/16	12 5/16

REMODELING BALTIMORE CARS—SAMPLE DETAIL SHEET WITH MATERIAL LIST, ORIGINAL 8 x 14½ INCHES

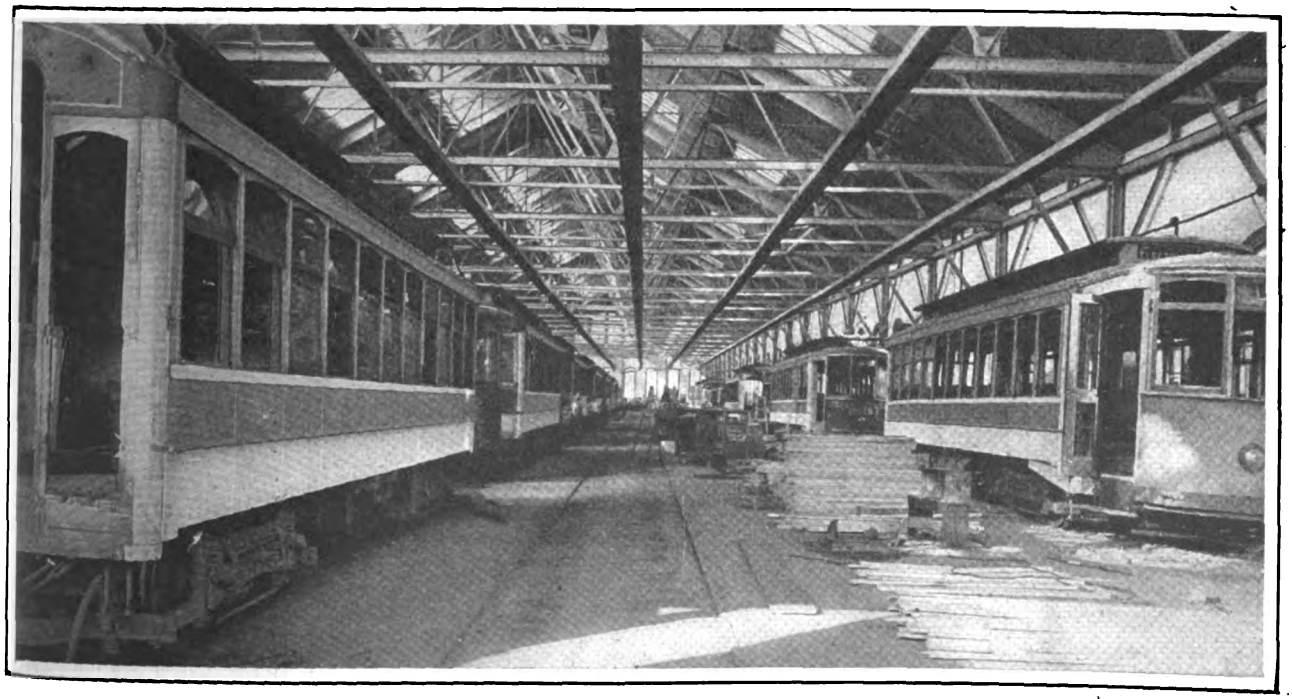
urban type; (4) thirty P.A.Y.E. semi-convertible high-speed, suburban type.

Of the above, the cars with short platforms required the lengthening of these to 5 ft. 8½ in., to provide the necessary widths of opening and to permit standardizing of doors, etc. Lengthening was not necessary in groups (2) and (4), the cars in which were already of the P.A.Y.E. type.

Preparation of Designs and Specifications

In view of the magnitude of the work it was necessary before proceeding with the details to make a careful study of the exact conditions that had to be met. Among the problems in mind were the securing of the maximum door opening, getting the doors as nearly alike as possible, standardizing sizes of glass, providing for the mounting of the wheel guards, using standard handles, etc. The study was conducted by the use of a model car end, shown in several illustrations. To this model the various details and car equipment features that were to be met with in the reconstruction of the cars were applied.

After the model had been perfected, the parts were removed and drawings were made of them, a sample drawing being reproduced herewith. Each part was given an item number by which it is designated whenever reference is made to it. All drawings are made on a standard size, 8 in. by 14½ in. In order that full in-



REMODELING BALTIMORE CARS—BAY OF SHOP, SHOWING CARS IN SEVERAL STAGES OF REMODELING

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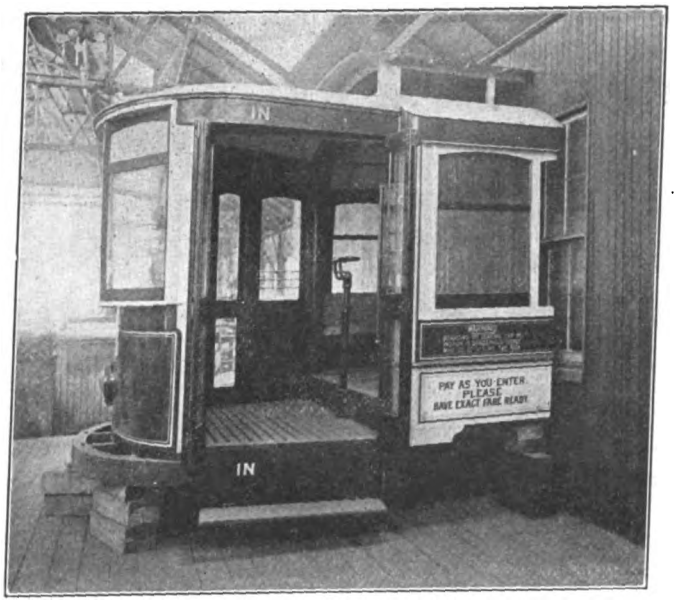


REMODELING BALTIMORE CARS—DUMMY VESTIBULE FROM ENTRANCE SIDE

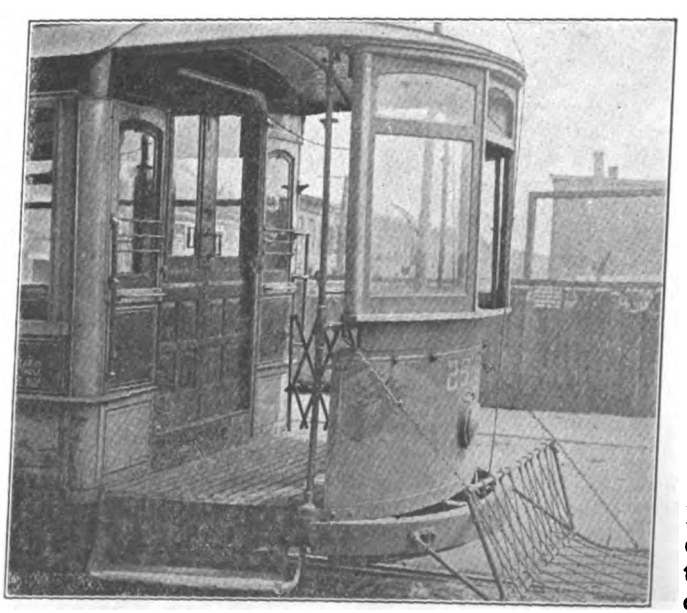
REMODELING BALTIMORE CARS—DUMMY VESTIBULE FROM EXIT SIDE

formation may be always available as to the quantity desired in each case, each blueprint has a material quantity schedule, showing the lot number, the number of cars in the lot, the number of pieces per car and the total number of pieces. In addition, a general specification was prepared.

The schedules of general instructions for the several shops which are reproduced by way of illustration will serve to give a concrete idea of the way in which the work is being handled.

Copies of the drawings and specifications were sent to car, folding step and door specialty makers for bids, and the work of furnishing all of the parts possible was let out by contract. This included as many of the pieces of woodwork as could be ordered in reasonably large numbers. Obviously manufacturers were in a position to supply these parts more cheaply than the company could make them, as the latter procedure would have involved the superimposing of a manufacturing routine on top of the maintenance routine of the shop. All of the parts were laid out with this idea in view, so that it was possible to buy a large part of the material all ready to assemble. This left for the shop department of the company only the furnishing of special pieces.

The problem of organizing the work so that it would move smoothly and harmoniously without interference with routine maintenance has been quite an undertaking. The magnitude of the task will be appreciated by master mechanics when they remember that 110 cars are being remodeled this year and the schedule calls for the finishing of twelve per month. The work could not, of course be done by the regular shop force, and a special force of about thirty men has been detailed for the work. One section of the shop has been assigned to the remodedling, and its appearance is shown in one of the illustrations.



REMODELING BALTIMORE CARS—END OF CAR BEFORE REMODELING

NOTES ON THE SHOP PROCEDURE

In order to indicate the shop routine on the work under discussion, a number of photographs have been taken showing the cars in various stages of completeness. The photograph below shows the platform of a city type, non-prepayment car with the standard metal dash and portable vestibule. On being brought to the shop, a car is stripped of the hoods, vestibules, dashers, platforms, outer platform knees, bumpers, steps, double sliding doors in end walls, and the portions of the end bulkheads below the bottom line of the doorway arches. The brakes and electrical devices are all likewise removed from the platforms. The appearance of the end of the car in the resulting condition is shown on page 305.

The outside platform knees, which are of ½-in. x 3½-in. x 7-in. angle iron, with 3-in. oak fillers, are next removed, the oak fillers being replaced with new ones of additional length. The old oak fillers removed from the outside platform knees are cut to shape to splice readily with the center platform knees, making the center knees the required length. The original crown pieces are used when possible on the lengthened knees.

The next step is the lengthening of the hoods by 8½ in., which means adding one rafter and splicing. Alternate roof boards are cut back one rafter, so that the new section joins smoothly with the old hood. In this way very little of the old hood is lost, and after the hood has been finished it is difficult to detect the fact that it has been lengthened out. Even the old canvas covering is used if it is in good condition, merely a

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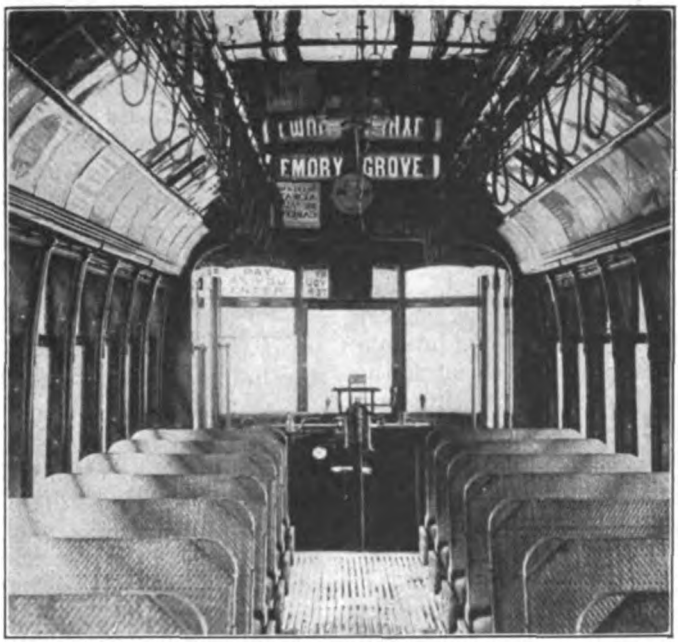
narrow strip being added to lengthen it.

The photograph below shows the car with the platform lengthened and refloored. While the platform is being lengthened, interior finish is added. Back of the end wall finish the material is cut away up to the body corner post, and to the latter a piece of ash approximately 3 in. thick and 8 in. wide is secured by means of long screws set well into the post. The countersunk holes and the corner post are filled in with plugs, hot glued, driven in and cut off flush. The head piece is also cut back to form a graceful arch, and the interior cherry finish is then applied.



REMODELING BALTIMORE CARS—INTERIOR VIEW OF REMODELED CAR

In finishing the ends of the cars, the dashes previously removed are returned to their places, the hood supports are replaced by ash vestibule corner posts of such shape and dimensions that they fit snugly against the portable vestibule and receive the metal dash. The latter is well secured to the corner post for support.

The space between the tops of the dasher and lower rail of the vestibule is then filled in with an extra width of No. 12 gage dasher iron, thus completing the dasher. The car is now ready to receive the vestibule door headers, guiding strips, etc., to which the parts of the door and step mechanism are applied. These features are clearly illustrated in the photographs.

The removal of the end walls, of course, reduces the space available for the corner longitudinal seats. The seat frames and cushions are, therefore, finished with a large corner radius

SCHEDULE OF GENERAL SHOP INSTRUCTIONS

DIVISION OF WORK AND CHARGES

CARPENTER SHOP

Schedule "A"

Scope—Lengthening platforms and hoods, including setting platform boards and strips; also adding folding doors and steps and fare boxes (boxes only).

Material from The J. G. Brill Company and International Register Company, except sundry items from shop not in excess of $5 per car.

Charge time and material as follows: Twenty-five cars Emory Grove line Nos. 356-380, Req. No. 574. Etc.

Schedule "B"

Scope—Remove end bulkheads, doors, and refinish end of car, alter sand boxes and corner seats, relocate and adjust brakes, registers, etc., reset dashers and vestibules; also install sliding brass sash in left-hand vestibule sash. This also covers two (2) stanchions and new style switch holders.

Material supplied by shop.

Charge time and material as follows: Twenty-five cars Emory Grove line Nos. 356-380, Req. No. 575. Etc.

Schedule "C"

Scope—Equip each car of the following list with illuminated route numbers.

Charge time and material as follows: Twenty-five cars Emory Grove line Nos. 356-380, Req. No. 745. Etc.

Note—For any work other than covered by the above schedules, proper information for charging time and material must be obtained.

TRUCK AND MOTOR SHOP

Schedule "D"

Scope—Relocating and adjusting brakes, sand boxes, cables. Testing wires and wiring.

Charge time and material as follows: Twenty-five cars Emory Grove line Nos. 356-380, Req. No. 575. Etc.

Schedule "E"

Scope—Equip each car of the following list with illuminated route numbers.

Charge time and material as follows: Twenty-five cars Emory Grove line Nos. 356-380, Req. No. 745. Etc.

Note—For any work other than covered by the above schedules, proper information for charging time and material must be obtained.

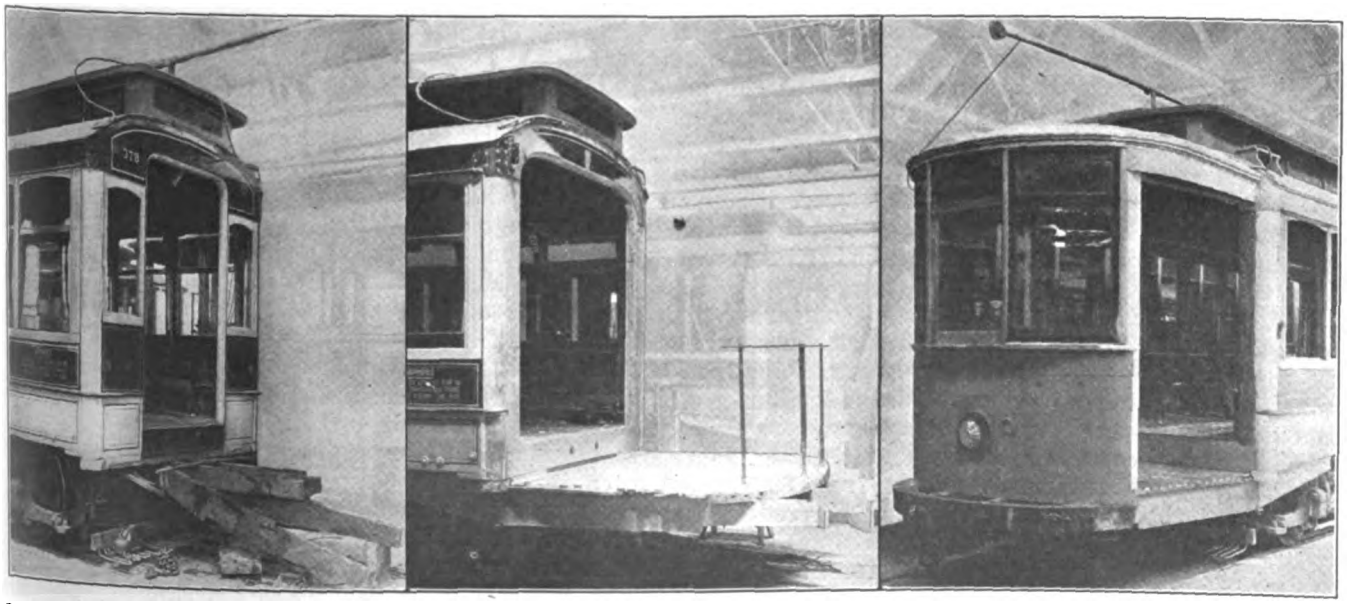
PAINT SHOP

Schedule "F"

Scope—Paint car, including all new work for doors and vestibules.

Charge time and material as follows: Twenty-five cars Emory Grove line Nos. 356-380, Req. No. 575. Etc.

Note—For any work other than covered by the above schedules, proper information for charging time and material must be obtained.



REMODELING BALTIMORE CARS—CAR READY FOR REMODELING; PLATFORM LENGTHENED READY FOR TRIMMING; VESTIBULE OF CAR READY FOR INSTALLING DOOR AND STEP MECHANISM

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to permit ready entrance and exit at the widened doorway.

After the cars have been completely equipped with the inclosed vestibules and folding doors, they are sent to the paint shop where they are burnt off, resurfaced, painted, striped, lettered and varnished, or, if the paint condition is found to be good, a coat of body color is applied and the car is striped, lettered and varnished. The cars not equipped with route numbers are properly supplied as they go through the shop, indicating the lines to which they will be permanently assigned. They are also equipped with the HB life guards, the fenders are adjusted, and those which are of the non-prepayment type, such as the cars now passing through the shop, are equipped with International coin-counting fare boxes of the standard type developed to meet the special requirements of this company's service. There are at present more than 170 of these boxes in use on the cars of the United Railways & Electric Company.

CONCLUSION

It is evident that when the improvements now under way have been completed, the rolling stock of the United Railways & Electric Company will be in condition to be maintained with economy. Due to the standardization of the detail parts the necessity for keeping a great variety of stock parts will be eliminated. Above all, the cars will be modernized from the standpoints of safety and convenience.

The remodeling as described is in charge of A. T. Clark, superintendent of rolling stock and shops, under the general supervision of W. A. House, president United Railways & Electric Company.

Locomotives for Interurban Roads

Formulas for Determining the Tonnage Capacities of Interurban Locomotives Are Given

IN an article dealing with the above subject, published in the current issue of the *General Electric Review*, S. T. Dodd of the railway and traction department General Electric Company discusses the application of the electric locomotive to interurban service conditions. He points out that since interurban railways have been turning their attention to freight traffic in order to increase their business small electric locomotives have been rapidly coming into favor.

Some of the factors that are retarding the development of these small locomotives are the variations in conditions of service and differences in mechanical standards of the various roads. It is suggested that if a definite effort were made toward standardization by both manufacturers and users some of the variations which now cause trouble might be eliminated and it might be possible to standardize the small locomotive into relatively few types. The results of such a standardization would be a reduction in the cost of locomotives and an increase in the scope and economy of locomotive service.

In order to arrive at some means of comparing the tonnage capacities of locomotives, interurban services are divided into three classes, namely, switching, continuous freight haulage over a rolling profile, and continuous freight haulage against a grade.

Switching service usually consists of a series of short runs involving average movements of from 200 ft. to 400 ft., and schedule speeds (distance covered in an extended period of time divided by the time) of from 2½ to 3 m.p.h. The problem is, therefore, largely one of acceleration and, as speed is immaterial, the motors should be geared for the lowest possible speed in order to secure a locomotive which is economical in energy consumption and low in first cost. The assumption is made that the available tractive effort of such a locomotive should be one-fourth of the weight on drivers, or, since in these small locomotives pony trucks are not used, one-fourth of the weight of the locomotive. It is also assumed that 25 lb. per ton is necessary to produce acceleration and overcome train friction. Expressed as a formula the

$$\text{Max. wt. of train in tons} = \frac{\text{Wt. of loco. in lb.}}{4 \times 25},$$

or if the locomotive weight in tons is designated by L the number of trailing tons,

$$T = \frac{\text{Wt. of loco. in lb.}}{4 \times 25} - L = 19L$$

Heating and accelerating ability are given as the factors which may limit tonnage in service which involves continuous haulage over a rolling profile. Assuming that the service is not modified by frequent stops and starts, and that train resistance is 10 lb. per ton, the limiting trailing tonnage, from the standpoint of motor heating, is

$$T = \frac{C}{10} - L$$

where C is the tractive effort corresponding to the continuous rating of the motors. From the standpoint of ability to accelerate on a grade the trailing tonnage,

$$T = \frac{\text{Wt. of loco. in lb.}}{4(20G + 25)} - L$$

$$= \frac{L(95 - 4G)}{4G + 5}$$

where G is the grade in per cent.

Continuous freight haulage against a grade is never met with in practice, but where the grades are long the motor heating approximates that which would obtain in such a service. For this condition the trailing tonnage is given as

$$T = \left(\frac{C}{20G + 10}\right) - L$$

The fact is emphasized that the above formulas are only general guides and need modification in many cases where practical application is being made. Examples illustrating the use of the formulas and comparative data on some interurban locomotives are also given.

P. S. C. Orders Reports on Condition of Bridges in New York

The Public Service Commission for the First District of New York has issued an order to various railroad companies operating in New York City possessing bridges or elevated structures within the city limits, together with the rapid transit lines, including the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company, and the latter's subsidiaries, directing them to furnish a report of the condition of all bridges and elevated structures of their respective lines within thirty days after the end of each calendar year. This report will amount to a certification to the commission of the condition of these bridges and structures. The order is to take effect immediately. The report must contain a statement that the bridges have been inspected by competent officials or employees of the respective companies, and if found safe the report must so state. If they are found to be not thoroughly safe, the report must further state what steps have been taken to place them in safe condition.

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Latest Thoughts on Claim Work

Delegates at Convention of Pacific Claim Agents' Association in Tacoma on August 9-11, Discussed Fundamentals of Claim Work, Relations with the Public, Motor Vehicle Traffic and Photographic Aids

THE eighth annual convention of the Pacific Claim Agents' Association, held in Tacoma, Wash., on Aug. 9, 10 and 11, was called to order by President Thomas G. Aston, claim agent Washington Water Power Company, Spokane, Wash. About forty members were present. Addresses of welcome were delivered by Dr. Ernest C. Wheeler, president Tacoma Commercial Club and Chamber of Commerce, and by L. H. Bean, manager Tacoma Railway & Power Company, Tacoma, Wash. President Aston responded to these welcomes, and then in his official address emphasized the benefit that the members and the companies receive from the association.

PAPERS AT OPENING MEETINGS

After the usual routine of committee reports, two papers were read by B. F. Boynton, claim agent Portland Railway, Light & Power Company, Portland, Ore., and A. M. Lee, assistant general claim agent Northern Pacific Railway, Seattle, Wash., on "Fundamentals of Claim Department Work" in their respective fields. These are abstracted elsewhere. Following the reading of Mr. Lee's paper, recess was declared, and the delegates were shown a new one-man car that was under construction in the shops of the Tacoma Railway & Power Company.

Practically the entire afternoon of the first day's session was consumed in reading and discussing the paper of F. J. Lonergan, attorney Portland Railway, Light & Power Company, on "Relation of the Claim Department to the Public," which appears elsewhere in abstract form. This paper aroused lively comment. J. H. Handlon, claim agent United Railroads of San Francisco, especially urged co-operation between doctors and the claim departments. He said that the first effort of his department was to secure the confidence of the injured party, impressing upon him the fact that the company would play fair and expected like treatment. In some cases the evidence secured by the department in its investigation was shown to the injured party. H. K. Relf, claim agent Spokane, Portland & Seattle Railway, Portland, Ore., said that he heartily indorsed the plan of meetings for carmen, where the staff of the claim departments could address the men on safety work and give instructions as to their conduct in case of accidents. The claim department, in his opinion, should impress upon operatives the necessity of securing definite information and names of witnesses. He suggested that the operating department and claim agent make their investigations jointly, if the accident was of serious proportion, as their combined knowledge of the conditions might produce more satisfactory results than if either worked alone.

Mr. Boynton stated that in his opinion investigators should be hurried to the scene of the accident at once, and also to the home of the claimant. If possible, signed statements of witnesses should be secured before the patient's attorney gets them. W. H. Moore, claim agent San Diego (Cal.) Electric Railway, suggested that the association should appoint a committee to frame a protest to be sent to the editors of the *Ladies' Home Journal* and *Good Housekeeping*, regarding the recent articles advising women to refuse at all times to divulge their names as witnesses to accidents. No action was taken at the time.

President Aston said that when an accident was called to the attention of his claim department, he immediately, in case the patient was a woman, detailed a female secret service agent to visit her home under some pretext to find out her condition. In case the injured party was not seriously hurt, the department made no move until a complaint was filed by an attorney representing her. If the injury was serious, the department made an immediate call and showed how fair it could be. Mr. Aston especially recommended that claim departments make friends with the medical fraternity. H. G. Winsor, superintendent of investigations and adjustments Tacoma Railway & Power Company, advocated doing away with the air of mystery in regard to the operation of the claim department. If a passenger was injured on the lines of his company, it felt that he should be paid in proportion to his injury. This kind of treatment, Mr. Winsor said, resulted in the securing of friends for his company.

SECOND DAY'S SESSIONS

The morning session on the second day was devoted first to discussing the subject of a paper which was to have been presented by O. D. Harris, assistant general claim agent Pacific Electric Railway, Los Angeles, Cal., entitled "Regulation of Motor Vehicle Traffic in the Country." This was not given, owing to the absence of Mr. Harris. Mr. Lee expressed the opinion that this country is rapidly approaching a time where it will be forced to regulate autos the same as street railway cars and steam railroad trains. One of the first requirements, according to Mr. Lee, will be that all motor traffic halt before crossing railroad or interurban tracks. President Aston remarked that the motormen of his company were instructed to assume that auto drivers are both deaf and blind. They are told: "If your assumption is correct, you will have avoided an accident; if not, no harm will have been done."

This discussion was followed by an address on "What Policy Is Best Adapted for Co-operation with Owners and Drivers of Motor-Driven Vehicles?" by J. W. Browne, claim agent Tacoma Railway & Power Company, which will be published in abstract later. In the discussion of Mr. Browne's paper, Mr. Aston said that automobiles should be regulated rather than street cars. He heartily advocated that members of the association affiliate themselves with some automobile association, and he also advised that claim agents avail themselves of every opportunity to address automobile clubs and similar organizations on the subject of safety work. The claim agents agreed that the problem of safety work must of necessity be purely educational, and that it is the serious duty of each member to exercise every effort to further the work.

Mr. Boynton thought that the suggestion in regard to addressing automobile clubs was so valuable that he intended to put it into practice in Portland within a week by detailing a man from his department to speak to the various local clubs.

Mr. Winsor made a motion as follows: "That the incoming legislative committee of this organization give

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careful consideration to the subject of motor vehicle regulation, both in the city and in the country, and work in co-operation with all the member companies of this association, to the end that suitable laws may be enacted at the next convening of the several legislatures covered by the territory that this association represents." This motion was seconded by Mr. Boynton and carried unanimously.

The afternoon session of the second day was featured by the reading of the papers, "Safety Work in Schools," by T. N. Henry, safety lecturer Tacoma Public Schools, which will be published at a later date, and "Safety Work with the Public," by H. B. Coffin, chairman Public Safety Commission, Portland, which is published in this issue in abstract. The address of F. L. Burckhalter, superintendent Southern Pacific Company, Portland, on "Safety Work with Officials and Employees," was not delivered, as Mr. Burckhalter was unable to be present.

CONCLUDING SESSIONS

On the morning of the last day, the delegates heard the papers by F. M. Hamilton, superintendent department of accident investigation Puget Sound Traction, Light & Power Company, on "Appraisal of Property Damage, and by A. J. Falknor, attorney for the same company, on "Regulation of Motor Vehicle Traffic in Seattle." These will be abstracted later. Just before noon the association went into executive session to hear and discuss the paper of Mr. Relf on "Treatment of Hospital Cases." The last paper was presented by Mr. Handlon, on "Photography and Other Exhibits as an Aid to Trial Attorneys." This paper appears in abstract form on another page.

After a discussion of some length, the convention addressed itself to general business. The city of Portland, Ore., was designated as the next place of meeting. The following officers were elected to serve for the ensuing year: President, H. K. Relf, claim agent Spokane, Portland & Seattle Railway, Portland, Ore.; first vice-president, H. G. Winsor, superintendent investigation and adjustments Tacoma Railway & Power Company, Tacoma, Wash.; second vice-president, W. H. Moore, claim agent San Diego (Cal.) Electric Railway; third vice-president, Thomas A. Cole, claim agent Los Angeles Railway Corporation, Los Angeles, Cal.; secretary-treasurer, B. F. Boynton, claim agent Portland Railway, Light & Power Company, Portland, Ore.

The new executive committee includes: J. H. Handlon, claim agent United Railroads of San Francisco; A. M. Lee, assistant general claim agent Northern Pacific Railway, Seattle, Wash.; F. M. Hamilton, superintendent department of accident investigation Puget Sound Traction, Light & Power Company, Seattle, Wash.; D. C. Davis, district claim agent Northern Pacific Railway, Tacoma, Wash.; Charles A. Blackburn, claim agent Butte Electric Railway, Butte, Mont., and Thomas G. Aston, claim agent Washington Water Power Company, Spokane, Wash.

The convention was not lacking in entertainment features. One of the most enjoyable occasions of the session was a large dinner dance in the dining room of the Tacoma Hotel on the evening of Aug. 9. On Thursday the convention adjourned about 4 p. m. to attend a basket picnic held at Point Defiance Park. On Friday morning the visiting ladies were entertained with an automobile ride over the city's boulevards. Undoubtedly the greatest treat in the entertainment line, however, was the automobile trip to Paradise Valley and the famous Mt. Tacoma. The party left Tacoma Saturday morning and remained over night at the mountain hotel.

Safety Work with the Public

BY HARRY B. COFFIN
Chairman Public Safety Commission, Portland, Ore.

The city of Portland was not slow to realize the importance of the safety first movement, as two years ago its present mayor, H. R. Albee, appointed a public safety commission, one of the first to organize in this country. This commission was made up of prominent business men, a master surgeon, high officials of the police and fire bureaus, the city traffic engineer, the superintendent of schools, the general superintendent of a steam railroad, an official of the local traction lines and representative members of the daily press.

Starting the campaign in the public schools, this commission brought home the principles of safety first to its 35,000 young Americans, instilling in their minds the dangers lurking all around them. It did not stop there, but appealed to the home life and the vocational activities, to suppress the chance taker, to eliminate dangerous conditions. The interest of the public was aroused and maintained. The press assisted in every way possible, and the authorities co-operated in initiating corrective measures.

During the past six months there have been 256 traffic collisions. There were 108 cases in which pedestrians were hit, resulting in five citizens being killed by automobiles and one by street cars, and 148 injured by automobiles and twenty-one by street cars. During this period, 2103 traffic violators were handled by the police bureau, of which 554 were warned and paroled by the captain in charge, 796 fined, 604 continued for sentence and twenty sent to jail for driving while intoxicated. A very creditable showing as compared to the monthly death roll in Seattle of five; San Francisco, eleven; Chicago, forty-five; Detroit, thirty, and New York, fifty.

One of the most potent factors in the safety first movement is the gathering together from time to time of delegates representing the community life of the city. Such a movement was initiated in Portland, called the "safety forum." A call was sent out to business houses and public utility corporations. As a result, we registered at the first meeting nearly 250 delegates, and the work of promoting interest in these representatives to carry the movement into every channel of the community's activities will be continued in the autumn.

How can wider and greater results be accomplished? By an organized effort to invoke the co-operation of a sympathetic public opinion. Why not help organize a public safety commission in all cities. Why not initiate a safety council in your own county to deal with the problem of safeguarding and education? It is pertinent to your business. The problem is not a one-man job. On the contrary, the broadest measure of support is required by county and town officials, public service corporations and the public generally.

Your commission would naturally plan and supervise a campaign of education. This would lead to a study of general hazards and those local to your community as connected with the physical and sanitary conditions of the streets and public places. Recommendations for safeguarding dangerous conditions and of suitable traffic regulations, the establishment of safety zones and isles of safety, the installation of up-to-date methods of handling traffic, the establishment of traffic bureaus with competent and experienced officers in charge directly responsible to the chief; the inspection of fire hazards in the home and in the factory; and, last but not least, the instruction of school children—all these subjects offer excellent opportunities for study and action.

The following thoughts, on a card sent to us, have made a deep impression:

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Fathers: Be cautious in your work. Remember the dependent family at home.

Mothers: Caution the working members of your family always to be careful.

Sisters and Daughters: Urge your brothers and fathers to do everything in the safe way.

Young Men: Careless methods used now may mean total or partial disability to you for the rest of your life.

Boys and Girls: Learn to do things NOW in a safe way. It will be valuable to you as you grow older.

Foundamentals of Claim Work

B. F. BOYNTON

Claim Agent Portland Railway, Light & Power Company, Portland, Ore.

The main fundamentals of claim department work are efficiency, co-operation, courtesy, prevention of accidents, and fair and square dealings, with both the public and the company. To accomplish this, the department must have competent, trustworthy investigators who will at all times, when taking statements from witnesses or claimants, bring out in unbiased fashion the points that are so necessary to the man in charge in determining the liability. The office employees that handle the records and do the filing should be selected as to their especial adaptation for correct filing and keen discernment, for with a corps of wide-awake office help a repeater or fraudulent claimant will very seldom pass through the hands of all without recognition.

The physicians and surgeons should be big, broad, intelligent men—men who are judges of human nature—for the kind, courteous, considerate attention given a patient by the physician many times minimizes what might have been a bad claim to adjust. They should thoroughly understand that they should at all times in their reports to the claim department show up the injuries in such a way that the claim agent will know the exact extent of these. The trial attorneys should at all times, when dealing with the juries and witnesses, show a disposition to be absolutely fair and impartial. In other words, they should show to the community at large that all the company seeks is absolute justice, let it hit where it may.

The prevention of accidents in connection with an electric railway is a very essential fundamental, and it should be under the claim agent's supervision. He is in a better position than anyone else to see what is causing different types of accidents, and if he is a man who has had any practical railroad experience, he will have a good idea of what would be the best preventive.

Another important fundamental is co-operation between the claim department and the operating departments. In fact, to obtain the best results a claim department must have the hearty co-operation of every other department connected with the utility. Moreover, as regards the people outside the company, the claim agent should meet with the business men and the public at large at the different gatherings and show that he takes an interest in the welfare of the community in all its different phases and is willing at all times, if necessary, to give his time toward different public enterprises.

Lastly, the different members of the claim department should be thoroughly schooled in treating the public in a kind, courteous manner. There is nothing that any department in any large or small institution can do that brings as good results as the practice of being polite and obliging. Members of the claim department should frequently hold meetings and exchange ideas on the best means of obtaining a higher standard of efficiency.

Steam Railroad Claim Work

BY A. M. LEE

Assistant General Claim Agent Northern Pacific Railway, Seattle, Wash.

Whatever contributes to good will between a steam railroad and those with whom it comes into contact may be considered as fundamental. Through the medium of the courts and legislation there has developed a growing tendency toward the removal of legal liability as the controlling consideration in determining the merit of claims. The leaning, on the contrary, has been toward the establishment of a humane estimate in injury cases growing out of the conduct of the railway business. The aim has been toward affording protection to the servant and according to him or to his heirs fair consideration following a misfortune.

In Washington and in many other states the question of compensation is entirely removed from any argument as to the circumstances surrounding the injury or the legal merit of the claim. This idea has not been enacted into law by Congress, and it does not now embrace the interstate carriers. But the tendency is in that direction, and the employer's liability act passed by Congress several years ago has removed many defenses theretofore available to the carrier in injury cases. These legislative enactments show the trend of public thought on the subject of compensation, and it will be reflected by the successfully conducted claim department of to-day. The fundamental responsibility is to afford help and relief in meritorious cases while protecting against imposition, and to do this without creating controversy.

The right to give away the company's money does not rest with the claim agent where a strict interpretation of legal merit shows no liability, but the developments of recent years toward affording the employee every protection possible and compensation for an injury incident to the conduct of the business, will offer a fair and reliable scale upon which to weigh the question—what fault produced the injury? And fairness, not alone to the injured party but to the company as well, more often indicates the wisdom of paying something. A mistake in the ordinary run of claims may much more profitably be made on the side of compensation than by withholding it. The payment, if made with a right explanation, in a case of even small merit, retains a grateful loyal employee in the service and at the same time removes the chance of litigation and maybe a large judgment.

Consideration of all of the elements of a particular case should be based upon a broad fairness which must govern also the inquiry into the facts. Unfairness carries its own penalty, and the discovery of treachery in any of our dealings will be at the sacrifice of a material part of our usefulness. Withholding justice will take away future opportunity for administering it. On the other hand, extravagance distorts good judgment and creates a false appetite. Fairness is the only safe guide.

By what has already been said there is no intention to discourage thorough investigation. Many cases arise wherein the loss is great, and the obligation, if any, is large; the question must necessarily be settled by some reviewing officer charged with a larger responsibility than the claim agent. A full knowledge of all the facts is essential to such a determination, and in order that no one may be misled care and resourcefulness must be diligently applied in gathering all of the facts. But this thoroughness will never be in conflict with absolute fairness.

We must not overlook the small thing against us because the general showing is overwhelmingly in our

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favor. The small element of negligence that we omit to consider may be the basis upon which a resourceful attorney will build up a case involving at least considerable expenditure of time and money for a defense. On the other hand, the small bit of adverse evidence, even though it be very small, may give the responsible reviewing officer justification for authorizing the expenditure of a lesser sum than litigation would involve, so that the claim agent is permitted at the right time to dispose of a case amicably.

The figures which wreck the showing which the claim department would like to make on the company's books under "Injuries and Damages" do not come from misguided liberality in the interpretation of the rights of injured persons, but from one-sided investigation and narrowness in determining the fair measure of the other man's rights, which mistake ultimately results in expensive litigation with sometimes a heavy judgment. All litigation is expensive, and for the most part it is also hazardous and largely speculative. It is best to make every reasonable concession to avoid a lawsuit.

Relation of the Claim Department to the Public

BY F. J. LONERGAN
Attorney Portland Railway, Light & Power Company, Portland, Ore.

The work of the claim agent of a public service corporation of to-day involves greater and more intricate problems and demands a higher degree of skill and efficiency than ever before in the history of such corporations. The claim agent owes a grave responsibility not only to the company he serves but also to the public, and to perform the duties of a claim agent satisfactorily requires a vast amount of preparation and training. The work requires a devoted loyalty to the company and also a just, equitable and courteous attitude toward the public in general.

The claim agent, as a representative of a public service corporation, occupies a position which requires of him the utmost good faith and integrity in all his dealings with the public. On the other hand the claim agent should demand and receive from the public honest cooperation, not only in the settlement of claims but also in the investigation which follows after an accident has occurred. For it must be readily apparent that where the public through its regulatory commissions has undertaken to regulate the service and limit the return upon the investment of a public service corporation, it has a direct interest in the affairs of such corporation, and if there is to be a betterment of service or a reduction in rates, every saving made by the claim agent must be considered a factor in bringing about such a result.

Were it not for the fact that public service corporations are required to pay out vast sums of money every year on account of dishonest claims—claims that are secured through fraud, deceit, exaggeration and perjury—there would be a considerable saving in the damage accrued account which would necessarily redound to the benefit of the public. I have yet to meet a claim agent, and I have been fortunate in meeting many, who does not experience almost daily the work of malingerers or professional claimants, a practice which would be short-lived if public opinion could be aroused sufficiently in cases of this character. To arouse public opinion in cases of this kind, is certainly one of the duties that the claim agent owes to the public as well as to his company.

Recently a woman secured a judgment against the Portland Railway, Light & Power Company on perjured testimony, and when the perjury was discovered, indictments were returned against the woman, her husband and another for subornation of perjury and against the witness for perjury. All parties pleaded guilty. The court, after two weeks of dilatory tactics, directed a verdict of not guilty against the woman's husband and dismissed the indictment against the woman. It also had the pleas of guilty withdrawn for the witness and the one who had helped procure his subornation, and the indictments in their cases dismissed. The court gave as the reason for this unheard-of proceeding that it thought the whole matter to be of a civil rather than a criminal nature, but to add to the travesty, it then promptly overruled a motion for a new trial in the civil case. Thus it may be seen that there are strange obstacles to be met in the attempt that is made to mold public opinion.

When we understand and appreciate the true relationship between the public and a claim department, we are appalled at the monumental stupidity and ignorance of such policies as has been advocated through the columns of the *Ladies' Home Journal*, advising and warning persons who might witness an accident to refuse their names to any representative of the utility who might call upon them and to refuse any assistance in arriving at the true facts in the case. Who should be more interested in giving to a public service corporation the true facts and circumstances surrounding an accident than one who belongs to the body politic?

The claim department has a great work to perform in its relation to the public. There are undoubtedly many ways in which this work might be accomplished, but the most important point concerns the character and the efficiency of the claim agent himself. The claim agent should appreciate that the public is necessarily interested in his work, and it should be his duty to bring this home to the public at every opportunity. He should enter into this work with the same earnestness and sincerity as he would in the performance of any grave responsibility. He should have a dignity that commands respect and an absolute honesty of purpose that carries with it conviction, and he should maintain a department that is so conducted and managed as to secure and at all times retain the utmost respect and confidence of the public.

Photography and Other Exhibits as Aid to Trial Attorneys

BY J. H. HANDLON
Claim Agent United Railroads, San Francisco, Cal.

Photographs can often be used to advantage to reveal the physical conditions existing at the scene of the accident, such as the condition of the roadway with reference to the paving and station platforms with reference to the accommodations provided for passengers. They can also be used to show the viewpoint of the motorman or engineer at various angles and likewise the viewpoint of the driver or pedestrian, as well as to describe the grades approaching the scene of the accident, the location of street or store lights, the congested condition of the thoroughfare, the space between tracks as shown by passing cars, the distance between the tracks and the street curbing or crossing gates or station platforms, and the overhang of the car when accidents occur at crossovers or curves.

When a photograph is taken immediately after an accident, it is sometimes possible thus to obtain evidence of the skidding or route of the vehicle and the exact location of blood spots or debris arising from the collision. When a vehicle is involved, it is advisable to photograph it to show the point of contact as well as the extent of the damage.

Photographs of the car are always valuable whether

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the case has arisen from a collision with a pedestrian or a vehicle or from an alighting or boarding accident. In the last mentioned class of accidents it is advisable to prepare for an accusation of defective car-steps by securing a photograph of these immediately after the accident. In investigating collisions between cars it is wise to examine and photograph the rails in the hope of discovering that some foreign substance has greased the rails. Defective parts of equipment should be photographed to establish the fact that the accident was unavoidable. Of course, the part that is defective should also be used as evidence in court.

Whenever possible, it is important to obtain photographs of injured persons while at work or showing them as being engaged in active pursuits. The exact date and time the photograph is taken, the accident report number and name of the photographer should be shown on the photograph. X-ray photographs of injured bones should be secured when any question arises as to the extent of the injury or the degree of recovery.

Charts should be prepared showing the various distances that are factors in the accidents, and profile maps can often be introduced to advantage. It is advisable to urge claimants and witnesses to furnish a sketch of the conditions under which the accident occurred. Shopmen's reports of their inspections of the car and their records of repairs made to the car before and after the accident, time-tables, weather reports, and police and hospital records are all valuable and often very necessary.

Instances have arisen where claimants and witnesses have refused to sign their statements but have been prevailed upon to identify their statements by tearing off a corner. Where their hands were unclean, they have been permitted to handle the statements so that their finger prints would be visible to the court or jury. When interviewing persons who deny witnessing an accident, it is important to secure from them a signed statement to this effect. Then, should they afterwards testify in court that they were eye witnesses, little or no credence would be placed in their statements.

Overhead Charges in the Bay State Case

Company's Expert Allows 12.74 Per Cent of Structural Cost to Cover All Such Charges

IN the reecntly argued fare-increase case of the Bay State Street Railway, Boston, Mass., before the Massachusetts Public Service Commission, an exhaustive study of material and labor costs was carried out by the company's consulting engineers. The company expended more than $120,000 in this work, including supplementary studies of rate schedules, and the results of the investigation are on file and open to public inspection in ten volumes of typewritten data in the offices of the commission. These data are well worth the examination of any engineer interested in valuations, for they are filed in unusually complete and usable form and throw a great deal of light upon the historic costs of electric traction property. The main points of the company's brief in the final presentation of its case to the commission were published in the ELECTRIC RAILWAY JOURNAL of July 29.

In the Bay State case, a considerable part of the overhead charges were said to be incurred during the construction of the constituent companies and were outstanding capital obligations at the time of the consolidations. This made it impossible for the engineers to present the actual records, and it was necessary for the company to submit estimates based on its experience and that of its engineers. The company contended that the only fair way to consider overheads in any case was to determine whether the total percentage allowed for such items was equitable. This was said to be the practice of most commissions. While it was advisable to have the engineer in charge give details as far as possible, the allowance should not be shaded because in one account engineering seemed too high, as it was necessary to make many arbitrary apportionments in working up the details. Thus, in the Bay State case, the work orders for underground construction were complete and no contingencies were assigned. These showed that 14 per cent of the structural cost was overhead. Yet after a complete study R. M. Feustel, expert for the company on valuation, was obliged to assign the details of the 14 per cent arbitrarily.

For all overhead charges, the Feustel allowance was 12.74 per cent of the structural cost, or $4,769,000. This, it was said, was conservative in comparison with the allowances made by other commissions. It was suggested at the hearings that the allowances of other commissions were made up on the reproduction-cost basis and therefore would naturally be higher. Mr. Feustel, however, recognized the fact by making the overheads lower on the original cost than those estimated on the reproduction-cost basis. The Bay State figures were also attacked on the ground that part of the overheads were met out of operating expenses. Mr. Feustel agreed that certain costs which might properly have been included in overheads undoubtedly were charged to operation, but he stated that his percentage was lower than it would otherwise have been because of this fact. His allowances for organization and legal, engineering and interest costs during construction were purposely kept lower than if the overheads had been figured on the reproduction-cost basis.

In regard to the assertion that if any part of the overhead costs had been met through operating expenses they should not again be allowed for in the value of the plant, it was emphasized that in the Bay State case other property paid for by the stockholders had disappeared, being used up in the service of the public; that the public had never paid enough to keep the property intact and that the company had never had a fair return by way of dividends. The company contended that if any overheads were paid for out of operating expenses it could not fairly be said that such costs were met by the public. On the contrary, it held that they were paid for by the stockholders by foregoing dividends or by capitalizing replacements which the public should have paid for. It was stated that during the last two years alone the stockholders had foregone in the way of dividends considerably more than enough to make up any possible failure to capitalize overheads, and the entire amount had gone into the property to take care of depreciation which should have been paid for by the riding public.

The supplementary report of the New Jersey State Board of Taxes and Assessment for the year ended Dec. 31, 1915, shows that the miles of track of cable, electric and horse railway companies in the State, as of the above-named date, totaled 1,251.53 miles. The capital stock issued amounted to $86,818,990, while that paid up was $83,582,376. Funded debt totaled $97,902,100 and other debts $13,934,427. The cost of railroad, including equipment and appurtenances, was $181,493,751. Gross receipts amounted to $22,034,000, while the expenditures for repairs, superintendence, management, etc., totaled $11,415,308. Dividends were paid to the extent of $1,866,339 during the year.

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Keeping Mechanical Department Costs

Up-to-the-Minute Cost Data Are Available Through the System Which Is in Use on the Oakland, Antioch & Eastern Railway

By F. A. MILLER

Superintendent of Power and Equipment, Oakland, Antioch & Eastern Railway, Oakland, Cal.

THE following system of keeping cost data was established in the mechanical department of the Oakland, Antioch & Eastern Railway by the writer about two years ago. It has proven of great assistance, as it enables one at a moment's notice to put his finger on just what it has cost the company to maintain any piece or all of its equipment for a given period. This makes it possible for the department to run down excessive costs on any item which goes to make up the annual maintenance budget.

METHOD OF SEGREGATING ACCOUNTS

A blue printed list, entitled "Shop Order Numbers," is the basis of segregation of all charges for labor and material which are expended in equipment maintenance. In this list are given the various equipment items and their corresponding shop order numbers. The list contains forty-eight main headings, which in turn are suitably itemized. A framed copy of the list is kept in each of the departments of the shop, and the foremen handling work are held responsible to see that the men in making out their time slips are charging the correct shop order number.

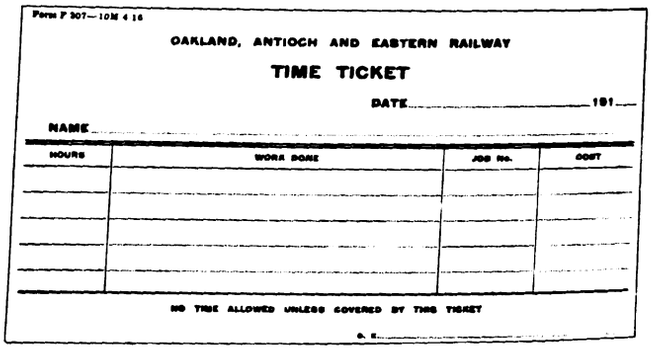
In the accompanying illustration is displayed the form of time slip used. Such slips are made out daily by the men and turned into their foreman, who O.K.'s and sends them to the office of the mechanical department not later than 10 o'clock the following morning. The slips are then entered on a loose-leaf time roll. This is made with one carbon copy, the original being attached to the payroll, which is forwarded to the auditor's office at the completion of each period. The copy is left in the department for filing.

The time slips are now extended according to the men's rates, and a recapitulation is made of all of the shop order numbers. The total for each equipment item is posted daily on a 5-in. x 8-in. card, a sample of which is shown partly filled out as Form II. There is one of these cards for each item listed on the blue print, and after a month's work has been completed a monthly total is extended; also a total for that month plus that for the previous month or months. Thus if one desires to know the maintenance labor cost of a certain piece of equipment up to any day or month or year, this card gives the information. At the end of the year the totals are transferred from these cards and tabulated under their respective heads as classified on the blue print. This tabulation shows labor, material, total and per cent of total. Per cent of total means the relation in per cent that the money spent on a specific job has to the total amount spent in the maintenance of equipment. By this method, increases or decreases in maintenance costs can be readily detected. The tabulated report covering the maintenance of electrical equipment on passenger cars, twenty of which are motors and fourteen of which are trailers, for the year 1915 is here presented.

After the cards have been posted a recapitulation of all the shop order amounts is again made and segregated

PASSENGER EQUIPMENT—COST OF MAINTAINING ELECTRICAL EQUIPMENT FOR YEAR 1915

Item	Labor	Material	Total	Per Cent of Total
Collectors:				
Pantographs	$172.64	$58.88	$231.52	4.8
Trolley poles and wheels	173.89	261.58	435.47	8.6
Trolley bases	10.07	1.01	11.08	.22
Totals	$366.60	$321.47	$688.07	13.62
Per car-mile				0.047 cent
Wiring:				
Main wiring	$139.07	$54.69	$193.76	3.9
Control wiring	76.71	40.93	117.64	2.5
Dynamotor wiring	58.72	89.61	148.33	3.03
Totals	$274.50	$185.23	$459.73	9.43
Per car-mile				0.0308 cent
Main Apparatus:				
Change-over switch	$87.36	$11.57	$98.93	2.03
Circuit breakers	7.86	.74	8.60	.18
Reversers	101.43	49.09	150.52	3.08
Dynamotor brush holders	8.55	20.16	28.71	.58
Main resistance	77.96	183.98	261.94	5.4
Switch groups	164.48	62.02	226.50	4.7
Totals	$447.64	$327.56	$775.20	15.97
Per car-mile				0.051 cent
Motors:				
Motor bearings	$43.05	$176.64	$217.69	4.5
Brush holders	35.18	59.83	95.01	1.9
Motor leads	85.67	98.42	184.09	3.8
Armature bearings	9.00	.56	9.56	.19
Gear cases	1.02	None	1.02	.02
Changing armatures	134.48	1.98	136.46	2.8
Repairing and rewinding armatures, 322 E	172.76	116.57	289.33	5.9
Changing fields	10.96	None	10.96	.22
Totals	$491.10	$452.00	$943.10	19.14
Per car-mile				0.082 cent
Dynamotors:				
Brush holders	$8.55	$20.16	$28.71	.58
Resistance	47.20	111.48	158.68	3.5
Changing armatures	50.55	.45	51.00	1.5
Repairing and rewinding armatures	159.75	74.86	234.61	4.8
Changing fields	8.78	1.87	10.65	.22
Repairing fields	7.44	26.00	33.44	.7
Totals	$282.27	$234.82	$577.09	11.30
Per car-mile				0.038 cent
Control Equipment:				
Controllers	$26.01	$0.50	$26.51	.5
Operating switches	2.02	None	2.02	.04
Control resistance	6.54	8.06	14.60	.3
Bus line receptacle	22.15	12.81	34.96	.7
Bus line jumpers	32.38	30.65	63.13	1.3
Control receptacle	33.41	17.16	50.57	1.04
Control jumpers	76.94	34.32	111.26	2.3
Miscellaneous electrical repairs	25.88	49.91	75.79	1.6
Electric brakes	58.22	44.66	102.88	2.2
Totals	$283.55	$198.07	$481.62	9.98
Per car-mile				0.032 cent
Inspection electrical equipment				$960.00
Per car-mile				0.083 cent
Total cost				$4,889.86
Total passenger-miles				1,500,604
Cost per car-mile				0.32 cent


Form P 307—10M 4 16

OAKLAND, ANTIOCH AND EASTERN RAILWAY

TIME TICKET

DATE _____ 191__

NAME _____

HOURS	WORK DONE	JOB No.	COST

NO TIME ALLOWED UNLESS COVERED BY THIS TICKET

FORM 1—DAILY TIME SLIP FILLED OUT BY WORKMEN FOR REGULAR WORK

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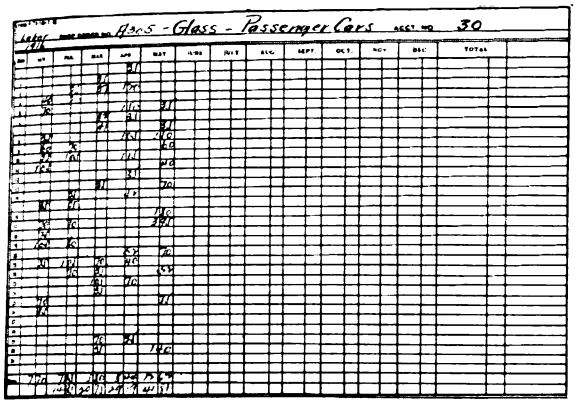
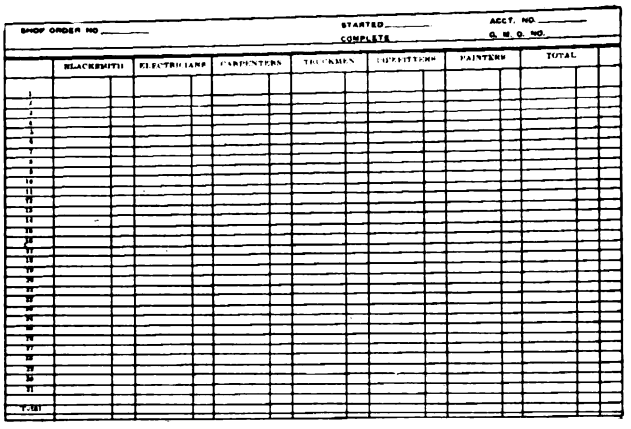


FORM II—RECAPITULATION CARD FOR REGULAR SHOP ORDER NUMBERS



FORM III—RECAPITULATION CARD FOR SPECIAL JOBS; LISTS COSTS FOR SHOP ORDERS OTHER THAN MAINTENANCE

in accordance with the Interstate Commerce Commission classification. The next step is to post these segregated amounts on a large form arranged to cover a period of one month. This form is posted daily. Each day's amount is added to that of the previous day, so that if it is desired to know how much the payroll amounts to at any time in the month, or the total of any account, it can be read directly from this sheet. At the end of each month a typewritten report is extracted from it and forwarded to the auditor's office for comparison with the payroll.

The labor slips are finally filed, each day's time slips being placed in an envelope together with the other necessary papers pertaining to that day's business and filed away by the day, by the month and by the year.

METHOD OF HANDLING MATERIAL AND SPECIAL ACCOUNTS

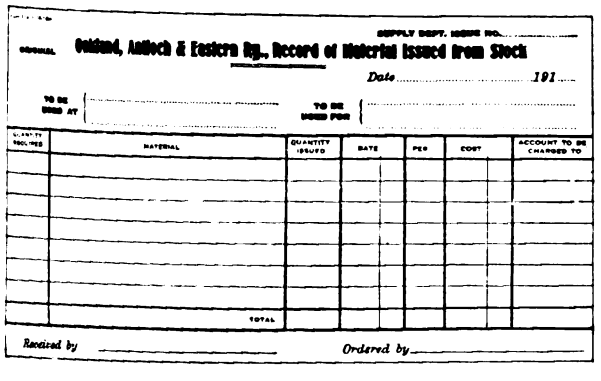
Material is handled in practically the same manner as labor. In finding the cost of materials for a particular equipment item, a recapitulation of all the shop order numbers is made, the same as with the labor slips, and posted on cards, Form II or Form III, as the case may be. The Interstate Commerce Commission classification is then made and posted on the large sheet with the labor account.

For construction work or for any special work on which an individual cost is desired, Form III is used. In this case a shop order number is made out in large letters and posted in the shop on a board designated for that purpose, and all labor and material is charged to that order number. When the work is completed, a signed slip is forwarded to the mechanical department office by the foremen who had men from their department on this work. The shop order slips are filed away numerically. A recapitulation of them is made on Form III showing the amount of money required by each class of help to do the work, and also the amount of material used, thus giving the complete cost of each order put through the shop.

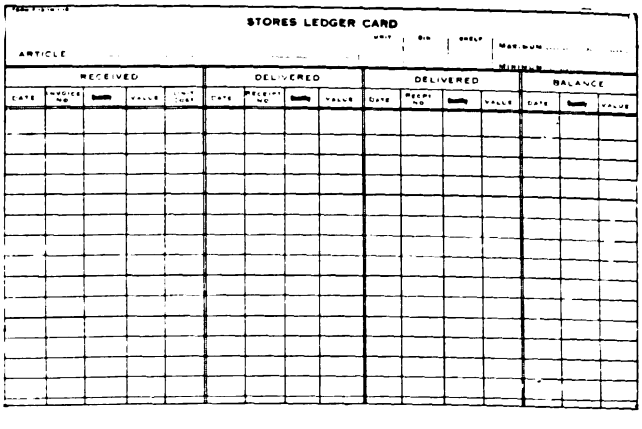
STOREKEEPING METHODS

All material, whether in the store or otherwise, is under the control of the store and in the material and supplies account. Therefore, in order to secure material of any kind a requisition must be presented to the stockkeeper. Foremen are supplied with requisition blanks, and have authority to request material of the store for work in their departments. In making out a requisition, the shop order number as taken from the blue print is recorded on the requisition form. The completed requisition is then presented to the stockkeeper, who delivers the material, getting the workman's acknowledgment of its receipt. The stockkeeper inserts on this requisition the quantity of material delivered and the corresponding stock numbers. Our material is divided into twenty-five classes, such as "track and roadway," "car body material," "electrical equipment," "bolts, all kinds," "wire, all kinds," etc. Each class is represented by a letter, and all of the different kinds of material under that class are listed numerically. The stockkeeper turns the completed material requisitions together with the purchasing department requisitions covering received materials in to the office of the mechanical department each morning before 9 o'clock. These purchasing department requisitions are signed by the stockkeeper, who also indicates thereon the date of receipt of the material.

All completed requisitions are filed away daily in a box, classified according to account, so that at any time in the month if it is desired to look up the material used on some account the requisitions will be found in this box under the account number in question. At the



FORM IV—USED BY FOREMAN IN REQUISITIONING MATERIAL FROM STOCKROOM



FORM V—MATERIAL LEDGER CARD KEPT IN MECHANICAL DEPARTMENT OFFICE

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end of each month these are removed and the papers pertaining to each account are clipped together and filed away by months, together with the necessary papers supporting the month's business.

Store ledger cards, Form V, for all material in the material and supplies account, segregated into classes and arranged numerically, are kept in the office of the mechanical department. These cards are also used as price cards.

The main point is to have each day's work considered a unit and complete it that day. In this way no time is lost in looking up records a week old, errors are eliminated in the distribution, and nothing is forgotten, as the transaction took place on yesterday and is still fresh in the minds of all concerned.

Pacific Electric Railway Experiments with Motor Bus Feeders

Company Operates Six-Wheel Auto Bus in Arlington, Cal., Where Jitneys Have Been Excluded

THE Pacific Electric Railway recently built at its Los Angeles shops two six-wheel motor buses of the type shown in the accompanying illustrations, which will be used experimentally as feeders for its electric systems in an effort to work out some successful plan for improving and extending its service. Company officials have made it plain that the new vehicles are not put on in competition with jitney buses, but will be assigned regular schedules for the present in outlying districts which it is desired to connect with existing traction lines or where it is not practicable to build extensions under present conditions.

A novelty in the new cars is the flexible feature, an important element of the patents. The passenger body is not a trailer, as it is supported on a ball and socket joint located forward of the rear axle of the engine member, thus combining the two parts in a six-wheeled, flexible coach. An automatic steering lever connects the middle or driving axle with the hindmost axle, the latter having the same connections between wheel and axle as the ordinary automobile front axle. In this way the hindmost wheels are made to track those ahead, and thus the limiting turning radius for the entire coach is no greater than that of the four wheels of the engine member.

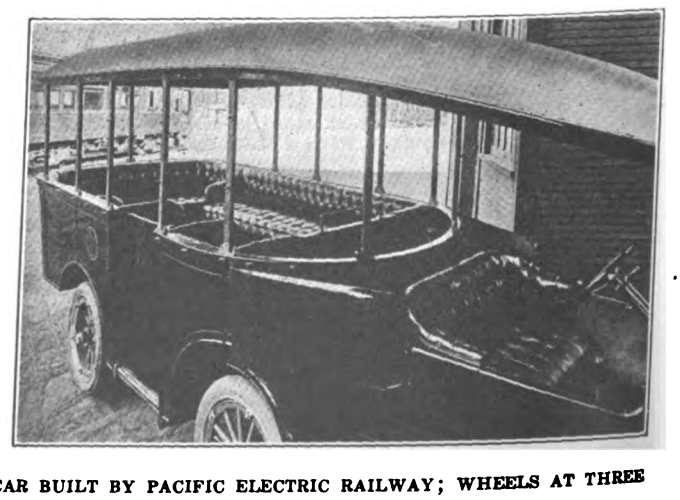
A feature claimed for this type of construction is that because the forward end of the passenger section is supported at one point, the rocking common to the ordinary four-wheeled car is absent. By having the motor on a separate chassis the passengers do not feel its vibration, and the connection is made convenient for speedy uncoupling, so that in the event of any breakdown on the engine member the rear section can be jacked up and another engine member coupled on in a few minutes. Spanning the flexible joint between the engine member and the passenger section are curtains, which operate on spring rollers. These curtains are to be painted with route signs.

One man operates the machine, the seating arrangements being such that passengers pay their fares on leaving. The first two cars built have a seating capacity of twelve in the rear section and one with the driver. These cars were built according to plans which have been worked out in detail for either twelve or twenty-passenger bodies. Any light automobile can be adapted as a motor. Those used by the Pacific Electric in their first two units are Chevrolet cars with engines rated at about 30 hp.

The first of these cars to be put in service went into commission on July 26 in Arlington Heights, a suburb of Fresno, which has a population of about 3000, and which has been without transportation facilities since the jitney buses were excluded from that city. The ordinance which forbids the operation of jitney buses in Fresno does not prevent the operation of this car, as it is an electric line feeder and has become a part of the equipment of the Fresno Traction Company. The bus will run only on streets where there is no car service at present, and will transfer passengers to the electric system. The new car was driven from Los Angeles through the Mojave Desert and over the Tehachapi Pass up to Fresno, a distance of 246 miles, in ten hours and thirty minutes, arriving in excellent condition and ready for immediate service.

It is believed that this coach combines the good points of the jitney, such as low operating cost, curb loading, quick get-away, comfort of riding, with the good points of the trolley car—greater capacity, responsible management, and free transfers to existing lines. Being operated by a street car system these vehicles serve as feeders from outlying or adjacent districts, for use where service by trolley cars is not profitable or is objectionable, and for testing out extensions of rail systems.

The equipment is the invention of R. B. Fageol of Oakland, Cal., who produced the Fadgl motor trains used at the Panama-Pacific Exposition. Mr. Fageol's inventions are being handled by the Fadgl Flexible System of San Francisco. Although two demonstration cars have been built previously, those recently put in service by the Pacific Electric are the first to be tried out by an electric railway company.



TYPE OF CAR USED BY FRESNO (CAL.) TRACTION COMPANY CAR BUILT BY PACIFIC ELECTRIC RAILWAY; WHEELS AT THREE DIFFERENT ANGLES

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How to Appraise Public Utility Property

In This, the Concluding Section, the Author Discusses the Use of Field Checks, the Summation of Field Data, the Preparation of Labor Costs and the Use of Appraisal Data in Evidence

By GEORGE W. KUHN, M.E.

THE ELECTRIC RAILWAY JOURNAL of July 15, 1916, contained the first section of this article on the general methods to be pursued in appraising public utility property. In that issue the discussion was confined to the planning of appraisals, co-operation with the appraised company, the handling of company records and the designing of forms. In this issue the author takes up the use of field checks, the summation of field data, the determination of labor costs and the presentation of appraisal data in evidence.

FIELD CHECKS

To secure information not available from the company's records or to check that which has been secured, a field inspection of the property is usually found to be necessary. Whether such information is to be complete or at random will depend upon the nature and the amount of information required as well as upon the extent of detail and accuracy desired. The examination may be made primarily to determine the physical condition of the property or to obtain such knowledge of construction types and conditions as will form a sound basis for compiling installation costs. It is recommended that at least a random field examination be made regardless of the apparent completeness of the written record, so that the reliability of the written record may be confirmed or definitely discredited.

The field check will be most effective if timed to start after all the office work pertaining to the inventory of structures in the field has been completed. Only at such time can the amount of detailed field data required be known and the inspection so arranged that all of such information may be obtained during one examination. Many of the problems arising during the preparation of the office inventory may be profitably reserved for solution in conjunction with the field inspection.

The time necessary for checking the office records by a count in the field may be very much reduced if arrangements are made to have the various company employees in charge of groups of property prepare inventories. This can be done readily and accurately because of the familiarity of the men with the property in their charge, and a random check by the appraising force will establish the reliability of the original count and furnish a double check on the records in the company's office. The facts that such employees usually receive lower wages than the appraising force and that the counting by such employees will add an insignificant amount to the ordinary day's work, will tend to keep the total cost of making the inventory of such property very agreeably low.

To facilitate work in the field, the streets on which property is located should be systematically arranged into routes for economic travel. While it is true that the manner in which the written records have been prepared will determine the corresponding form and order in which the field records are to be made, a judicious division of streets so that in a given section the number or size of wires or ownership or use of poles is constant will make it possible for a field party to keep track readily of several kinds of property at the same time. In so far as possible the plan of the field operations should be worked out in detail in the office by the use of maps, street guides, routes of street car lines and all the information at hand.

The route sheet shown as Form I adds to the convenience of both the field men and those directing the work from the office. The "route number" space makes it possible to refer to a route definitely and most briefly, while the "locality" space takes the name of the section of the territory covered by the appraisal and gives a more or less definite conception of the conditions to be met and also helps to determine whether certain routes should be assigned together to the same field party. The length of the route in miles, as entered in the "approximate miles" space, helps toward uniform total street length being assigned to the various parties. The column headings for "Street," "From," and "To" are self-explanatory. The heading "F. P." calls attention to places where circuits and equipment are supported on foreign poles or on elevated railway structure. The heading "Remarks" allows the man in the office to insert notes telling the field party where they can save time by riding, directing them to pick up equipment,

Company ..... Date ..... File No.
Computer ..... Checker ..... Sheet No.
Subject: Route Sheet for Field Check ..... Inv. No.

O Route No. ..... Locality ..... Approx. Miles

Street	From	To	F. P.	Remarks

FORM I—CONVENIENT ROUTE SHEET FOR FIELD MEN AND FOR DIRECTING WORK FROM THE OFFICE

short runs of circuits or pole lines on intersecting streets, and calling attention to changes in names of streets on which property is installed and matters of like nature.

Form II on page 316 shows the field man at once the entire situation for a given street. It shows whether certain groups of property are installed or not, whether any questions are to be answered and whether additions and removals since the date of the appraisal require consideration. A checkmark in a given column opposite a given street will show that the particular item has been considered in the office for that street. The color of the checkmark may very conveniently be used to show the field man whether the item marked requires his further consideration for the street involved. Not only is time saved by making it unnecessary for the field man to look through many detail sheets each time a question arises in his mind, but the sheets and records themselves are spared an immense amount of handling which could have only detrimental effects on them.

Every convenience that will assist in the work of the field parties will well repay the trouble and time spent in providing it. Such matters as stiff backs for the

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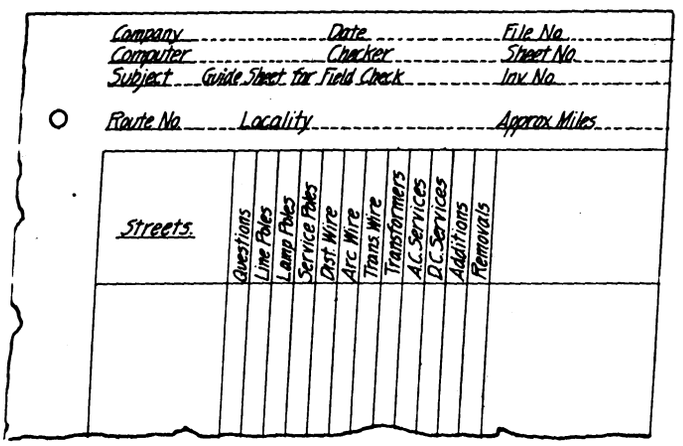
binders containing the necessary records, so that writing in the field may be done less inconveniently; large rubber bands to prevent the pages being disturbed by the wind; extra forms fully ruled to save work of ruling same in the field; a pocket map and a street guide of the locality, and a copy of instructions should be issued to each party going into the field. The type of pocket map found to be most useful is provided with an alphabetical list of street names printed on the back of the sheet, so arranged that by using a co-ordinate system of letters and numbers on the borders of the front of the map, any street may be quickly located. The instruction sheets should contain a complete description of construction types used in the classification of the property being examined. The accompanying set of field instructions and sketches of construction types for circuit suspensions on elevated railway structures (pages 317 and 318) illustrate the complete description of work that should be given to field men.

Definite rules should prescribe the manner of correcting the original office record so that it will not be destroyed nor later comparison of office records with



FORM II—GUIDE SHEET WHICH SHOWS AT A GLANCE THE ENTIRE SITUATION FOR A GIVEN STREET

information found in the field made difficult. By careful attention to such details as the use of colored pencils, the prohibition of erasures, the use of definitely determined symbols, etc., the original entry may be confirmed or contradicted, or even a final entry differing from both the original office data and the information observed in the field may be specified along with the reason therefor, while at the same time the entire record from beginning to end may be preserved intact on the original sheet for future reference. In general, the more fully the plan anticipates the differences which will surely develop during and after the field inspection between the records and the field observation, the greater will be the efficiency, the more useful will be the results obtained and the lower will be the cost of the work.

In laying out routes, the plan should be so arranged that of a certainty property at intersections of streets shall be recorded only once. To this end, conventional signs or check marks should be specified in the instructions, through the use of which a party coming upon the property in the field may know whether it has already been listed by a preceding party. The limits of routes to be followed by the various parties should be very definitely decided, and specifications should be explicit as to side of street, pole number or other boundary which is to divide the different territories. Marks placed by parties on property in the field may be so designed that, when used in combination with a system of telephone calls to the office at specified times, the parties may be promptly located by men from the office seeking to confer with them or to furnish them with supplies.

The duplication of a field examination for the purpose of verifying the results originally obtained is not justified because of the relatively great expense for the results obtained and the usually very small percentage of error found. Practically as good a check may be obtained by having the field parties made up of more than one man each and requiring that two members of each party shall make independent determinations of the quantities, measurements or other detail recorded. This can be done very quickly and often obviates serious errors in the work.

Arrangement of routes is planned with the recorded data as a basis, but field parties should, of course, be alert to observe and record any extensions beyond those shown by the record in hand, where such extensions occur on the lines or routes assigned to them. The same care should, of course, be used in taking account of places where property as existing in the field is not of the same description or amount as that recorded in the office. In cases where the field check is carried on after the official date of the inventory, the amount of change of record is very much reduced if memorandum lists of extensions and retirements since such date are furnished to the field parties. Such information will account readily for differences found by men in the field and save much misunderstanding and needless work.

In the preparation of inventories, particularly of such properties as are not readily susceptible of a field check, means must be provided whereby the inventory made from the company's record may be checked. Among the very best means is the preparation of records in graphic form, and if the company does not have suitable maps and records for the purpose, they should be prepared by the appraisers. Such maps should be to scale and sufficient space should be provided to allow several conventional lines being marked on the streets. The probable necessary widening of the street spaces will, of course, throw the block measurements out of scale, but if measurements along streets are taken between center lines of intersecting streets, the scale may still be used without serious error. Such maps when completed will show the continuity of underground duct lines, pipe lines and overhead circuits, the necessity for attendant structures such as standpipes, switchboxes, valves and fittings of various kinds, etc., and will tend to point out errors not readily discovered otherwise. They will also often furnish information not available from any of the records examined and offer a basis for the conception of the system as a whole; the extent and location of the territory served; the condition of the property as to duplication of plant, inadequacy, direction of probable growth of the system, etc. Much valuable information regarding average length of haul from the storeroom, location and density of distribution of poles, pipe lines or underground duct systems, location of line transformers, pavement conditions, flexibility of the system with regard to alternate or relay routes of transmission or distribution, etc., may often be deduced from such graphic descriptions of the property and the district served.

SUMMATION OF DATA

In the treatment of the information listed on the field sheets, it will be found to be a distinct advantage to average such sheets into groups, so that they may present complete and separate histories of the examination of the various parts of the property. For flexibility, however, the various steps in the consideration of the property groups should be capable of independent treatment and the following arrangement has been found very convenient and is recommended. The prop-

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Instructions for Parties Checking Overhead Lines in the Field

General: The main object of the inspection is to determine the accuracy of data taken from the company's record as of the date of the appraisal. It is desired also, however, that a general observation be made of construction methods, practices affecting costs and conditions affecting depreciation so that intelligent reports may be made upon these matters. Specific note should be made where property is inoperative.

To facilitate the work, streets on which the company has overhead circuits have been grouped into routes and such routes have been divided, as far as practicable, into sections in which the physical characteristics of the property are constant. The sections have been so arranged as to give the most economical line of travel for the route, and it is important that the sequence and direction noted should be followed.

The inventory records of the various groups of property to be inspected have been arranged by streets and compiled into route folios along with an explanatory route sheet which gives the names of the streets making up the route, the sequence of streets traveled and direction of travel. All material listed on the inventory sheets should be accounted for by the party in charge of the route unless specifically instructed otherwise by notes on the route sheet. Construction work done on property since the date of the appraisal is noted on the route sheet and care should be taken to avoid listing this as extra property not entered in the inventory record.

Special rules regarding procedure at intersections of routes and lines are given elsewhere in these instructions.

Electric Services: Spaces have been provided on the service sheet in which to note the lengths of cable, pipe and greenfield in each service. It is not necessary to estimate or list lengths inside buildings. Cable should be listed by the length from the pole to the building and will be assumed to be three conductor unless listed otherwise. List pipe and greenfield separately and specify total lengths of aerial wire used in feet of single wire.

Specify services according to following characteristics by type letters:

A—Aerial wires (or cable) from pole to building with greenfield on building.

A1—Aerial wires (or cable) from pole to building with pipe on building.

A2—Aerial wires (or cable) from pole to building with pipe and greenfield on building.

B—Branch service (tap from another service) with greenfield on building.

B1—Branch service (tap from another service) with pipe on building.

B2—Branch service (tap from another service) with pipe and greenfield on building.

C—Inside wiring only (services marked "B?" in lists are to be changed to "C" if found to be inside wiring only).

Greenfield or pipe used for services and located on poles, elevated railway structures, etc., should be noted in a separate column as extras, and the single length of wire in them should be included as part of the total length of wire in the service.

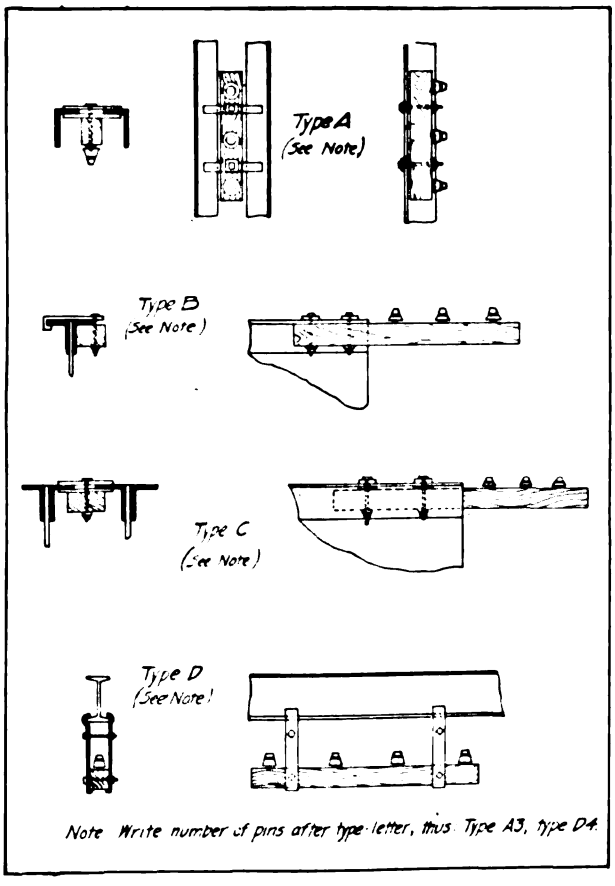
Special poles which are not line poles on private property, as well as storm-boxes, stand-pipes, etc., which are erected and used exclusively for services, should be noted for such use on the pole lists.

Extra supports, such as cross-arms on elevated structures, when used exclusively for house services should be noted on the service sheets, but when used for street lighting should be noted on the lamp pole sheets.

Services are special departures from the main overhead line to serve the consumers' premises and, except in large installation, may be distinguished by the fact that they use multiple conductor cable. Consider all wires between line poles as part of the main circuits. Services from series arc circuits are to be taken as running from the line pole to the lamp pole or, in case the pole supporting the lamp serves also to support the line, from the top of the pole to the lamp only.

Where it has been necessary to assume that certain services are of underground construction and such services have not been found in the records of the underground construction, the listed item has been marked with a blue check. This group includes services running down standpipes from overhead lines but excludes connections between overhead and underground lines. Primary services to public schools and large buildings have been marked on the list with a red check. Special attention should be given to these checked items and full information recorded if any overhead construction exists.

It is expected that the men in the field will form mental conceptions of the standard types and sizes of materials used so that when construction departs to any marked extent from the standard they may be able to recognize and record the details.



SKETCHES OF CIRCUIT SUSPENSIONS ON ELEVATED RAILWAY STRUCTURES TO ACCOMPANY FIELD INSTRUCTIONS

Lamp Poles and Transformers: Before starting to inspect a locality, the record showing the location of lamp poles and transformers should be consulted and the approximate locations noted. By this means much unnecessary work may be avoided since only sheets bearing on other groups of property will have to be consulted for locations for which no transformers or lamp poles are recorded. It will be assumed that each transformer is provided with two primary cutouts and no secondary cutouts unless the field notes specifiy otherwise.

Poles and Fixtures: To avoid confusion due to double recording of material at intersections of lines, the following method will be followed:

1. At ends of lines and at intersections, including cases where one or more lines are carried on foreign suspensions, the intersection or terminal pole carrying circuits being checked shall be so marked by the first party arriving at such poles that the disposition of the material may be known by the second party. The following marks will be used and will have the meaning noted:

X—Pole, fixtures and transformers (if any) taken.
P—Pole and fixture only taken.
T—Transformers only taken.
O—Circuit only taken.

2. The first party arriving at an intersection will take note only of such material as is listed on the sheets in its possession, leaving all other material to be taken by subsequent parties. The first party will also mark an arrow on the side of the pole near the walk, about five feet above the ground and pointing in the direction of travel of such party. Where fire alarm boxes are installed on poles and painting of the pole might cover such arrow, the arrow should be duplicated near the ground line.

3. Where standpipes are installed on poles for the use of circuits rather than for services, such standpipes should be listed as part of the pole and fixture account and the note should show the kind of circuit served.

4. Pavement for street and sidewalks, which would be affected by the installation of poles, stubs and standpipes, should be noted on the pole sheets by means of the following abbreviations (use printed capital letters):

A—Asphalt sheet.
AB—Asphalt block.
WB—Wood block.
G—Granite.
M—Macadam.
BB—Belgian block.
B—Brick.
D—Dirt.
MS—Medina sandstone.
F—Flagging.
C—Cement.

5. Where too great expenditure of time is not involved, general notes should be made regarding excavation conditions as observed at openings, conditions affecting disposal of surplus excavated material, etc., wherever possible.

6. Where giant strain insulators are used to sectionalize or end circuits, such insulators should be listed as extras. When used in pairs, note as "double giants." Note clevis ends, specially large sizes and extra greenfield on poles. Identify stubs, guys and anchors with the pole which they serve, noting cases where stubs at intersection, etc., serve more than one pole. Where two guys appear on a pole owned by a foreign company but used by the electric company, assign one guy to the electric company. Note double cross-arms as the number of pairs of single cross-arms to which they are equivalent.

7. In listing poles not found on the original inventory records, all data, including ownership, if such can be determined, should be noted and the location given with respect to a given curb of the nearest intersecting street.

8. Methods of supporting circuits from elevated railway structures are shown in the accompanying sketches and the number of units should be reported by type letter. When the limits of location are given between which the type of construction is uniform, the average spacing of units may be given instead of an actual count. It is recommended that such sections be not allowed to become too lengthy so that confusion in counting may be avoided.

9. The field parties will take circuits, poles, etc., up to and including the pole immediately at the station or substation.

Circuits: In checking circuits in the field, note pole numbers of poles at limits of sections directly on the circuit sheet. Where such pole is foreign-owned or the number cannot be distinguished, the length given on the record may be checked if found correct. Lengths given for sections of circuits supported wholly on foreign poles have been approximated only and should be checked roughly for

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Instructions for Parties Checking Overhead Lines in the Field—*Continued*

accuracy, and correct figures should be substituted where necessary. Do not erase records; draw a pencil line through them and write the correction above. Where no figures were included in the original inventory, insert a cipher and draw a pencil line through it and then write the correction above it.

Miscellaneous: Each party should see that it is provided with a street guide and map, a list of streets having more than one name, a crayon, a copy of instruction sheets, all records for the section to be inspected and additional forms for listing material found. The number of hours worked per day is to be the same as in the office. Progress should be reported to the office each forenoon and afternoon by telephone, and a record will be kept in the office of the time of calling, the location, the progress made and the direction of travel, so that the field men may be reached conveniently in case it is necessary to convey information or supplies to them.

Sheets checked in the field are to be signed in the space marked "checker" by the man in charge of the party. Records are to be preserved with all care possible. Avoid the use of ditto marks. The use of ink and large check marks, erasures of original record and other practices tending to disfigure the sheets or make them illegible are strictly forbidden. As sections of routes are completed, they should be checked off on the route sheets. Materials found in the field and not recorded on the lists and not included in notes of installation since the date of the appraisal should be listed under the heading "field extras." As in the original records, not more than one street is to be considered on a sheet.

The following abbreviations are for use in listing material.

F.P.—Foreign pole
P.P.—Private property
G.—Ground wire and guard
Ph.—Pot head
Cb.—Curb.
P.—Pine.
Ch.—Chestnut
Cd.—Cedar
F.—Feeder
M.—Main
Cr.—Concrete
L.A.—Lightning arrester
U.G.—Underground
S.P.—Standpipe
Sp.—Special
R. C.—Rubber covered.
Wh.—Westinghouse
G.E.—General Electric
M.H.—Manholes
S.B.—Service box
D.B.—Double braid
L.C.—Lead covered
Pr.—Primary
S.—Secondary
H.D.—High tension direct-current
H.A.—High tension alternating-current
L.D.—Low tension direct-current
L.A.—Low tension alternating-current

In referring to poles the following will be used:

J.T.—Pole owned jointly by electric company and telephone company.
J.W.—Pole owned jointly by electric company and Western Union.
J.C.—Pole owned jointly by electric company and city.
T.—Pole owned by telephone company, used by electric company.
W.—Pole owned by Western Union, used by electric company.
C.—Pole owned by city, used by electric company.
E.T.—Pole owned by electric company, used by telephone company.
E.W.—Pole owned by electric company, used by Western Union.
E.C.—Pole owned by electric company, used by city.

erty is divided into groups according to some system of accounting. The system found to give the best results is the uniform system prescribed by some regulating body, such as the Interstate Commerce Commission or the State Public Service Commission. The group designation (in the case considered this would be the account) receives some identifying number and is incorporated into the file number of sheets on which property included in that group is listed. This will act automatically to arrange all allied property into distinct groups in the files. A further step consists in dividing such files into sub-groups, such as field sheets, detail computation sheets, final summation sheets, sheets on which depreciation, scrap value, etc., are considered, and the like. These sub-groups may be easily separated from other parts of the general group by the simple incorporation of a sub-group letter, or other designation, into the file number. In case detailed and independent computation or consideration along separate lines is necessary for parts of these sub-groups, it is a simple matter to divide them into sections whose numbers will appear as prefixes to the sheet numbers.

It is advisable that the sub-groups containing the compilation and computation sheets be kept separate from the records of field inspection, both for convenience in handling and because the original field sheets will thus be protected from much unnecessary wear and tear which might result in erasure or blurring of the record.

In all computation or summation work where there may be necessity for analysis or revision at some later time, it is almost absolutely necessary that record be made of the source from which information was obtained and that the results of computations be verified before they are used in further continuation of the work. Judgment must be used to determine how far an investigation should go before the detail consideration must be checked, since it is apparent that there is a golden mean which will balance saving in cost of checking against importance of probable error with consequent duplication of part of the work of computing.

For obtaining uniformity in methods and clearness of information regarding such methods, it has been found to be a very profitable practice to write descriptions of what is done while the work is still fresh in the mind of the men in charge, and to incorporate such descriptions in definitely assigned places in the files. Such procedure will be found to be of great help when pressing questions as to details arise and the time allowed to answer is short. It will also prove valuable when similar work is contemplated at later times and the formulation of plans and methods is in order. Such description is, of course, an elaboration and amendment of the plan of work as originally prepared.

During the work of gathering and summing detailed information the men in charge should devote themselves to supervising and planning work ahead. For this reason they should be careful not to allow themselves to be drawn too deeply into the detail of estimating labor costs, laying out forms, etc. The efficient working out of the plan will require that there shall be some man or men free to devote time to questions which must be decided and policies which must be formulated. No small part of the planning will consist of determining where and how listing machines, computing machines, mimeographs, printed forms and similar mechanical means shall be brought into the work to reduce the load of the routine work on the men. A careful study of such means will result in a remarkable saving in costs.

LABOR COSTS

The work of preparing labor costs for the installation of property will usually devolve upon the appraisers, for in general the corporation does not keep its cost records in such shape that the units desired in appraisal work may be readily derived therefrom. Great care must be used in preparing estimates, and as much time as can be spent economically on the study of operating conditions should be devoted to obtaining a special knowledge upon which to base the estimates. It is very important that such fundamental information should be so obtained that it will set forth clearly the conditions which existed at the time of the installation of the property and which affected the original cost of such installation. Material prices may usually be obtained by consulting the company's vouchers and supplementing such observations by requests for quotations as of the date desired from manufacturers. Where the actual expenditure by the company is sought, great care must be used in the consideration of cases where several items of property were installed together and made more or less common use of the same installation cost.

All records of the company which purport to show labor costs should be carefully examined before being used, because such records frequently show the amount

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of work contemplated rather than the actual work done. In any case, such records should not be used without an independent study in the field of similar work in progress and a thorough investigation by means of conferences with the company's departmental heads, etc., as to past methods and conditions affecting the work. If the men carrying on the field check of the inventory are properly instructed, their observations and reports on specific and general construction conditions in the various sections of the territory should be very valuable.

After the inventory of quantities and the study of unit costs have been completed, modifications of the original plan for summation to effect many time-saving short cuts may be suggested and eventually adopted if the relative importance and prices of the several types receive careful consideration. The elimination of some of the finer details recorded, which are seen to be not sufficiently dissimilar or not important enough in either value or amount or both to be given special consideration as separate groups, will result in considerable saving in work done by computers and checkers. Such merging of minor groups will usually bring about important economies without seriously affecting the final result.

The use of averages, weighted or otherwise, should be scrutinized very closely. Information based on such averages is often used without sufficient care and may lead to very erroneous conclusions. Before averages are used it should be definitely determined that they are not only mathematically accurate but are logically and practically correct and that their use is not made impossible by one or more of the actual conditions under which the company operates its property.

PRESENTATION IN EVIDENCE

When the appraisal is being made by a commission, the company and the complainant should be invited to appoint engineering representatives who may inspect methods used in listing the property and whose agreement to the reasonableness of such methods will bind the company and the complainant against objecting to such methods later after the work is completed. Along the same line the decision may well be reached to have engineering representatives of both the company and the complainant, if there be one, present to comment on the reasonableness of the unit prices proposed for use and to lend such assistance as may be approved by the commission's engineers in the preparation of such prices. If agreement to methods and unit prices be obtained in advance of the determination of totals, it will be possible to reduce the time spent at hearings to a small fraction of the usual amount. Steps of this nature tending toward the determination and final presentation of the simple fact before the regulating body will not only save much time of expensive officials and experts but will result in all parties being better satisfied with the result, and the result itself being obtained much sooner than it would be otherwise.

It is recommended that only summaries or statements of total figures be put into evidence before the regulating body. Much time is only spent needlessly if great masses of detail are handed by specialists such as expert accountants or engineers to lawyers, who are laymen as far as engineering or accounting reports are concerned, to be put into evidence before other laymen and then examined and argued over by other lawyers who are advised in their questioning by accountants or engineers in the employ of the company or the complainant. Such examination can best be done in conferences, where all detail will be available from the original records and where argument will be at first hand and without formality.

If detailed information be desired by one of the parties, it can usually be prepared from the original records at reasonable notice. It is best, therefore, not to attempt to prepare answers to more than those questions which will almost surely be asked but to depend on the flexible condition of the record to answer others. Such procedure will save much time, since many possible questions involve the preparation of lengthy information which may well be deferred until the necessity is made distinctly apparent.

COMMUNICATION

Electrification in Europe and America

NEW HAVEN, CONN., Aug. 15, 1916.

To the Editors:

I have read with much interest the report and recommendations of the general managers of the Swiss Federal Railways, with regard to the new St. Gothard electrification, an account of which appears in the issue of your journal for Aug. 5, 1916. Their decision to adopt the single-phase system in this case is an extremely important one, and will have far-reaching consequences, since it actually determines the system to be used in the future for all lines in Switzerland, both government and privately owned, some 2000 miles in all. It is apparent that those making this decision did so with a full realization of their responsibilities, of the importance of the issues involved, and after exhaustive study of all possibilities. Under the circumstances a few comments may be of interest.

The underlying conditions controlling the situation in Switzerland may be summarized as follows:

1. Switzerland has no coal deposits but has plenty of water power available. Relatively cheap electric power is therefore at hand. The use of electric power is everywhere encouraged largely as a means of rendering the country economically independent of its neighbors.

2. Tunnels large and small are abundant. In this case 30 per cent of the distance to be electrified is of tunnel construction. This together with the extent of the tourist traffic renders the smoke from steam locomotives particularly objectionable.

These factors together with the excellent technical training given to the Swiss engineers explain in large measure why for years Switzerland has led the van in both hydroelectric and certain phases of railway electrification development work.

That the board of managers should consider the development of the direct-current system as "insufficiently advanced to be seriously considered at this time," will come as a shock to many who remember the successful application of this system at a time when the single-phase system was unknown. Twelve years ago the direct-current system was considered fairly well developed and mature, whereas the single-phase system was unborn. What has occurred in the interval? What are the dominant features of the single-phase system upon which it makes its appeal to-day as exemplified in this report from a body of impartial and competent engineers? The direct-current system has been notably successful wherever applied. The direct-current motor in many ways is universally acknowledged to be superior to the single-phase motor. What, then, are the reasons why direct-current was not chosen in this case, and are those reasons ones which apply to conditions in the United States?

From a close reading of the abstracted report, and of

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the original, a copy of which I was privileged to see, it appears to me that there were several controlling reasons influencing the decision in favor of the single-phase system as follows:

1. Its demonstrated universality of practical application.

2. Its contingent adaptability to probable future conditions having in mind the present trend of electrical development.

3. A fair measure of standardization has already occurred in single-phase systems.

4. There are in Europe no manufacturers with the necessary experience in the development of heavy, high-voltage direct-current apparatus, or with facilities through the use of which this apparatus could be thoroughly and conclusively tested out.

5. The superior speed characteristics and speed control possibilities of the single-phase motor make a strong appeal.

By way of comment on these points, it may be said, first, that the single-phase system has already been successfully applied on a large scale to every condition confronting the Swiss engineers; to main lines, terminals, tunnels and yards; to freight, passenger, switching and miscellaneous services; to locomotives, multiple-unit cars, high and low-speed services, etc.

Regarding the future, the recent development of the phase converter and the already more than foreshadowed development of the mercury arc rectifier, point to the coming of a new composite or universal system toward which all present systems are strongly converging. This new system will permit the simultaneous operation of all present types of traction apparatus under a single wire carrying high-voltage alternating current, and will combine the real advantages of all systems while at the same time largely escaping the disabilities of each. In the future a single-phase locomotive at relatively slight expense can readily be adapted for direct-current operation where it proved desirable, while the rest of the system remains unchanged. With the direct-current system, a change or adaptation to new requirements may and, probably would, mean the abandonment of costly substations and extensive changes to power stations, transmission lines and rolling stock.

In the line of standardization of single-phase railways in this country the use of 11,000 volts on the contact wire is universal. In Europe most electrifications are at from 15,000 to 16,000 volts. Should higher voltages seem desirable in the future they can be used without prohibitive cost or inconvenience. This is not the case with direct-current.

The fact that the extra weight of the single-phase motor has compensating advantages as regards speed possibilities has been little understood and appreciated in America. The Swiss engineers, however, are evidently alive to it and fully appreciate its great commercial significance. This point is more fully treated in the earlier reports on the Swiss Federal Railways, which also refer to the possibility, with single-phase motors, of varying the voltages on the locomotive transformer taps and to the value of this as a means for correcting line drop.

The report in comparing the various systems touches upon many other features: over-all efficiency, inductive and other interferences, effect upon peak load of starting losses, method of primary generation, *i.e.*, whether single-phase or three-phase, etc., and throughout shows a most discriminating sense of relative values. It clearly separates essentials from non-essentials, refuses to cloud main issues by the discussion of unimportant details. The broad aspects and tendencies and their relations to the future are never lost sight of. In fact, it is an admirable report.

I, for one, am a strong believer in the direct-current motor, *per se*, and have never swerved from my belief that for certain restricted applications the direct-current system has no equal. It is capable of and doubtless will receive much further improvement. I am very conscious, too, of the disadvantageous features of the single-phase system in certain of its details. Nevertheless the practical consensus of opinion in both Europe and America seems to be that for general application and heavy work the single-phase system, with all its defects, possesses overwhelming advantages. Engineers in France, Germany, Austria, Switzerland, Sweden appear to be of practically one mind in this matter. In America opinion is not quite so settled, although even here, too, the set of the tide in the direction of single-phase has recently been very pronounced, especially since the decision of the Pennsylvania Railroad to adopt single-phase at Philadelphia as the nucleus of a more general application to that company's diversified requirements in the future.

The point should be emphasized, however, that America does not share with Europe the disability of having no experienced and responsible manufacturers equipped to supply high-voltage direct-current apparatus. At least two reliable firms are ready to do this, and to some extent this fact changes the situation over here. I therefore look to see more applications of direct-current in the future in America, but believe that these will be chiefly of a special kind, *i.e.*, to subways, short suburban lines, certain short heavy freight lines, etc. In Europe, however, under the conditions which obtain, it is improbable that much further high-voltage development will take place, for except for light interurban service, the single-phase system seems too firmly established.

In the face of the overwhelming current of competent opinion here and abroad in favor of the single-phase system, it is difficult to escape the conclusion that at present this system, in spite of its limitations and defects, is, on the whole, the one which impartial engineers are most willing to recommend for application to the diversified requirements of steam railroads.

WILLIAM ARTHUR.

Niagara Falls Stop-over Privilege Granted by International Railway

With the completion of the new aerial tramway across the Whirlpool Rapids in the lower gorge of the Niagara River at Colt's Point, Ont., the International Railway of Buffalo, N. Y., has granted an additional stop-over at this point to passengers making the Gorge Route belt line trip on the Park & River division of its line along the Canadian gorge. The aerial tramway, built by Spanish capitalists and modeled after the only other of its kind in the world at San Sebastian, Spain, across the gorge opening into the Bay of Biscay, is one of the greatest attractions for tourists at the Falls. It is 1800 ft. long and midway from terminal to terminal the car is 200 ft. above the vortex of the awe-inspiring Whirlpool. The line is reached only by the International Railway.

Among the pleasant and profitable customs which are gaining vogue in educational circles, one of the most interesting is the exchange of professors for lecture courses. One such recent exchange resulted in the delivery of a course of six lectures on railway electrification by Prof. D. D. Ewing of the faculty of Purdue University, at the University of Michigan.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

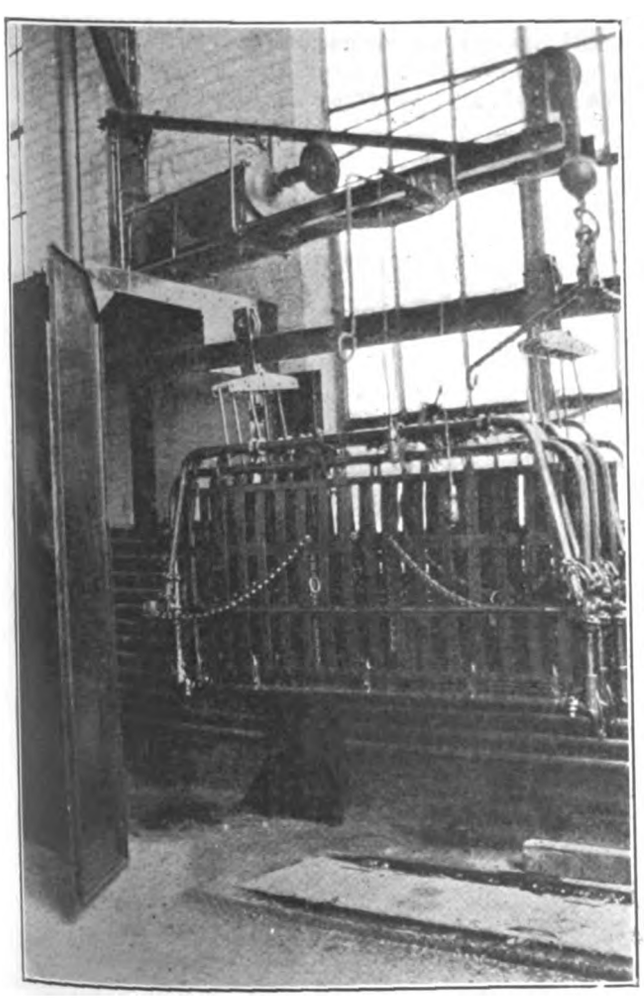
Labor Cost of Painting Fenders Reduced by Dipping—New Meter and Low-Flow Alarm for Circulating Liquids—Increasing a Substation Attendant's Earnings $15 per Month—Keeping a Continuous Inventory in the Storeroom—Western Road Finds Friction Brake Satisfactory—Other Articles of Practical Interest

Dipping Equipment Reduces Cost of Painting Fenders

Twelve Fenders Painted in Twenty Minutes by the Use of This Process

BY H. C. EBELING
Engineer, the Cleveland Railway Company, Cleveland, Ohio.

The cost of painting fenders in the shops of the Cleveland Railway Company, Cleveland, Ohio, has been materially reduced by the installation of a special fender painting apparatus and, at the same time, a better job of painting is accomplished because all the small crevices and corners of the fenders are thoroughly coated with paint. This painting apparatus consists essentially of a jib crane mounted on the shop building wall, equipped with an air cylinder and the necessary ropes for lowering the fenders into the dipping tank and raising them to the carriages on which they are moved into the drying oven. The oven is installed immediately beneath the jib crane, and it is supplied with a short section of track equipped with carriages upon which the fenders are hung after they are dipped. The oven was provided to hasten the drying process. It is built of steel and is heated by a section of the steam heating pipe coils, which also serve to heat the building.



FENDER PAINTING EQUIPMENT USED BY CLEVELAND RAILWAY

The order of operation of this equipment is as follows: The fender is placed near the dipping vat, where it is picked up by the crane and lowered into the paint. After the fender emerges from the vat it is hooked onto two small carriages mounted on the track leading into the drying oven. Two of these carriages, one placed on each side of the fender, are equipped with a sufficient number of hooks to hold four fenders. Before the fenders are moved into the drying oven, however, the excess paint is allowed to drip back into the vat, over which they are suspended. The drying oven is of sufficient capacity to hold twelve fenders.

Prior to the installation of this equipment one man was employed continuously in painting fenders, and he was always behind with his work. At the present time the two men who have charge of fender repairs also dip them, since it requires only twenty minutes to dip twelve fenders, which is all that the drying oven will hold. The raising and lowering of the fenders into the dipping tank is accomplished by the air cylinder controlled by a pendant lever attachment. A view of the jib crane, dipping tank and the fenders mounted on the two carriages which transport them into the drying oven is shown in the accompanying illustration.

Let the Workmen Know the Cost

Saving Follows When Men Know the Relative Value of Available Material

BY "VULCAN"
A.M.I.C.E., A.M.I.E.E., England

The value of the materials and apparatus used on electric railways is, as a general rule, unknown to the men engaged in the carhouses and repair shops as it is thought, perhaps rightly in most cases, that nothing would be gained by the publication of such information. It is obvious of course that in many instances it would be against the employer's interest to make generally known among the men the prices paid for goods. On the other hand, there are cases where the lack of such information is the direct cause of waste and excessive maintenance expenses.

On one occasion the writer found it necessary personally to investigate the reason for the heavy consumption of quick-drying, oil-proof, insulating varnish. This particular varnish was normally used for circuit breakers, the interiors of controllers, and for the outside finishing of fields and armatures, and its cost was about $2.75 per gallon. A considerable wastage was found to be due to the practice of leaving the varnish when not in use in large uncovered paint cans so that rapid evaporation took place. Of much greater importance, however, was the fact that this expensive varnish was through ignorance being used in large quantities for such rough jobs as painting repaired lifeguards, motor cases, wheels, trolley standards and poles, the outside of controllers, etc., where a cheap

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quality of ordinary black varnish would have done equally well.

The men at the carhouses, as would be expected, were the chief culprits in this matter. These men are not usually as well trained as those in the central repair shops, and there is therefore some excuse for their failure to discriminate between the different materials which look very much alike. In each case the shop foreman's excuse was that neither the men nor himself knew the expensive nature of this particular varnish as compared with the others and, had the price of it been approximately known it would have been used in a more reasonable manner.

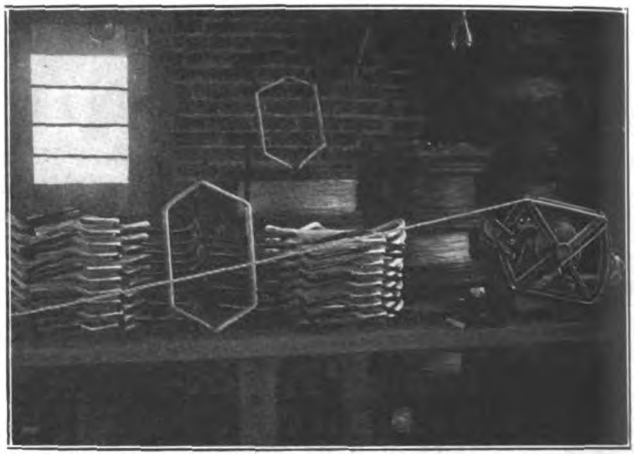
The following year there was a saving of more than $975 in this item, due to the more economical use of the varnish as compared with the previous twelve months. In the writer's opinion there are many instances in electric railway practice where it proves to be a paying proposition to let the men know the approximate cost of the materials which they are handling.

Keeping the Substation Attendant Busy

Employees Increase Their Earnings by Doing Odd Jobs on Illinois Traction System

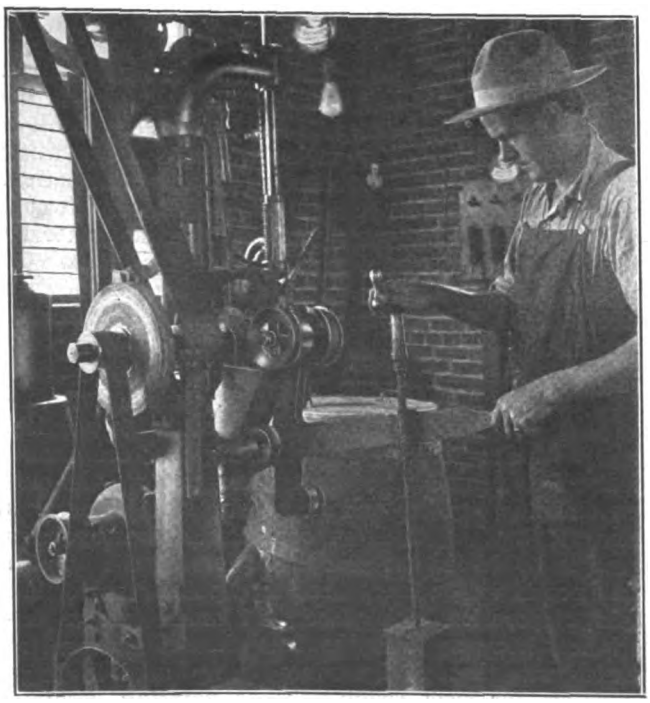
Some time ago H. E. Chubbuck, vice-president executive Illinois Traction System, worked out a plan whereby the service of substation attendants could be made more valuable to the company and at the same time the attendants could increase their earning capacity. This plan provided for furnishing the various substation attendants with such machine tools as were necessary to employ their time when they were not engaged in their regular substation duties. The first successful experiment in this work was conducted in a substation at Lincoln, Ill., where the attendant is now winding armature coils, and boring, grinding and balancing trolley wheels.

Beside the present direct-current substation at Lincoln is an old building formerly occupied by single-phase substation equipment. This building furnished a floor space about 20 ft. square, and at first the substation attendant only wound armature coils. This proved so successful, however, that the finishing of trolley wheels was soon added to these auxiliary duties. At the present time the machine tools in this substation attendant's shop include an armature winding unit, a trolley wheel grinding and finishing machine, two electric ovens for baking the finished armature coils, and a complete stock of wire and other necessary materials. The trolley wheels are cast in the general repair shops of the company at Decatur, Ill., and shipped to the Lincoln substation for finishing after which they are shipped to the storehouse. The finished coils are also sent to the storehouse.

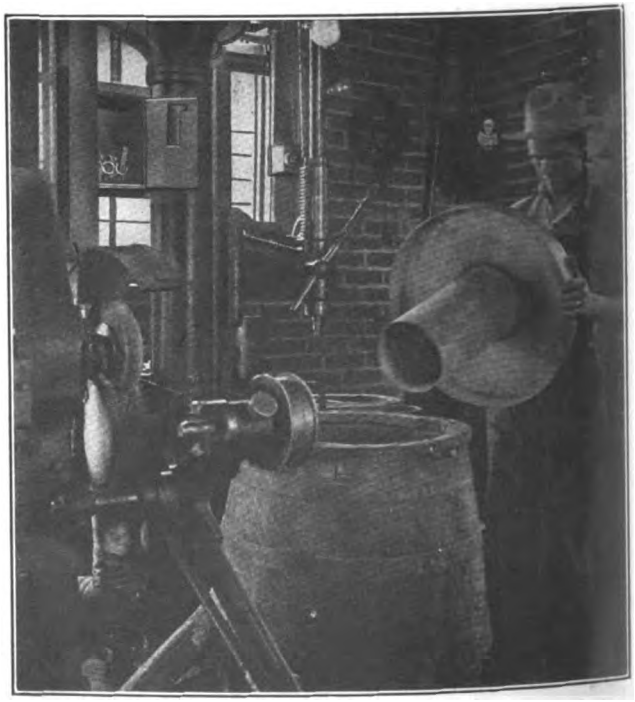


COIL WINDING MACHINE USED IN ILLINOIS TRACTION SYSTEM SUBSTATION

Both the armature winding and the trolley finishing are being done very satisfactorily, and at the same time the substation attendant earns from $10 to $15 per month more than his regular wages. While this work is now being done only at the Lincoln substation, the success which has attended this initial installation makes it probable that equipment will be installed in other substations on the system where probably other work than that done at Lincoln will be given to the substation attendant. This work is being done under



SUBSTATION ATTENDANT GRINDING TROLLEY WHEELS



SPECIAL BARREL FOR RECEIVING BRASS DUST FROM GRINDER

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the supervision of O. P. Chubbuck, superintendent of the general repair shops at Decatur, Ill. The coil winding unit which has been previously described, as well as the trolley wheel grinding machine, are shown in the accompanying illustration.

In connection with the trolley wheel grinding, it is of interest to note that the equipment includes an arrangement for saving the brass dust produced in this operation. This equipment includes two hoods beneath the grinding wheels, leading into a spout so arranged in conjunction with a blower that the dust is conveyed from the emery wheels to a barrel also especially made for receiving it. Generally this dust is wasted, but the high price of brass, even in normal times, makes it worth while to save the dust produced in grinding. When a sufficient quantity of dust has accumulated it is shipped to the general repair shops at Decatur, where it is used over again. At first it was rather difficult to keep the dust from blowing out of the barrel after being taken away from the emery wheel. An outlet had to be afforded for the air which blew the dust into the barrel, and this in turn carried the copper dust out of the barrel with it until an especially arranged cover was provided. This cover is made of sheet metal and is made to fit snugly over the top of the barrel by sealing it with a cloth cushion. In order to provide a barrel which would give an outlet to the air, and at the same time prevent the fine brass from blowing out of the barrel, the cover was pierced with an inner spout or tube which extends about 18 in. down into the barrel. The barrel and especially arranged cover are shown in one of the accompanying illustrations.

High-Power Incandescent Headlight

The St. Paul Electric Locomotives Are Equipped with 750-Watt Headlight Lamps Giving Approximately 250,000 Apparent Candle-power

On the electrified division of the Chicago, Milwaukee & St. Paul Railway the line traverses states whose statutes require an illuminant of 1500 unreflected candle-power for all locomotive headlights. This has made imperative the construction of a headlight for the electric locomotive which would accommodate a pendant-mounted 34-volt, 750-watt, focus-type, Mazda C lamp. Such a large headlight made necessary a rolled-up steel casing with a spot-welded back, classification number boxes projecting at angles of approximately 30 deg. being provided on both sides. Metal stencils stamped with the number of each locomotive, backed with opal suffusing glass and fronted with clear glass are carried in the number box doors, the numbers being illuminated by direct light from the lamp passing through slots in the reflector. The headlights are equipped with a ball-and-socket focusing mechanism and a solid case iron base, and they have 20-in., parabolic, silvered-metal reflectors.

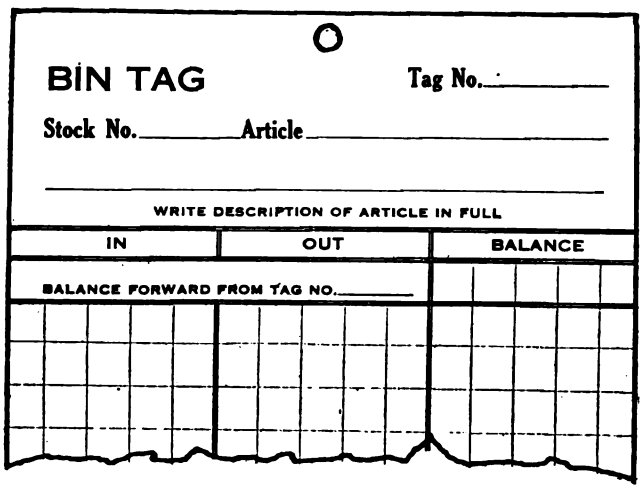
The heat radiated from the extremely high-powered lamp calls for special attention to ventilation and involves the use of a door pane of solid, heat-resisting glass, which will also withstand the severe mechanical shocks and the impact of birds which, becoming blinded by the intense light, fly against the glass like moths toward a flame. This headlight, when equipped with the 34-volt, 1500-cp. lamp, will give approximately 1,150,000 beam candle-power. It is, without question, the most powerful incandescent headlight in commercial operation to-day. Practically all of the apparent candle-power is exerted within an arc extending 5 deg. from the center of the beam, the maximum approximating 250,000 cp., being distributed within 1 deg. from the center of beam.

The current supply for the lamp is taken from slip rings on a 9-kw. control generator at 96 volts. It is then transformed to 34 volts, and a tap is provided on the transformer secondary to give one-half the voltage for dimming purposes.

Bin-Tag System Provides Perpetual Inventory

This Simple Method of Handling Stores Is Used by the Benton Harbor-St. Joe Railway & Light Company

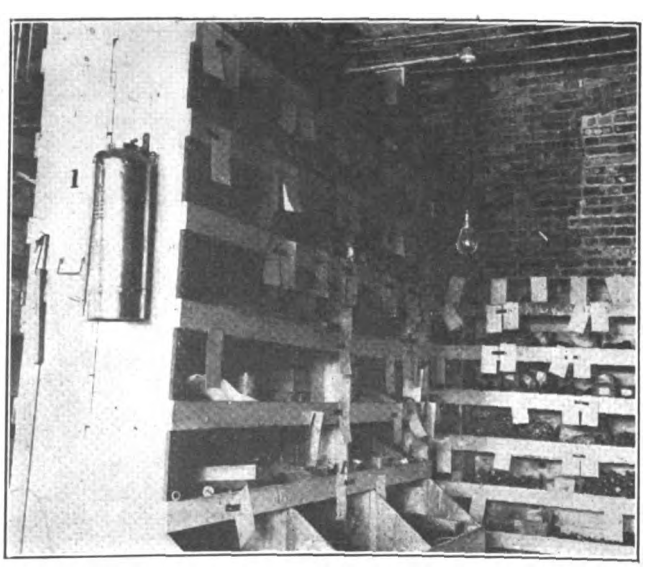
A stock record system must necessarily be employed in small storerooms if accuracy is to be obtained, because the quantity of stock handled annually does not warrant sufficient clerical help to keep up an elaborate system. With this idea in mind the storehouse of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., has adopted a bin-tag system. This



SAMPLE BIN-TAG USED ON BENTON HARBOR-ST. JOE RAILWAY

forms a perpetual inventory, and is a positive check on the stock ledger. The form of bin tag employed is shown in the accompanying illustration. Each tag is given a number and on it the stock number and the name of the article are also shown. Three columns are provided for recording the quantities of material added to the stock from time to time, the lots taken out on requisitions and the balances remaining.

These bin tags are fastened to the sides of the bins



BINS IN A CORNER OF STOREROOM SHOWING TAGS ATTACHED BY CLIPS

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with spring clips as shown in one of the accompanying illustrations. Whenever stock is taken from the bins, the quantity is recorded in the "Out" column, and similarly whenever new stock is received it is recorded in the "In" column. Each record is dated and at the close of the day the balance of stock on hand is figured and transferred to the storehouse stock ledger. In order to facilitate the handling of stock, every article is given a number along with its correct name so that there can be no difficulty from that standpoint. A copy of each requisition is forwarded to the auditor, and this, along with a record of the quantity of new stock purchased forms a record of the stock on hand. Periodically the auditor checks his balances with those of the storekeeper.

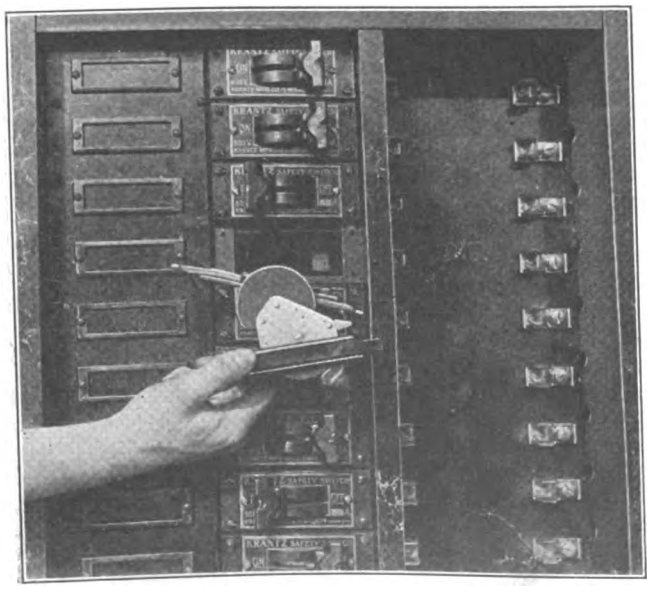
This bin-tag system also facilitates the delivery of stock upon requisition, because the record is set down at the bin from which the material is removed and at the close of the day it is simply a question of transferring this record to the storehouse storekeeper's stock ledger.

Developments in Railway Voltage Safety Switches

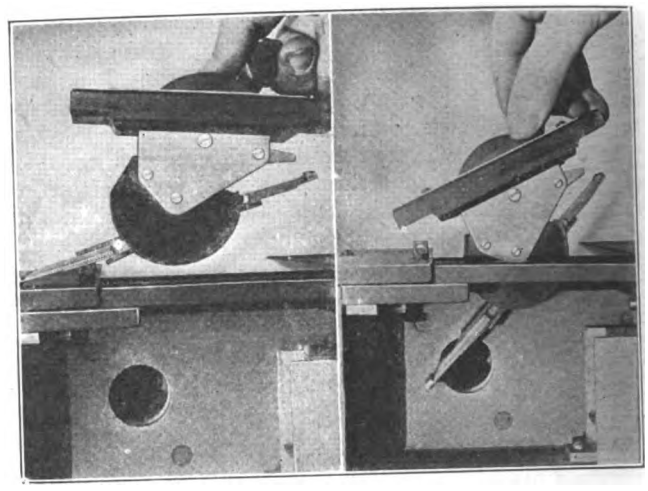
Employees Cannot Come in Contact With Live Parts While Operating Switches or Replacing Fuses

Sometime ago the Brooklyn Rapid Transit System and its associated company, the New York Municipal Railway Corporation, studied the possibility of safety switches for panel boards at passenger stations and terminals. Such structures, of course, are sometimes in charge of ticket sellers or others unfamiliar with electricity. With the use of live-face knife switches there was always danger that the operators would come in contact with live parts. Accordingly the engineers of the above-named railways desired to obtain safety switches for heating, lighting and other circuits of railway voltage that would eliminate this danger.

The accompanying illustrations are of a new safety switch which has been adopted by these companies and which is manufactured by the Krantz Manufacturing Company of Brooklyn, N. Y. Panels made up of these switches are now being placed in all new stations, an average of two per station on the new elevated lines, and from two to five in the subway. These safety switches



SINGLE-POLE SAFETY-BRUSH SWITCH PANEL USED ON NEW YORK MUNICIPAL RAILWAY



SECTIONS THROUGH PANELS, SHOWING SWITCHES BEING REMOVED WITHOUT EXPOSING OPERATOR TO DANGER

have also been adopted by the Interborough Rapid Transit Company of New York.

All panel boards adopted by the New York Municipal Railway are made up of slate lined cabinets divided into two main sections from left to right. One section contains negative common return wire connections covered with slate on which are mounted card frames, one for each circuit. The second section contains the switches with corresponding fuses. The switches are isolated from one another by suitable insulated barriers. The fuse compartment is accessible only to the electricians each of whom is provided with a master key. The door of this compartment uncovers the fuses for all circuits.

These standard panels are intended for lighting and small heating units, but in some instances relays, fuses, and resistors of the automatic train-announcing system (lights and gongs) are placed above the layout described.

The heart of the safety panel is, of course, the switch. This is of brush contact type, usually single pole, and operated on the toggle-joint principle. Up to and including 10 amp., auxiliary carbon contacts are used; for larger sizes, magnetic blowouts are provided. The person who manipulates a switch cannot possibly remove it except when it is dead, and when the switch has been removed no live parts remain exposed in the switch cell. Furthermore, the removal of one switch does not disturb the others.

The panels adopted by the Interborough Rapid Transit Company differ from the B. R. T. and N. Y. M. panels only in the following points: The switch and fuse are in one compartment, and each compartment is built on an auto-lock principle; that is, there is a door over the fuses which cannot be opened unless the switch is open, and the closing of the switch automatically locks the door, thereby making it impossible at any time for anybody to come in contact with live parts. This construction leaves all parts of the switch and fuses dead and ready for inspection and examination when the switch and door are open.

It is apparent that these safety switches are just as applicable to car panels carrying the auxiliary circuits, as they are to station panels.

The load on one of the street car lines of the Havana (Cuba) Light, Railway & Power Company picked up very much recently and an extra feeder wire was needed. On account of the high cost of copper the company is using scrap trolley wire for this service until the price of copper becomes normal again. They find that this serves the purpose very well.

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VIEW SHOWING FRICTION CLUTCH DRUM UNDERNEATH THE CAR

Friction Clutch Brake Improved

Changes in Brake Rigging Result in Fewer Flat Wheels and Less Brake Shoe Wear

After seventeen or more years of experience, the railway department of the Pacific Gas & Electric Company has decided that for service in Sacramento, Cal., the rope friction method of applying brakes affords better control, causes less brake-shoe wear, and practically eliminates the wheel flattening that results from locking wheels. The original scheme of applying brakes in this way was adapted from a plan in use on the Grove Street line in Oakland, Cal., but on the Sacramento system several changes had to be made in order that the best results could be secured.

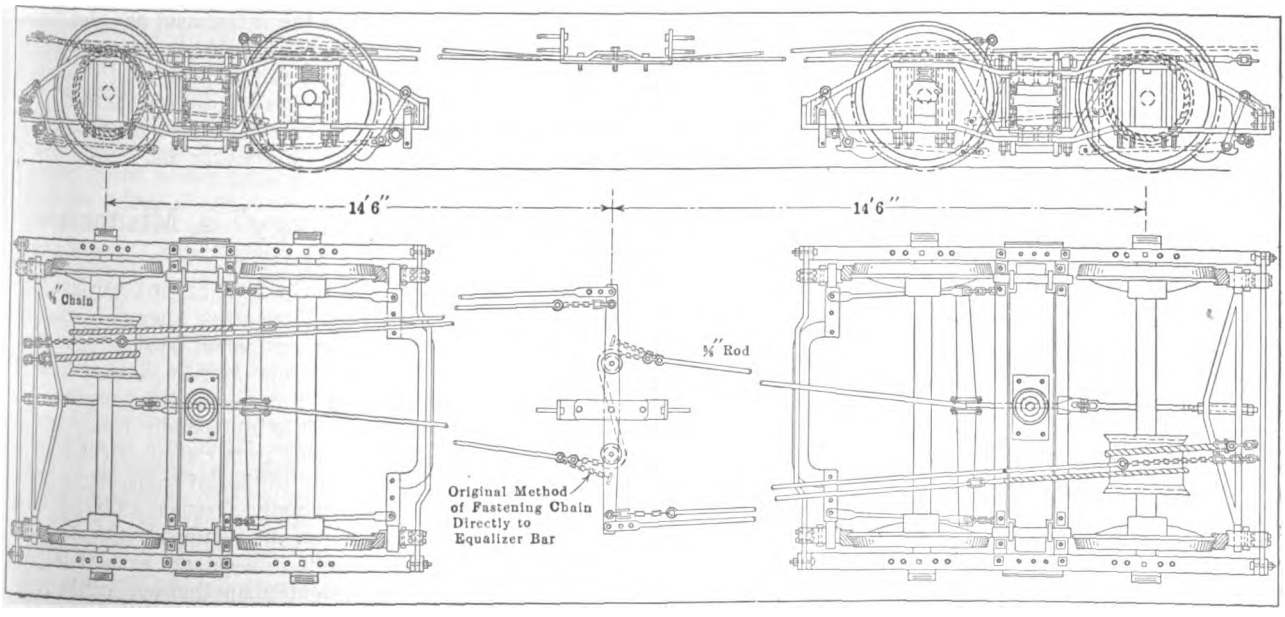
The first brake installed gave considerable trouble because the connecting chain was coupled directly to the equalizer bar and also because the leverage on both light and motor wheels was the same, causing the light wheels to lock and flatten. These difficulties were overcome by placing two small sheaves on the equalizer and running a chain over them in the manner shown in the accompanying drawing. The original method of fastening the chain directly to the equalizer bar is also shown. The leverage on the light wheels was decreased by means of a dead lever.

On cars equipped with this braking mechanism no air brakes are provided, and as the Sacramento system is without steep grades it has been found feasible to control the cars by hand brakes without undue effort on the part of the motorman. The brake shoe and brake beam are such as are ordinarily used with standard equipment except that the motorman has two levers for applying the brakes. The first of these, which operates the rope friction mechanism, is used ordinarily, and the other, which is direct connected to the same brake beam, is held as an emergency reserve to be used if the rope breaks, if the friction mechanism fails for any reason, or to prevent the car from slipping back down grade.

The rope encircles the 18-in. friction drum in such a way that when it is tightened the forward motion of the car applies the brakes, and the greater the speed the more effective the braking. When the car is standing still, the brakes cannot, of course, be applied with this lever. The idea is in effect that the motorman snubs the rope around the moving part of the running gear, utilizing momentum to apply the brakes.

The rope used is a 1½-in. manila rope of the variety known as "snag rope" by river boatmen. Its peculiarity is that it will not stiffen when wet. This particular rope has been found to give the best service on the friction drum. An 8-ft. length is used on each end of the car, and its life in the ordinary service varies from three to five months, according to the care exercised by the motorman. New men invariably wear out the ropes faster.

It is a notable fact that although new platform men coming on the force often complain about the absence of air brakes on some of the cars, the older men who have the choice of equipment have invariably taken the rope friction equipment in preference to that provided with air brakes. Another point which the master mechanic makes in favor of the rope friction is the decreased brake-shoe wear. When the first air-brake cars were put in service, the brake-shoe wear was so much heavier than with the other type of equipment that it caused considerable comment in the shops, but it was found that the wear with the air-brake equipment could not be kept down to the wear normal on the friction-brake cars. To increase the life of shoes on the air-brake cars it has been found very effective to use chain scrap in the shoe castings. This has been done economically as the company casts its own brake shoes in the Sacramento shops. In making these castings, after the pattern has been removed from the mold a suitable



PLAN AND ELEVATION SHOWING FRICTION CLUTCH DRUM AND IMPROVED BRAKE RIGGING ON PACIFIC GAS & ELECTRIC CAR

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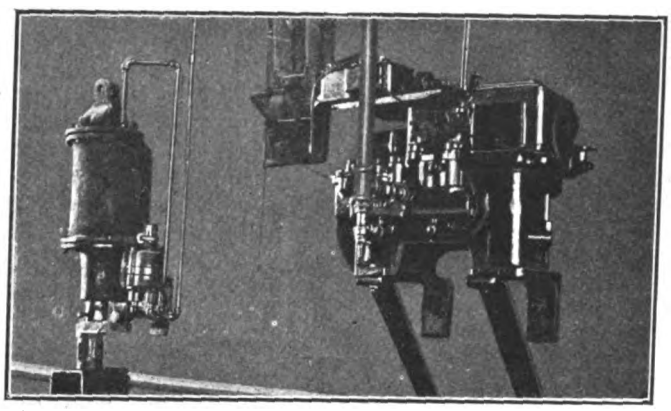
length of chain is fastened in place and the hot metal poured around it.

The Sacramento Railway Department of the Pacific Gas & Electric Company is operated under the supervision of N. J. Hullin. G. C. Snider is master mechanic.

Bulldozer Made of an Air-Brake Cylinder

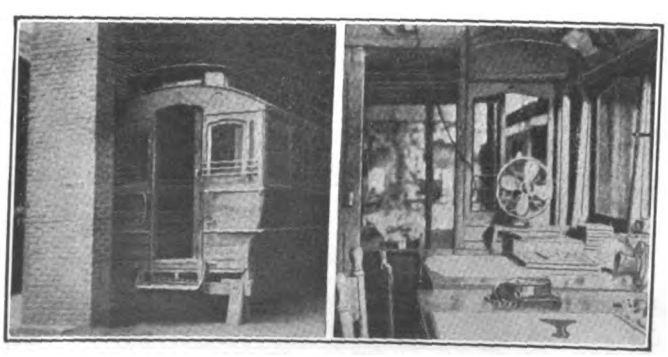
An old air-brake cylinder mounted on the wall of the repair shops of the Galesburg Railway Lighting & Power Company, Galesburg, Ill., equipped with a pressure head and a substantial table for supporting the work, is used whenever pressure is desired. A view of this equipment is shown in one of the accompanying illustrations. The control of the air-brake piston is through an ordinary engineer's valve, and compressed air is supplied by an air compressor equipped with an automatic control device, both of which were removed from an old car. The air reservoirs are mounted on the bottom cords of the roof trusses overhead. A view of this unique equipment is shown in the accompanying illustration.



VIEW OF AIR COMPRESSION AND BULLDOZER

An Office Made from an Old Street Car

The illustrations herewith show how W. F. Breese, master mechanic of Columbus (Ga.) Railroad, solved his office problem by converting an old street car into an office. He set up the car in the corner of the shop on two heavy wooden horses. It is equipped with all necessary conveniences, including fans, electric heaters, a bookcase, cabinet, two desks and two chairs. This saved erecting a partition in the building. The car used for the office was the first electric car operated in Columbus and is, of course, a sort of relic, hence interesting as well as useful.



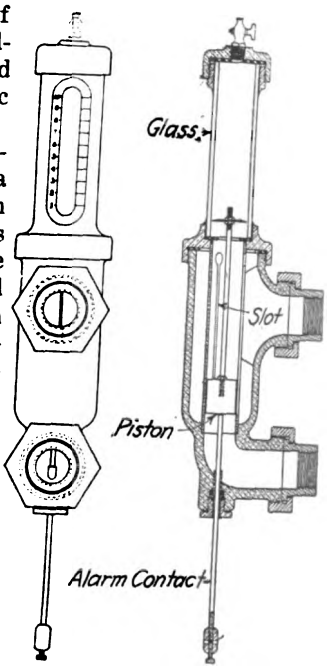
OLD STREET CAR CONVERTED INTO AN OFFICE; EXTERIOR AND INTERIOR VIEWS

New Type of Flow Meter

A Simple Meter for Liquids, Which Also Provides a Low-Flow Alarm

This device, which has been designed by J. F. Vaughn, and which was recently placed on the market by the Spray Engineering Company, Boston, Mass., is specially applicable for indicating the flow of liquids in water or oil-cooled transformers, and in water-cooled hydraulic machinery bearings.

As shown in the illustrations, it consists of a cylindrical chamber with suitable pipe connections enclosing a slotted tube through which the liquid must pass. Enclosed in the slotted tube is a piston which is carried upward as the liquid is turned on, until the exposed area of the slots is sufficient to permit the flow of the liquid. Up to the capacity of the indicator the flow is directly proportional to the area of the slots in the tube. An index is attached to the upper end of the piston rod, which extends up into a glass tube at the top of the cylindrical chamber. The glass tube is encased in a protecting cover, cut away to allow the movement of the index to be noted, a scale, calibrated to read in gallons per minute, being provided.



ELEVATION AND SECTION OF FLOW METER FOR LIQUIDS

A feature is also an electric contact device consisting of an adjustable brass rod extending through an insulated stuffing box at the bottom of the chamber, establishing contact when the piston rests on the rod. This can be connected in circuit with a lamp or bell, to attract attention when the flow has fallen below a fixed minimum.

Results of tests show that the indicator gives a straight line calibration over a large range, and the loss of head in operating the instrument has been found to be negligible, not exceeding 0.004 lb. per square inch with a capacity of 15 gal. per minute.

The indicator may be used with screens for dirty water, and can readily be cleaned by unscrewing the top and slipping out the slotted tube and glass.

"Armature Buggy" a Misnomer

It is the experience of the master mechanic of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., that "armature buggy" is more or less a misnomer for the equipment used for that purpose, because if it is made a little heavier and of slightly more generous dimensions than required for handling armatures, it is a universally handy tool in the average electric railway repair shop. Of course, its usefulness is confined only to that of transporting heavy materials. There are usually frequent calls for work of that nature in shops not equipped with overhead bridge cranes, or where it is necessary to move the material from one department to another outside the range of the crane installation.

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NEWS OF ELECTRIC RAILWAYS

NEW YORK STRIKE AFTERMATH

New York Railways Accused of Violating Strike Agreement —Reinstatement of Discharged Men Demanded— Company Appeals to Its Own Men

Most strikes have their more or less serious aftermath. This has been true of the recent settlement in New York. More particularly with respect to the New York Railways is the cry of wolf being raised. On Wednesday afternoon union officials seemed bent on making an issue of the cases of men they allege have without reason been denied reinstatement. Talk of an ultimatum to President Shonts of the company by the labor representatives was rampant. Mayor Mitchel was communicated with at Plattsburg by his secretary. The union even called a mass meeting for the consideration of a strike vote.

Meanwhile the directors of the New York Railways were in regular session. All kinds of wild guesses were made by the newspapers as to what was taking place. The rumor foundry shut down for the night, however, when President Shonts of the company at 4.30 p. m. made public a letter written by him to the chairman of the committee of organized employees, in which he said that he had arranged for Vice-President and General Manager Hedley of the company to see Mr. Conway and his committee of employees of the company at the company's office at 11 a. m. on Thursday. Mr. Shonts said he was willing to meet any number of committees as long as they are made up of employees of the company.

At the conference on Thursday morning between officials of the union and Mr. Hedley the men demanded the immediate reinstatement of the employees alleged to have been discharged for activity in the recent strike. Mr. Hedley declared he lacked authority to reinstate the men, and said he would lay the question before the board of directors at a meeting on Friday. The union representatives then withdrew, declaring they would take up the subject of the reinstatement of the men with Chairman Straus of the Public Service Commission and Mayor Mitchel, the underwriters of the agreement, in case direct negotiations failed. Officials of the New York Railways consented to the admission to the meeting of three officials of the Amalgamated Association. Hugh Frayne, New York State organizer of the Federation of Labor, also attended the conference, which was in executive session.

The summary of the conference on Thursday as made public explained that the conferees, in discussing the discharges of the forty-eight men, had concerned themselves chiefly with an interpretation of clauses Nos. 4 and 5 of the strike settlement agreement of Aug. 7. These clauses follow:

"Clause 4. In the interest of public safety and public service, the company wants it clearly understood that the direction and control of employees in all matters looking to efficiency in the service remains with the company and is not to be the subject of conference or arbitration; but if a dispute should arise as to whether a particular case falls within the above class, that question shall be subject to conference and arbitration as above provided for.

"Clause 5. If the above is agreed to and accepted, it is further agreed that the employees shall declare off the strike and return to work immediately in the positions they occupied prior to the time of going on strike, without prejudice."

It has been the contention of the Amalgamated that neither of these two clauses applied to the dismissals made by the company, because the company had promised to take back all employees, regardless of discipline, as soon as the strike was settled. The company, on the other hand, insisted that it never meant to take back strikers who were convicted in the courts of violence, and that it was justified in this refusal by the clause giving it exclusive jurisdiction over matters relating to discipline. J. L. Quackenbush, general attorney for the company, told the union representatives that the company officials had inserted the clause giving the company the exclusive right over matters of discipline, after talking the subject over with Mayor Mitchel and Mr. Straus. He said it was detrimental to discipline for the company either to employ or re-employ men who had been convicted of crime in the courts.

Since the strike the New York Railways has carried its case direct to its own men. The officials at two mass meetings of the men on the evening of Aug. 15 urged the men to form their own organization and to deal with their employers without outside assistance. Mr. Hedley, who addressed the meetings, said that he wanted to talk direct to the men and wished them to tell him their grievances in a sensible, manly way. He said that he had heard the charge to the effect that the directors had violated some of the conditions of the strike agreement. That was not true. There had been no violation of any kind. The principle of the directors was to give every employee a square deal. Mr. Hedley was quoted as saying that the men who do not join the union will receive the same pay as those that do and that the management would also have the say whether the men that do not join will receive something more than those that do.

On Aug. 15 a letter from the union of New York Railways employees to Mr. Shonts went forward, accusing the officials of "deliberate and flagrant violation" of the agreement of Aug. 7. The charges of the union men mentioned in the letter were indiscriminate discharging of men who participated in the suspension of work, and violation of the agreement by "attempting to advise, suggest, and carry forth a plan of the election of committees to represent the employees when you agreed not to interfere in any way with the committee or the selection of same." A conference was demanded "so that we may know what your intentions and policies are to be in relation to this agreement." This was the communication to which Mr. Shonts replied, fixing Thursday at 11 a. m. for a conference.

At the same time that he replied to the committee representing the union employees of the company Mr. Shonts sent a long letter to Mayor Mitchel and Mr. Straus, chairman of the Public Service Commission. He explained why men had been discharged following the strike and why the company felt that it was within its rights in asking its employees to elect new committees and representatives. He insisted that there was nothing in the agreement of Aug. 7 that bound the company to deal with only one committee. His letter covers so well the progress of material events since the strike that it follows substantially in full except for the introduction:

"In view of the agreement underwritten by you jointly, which we had expected would effectually deal with any questions which might arise in the future, I think it important to quote paragraphs from the letter received from a committee of employees and to give you the facts.

"'First—Since the return of the employees to work, by indiscriminate discharging of men who had participated in the suspension of work, when you were aware and in honor bound to restore every employee back to his former position without prejudice.'

"The facts are that since 9 o'clock p. m., Aug. 7, forty-eight men have been dismissed from the service of this company. The causes of these dismissals were as follows: Twenty-eight for failure to turn in fares, fourteen for having been adjudged guilty of a crime, two for insubordination, two for drunkenness, two for failure to report on time. Several men were laid off for having been arrested, charged with violence in connection with the recent strike. As soon as these men were acquitted by the court they were restored to service.

"No man has been discharged or interfered with in any way with reference to his union affiliations. Our officers have been instructed to comply scrupulously with every detail of both the letter and the spirit of the agreement.

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"We desire to call your attention to the fact, on the other hand, that in many cases employees of this company have clearly violated the rules of this company, some of the violations increasing the hazard and endangering the safety of passengers on our cars.

"In order, however, that there could be no possible question of our good faith, we have gone to extreme lengths in judging every such case in the hope that as soon as matters settled down to a normal basis the men would realize their obligation to adhere to the rules of the company.

" 'Second—you have further violated the agreement by attempting to advise, suggest and carry forth a plan of the election of committees to represent the employees, when you agreed in the above mentioned agreement not to interfere in any way with the committees or the selection of the same.'

"The facts are that we have in no respect attempted to interfere in any way with the committees which might be selected to represent employees. We have advised the employees to select their own committees and have provided a method of absolutely independent secret balloting for those desiring to follow that course.

"We did agree to receive a committee of our men, to allow that committee to select any advisers and spokesmen it might choose. We did not, however, agree to receive only one committee. While not interfering with the union in any way, and while not refusing to receive any advisers or spokesmen a committee of our employees might choose, we have provided a method whereby the interests of every employee, union or non-union, might have representation in dealing with the management.

"To the end that the election of employees' representatives shall beyond question represent the wishes of the men themselves, I beg to request that you delegate persons to represent you at each polling place in supervising the conduct of the election and the count of the ballots. I attach hereto a list showing the location of the polls and the time at which they will be open.

"All that we want is that those of our men who do not desire to join a union shall have complete freedom to refuse to join. We have stated publicly and we have steadily advised our men that, in our judgment, the best interests of New York would be served if our employees dealt directly with the company, without reference to outside organizations having no such responsibility to this community as we and our employees have. We have given the union complete freedom to exercise such moral suasion as it might in inducing our men to join the organization. We are likewise doing all that we can to convince our men, perfectly frankly and openly, that their interests will be promoted by refusing to join. That procedure is entirely in accord with the agreement of Aug. 7.

"We have received a series of demands from a committee of our men, and in accordance with our agreement we shall meet with this committee and discuss the situation. In order that there may be a more intelligent interpretation of the demands that have been made, as well as of the letter which is now being inclosed, I feel it important to call your attention to certain features of the agreement of Aug. 7.

" 'First—That all the disputes that may arise between the company and the employees in the future, on which they cannot mutually agree, shall be submitted to arbitration.

" 'Second—That, in the interest of public safety and public service, the direction and control of the employees in all matters looking to efficiency in the service remains with the company, and is not to be the subject of conference or arbitration, but if a dispute should arise as to whether a particular case falls within the above class that question shall be subject to conference and arbitration as above provided for.

" 'Third—That employees have the legal and moral right to organize, and the company pledges that it will not interfere with the employees in their exercise of these rights, nor shall employees undertake to interfere with other employees in their exercising of their rights to decline to organize, either by intimidation or coercion."

"We shall, of course, abide scrupulously by every detail of the agreement. We are quite prepared to submit any question arising out of that agreement to arbitration. But we are sure you will agree with us that it was in accord with the letter and spirit of the agreement that our men shall have absolute freedom in choosing their affiliations."

WHAT NEW YORK UNION MEN DEMAND

Agreement for a Year—Thirty Cents an Hour First Year for Trainmen and Thirty-three Cents Thereafter—Text of the Demands

The demands of the organized workers for a radical revision of hours of employment and for better pay were served on the New York Railways, the Third Avenue Railway and the Second Avenue Railroad on Aug. 14, although the labor leaders were fully aware of the plans made by the officials of the New York Railway to have their employees select new representatives at a special election to be held by them on Aug. 18. The demands were made not only on behalf of motormen and conductors, but of all the other employees in the service of the companies. In addition to making provision for men who have been discharged, or who have been accused of dereliction in their duties, the union asks that a new work day for motormen and conductors, on a basis of nine hours as a minimum and ten hours as a maximum, be established by the companies, and that if these employees be held on call more than twelve hours to allow for "swings" they be paid time and a half for all overtime. The organized workers also demand that men working less than six hours be paid for eight hours' work, and that all carhouse employees be granted a 10 per cent increase in wages. The same demands, with minor exceptions, were served on the New York Railways, the Second Avenue Railroad and the Third Avenue Railway and its subsidiaries. They are as follows:

"Section 1. There shall be a basis of a nine-hour minimum of work and a maximum of ten hours for conductors and motormen, the full day's work to be completed in twelve consecutive hours. Runs over six hours and under ten hours shall pay ten hours. Runs under six hours shall pay eight hours. There shall be no more than seven hours' work in any one-half run.

"Section 2. Regular motormen and conductors will not be required to work overtime, but where men consent to do any extra work over and above their daily schedule they shall be paid at the rate of time and one-half, time to start from the completion of regular work until the completion of such extra work. Men who are ordered to report at a certain time are to be paid, not from the time they start on the cars, but from the time they are ordered to report.

"Section 3. All work done on snow plows, sweepers and scrapers shall be paid for at the rate of 50 cents an hour, and all equipment in such work shall be manned by no less than three uniformed men. Particular effort will be made by the company to allow time for meals at reasonable intervals for all surface motormen and conductors doing snow work, but in no case will a man be required to do more than six consecutive hours' snow work without giving him time off for meals; and where such time off is not sufficient time to go to their regular place for their meals, the company will furnish meals or meal tickets.

"Section 4. When a member of the association is summoned to answer a charge it must be as soon as possible after the alleged offense is committed. He shall lose no more time than is actually necessary, and after a fair and impartial hearing before officials of the company and committee of the association, if not found guilty of the alleged offense, he shall be reimbursed for all time lost.

"When any member is summoned to answer charges, he shall, upon request, have time to present any defense which he may have, and, if he so desires, shall be entitled to an adviser or advisers and an adjournment for a reasonable time to enable him to present his defense.

"Whenever a member of the asscition is summoned to answer to a charge, he is to be handed a copy of the charge and shall be given five hours to answer. If not satisfied with the decision of the superintendent, he shall have the right to appeal to the general manager, and in this appeal he will be entitled to an adviser or advisers, and the final decision shall be given within one week, and if found not guilty he shall be reinstated in his former position and he shall be paid for all time lost.

"When any member of the association is summoned to answer to a charge before the superintendent and has been excused or has not been proved guilty, no other charge shall be

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read to him, and he shall be paid for all time lost. Petty charges against the members shall be answered for without loss of time. Regular men violating the rules of the company and penalized to have time off shall not be required to report for work.

"Section 5. A lost car shall consist of an absolute failure on the part of a man to get his car out on time. Men reporting that they are sick ten minutes or more before the car is due to leave the carhouse in the morning shall not be credited with a lost car, and where men are to make reliefs at other than division carhouses, and are unable to reach their relieving point, they shall notify the station master or official in charge one hour before relieving time.

"Men who are sick shall give thirty minutes' notice, personally, by messenger, or by telephone. No lost car charge shall be made to men who are impeded by a tie-up. When an extra man fails to show up no lost car shall be charged against him unless he has missed some run. The present rules for punishment for a lost car shall be discontinued, and all penalties applied to individual cases. In no case shall an employee be discharged because of a lost car.

"Section 6. The rates of wages to be paid motormen and conductors on electric lines and storage battery cars shall be 30 cents an hour for the first year of service and 33 cents an hour thereafter. Conductors and drivers on horse cars shall receive 28 cents an hour for the first year and 30 cents an hour thereafter. Flagmen and switchmen, 25 cents an hour —the day's work to be completed in twelve consecutive hours. An increase of 10 per cent shall be granted to all carhouse employees. For them ten hours shall constitute a day's work.

"Section 7. It is to be understood that the question of seniority shall be taken up for adjustment between the officials and the several divisions.

"Section 8. The superintendent in charge shall meet the employees who have been summoned before him each day between 9 a. m. and noon, excepting Sundays and holidays.

"Section 9. An employee summoned to explain or act as a witness in a law suit affecting the company shall be paid for all time at his regular rate, and if taken from his run and not restored he shall receive a full day's pay.

"Section 10. No motorman or conductor shall be suspended or discharged for inability to secure the names of witnesses in any accident.

"Section 11. When men are working regular schedule runs and their cars are taken from the line or discontinued, they shall receive full schedule time whether the car is operating or not. Nothing in this section shall interfere with the official in charge using such men for other work, but such work shall not extend beyond their regular scheduled hours.

Section 12. Conductors when required to register fares at terminals before collecting the same from passengers, shall not signal the car to leave the terminal until such fares have all been collected.

"Section 13. Motormen and conductors when instructing new men shall receive 35 cents in addition to the regular day's pay.

"Section 14. All motormen and conductors while shifting, switching and flagging cars shall receive the regular motormen's and conductors' rate for such work.

"Section 15. If cars do not leave the carhouses on time, motormen and conductors shall receive their full day's pay.

"Section 16. If any extra men ordered to report to the carhouse receive no work they shall be allowed two hours' pay on their regular rate. Motormen and conductors working until 1 a. m. shall not be required to report until 11 a. m. the same day. This shall not interfere with any motormen or conductors who desire to report sooner.

"Section 17. Regular motormen and conductors having no Sunday runs shall not be required to report for work, but when such motormen or conductors do report they shall receive a minimum of six hours' pay.

"Section 18. Motormen and conductors shall not be responsible for loss of switch bars, run plates or dash signs. Uniforms shall be purchased in the open market, the company to have the right to select color of cloth and specifications for same.

"Section 20. Whenever any complaint is made against any employee of the company by a passenger or by any other person, such person making the complaint must be present at the time of the hearing. In the event that the charge against such employee is not substantiated, he shall be entitled to and shall receive his regular day's pay.

"Section 21. All motormen and conductors operating night cars shall be relieved by or before 7 a. m., the night's work to be concluded in twelve consecutive hours.

"Section 22. An open book shall be established at each carhouse in which men may sign for day or days they wish to be absent, and the first man registered for a particular day or days shall have first preference. Applications to be made ten days ahead.

"Section 23. Any employee elected by the employees to represent them on matters which will prevent him from working his car shall, after he has been relieved from such duties by said employees, be permitted to return to his former position with the company in his full seniority rights.

"Section 24. Any committeeman selected by the employees to represent them at each carhouse shall have the privilege of being off when it is necessary to carry out any business of the employees.

"The above requests and conditions shall be binding upon the companies and the employees for a period of one year, dating from Aug. 1, 1916, to July 31, 1917."

NEW YORK STRIKE MEMORANDUM TO GOVERNOR

Public Service Commission Suggests That Agreements to Arbitrate Be Recorded with Commission and Made Part of Binding Franchise Obligation

Oscar S. Straus, chairman of the Public Service Commission for the first district of New York, on Aug. 10 transmitted to Governor Charles S. Whitman a memorandum in case number 2126 concerning the recent strike in New York, in which he reviewed briefly the inquiry made by the commission into the strike and appended for consideration of the Governor certain deductions of the commission. In concluding his letter of transmittal to the Governor, Mr. Straus said:

"You doubtless will be gratified to learn of the effective part this commission has taken in this important transportation situation. The commission, however, does not feel that its duty is completed. We have learned very important lessons from this experience and these lessons may be utilized by the commission in proposing legislation in accordance with the duty imposed upon it by the Public Service Commissions Act. We had intended in any event to apply to the Legislature for supplementary and amendatory legislation. In order, however, that such legislation as we hoped to recommend to the Legislature shall be well considered and discussed from every angle, we regard it as of sufficient consequence to present the entire situation in detail with our tentative conclusions, together with certain phases of the subject, to be considered as a basis for legislation. This we hope will elicit criticism from every side. We intend to continue the investigations. In the meantime, I take great pleasure in transmitting to you this preliminary statement of the entire situation, together with an outline of the legislative problems that are presented. We shall be glad to receive from you an expression of your own views upon the subject."

The memorandum proper was concluded as follows:

"While the settlement of the strike is important, the commission believes that the lessons to be derived therefrom are more important and should be plainly set forth as a basis for further study and legislation. At this time it is not practicable to formulate definite measures to be introduced in the Legislature, but, in order that there may be the widest possible criticism and opportunity for discussion, the commission now presents for consideration certain deductions which it makes and certain questions which its experience suggests, as follows:

"First—It is evident that the responsibility for maintaining service and adequate transit conditions requires that the commission shall be clothed with the fullest powers. The public now believes that the commission has such powers. This is not true, however, for the statutes contain careful limitations which have been further restricted by judicial decisions. If the commission is to be an administrative body to regulate and control public services, its power should be ample and undoubted. In applying this concretely to industrial situations it is obvious that even if

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public opinion is the only power to control a given situation, such public opinion should be brought promptly to bear upon the basis of authentic knowledge of the facts and the just application of reason. If law and order are to be maintained in the community, correctly informed public opinion must receive an opportunity to assert its power.

"Second—We are of the opinion, further, that if it had been known that the facts in the Yonkers and Westchester matter were subject to public investigation and inquiry by the Public Service Commission, the men would have been satisfied with the enforcement of the agreement to arbitrate and would have been satisfied with an order from the commission directing the president of the railroad to proceed with the arbitration. We, therefore, suggest that when agreements to arbitrate are made between public utility companies and their employees, they should be recorded with the Public Service Commission, and if ratified and approved, made a part of the binding obligations of the company in the exercise of its franchise. This would permit the making of voluntary agreements between employees of the companies and the companies, with the knowledge on the part of both that there was power in the commission to enforce the agreement. We are of the opinion that the Public Service Commissions Law should be amended to compel parties to such agreements to register them with the commission, and in the event of a breach to permit either party to apply to the commission for relief, and that the commission should be vested with adequate power to grant relief in such cases.

"Third—The recent experience of the commission indicates clearly, as did the experience in 1877 and 1902, in the cases of the Boston & Maine Railroad strike and the anthracite coal strike, that investigation and publicity are more than half the cure for industrial differences.

"Fourth—The rapid transit lines of the city are now or about to be operated under the provisions of contracts entered into between the commission, as representative of the city, and the companies, whereby the city is in a position of ownership of most of the lines and to a certain extent in partnership in the operation, thus creating a situation unlike any existing elsewhere, wherein there is a direct municipal, as well as public, interest in the continuous operation of the rapid transit systems of the city. This raises the question which is presented for consideration and public discussion, as to whether the employees on such lines occupy a position toward the public and the municipality different from the position occupied by the employees of other public service corporations.

"Fifth—There is no doubt that men have the right to refrain from working and any rule that requires a man to work against his will is in the nature of slavery. On the other hand, there are positions of public service that require the performance of instant duty; for example, the policeman or the fireman may not throw up his job while on duty, though he may resign his position.

"It may very well be considered at this time whether or not the principle should be extended to the extent of saying that it is against the public interest that men employed on railroad or other public utilities may, without notice, exercise their right to quit their jobs in a group, thus crippling, if not totally arresting the operations of public utilities, to the great damage of the public. We are not undertaking now to suggest what remedy, if any, may be just and practicable, but it is already the law that the matter of the operation of public utilities is a matter of state regulation. Is the quitting of the service a matter for state regulation?

"These questions cannot be settled without the broadest possible discussion. They should be considered from every angle, with due consideration for the rights of the employees and the public. We believe that the commission should present these questions for consideration so that when it resumes its hearings for the purpose of framing legislation, it will have the benefit of receiving information, suggestions and criticisms to aid in arriving at a final conclusion."

The commission expresses the opinion that the two days of investigation into the Third Avenue Railway situation clarified the facts and fixed the responsibility. All documents recording the agreements have been placed in the record in the case.

RAPID TRANSIT MATTERS TO COME UP IN PITTSBURGH IN SEPTEMBER

Dr. J. P. Kerr, president of Council of Pittsburgh, Pa., announced on Aug. 11 that serious consideration is being given a proposal which has been made to the effect that the rapid transit commission to be appointed by the Mayor shall have two unpaid advisers, one from the Pittsburgh Railways and the other from the Pittsburgh Subway Company, which has an ordinance pending for the construction of an underground line to East Liberty.

The rapid transit question was started in the present Council through the adoption of a resolution asking A. Merritt Taylor, Philadelphia, to consult with the city officials. In May Mr. Taylor made a tour of the city and advised with the Mayor and Council. He suggested that the city conduct an extensive survey, patterned after the one he supervised in Philadelphia, for the purpose of determining the necessity for a subway or elevated line. It was Mr. Taylor's idea that a complete survey and plan be developed for the future as well as the present so that whatever is done within the next few years will fit into a comprehensive metropolitan system.

An ordinance was introduced in Council authorizing the Mayor to appoint a rapid transit commissioner to proceed with such a survey, which it was estimated would cost about $150,000 and to provide which it was planned to issue councilmanic bonds. After some discussion the matter was tabled until after the summer vacation. Dr. Kerr says now that it is the intention of the Council to proceed immediately after the first meeting in September to attempt to secure the required additional rapid transit facilities for the city of Pittsburgh.

TWO OUT OF EIGHTEEN SUGGESTED CINCINNATI EXTENSIONS APPROVED BY COMPANY

Through Walter A. Draper, vice-president, the Cincinnati (Ohio) Traction Company made its report on Aug. 11 on requested and proposed car-line extensions to the street railroad committee of the City Council of Cincinnati. Of the eighteen extensions requested by suburbs, civic associations and individuals, the company approves of only two. One of these, the extension of the McMicken Avenue line over Hopple Street, will be stopped at the west end of the Hopple Street viaduct, if the wishes of the company are observed. The extension of the Warsaw Avenue line to Covedale is approved and the company states that it recognizes its obligation to reroute the College Hill and Westwood cars.

Various reasons were assigned for the disapproval of the extensions, principal among which were sparse population in some sections, difficulty and cost of construction and operation and the advantage of delay until the rapid transit loop shall have been built. The report takes each case in order and discusses it in detail.

The requests and proposals for extensions were made in connection with the terms to be incorporated in the revision of the franchise which is now under consideration, and the report calls attention to the fact that they total more than 50 miles and call for the construction of approximately 32 miles of new track, at an estimated cost of $1,200,000. This does not take into consideration the additional rolling stock, feeder wires and other equipment that would be necessary in operating the extensions.

The report discusses the practices that have been common in the case of suburban real estate development. It is generally safe to assume, said the report, that requests for extensions indicate that they will not be remunerative. The company would naturally build such as it believed would show a profit in operation without being requested to do so. On the other hand, it does not always follow that extensions constructed by the company are remunerative from the start. Under certain circumstances the company recognizes an obligation to build extensions and offer an improved service when immediate returns are not apparent. The report says:

"Without putting a burden on the entire transportation system that it cannot stand, the transfer system in Cincinnati should be extended to provide as nearly as possible

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what the people apparently desire; that is, a universal transfer system which will allow them to go from one point in the city to another point on the lines of this company by the shortest route, with the proper protection against abuse. This, with the revision of the other terms of the franchise along lines indicated in this communication, this company believes can be done. Consequently this company is prepared to say that if other features of the franchise are worked out fairly and equitably, it will accept as one of the terms of revision an extension of the transfer system, properly safeguarded, providing for transfers on transfers to enable its patrons to go from point to point by the shortest route."

The company is arranging to place in each of its cars booklets containing a complete list of transfer privileges, to which passengers may refer in case of a dispute with the conductor.

For the year ended Dec. 31, 1915, 36,000,000 transfers were collected, as against 101,000,000 cash fares. From this it was shown that the average fare per passenger was reduced to 3.75 cents.

Mayor George Puchta is endeavoring to have the proposed lease of the rapid transit loop submitted to the voters at the November election. To that end he held a conference with members of the Rapid Transit Commission, city officials and others on Aug. 11.

HARRISBURG STRIKE A DEAD ISSUE

Charles G. Quinn, secretary of the State Federation of Labor, announced on the night of Aug. 16 that the Public Service Commission of Pennsylvania would be asked before Aug. 19 to investigate the financial condition of the Harrisburg Railways and to order a reduction of fare to various suburban points. Quinn has been backing the strikers in their fight for recognition of the Amalgamated Association. He alleges that based on real value an enormous dividend is being paid by the company and that fares could easily be lowered and still allow a considerable return on the capital invested.

More than a dozen jitneymen, operating without the required city license, were arrested on order of Chief of Police Thomas J. Ziel on Aug. 16, and ten strikers, charged with participating in attacks on a trolley car last week received a preliminary hearing on the evening of the same day.

J. J. Thorpe, the Amalgamated Association organizer, on Aug. 16 again appealed to the citizens of Harrisburg not to ride on the cars, but the usual number of passengers is being hauled, the company's records show. On Aug. 12 Mr. Thorpe authorized the publication of a letter to him from Mayor Armstrong of Pittsburgh in which the Pittsburgh executive expressed the hope that Thorpe would bring about a peaceful settlement of the strike.

On Aug. 11 mass meetings were held by the strikers in the suburbs in the hope of getting the sympathy of the suburbanites and of persuading them not to ride on the cars. As no jitneys were running, however, the suburban traffic was very heavy throughout the day and has been growing heavier.

At 5 a. m. on Aug. 11 all jitneys were ordered off the streets, with the exception of those having city licenses, and all but about a score of the 500 operating quit business. Mr. Thorpe urged the jitney men to continue operation on the "tip" system whereby the drivers had no fixed charge but took what people chose to give them. Only a few took his advice, and most of those that did have since been arrested. Several of these men were fined, but they have appealed their cases.

On Aug. 16 the company was running within four cars of the usual schedule, but conditions were such that they are not needed. About 25 per cent of the employees remained loyal throughout the strike. Of those who struck, about one-third have been taken back. Those who have been rehired applied individually for jobs. One day of the strike it rained all day long, and the few jitneys which ventured out charged as high as $1 per trip. Local papers scored the operators for the "hold up." All the cars of the Harrisburg Railways carry this sign at each end:

"We employ no strikebreakers. You're safe in this car.

"The conductor and motorman on this car are experienced men, citizens of Harrisburg, earning an honest living, working a reasonable time for whom and with whom they choose to work.

"Your riding on this car makes it possible for these men to earn an honest living, and they in turn know how to make your ride safe and pleasant."

Kentucky Compensation Act Discussed.—The new workmen's compensation law was the subject up for consideration at the last meeting of the Louisville Rotary Club. R. T. Caldwell, president of the Kentucky Board, was the speaker. He went into considerable detail in his discussion of the safety first movement of the Louisville Railway as illustrating the principle lying behind the act. Before the campaign was begun by the company the number of deaths from accidents averaged one a month, but as a result of the propaganda there had not been one fatal accident for thirteen months.

One Man on a Car Provides Vacations. — The Athens Railway & Electric Company, Athens, Ga., recently issued the following notice to its patrons: "In order to give each man in our employ a vacation we are taking advantage of the small travel on the railway in August to give the motormen and conductors their leave during this month, by operating the cars with one man. We believe this plan will enable us to give to our patrons good service and to our men a rest and change that will be beneficial. This plan will be operative Aug. 5 and continue until each man has had a ten-day vacation."

Buffalo Suburban Line Damaged in Strike.—Disclosures of apparent negligence on the part of county authorities to protect the property of the Buffalo (N. Y.) Southern Railway from destruction by striking platform men and their sympathizers will lead to a grand jury investigation. The interurban road has been almost permanently crippled by the destruction of trolley poles, rails and wire, despite the monthly expenditure of $2,500 on the part of the county to patrol the line. Deputies employed by the county have not made an arrest. Nathan A. Bundy, receiver of the line, estimates that the property damage is in excess of $20,000. Those who have complained of lawbreaking on the part of strikers have been intimidated and threatened with violence. Cars have been operated over some parts of the line, but there has been no service over the entire line since last June. No agreement is in sight.

Court Allows Expenditure for Toledo Cars.—Judge Killits of the United States District Court at Toledo, Ohio, has authorized the Toledo Railways & Light Company to use the money in possession of Captain Craig, representing the court, for the purchase of additional cars. The company will have sixty new cars after Sept. 1 at a cost of $397,350. They will be paid for in semi-annual instalments of $16,000 after the initial payment of $77,260. The funds have been accumulating from the difference between the regular fare and the straight 5-cent fare or six tickets for a quarter allowed by the court, following the strike settlement last spring. The amount on hand at this time is $43,741. Previous to the strike in April the fare during the morning and evening rush hours was 3 cents. The terms of the settlement of the strike were published in the ELECTRIC RAILWAY JOURNAL of April 15, page 745.

Norfolk Franchise Hearing Continued.—Another hearing in regard to the proposed franchises of the Virginia Railway & Power Company in Norfolk was held by the committee of the whole Council on Aug. 3. The objections offered to the grant were practically the same as those advanced at the last hearing. Several Councilmen urged the employment of experts to go over the ordinances, and the session was finally adjourned without definite action. One additional objection offered was to the provision for the payment of one fare for two children under five years old accompanying an adult. It was also stated that provision should be made for an extension of the area to be covered by underground wires. The committee on cheaper gas, which has a connection with the other franchises, has held several meetings and is at present gathering information regarding rates in other places and awaiting figures in regard to the operation of the gas company, which are being compiled.

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Financial and Corporate

ANNUAL REPORT

Brooklyn Rapid Transit Company

The comparative income statement of the Brooklyn (N. Y.) Rapid Transit Company for the fiscal years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Transportation revenue	$27,557,278	98.60	$26,096,265	98.74
Miscellaneous revenues	391,493	1.40	331,421	1.26
Total operating revenue	$27,948,771	100.00	$26,427,686	100.00
Maintenance of way and structures	$2,485,421	8.89	$2,391,814	9.05
Maintenance of equipment	2,508,369	8.98	2,401,841	9.09
Operation of power plant	1,725,307	6.18	1,553,177	5.88
Operation of cars—trainmen's wages	5,084,648	18.19	4,787,574	18.11
Operation of cars—other expenses	1,858,323	6.65	1,744,690	6.60
Damages	602,968	2.16	607,700	2.30
Legal expense in connection with damages	256,113	0.91	261,153	0.99
General law expenses	66,038	0.24	53,406	0.20
Other general expenses	797,652	2.85	819,754	3.10
Freight and mail expenses	302,102	1.08	338,414	1.28
American Railway Traffic Company—expenses	6,961	0.02	854	0.00
Total	$15,693,907	56.15	$14,960,381	56.61
Net revenue from operation	$12,254,864	43.85	$11,467,305	43.39
Income from other sources	438,705	1.57	438,715	1.66
Gross income	$12,693,569	45.42	$11,906,020	45.05
Taxes	$1,837,682	6.58	$1,700,035	6.43
Interest and rentals (net)	5,244,055	18.76	4,693,423	17.76
Total deductions	$7,081,737	25.34	$6,393,459	24.19
Net income	$5,611,832	20.08	$5,512,561	20.86

The system's passenger revenue for the year ended June 30, 1916, increased $1,599,983 or 6.29 per cent. The increase in the preceding year was only 3.05 per cent. Freight revenue fell off $132,599, and other operating revenues (including advertising, station privileges, rents, etc.) increased $60,071, making the total operating revenue $1,521,085 or 5.76 per cent greater than for the preceding year. The operating expenses increased $733,526 or 4.90 per cent, leaving an increase of $787,558 or 6.87 per cent in net revenue from operation. The operating ratio was 56.15 per cent as compared to 56.61 per cent for the preceding year.

In the operating expenses there was included $4,993,790 for maintenance of way and structures and equipment, this representing an increase of $93,606 or 3.91 per cent for way and structures, and $106,528 or 4.44 per cent for equipment. This amount, however, was not all expended, and $531,484 thereof was set aside for reserves, this being an increase of $275,099 in reserves for depreciation over the preceding year. Trainmen's wages and other direct expenses in the operation of cars increased $410,707 or about 6.29 per cent, occasioned partly by the increase in traffic and partly by the higher scale of wages which became effective on Dec. 31, 1915.

The deductions from income were increased by $574,958 on account of new rapid transit lines placed in operation during the year, but other interest deductions showed a slight decrease, so that the net increase for interest and rentals was $550,631 or 11.73 per cent. Taxes increased $137,647 or 8.10 per cent. The final result of the system's operations was a net income of $5,611,832, an increase of $99,271 or 1.8 per cent over the figures for the preceding year. Dividends were paid at the rate of 6 per cent per annum, absorbing $4,467,318, and a balance of $1,144,514 remained for the year.

When the company assumed the obligations imposed by the rapid transit contracts with the city, it was expected that during the period of construction, and before the benefits of those contracts would be felt in their effect upon net revenue, pending full operation, there would be a small margin, if any, of surplus earnings over dividend requirements. It is said to be likely, however, judging from the satisfactory response to such new facilities as have been placed in operation, that the company will be able safely to continue dividends at the present rate during this construction period, and thereafter the margin of surplus ought to be considerably greater.

The report of the company states that the results of operation of the new lines have been quite satisfactory. The railroads which have been thus far placed in operation are not those from which material additions to net revenue were expected, except as they furnish better facilities to territory previously supplied with transit, or until, in the case of the outlying lines, the tributary population should increase. None of the new lines from which a considerable net revenue was anticipated has yet been placed in operation, or will be until the latter part of the present fiscal year. Instead of the entire new system being completed and ready for operation on Jan. 1, 1917, as was hoped when the contracts were signed, the benefits of operation of the most profitable part of the system will not be enjoyed until about the fiscal year 1918-1919. Notwithstanding this delay, it is encouraging to note that the passenger receipts of the operating company, namely, the New York Consolidated Railroad, have increased during the last fiscal year by $1,333,380, and the net revenue has been sufficient to make good all of the company's first preferential of $3,500,000, and $424,467 additional on account of interest and sinking fund upon the investment of new capital in improvements and in contribution to city-built railroads. For the entire period of operations under the city contracts, from Aug. 4, 1913, to June 30, 1916, the net earnings have been sufficient to make good all the company's first preferential of $3,500,000 per year, with the exception of the small amount of $14,605.

The companies of the system expended during the year for welfare work among the employees, and for pensions of men retired from service, $112,840. Of this total $17,703 was on account of the system's medical bureau; $35,818 on account of pensions; $23,920 (covering only a portion of the year) for contributions to employees' insurance premium, and the remainder for clubhouse expenses, contributions to baseball league, entertainments, etc. The full first year's payment toward the premiums for the employees' group insurance plan will, it is said, require the approximate sum of $31,000.

Special franchise assessments from 1907 to 1912 inclusive, with the exception of 1909 when the assessment had previously been compromised, were adjusted in March. The assessments in litigation aggregated $191,672,200, on which the original tax was $3,363,427. The amount of reductions in valuation procured was $44,982,679, and after paying nearly $400,000 in interest and penalties the saving effected in taxes was $372,670. The compromise eliminates practically all of the system's liability for taxes prior to the current year.

The capital expenditures during the last fiscal year totaled $11,434 059, of which $10,823,715 represented rapid transit expenditures made in pursuance of the new contracts, and $209,910 represented similar expenditures in suspense. The expenditures for construction and equipment up to June 30, 1916, under the rapid transit contracts with the city, were as follows: On account of contribution to city-owned lines, $11.148.834; on account of equipment of city-owned lines, $6,153,119, and on account of additions, extensions and improvements to existing railways, $23,532,620—a total of $40,834,575.

Miscellaneous operating statistics for the last two fiscal years follow:

	1916	1915
Passenger earnings	$27,063,235	$25,462,957
Per cent increase over preceding year	6.28	3.05
Passengers carried	728,465,567	689,822,507
Revenue mileage	98,748,451	92,909,994
Per cent increase over preceding year	6.28	6.14
Earnings per revenue mile (cents)	27.4	27.4
Units per passenger (cents):		
Passenger earnings	3.72	3.69
Miscellaneous earnings	0.18	0.20
Total earnings	3.90	3.89
Operating charges	2.16	2.17
Taxes	0.25	0.24
Interest and rentals	0.72	0.68
Total	3.13	3.09
Surplus	0.77	0.80

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MODIFIED REORGANIZATION PLAN

Reorganization Committee of Syracuse & South Bay Electric Railroad Reduces Proposed Bond Issue

The reorganization committee of the Syracuse & South Bay Electric Railroad, Syracuse, N. Y., in a circular dated July 28, notes that the properties covered by the $550,000 of first mortgage bonds of the Syracuse & South Bay Electric Railroad and Syracuse, Watertown & St. Lawrence River Railroad are now being advertised for sale under foreclosure. Allen & Peck, Inc., estimate the net income of the combined properties applicable to capital, for the year ended June 30, 1917, at $19,000, about the same as the income for the year ended June 30, 1914. They also recommend that considerable expenditures be made immediately in renewing poles and ties and surfacing track. The property of the Oneida Lake Terminal Company at South Bay, upon which the railroad terminal is located, should, it is said, be acquired. Moreover, provision must be made for the expenses of the foreclosure, the distributive share of the few bonds not deposited with the committee, the expenses of the committee, etc. It being impracticable to raise the $50,000 cash needed for these purposes upon the new securities as heretofore proposed, a modification of the plan appears imperative so as to permit the issue of not to exceed $50,000 of first lien secured notes.

The estimated earnings make it advisable to reduce the proposed bond issue from $375,000 to $205,000, with a corresponding increase in new first preferred stock. The actual earnings under the receivership do not warrant the payment of interest on the bond issue as originally proposed from July 1, 1915, and the reorganization committee believes that interest on the new bond issue as now proposed should accrue from Oct. 1, 1916. For the purpose of ensuring a continuity of management and control, it has inserted in the proposed amendments a provision for a five-year voting trust, and the new stocks will be delivered in the form of voting trust certificates.

The reorganization plan now contemplates an outstanding capitalization, subject to modification by the Public Service Commission, of $50,000 of first lien 6 per cent notes, $205,000 of sinking-fund 5 per cent bonds, $425,000 of 6 per cent first preferred stock, $420,000 of 6 per cent second preferred stock and $150,000 of common stock. The exchange treatment of the existing securities for each $1,000 worth is shown in the accompanying table.

Holders of existing common stock of the two companies are to receive nothing under the plan. In case the Public Service Commission shall require a reduction of the amount of stock, bonds or other indebtedness provided for under this plan, such reduction shall, if possible, be made in the amount of the new common stock, and the amount thereof to be received by holders of existing South Bay preferred stock shall be reduced accordingly. In case the reduction required shall be such as to eliminate the proposed new common stock, the holders of the existing South Bay preferred stock shall receive nothing under the plan and the new second preferred stock shall be called common stock. In case the reduction is such as to reduce the amount of the second preferred stock (thereupon to be called common stock) below the amount proposed, then the amount of such second preferred stock to be received by the holders of other indebtedness shall be reduced accordingly. In case the reduction shall be such as to eliminate the new second preferred stock as well as the proposed new common stock, then the holders of such other indebtedness shall receive nothing. In case the commission shall require still other reductions, the new stock, bonds and other indebtedness to be issued, and the distribution thereof, shall be such as the commission shall approve, and as nearly as possible in accordance with the plan, but so that before any distribution is made to the holders of existing other indebtedness the holders of the existing bonds of the two companies shall receive stock and bonds to the aggregate face value of those which they would receive under the plan. Of the remaining stock approved by the commission, the holders of existing other indebtedness of both companies shall, before any distribution is made to the holders of existing South Bay preferred stock, receive, if possible, an amount equal in face value to the amount of stock which they would have received under the plan.

SECURITY EXCHANGE BASIS FOR SYRACUSE & SOUTH BAY ELECTRIC RAILROAD REORGANIZATION

Old Issues	New 5 Per Cent Bonds	New First Preferred Stock	New Second Preferred Stock	New Common Stock
First Proposal:				
Bonds of Syracuse & South Bay Electric Railroad	50 per cent–$275,000	40 per cent–$220,000	.....	.....
Bonds of Syracuse, Watertown & St. Lawrence River Railroad	40 per cent– 80,000	27½ per cent– 55,000	.....	.....
All other debts	.....	.....	100 per cent–$420,000	.....
Preferred stock of Syracuse & South Bay Electric Railroad	.....	.....	.....	50 per cent–$150,000
Present Proposal:				
Bonds of Syracuse & South Bay Electric Railroad	30 per cent– 165,000	60 per cent– 330,000	.....	.....
Bonds of Syracuse, Watertown & St. Lawrence River Railroad	20 per cent– 40,000	47½ per cent– 95,000	.....	.....
All other debts	.....	.....	100 per cent– 420,000	.....
Preferred stock of Syracuse & South Bay Electric Railroad	.....	.....	.....	50 per cent– 150,000

INTERURBAN RAILWAY DEFAULTS INTEREST

Digest of Circular to Security Holders of the Buffalo, Lockport & Rochester Railway Giving Reasons for Default

The Buffalo, Lockport & Rochester Railway, Rochester, N. Y., operating 58 miles of interurban railway between Rochester and Lockport, where connections are made for Buffalo, defaulted on Aug. 1 on the payment of interest due then on the $2,799,000 of first mortgage bonds outstanding. A circular addressed to the security holders over the signature of C. Loomis Allen, president of the company, and W. W. Foster, secretary and treasurer, says in part:

"As of Jan. 1, 1911, the company resumed operation of its properties at the close of a period of operation by a receiver, pursuant to a readjustment of the capitalization of the company made without foreclosure. Prior to this readjustment the amount of the first mortgage bonds outstanding was $3,400,000. In the readjustment the holders of $650,000 of the bonds deposited them with the National Trust Company, Ltd., Toronto, and relieved the company from the further payment of interest on these bonds, thus reducing the amount of interest bearing first mortgage bonds to $2,750,000. Yet the earnings applicable to bond interest have not since the above-mentioned receivership been sufficient to pay the interest on the $2,750,000 of bonds, the statements of the company for the last five years having shown deficits as follows: Year ended June 30, 1912, $11,976; 1913, $78,233; 1914, $54,491; 1915, $21,108; 1916, $44,199.

"In spite of these deficits the company continued to pay interest on the $2,750,000 of bonds, raising the funds required for this purpose, in addition to the company's earnings, by loans from the stockholders and others.

"On Aug. 1, 1915, the company had a large amount of accounts payable outstanding, as well as a large amount of short time notes, and the credit of the company was such as to make it very difficult to operate the property economically. In the hope that the earnings of the company would improve during the next few years the directors, about Aug. 1, 1915, authorized an issue of $200,000 in face amount of 6 per cent second mortgage bonds, the proceeds to be applied in paying off the accounts payable, discharging the short-time paper and re-establishing the credit of the company. All of these bonds were taken by the stockholders of the company at par, although the first mortgage bonds were then selling in the market at far below par, and the proceeds applied for the purposes above mentioned. During the last year the utmost economies in management have

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been effected, and in the opinion of the officers no further reduction in operating expenses could be made without injury to the physical property. The gross earnings of the company, however, did not increase as it was hoped they might, but on the contrary during the year ended June 30, 1916, the earnings fell off 9.47 per cent.

"During the past year the company was faced with the necessity of making capital expenditures. Forty-nine thousand dollars, face amount of first mortgage bonds, which had been placed in escrow pursuant to the above-mentioned recapitalization, were issued for this purpose, thus bringing the total first mortgage interest-bearing bonds up to $2,799,000.

"In view of the continued annual deficits of the company and the decrease in gross earnings, the directors came to the conclusion that they were not justified in attempting to borrow funds for the payment of bond interest, and accordingly the Aug. 1, 1916, default in bond interest occurred.

"In the opinion of the officers the falling off in gross earnings is due to two causes: first, the general business depression prevailing in the district where the company's property lies; and, second, the use of the privately owned automobile.

"The directors are giving serious consideration to the financial affairs of the company and after the gross earnings for the next quarter are ascertained they will have a further communication to make to the security holders."

NEBRASKA LINES SHOW DECREASES

During the year ended Nov. 30, 1915, according to the Nebraska State Railway Commission, the gross earnings from operation of all electric railways under its jurisdiction amounted to $3,742,703 as compared to $3,764,667 in the preceding year. Operating expenses, however, increased from $1,882,751 to $2,149,140. As a result, after the inclusion of non-operating income, the income before taxes fell from $1,907,589 to $1,664,126. Dividends showed an increase from $539,366 to $557,812, but the amount reserved for depreciation dropped from $294,605 to $2,812. The expenditures for additions and betterments also showed a great falling off from $568,464 to only $12,255. The number of fare passengers decreased in the last year from 68,234,000 to 67,288,561, while the total number of revenue car miles rose from 13,016,501 to 13,174,366.

INSULL INTERESTS ASSUME CONTROL OF CHICAGO & MILWAUKEE ELECTRIC

The reorganization of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., now known as the Chicago, North Shore & Milwaukee Railroad, has been completed after eight years of litigation. Britton I. Budd, president Chicago Elevated Railways, has been elected president of the reorganized company, and Samuel Insull has been made chairman of the board of directors. George M. Reynolds, president Continental & Commercial National Bank; R. Floyd Clinch of Crerar, Clinch & Company, and Mr. Insull have been chosen as the three voting trustees. Mr. Clinch has also been elected vice-president. The board of directors consists of Messrs. Insull, Clinch and Budd and H. L. Stuart, John R. Thompson, H. S. Osler and E. A. Shedd.

Under the reorganization plan there will be an authorized issue of $10,000,000 of first mortgage twenty-year 5 per cent bonds, a first lien on the entire property. No bonds can be issued in excess of $5,000,000 except for additional property acquired, and at not more than 85 per cent of its cost or fair value. Of the first $5,000,000 of bonds $3,620,000 will be issued immediately. In addition $400,000 of one, two and three year notes (callable at par on any interest date, and to provide for the retirement of which $440,000 of first mortgage bonds are reserved) will be put out. The remaining $940,000 of the bonds will be issued for improvements and betterments as needed from time to time.

The capital stock of $100,000 will be held by the trustees, and against it participation certificates without par value will be issued in three classes. The first, designated as Illinois participation certificates, will be an authorized issue of 50,000, paying dividends at the rate of $5 on each certificate per annum, cumulative after Jan. 1, 1918. The dividends on these certificates will have priority over those on other certificates. The second-class certificates will be called Wisconsin participation certificates, of which there will be a similar authorized issue of 58,000. For the third class, common participation certificates, there will be an authorized issue of 62,000.

The Illinois bondholders will receive ten Illinois participation certificates for each old Illinois bond. The Wisconsin bondholders will receive five Wisconsin participation certificates and in addition five common participation certificates for each old Wisconsin bond. For the present at least the operating organization which has been in charge of the property will be continued. The new management contemplates improving the physical property in the near future.

Boise (Idaho) Railroad, Ltd.—In the United States District Court at Boise on Aug. 3 the Germantown Trust Company, Philadelphia, Pa., trustee under a mortgage by the Boise Railroad dated Dec. 1, 1906, which was executed to secure first mortgage 5 per cent sinking fund gold bonds in the sum of $389,000, filed a bill of complaint to foreclose under the mortgage and asking for the appointment of a receiver for the railroad. It is alleged in the complaint that on June 1, 1915, there became due and payable on the bonds secured by the mortgage, a semi-annual installment of interest amounting to $9,725; that payment was not made at that time, and that the default still exists. Similar allegations are made with reference to interest due on Dec. 1, 1915, and on June 1, 1916.

Buffalo (N. Y.) Southern Railway.—Nathan A. Bundy, receiver of the Buffalo Southern Railway, has been authorized by Justice C. W. Cole in the Supreme Court to issue receivers' certificate for $7,000 with which to meet expenses during the strike of platform men. No settlement of the strike is in sight. No cars are being operated.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—The Supreme Court of the Territory of Hawaii on July 25 handed down a decision overruling the appeal of the territory from a preceding decision by Judge Stuart to the effect that the Honolulu Rapid Transit & Land Company might increase its capital stock from $1,207,500 to $1,600,000. Previous references to this case were made in the ELECTRIC RAILWAY JOURNAL of Nov. 27, 1915, and March 4, 1916. The main argument was over the franchise right of the company to issue securities up to the actual value of the property, plus 25 per cent thereof, the territory alleging that present value instead of original cost should be the measure of "actual value." This has now been twice overruled. The higher court finds a cost of $1,937,631 for the property, representing money actually and properly expended.

Northern Ohio Traction & Light Company, Akron, Ohio.—The proposed sale of a controlling interest in the common stock of the Northern Ohio Traction & Light Company to Eastern interests was not formally discussed at the meeting of the stockholders of the company in Akron on Aug. 15. The meeting, however, was adjourned to Sept. 5. It is understood that representatives of the Eastern interests had not completed their appraisal of the property when the meeting was held. Hodenpyl, Hardy & Company, New York, and E. W. Clark & Company, Philadelphia, are reported to be interested in the proposed deal. The stockholders approved the plans of the directors for the creation of a first lien and refunding bond issue of $14,075,000. Of this sum $4,000,000 is already under an agreement of sale.

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—The deal for the purchase by the Canadian Government of the Quebec & Saguenay line of the Quebec Railway, Light, Heat & Power Company, made in accordance with legislation passed last year, has been ratified by the Cabinet. The Exchequer Court will now settle the exact price to be paid for the road. In addition to the Quebec & Saguenay Railway, the Lotbiniere & Megantic Railway is included in the purchase. The government assumes the payment of interest on the $2,500,000 of bonds outstanding and agrees to meet the issue at maturity. It will purchase outright at par as soon as the deal is completed $373,000 of the bonds held by the Quebec Railway, Light, Heat & Power Company and will also pay the balance of the purchase price, if any, in cash. The lines of the company to be taken over will be operated by the company until

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actual possession of them is taken by the government, and the company must render an accounting to the government from June 30 until the lines pass into the possession of the Dominion.

Seattle (Wash.) Municipal Railway.—A. L. Valentine, superintendent of public utilities of Seattle, in a report to the City Council states that Division "A" of the Municipal Street Railway System was operated during July at a loss of $1,733, and Division "C" at a profit of $139. According to Mr. Valentine, Division "C," known as the Lake Burien Line, has been operated at a profit for the past three months, due to heavy freight revenues which will undoubtedly continue until late in the fall.

Southern Traction Company, Dallas, Tex.—The consolidation of the Southern Traction Company and the Texas Traction Company has been delayed by the inability of the bankers to carry out their contract to purchase bonds, according to statements mailed to stockholders of the companies by J. F. Strickland, president. Mr. Strickland said: "The developments do not change the consolidation plans, but simply delay them."

Sunbury & Susquehanna Railway, Sunbury, Pa.—Judge Cummings in the County Court at Sunbury, Pa., has ordered the sale of the property of the Sunbury & Susquehanna Railway as a whole under foreclosure.

DIVIDENDS DECLARED

Central Arkansas Railway & Light Company, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.

Central Mississippi Valley Electric Properties, Keokuk, Iowa, quarterly, 1½ per cent, preferred.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	June,	'16	$83,085	*$52,327	$30,758	$27,850	$2,908
1"	"	'15	78,667	*84,464	†5,795	17,058	†22,853
12"	"	'16	959,190	*788,700	170,490	257,545	†87,035
12"	"	'15	952,867	*864,438	88,429	206,520	†118,091

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m.,	June,	'16	$809,211	*$501,178	$308,033	$101,524	$206,507
1"	"	'15	708,743	*461,469	247,274	98,310	148,964
12"	"	'16	9,192,924	*6,054,068	3,138,856	1,184,182	1,954,674
12"	"	'15	8,236,323	*5,726,882	2,509,441	1,185,984	1,323,457

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m.,	June,	'16	$158,080	*$95,274	$62,805	$36,582	$26,222
1"	"	'15	165,028	*106,184	58,843	36,058	22,785
12"	"	'16	1,903,532	*1,207,628	695,904	436,458	259,446
12"	"	'15	2,185,512	*1,241,232	944,280	435,742	508,538

NEW YORK & STAMFORD RAILROAD, PORT CHESTER, N. Y.

1m.,	June,	'16	$36,634	*$25,465	$11,173	$7,979	$3,193
1"	"	'15	35,335	*21,632	13,703	8,000	5,703
12"	"	'16	379,152	*302,799	76,353	95,899	†19,545
12"	"	'15	376,543	*303,535	73,008	95,051	†22,042

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m.,	June,	'16	$80,250	*$45,436	$34,814	‡$23,434	$11,379
1"	"	'15	41,886	*17,921	23,965	‡13,286	37,286
12"	"	'16	566,077	*558,755	7,322	‡91,955	†84,632
12"	"	'15	469,227	*494,562	†25,335	‡56,297	†81,632

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m.,	June,	'16	$632,890	*$408,443	$224,447	$184,649	$39,798
1"	"	'15	592,376	*382,357	210,379	181,341	29,037
12"	"	'16	7,710,458	*4,937,933	2,772,525	2,199,373	573,151
12"	"	'15	7,908,397	*4,825,827	3,082,579	2,151,770	930,807

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m.,	June,	'16	$527,510	*$313,401	$214,109	$122,158	$91,951
1"	"	'15	442,809	*281,600	161,209	113,530	47,679
12"	"	'16	5,604,657	*4,069,016	1,535,641	1,402,067	133,574
12"	"	'15	5,205,892	*3,910,983	1,294,909	1,410,337	†115,428

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m.,	June,	'16	$22,907	*$22,588	$319	$1,808	†$1,489
1"	"	'15	22,477	*18,712	3,765	1,473	2,291
12"	"	'16	252,613	*257,103	†4,489	20,399	†24,888
12"	"	'15	258,303	*265,540	†7,237	16,106	23,343

*Includes taxes. †Deficit.
‡Excludes interest on bonds, charged income and paid by the N. Y., N. H. & H. R. R. under guarantee, also interest on notes held by the N. Y., N. H. & H. R. R., not credited to income of that company.

Traffic and Transportation

USE OF SINGLE-TRUCK CARS SUSTAINED

The Massachusetts Public Service Commission has dismissed a petition of residents of North Fairhaven relative to service on the Oxford line of the Union Street Railway. The petitioners asked that the company be compelled to use double-truck cars on this line, claiming that in using single-truck cars the road was violating the terms of its location grant. This specified, among other things, that the company should use upon its lines between New Bedford and Fairhaven "only such cars of late construction as are in good repair and equipment." The petitioners held that the cars operated on the line were not cars of recent construction.

In its finding the board points out that its duty under the law is to determine whether or not the equipment, appliances and service in general which is afforded are in any respect "unjust, unreasonable, unsafe, improper or inadequate" (Stat. 1913, Chap. 784, Sec. 23), and that conditions relating to such matters which may be imposed in grants of location have no controlling force so far as its duties and powers are concerned. The company has for some years paid regular dividends at the rate of 8 per cent per annum. While the company alleged that the Oxford line fails to earn fixed charges, the commission states that the figures submitted to prove this contention were based on averages with no allowance for the fact that the first cost of single-truck cars and the cost of operation are materially less than in the case of larger cars. The board concludes that, on the whole, it is probable that this short line earns its due proportion of interest and taxes and perhaps some profit. In any event, the finding sets forth, "The line is only a part of a compact city system which yields as a whole an excellent return and all its patrons have a right to expect reasonable and adequate service."

The single-truck cars of the Oxford line are of a type which a street railway would not be likely to adopt at the present time and are not suited to the usual requirements of modern service. Many such cars, however, the decision notes, are still in service in Massachusetts and their use must be judged by the conditions which they are called upon in any particular case to meet. The board holds that "so long as adequate seating capacity and the means for safe and reasonably comfortable and expeditious transportation are provided, the type of car is of secondary importance."

Conditions on the Oxford line have been investigated by the inspection department of the commission. The line is short (about 2.33 miles), and "the question of speed is relatively unimportant." While the cars in use were originally constructed about twenty years ago, some of these recently have been renovated and the department found all of them to be maintained in good condition. Complete passenger counts by the department on four days under varying weather conditions showed that the loads rarely exceeded the seating capacity. The commission found that track conditions need remedying, and the company has stated that it will renew the joints during the present month, the work having previously been held back by the failure of the municipality to make necessary highway repairs. The petition was dismissed on the basis of the completion of these track repairs by the company, also presupposing that the volume of traffic handled does not in general exceed the capacity of the service rendered by the existing rolling stock.

MAYOR SIGNS SAN FRANCISCO JITNEY MEASURE

Mayor Rolph, of San Francisco, Cal., on Aug. 4 signed the jitney bus ordinance which prohibits the use of Market Street, between Sixth and Fremont Streets, by jitneys between the hours of 10.30 a. m. and 4 p. m. The ordinance will go into effect in ten days. In a statement Mayor Rolph sets forth his reasons for signing the ordinance. While favorable to the regulation of the jitneys, he said that he was not ready to banish them. He said he did believe,

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however, that regulation was necessary. The chief clause in the ordinance relates to the regulation of Market Street traffic, but there are several other provisions which the jitney men claim will, in effect, put many of them out of business. In the morning and evening the jitneys are crowded one way and run almost empty the other. During the middle of the day traffic between the ferries and the City Hall is brisk and people ride both ways. Another provision only allows one driver to each jitney. At present there are about 1200 jitney drivers and only about 750 machines. Jitneys also must go to the end of their route, and this will still further restrict their operations. Instead of being able to turn around when they have delivered their last passenger they must continue.

The San Francisco *Call*, in commenting editorially on the action by the Mayor, said:

"Mayor Rolph has signed the jitney ordinance, and he deserves the city's gratitude for having taken the stand with a majority of the Board of Supervisors.

"That is much better than allowing it to become a law without his signature—it gives the measure a stamp of finality that should characterize all municipal legislation.

"The ordinance will become effective within ten days—possibly we shall see results within less time.

"The ordinance was passed through the efforts of the Lower Market Street Association, which organized for the particular purpose of investigating the jitney problem, to determine just how much of it was evil and how much was good. It found more evil than good, it marshaled its facts and figures, and these facts and figures resulted in the legislation which is soon to become a law.

"The method adopted by the Lower Market Street Association illustrates the effectiveness of organization and investigation in the preparation of remedial legislation."

PORTLAND'S FIRST JITNEY FRANCHISE UNDER CONSIDERATION

City Attorney La Roche, of Portland, Ore., is considering the first jitney franchise to be drawn up to meet the law that became operative on Aug. 19, and will present his recommendations to the City Council for its consideration. The ordinance has been framed for the Union Motor Bus Company, operated by L. J. Whitaker from the center of the city to Multnomah Lodge and points on the Columbia Highway. The franchise prescribes the route over which the buses of the company shall be operated, and no deviation from the route will be allowed, except with the consent of all passengers, when the driver may stop at streets contiguous to the route to unload or pick up passengers. The franchise also provides for the payment of a city license of $60 yearly, and that tariff charged shall not exceed 3 cents per mile inside the city limits. A licensed chauffeur must drive the cars, and cars must comply with regulations as to periodic inspection. The ordinance discontinuing the present system of jitneys operating under license from the city will take effect on Nov. 15. The franchises to be granted will become effective on that date.

NEW YORK SUBURBAN FARE QUESTION CONSIDERED BY COMMISSION

The Public Service Commission for the First District on Aug. 9 heard the pleas of representatives of 6000 petitioners from various sections of Queens Borough, principally from the Third Ward, in respect of a proposed agreement with the Long Island Railroad for use of its tracks east of Corona to Whitestone and Little Neck as a rapid transit line at a 10-cent fare. The delegation which visited the commission to urge this traffic arrangement was made up very considerably of residents of the College Point section. During the course of the proceeding one of the speakers announced that of the 6000 petitioners in favor of the 10-cent fare, 5500 were registered voters in the Third Ward out of a total voting population of 7500. Speakers in behalf of the project declared that the northeastern section of Queens has virtually no rapid transit of any sort, and that railroad fares were too high to permit of adequate home development of that section. There was also presented during the proceeding a report from Chief Engineer Alfred Craven of the commission, in which he stated that as a result of investigations, his belief that on the two-fare basis the initial annual deficit resulting from operation to the two points above named over the Long Island tracks would not be more than $26,000. At best, he states this is only a guess as to the probable results of the lease of the Long Island tracks as an extension of the Corona rapid transit line to the eastward. His report states, however, that in his belief enhancement of property values in the territory affected and increased riding which would naturally follow from better transit facilities would soon obliterate the deficit. The commission took the matter under advisement.

Automobiles a Menace in Paducah.—The chief of police of Paducah, Ky., is seeking an order from the City Commission which will enable him to regulate use of the streets by automobiles. His chief cause of complaint is that the prevalence of automobiles has become a serious obstacle to traffic.

Lake Shore Electric Railway Will Warn Travelers.—On Aug. 1 the Lake Shore Electric Railway, Cleveland, Ohio, announced that it would have 250 large warning signs made and placed along all highways 300 ft. from the company's right-of-way. This will be done under the guidance of the company's safety committee.

Electric Roads Must Be Considered.—The Public Utilities Commission of Kansas, in a recent order following complaint of the Union Traction Company, Coffeyville, requires that steam roads, in the preparation of their traffic sheets, give electric railways that carry freight the same consideration that is accorded other steam roads.

Freight Cars Run Wild in Seattle.—Three freight cars of the Seattle, Renton & Southern Railway, Seattle, Wash., careened down a long hill near Riverside Station shortly after midnight on Aug. 2 and after a half-mile dash crashed head-on into a steel electric passenger coach owned by the company, seriously injuring one passenger and bruising and cutting three others.

Service Complaint in Trenton.—George B. La Barre, director of public safety of Trenton, N. J., has announced that he will ask the City Commission to request the Board of Public Utility Commissioners to take up the matter of service as furnished by the Trenton & Mercer County Traction Corporation on its lines in Trenton. He considers the present service to be inadequate.

Permission Granted for One-Man Cars in Ballard.—The City Council of Seattle, Wash., has received the recommendations of the franchise committee that permission be granted to operate one-man cars on the Loyal Railway in Ballard. The line covers Market, Twentieth, Twenty-eighth, Sixty-seventh and Eightieth streets, from Twenty-fourth Avenue and Market, the southern terminus to Eighth Street and Thirty-second Avenue, N. W., the northerly terminus.

Twenty-five Killed in Head-on Collision. — Twenty-five persons were killed and many injured in a head-on collision on Aug. 12 between two cars on the line of the Southern Cambria Railway between Echo and Brookvale, 7 miles from Johnstown, Pa. Fourteen were instantly killed, while eleven others died after being removed from the wreckage. The company in a statement made on Aug. 12 said it was absolutely without data on which to base a report of how the accident occurred.

Booklet on Courtesy in Birmingham.—A booklet of suggestions for serving the public has just been issued to all the employees of the Birmingham Railway, Light & Power Company, Birmingham, Ala. It contains numerous suggestions for little courtesies that ordinarily are not expected by the public, but which, when accorded, please the recipient immensely. The pamphlet devotes much space for suggestions as to the conduct of conductors and motormen on cars, and suggests that they never contradict, or, as to that matter, get into an argument with a passenger. Many suggestions are contained for helping passengers on and off cars, especially if the passenger happens to be a woman, child or cripple. J. S. Pevear, president of the company, in a foreword to the booklet, explains that its purpose is to help trainmen "give the public the best possible service at all times, which is the kind of service our company desires to give and which the public has a right to expect."

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Personal Mention

E. F. Blaine has been appointed chairman of the Public Service Commission of Washington by Governor Ernest Lister to succeed C. A. Reynolds, resigned. Mr. Blaine will also act as the representative of the Public Service Commission on the State Highway Board.

Max Prill, Sr., president of the Centralia & Central City Traction Company, Centralia, Ill., has also taken over the duties of general manager of the company as the successor to J. M. McRoy. He has also succeeded Mr. McRoy as general manager of the Centralia Traction Company.

Edward T. Moore, manager of the Dallas (Tex.) Electric Company, has been appointed managing trustee of the Dallas Interurban Terminal Association. Mr. Moore succeeds Oliver M. Chadwick, Boston, who has been called to the Mexican border with the National Guard of Massachusetts, of which he is a member.

L. McAllister has resigned as master mechanic of the Great Falls (Mont.) Street Railway to engage in another line of work. Mr. McAllister was connected with the company fifteen years. He is a native of Indiana and was graduated from Purdue University. He was first employed at Baltimore as an inspector of ordnance. Before coming to Great Falls he conducted the McAllister Machine & Boiler Shops at Logansport, Ind.

James O. Carr of the Public Service Commission for the Second District of New York, who went abroad in June to study the transportation systems of France, England and Italy under war conditions, has returned to the United States. It is Mr. Carr's opinion that railroad transportation in England and France has been most admirably handled since the outbreak of the war, and that very serious conditions were met and dealt with satisfactorily.

S. B. Severson, secretary, treasurer and general manager of the Manhattan & Queens Traction Corporation, Long Island City, N. Y., and Robert Thompson, Jr., assistant general manager of the company, were presented silver loving cups at the carhouse of the company in Long Island City on the evening of Aug. 11 by the trainmen. During the recent strike on the lines in Greater New York none of the conductors or motormen of this line went out. When the men received their pay on Aug. 10 each conductor and motorman found an extra $10 in his pay envelope and each inspector received $20. The presentation to Messrs. Severson and Thompson was made by the men as a token of their esteem of their superiors.

OBITUARY

Will Christy, vice-president of the Northern Ohio Traction & Light Company, Akron, Ohio, brief mention of whose sudden death from an attack of appendicitis was made in the ELECTRIC RAILWAY JOURNAL of Aug. 12, was born in Akron in 1859 and was educated in the public schools of that city. As a young man he entered the tanning and leather business. After ten years of activity in this line he turned to railway work and in 1883, with Ira Miller, W. E. Metlin, his brother James and others, started the first horse-car railway in Akron. Later he became interested in promoting the Akron, Bedford & Cleveland Railway, a pioneer interurban electric railway. He also assisted in founding the Cleveland Construction Company, which built many electric railways in Ohio and elsewhere throughout the United States. He was one of the founders and the first vice-president of the People's Telephone Company, now the Ohio State Telephone Company. At the time of his death, besides being vice-president of the Northern Ohio Traction & Light Company, Mr. Christy was president of the Youngstown & Ohio River Railroad, Leetonia, Ohio; president of the Hamilton Building Company and the Central Savings & Trust Company, Akron; a director of the Citizens' Savings & Trust Company, Cleveland, and a director of the Firestone Tire & Rubber Company. Mr. Christy is survived by his widow.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Newport, Ky.—Petitions asking for a referendum on the resolution to accept the bid of the South Covington & Cincinnati Street Railway for a street railway franchise have been filed with the city commission. There were more than enough names signed to insure legality of the petitions. The commissioners state, however, that many people signed without a clear understanding of the issue.

Lockport, N. Y.—The City Council has approved the application of the International Railway, Buffalo, N. Y., for permission to lay double tracks through West Avenue, from Hawley to Main Street. This extension of its Lockport city lines will afford better facilities for handling traffic on the Buffalo, Lockport & Olcott Beach division. The new line will afford additional track facilities to the new $30,000 interurban terminal which will be erected by the company in Lockport.

TRACK AND ROADWAY

Jacksonville (Fla.) Traction Company.—This company has again signified its willingness to construct under reasonable supervision from the city the proposed extension of its Ostrich Farm line on Eighth Street from Evergreen Avenue to Tallyrand Avenue and thence to the city electric light plant, representing an expenditure of about $40,000.

Atlanta & Anderson Railway, Atlanta, Ga.—For the purpose of preparing the way legally for the construction of the proposed interurban electric railway from Atlanta to Anderson, S. C., a bill has been introduced in the Senate to amend the section of the constitution which provides for the incorporation of railroads, so as to include interurban lines. It is understood that as soon as this amendment is made the Atlanta & Anderson Railway will make application for charter. It will take thirty days to obtain such a charter after application, and as soon as the charter is granted the actual work of construction of the road will begin. The amendment is asked upon a decision of the Supreme Court, which points out that when this act was approved, Dec. 7, 1892, electric railways were not in general use, and no provision was made in the act for the extension of such railways. This decision calls the attention of the General Assembly to the fact that accurate provision should be made for such enterprises. Julian McCurry, Hartwell, is interested.

Waycross Street & Suburban Railway, Waycross, Ga.—This company is planning to extend its railway line along Washington Avenue from Gilmore as far as Wardlaw Avenue. This will carry the line through Gilchrist Park and to Sheba Park.

Chicago (Ill.) City Railway.—This company has purchased from the Chicago & Western Railway the tracks and franchises on West Sixty-third Street from South Cicero Avenue to Central Avenue, on Central Avenue from Sixty-third Street to Sixty-third Place, and on Sixty-third Place from Central Avenue to Austin Avenue, for $150,648. This is in accordance with an ordinance passed by the City Council directing the surface lines to take this property over under the franchise ordinance of 1907, as this part of Stickney is now within the city limits.

Chicago, Fox Lake & Northwestern Electric Railroad, Chicago, Ill.—Surveyors for this company have completed their work between Evanston and Palatine, Ill. The company plans to start work on the new line soon. The road will connect with the Palatine-Wauconda line, which, it is reported, will be purchased and electrified. From Wauconda the company expects to extend the line through the Fox Lake region to Lake Geneva.

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Indianapolis Traction & Terminal Company, Indianapolis, Ind.—Double tracks have been laid by this company on Alabama Street from Market Street to Washington Street. This company has also built turns at Washington and Delaware Streets and at Meridian and Maryland Streets.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company is reported to have drawn plans for the double-tracking of its Crawfordsville division between the western limits of Indianapolis and the Speedway, involving a probable expenditure of about $100,000 for construction.

United Railways, St. Louis, Mo.—The Board of Public Service of St. Louis has authorized the United Railway to build a single track on St. Charles from Fourth to Broadway, so as to constitute a new loop for the Hodiamont cars. At present the Hodiamont cars turn south on Sixth Street and then run east from Sixth to Fourth Street, making the loop back to Locust Street. The last strip of land for a private right-of-way in St. Louis County about half a mile in length, that will enable the United Railways to reroute its cars so that fifteen minutes will be saved between Webster Groves or Kirkwood and St. Louis, has been purchased by the corporation. The right-of-way runs from the Edgebrook bridge, in Maplewood, on the Manchester line to the junction of the Brentwood line and Hanley road.

Missoula-Polson Electric Railway, Missoula, Mont.—A. A. White, according to report, has started preliminary surveys on the proposed electric railway from Missoula to Polson, and has employed N. D. Miller, St. Paul, as chief engineer. The line will pass through St. Ignatius and St. Mary's Pass. [E. R. J., April 8, '16.]

Keating Gold Mining Company, Helena, Mont.—Survey work on the proposed 12-mile electric railway to be built from Toston into the Radersburg district by the Keating Gold Mining Company, and allied interests, has been started. Jesse R. Roote is the resident director of the company in the city of Helena.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The contract for the installation of tracks in the Broadway-Fourth Avenue subway system in Manhattan and Brooklyn, from Fifty-ninth Street and Seventh Avenue to the Flatbush Avenue Extension in Brooklyn, has been awarded by the Public Service Commission for the First District to the T. H. Reynolds Contracting Company, Inc., the lowest bidder, for $288,400. The Board of Estimate and Apportionment will be asked to approve this contract as soon as possible, so that the work may be gotten under way without delay, to make early operation possible. The Public Service Commission for the First District of New York is now advertising for bids, to be received on Aug. 30, for the supply of special work, order No. 9 (frogs and switches), for use in the construction of the Culver line in Brooklyn. The special work is to be delivered in installments, the entire delivery to be completed within five months from the delivery of the contract.

International Railway, Buffalo, N. Y.—This company has asked the City Council of Lockport for permission to extend its line through West Avenue from Transit to Hawley Street, where the company's new $30,000 concrete passenger terminal will be erected. The new structure will not be built on the site of the present terminal as was anticipated. It will be a two-story fireproof structure and will be used by the Buffalo & Lockport, Lockport & Olcott and Buffalo, Lockport & Rochester lines.

International Railway, Buffalo, N. Y.—Unable to force the Grand Trunk Railway of Canada, owners of the International bridge across the Niagara River connecting Buffalo and Bridgeburg, to construct additions to the structure so as to provide facilities for vehicular traffic a bill has been introduced into Congress authorizing the construction of a second bridge across the Niagara River at Buffalo. Among the men interested in the promotion of the project is Edward G. Connette, president of the International Railway Company. The members of the interstate and foreign affairs committee of the House recently investigated traffic conditions across the river at Buffalo and were impressed with the necessity for a vehicular bridge upon which street cars could be operated between the Buffalo and Canadian points.

New York & Queens County Railway, Long Island City, N. Y.—The Public Service Commission for the First District of New York has adopted an order directing this company to construct, maintain and operate a single-track temporary extension or connection of its street surface railroad from the present terminus of its Corona line on Summit Avenue, through Summit Avenue and Pell Street to Jackson Avenue if a temporary permit can be procured from the Board of Estimate and Apportionment. On condition that such temporary extension shall be built and operated, the order of the commission permits the company to suspend the operation of cars on the Flushing Meadows between Summit Avenue and Jackson Avenue in the second ward of Queens for the period of one year from July 29, 1916.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—The directors of this company have decided to build a line skirting the town of Berea. This will make a more direct route for the limited service and eliminate a number of stops. The time gained will be ten minutes. The franchise for the main line through Berea expires on Dec. 16. According to the Town Council a portion of another grant has nine years yet to run. The people hope to secure a local service by enforcing this alleged grant, but expect the limited cars to use the new route for which right-of-way has been secured and options taken.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—Recommendation that this company be required to extend its line of railway to Whitney mills and reconstruct the line between Clifton No. 1 and Clifton No. 3 will be presented before a circuit judge for confirmation, under the report of S. T. Lanham, master in equity. The master says in his report: "I recommend that an order be passed by the court requiring the defendants within sixty days to begin work upon the extension of its railway to the town of Whitney and Clifton mills No. 3, and to complete the same within four months from that date, such extension to conform to the general plan and policy of the system already completed and in operation so as to become an integral part thereof." The action to require the company to construct the railway was begun by A. T. Thomas, a citizen, in behalf of himself and all other citizens. After the case was docketed the circuit court judge ordered that the case be referred to S. T. Lanham, master in equity, to take testimony and arguments and report his findings of law and fact involved. The plaintiffs alleged in their complaint that the defendant company was violating its franchise, granted by the city, May 3, 1899, in its failure to make the extensions demanded in the action. The defendant company alleged that the franchise with the city did not obligate the company to make the extension.

SHOPS AND BUILDINGS

Tri-City Railway & Light Company, Davenport, Iowa.—This company reports that it has let a contract for its new repair shops to be built in Rock Island, Ill. Work will be started on the buildings immediately and it is contemplated that they will be ready for occupancy by December this year.

Northern Ohio Traction & Light Company, Akron, Ohio.—Plans for its new terminal at Akron were submitted to the building inspector on Aug. 10 by this company and a building permit was requested. The structure will be four stories high. The basement and first floor will be used for machine shops, power storage, waiting rooms and general offices. The upper floors will be fitted up for offices. The cost will be $125,000.

Columbus (Ohio) Depot Company.—Three pieces of property have been acquired by this company recently. These give it the entire half of the block extending from Town to Rich Street and from Wall to Front Street. E. R. Sharp is quoted as saying that the company is now in a position to proceed with the construction work. The southern half of the property will be used for interurban train sheds. The Exposition Hall Company has secured control of the second floor of this portion and an exposition hall will be erected over the sheds. The depot company will probably complete this portion of its work first in order to give the Exposition Hall Company an opportunity to proceed with its construction work.

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Manufactures and Supplies

COPPER PRICES FIRM—LITTLE BUYING

Observations on copper market conditions are of continued interest. One authority states that "but little copper is available for delivery until after October and the major market at the time is for October-December delivery. August and September copper is very scarce and buyers are compelled to pay premiums for it, but there is only an occasional demand for those near-by deliveries." The average price of Lake copper for the month of July, based on daily quotations in *The Iron Age* was 25.84 cents and of electrolytic 25.57 cents. At present the quotations are 26.75 cents and 26.50 cents respectively.

The large copper producers are said to be speeding up their output, but the enormous contracts for delivery to foreign nations offsets the greatly increased production.

For six months or more manufacturers here and in England and France have absorbed what one large producer characterizes as "a terrific tonnage." This was in preparation for the big drive. The foreigners had bought well and did not suffer for lack of delivery, but when the military needs became nearly met, then copper stocks, under foreign contract, began to accumulate on the docks.

Within two weeks past a tremendous new buying movement has set in, purchases as great as 150,000,000 lb. being rumored, with possibly larger purchases ahead.

In some lines of manufactured copper and brass the demand is still greater than the supply. Prices remained high and did not drop along with ingot copper. This may partly be attributed to the labor troubles that have occurred during the past six months at several of the plants which manufacture bare wire. Electric railways are big buyers of bare copper, but now are not purchasing in any large quantities. Very little construction work is under way.

However, insulated wire and cables are quoted for four to eight weeks delivery. Quick delivery cannot be made because there are no warehouse stocks.

From the above it is evident that at the present time conditions do not warrant any observations on a possible break in the price of manufactured copper.

CAR BODIES READY—NO TRUCKS

Forty-one city and suburban and eight large interurban car bodies are stored awaiting the delayed delivery of trucks before they can be put in service by the Detroit United Lines. *Electric Railway Service*, the publicity medium of the Detroit Company, in its last issue shows three views of car bodies awaiting trucks and tells the public the exact situation, as follows:

"We certainly are up against a tough situation—one that is mighty discouraging. Never in the history of the Detroit United Lines has our traffic within the one-fare zone and on the interurban lines been as heavy as this summer, never have we needed additional equipment so badly as now, never have the manufacturers of cars and car equipment been so slow in making deliveries. This slow delivery is all due, of course, to the excessive demand for material throughout the country. It has been absolutely impossible for the manufacturers to get the raw materials on anything like prompt time, and hence the absolute impossibility of turning out the finished product. As our patrons know, we have already added to our equipment this year many new cars, but only part of our orders has been filled up to this time, whereas all the orders should have been executed weeks and weeks ago. We are still short in passenger cars, in freight cars and in work cars. . . . Considering the vast amount of work before them, the manufacturers have done better by us than they thought possible two months ago, but the big fact remains that all the cars we ordered ought to have been in service weeks ago. They aren't in the service and they cannot be until all the parts are here and assembled."

OVERHEAD MATERIALS ACTIVE

Widespread Buying Characterizes the Condition in the Line Material Market

That the business condition is good is said to be due not so much to a few large orders but on account of a generous scattering of smaller orders. The roads seem to be buying for immediate use rather than for reserve stock. It has been the observation that a great many of the roads during the depression of the last two years not only exhausted their storeroom supplies of line materials but permitted the overhead to wear itself into such a state that now a general rehabilitation is required. With the improvements in earnings and business prospects, many electric lines are practically rehabilitating their overhead, and therefore the pendulum seems to be swinging the other way. The prices for overhead fittings are about 40 per cent above those of a normal year. The manufacturers report difficulty in obtaining raw materials, particularly malleable iron and steel parts. The high cost of copper, of course, accounts for the increase in selling price. The copper used in making overhead fittings is high-grade scrap, such as second-hand trolley wire, commutator bars and steel coils. As a basis on which to judge the increase in price of the iron parts, it is reported by one manufacturer that the cost of gray iron castings is 33 per cent above normal and that delivery is very hard to obtain.

LESS LUMBER CUT IN JUNE THAN IN MAY

The National Lumber Manufacturers' Association's official figures of the lumber cut from the mills represented in that organization, the monthly barometer of the trade, show that in June the mills represented materially reduced the production of both hard and soft woods. As compared with the May cut there was a decrease in the cut of soft woods of 35 000,000 ft. and of 22,000,000 ft. in hard woods. The shipments of soft woods were 215,200,000 ft. more than production, indicating a reduction of stocks.

ROLLING STOCK

Northern Ohio Traction & Light Company, Akron, Ohio, is reported to be considering the purchase in the near future of thirty-five cars of the Cleveland front-entrance, center-exit type.

New York Central Railroad, New York, N. Y., has ordered ten electric locomotives from the General Electric Company. These are to be similar to the "T" type which were purchased about two years ago and are for passenger service on the main line.

Havana Central Railroad, Havana, Cuba, noted in the ELECTRIC RAILWAY JOURNAL of June 3 as being in the market for additional equipment, has ordered seven motor coaches from the American Car & Foundry Company. These are to be 54 ft. 4 in. over platforms and are to be equipped with GE 240-A motors. One semi-convertible car, equipped with GE-67 motors has been ordered from The J. G. Brill Company.

Salt Lake & Utah Railroad, Salt Lake City, Utah, is in the market for two 61-ft. interurban motor cars, to contain a ladies' compartment, smoking compartment and a small express compartment, with seating capacity for sixty-six passengers. These cars are to be of all-steel construction, mounted on Baldwin trucks, and are to be equipped with four Westinghouse motors with a total rating of 460 hp. with H L control.

TRADE NOTES

Railway Improvement Company, New York, N. Y., has received an order for coasting recorders and anti-climbers for the forty-two elevated cars being built by the Pressed Steel Car Company for the Boston Elevated Railway.

Atlas Preservative Company of America, New York, N. Y., has received a contract to apply the Atlas "A" method of weed killing on the entire line of the Western New York & Pennsylvania Traction Company, Olean, N. Y., work to be started at once.

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Ellcon Company, New York, N. Y., announces that the appointment of William M. Wampler as Eastern sales manager of the Acme Supply Company, Chicago, Ill., will in no way affect Mr. Wampler's interest and activity as vice-president and general manager of the Ellcon Company.

Page Woven Wire Fence Company, Monessen, Pa., announces that it has made arrangements with the Copper Clad Steel Company, Pittsburgh, Pa., whereby it secures exclusive control of this company's product of copper-clad rods for the purpose of drawing the same into copper-clad wire. This product will be known to the trade and advertised as "Copperweld."

Peter Smith Heater Company, Detroit, Mich., announces the following recent orders for hot-water heaters: Chicago & Milwaukee Electric Railway, fifteen of the new O-C-2 design; Northern Ohio Traction & Light Company, fifteen O-C-2; Pittsburgh Railway, fifteen type 1-C; Michigan United Railways, eight O-C-2; the Michigan Railways, two O-C-2, and the Detroit United Railway, twenty-four 1-C.

Frank N. Grigg, Richmond, Va., advises that in addition to his appointment as Southeastern sales manager of the Acme Supply Company, Chicago, Ill., as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 12, he represents the following firms: Henry Giessel Company, Harlan & Hollingsworth Corporation, Heywood Brothers & Wakefield Company and the Transportation Utilities Company.

R. Martens & Company, Inc., New York, N. Y., who handle American made mechanical goods in Russia, have formed the "Russia Trade Corporation of America," to handle non-mechanical lines in Russia. The general offices are in the Maritime Building, New York, N. Y., and all business transactions will be entirely separate and distinct from the parent company. Frank G. Bolles, former manager of the export trade publication, *International Trade*, Chicago, has been made vice-president and will be in immediate charge of affairs.

Cement-Gun Construction Company, Chicago, Ill., reports that in addition to other work it is at present lining two tunnels in Montana for the Northern Pacific Railway; lining a tunnel near Unionville, Ind., for the Illinois Central Railroad; protecting the steel work on the Nickel Plate Railway bridge at Seventy-ninth Street, Chicago, where it crosses over the Illinois Central Railroad and also is covering with 2-in. reinforced Gun-crete siding the entire head-house, total approximately 200,000 sq. ft., for the Chicago & Northwestern Railway grain elevator at South Chicago.

Robert H. Belknap was appointed sales agent of the Bethlehem Steel Company in charge of the Chicago office, effective July 10. Mr. Belknap for a long period was Chicago representative of the Pennsylvania Steel Company and built a wide acquaintance among the electric railways. More recently he was appointed district manager of sales for the Pennsylvania Steel Company in the New York territory. The Chicago territory in which Mr. Belknap's efforts will now be centered includes all or part of the state of Indiana, Illinois, Kentucky, Tennessee, Iowa, Nebraska, Colorado, Wisconsin, Minnesota, upper Michigan, and Canadian territory lying north of Minnesota and Michigan.

G. A. Trube has been appointed export manager of the Westinghouse Air Brake Company and the Westinghouse Traction Brake Company, effective Aug. 1, 1916, with headquarters at Pittsburgh, Pa. Mr. Trube has had a wide foreign experience, having been associated with the Westinghouse Air Brake and Westinghouse Electric interests for many years, both in this country and abroad. He went to England in 1900 to carry out some special work and soon afterward made his headquarters there until January, 1912, when he was transferred to Paris to become managing director of the French Westinghouse Company, which position he has now resigned in order to return to this country and take up his new duties here.

ADVERTISING LITERATURE

Dayton Manufacturing Company, Dayton, Ohio, has issued catalog No. 200 containing 1600 pages replete with more than 11,000 illustrations of articles used chiefly in the construction and operation of railway cars. These, in connection with descriptive matter relating to patterns and articles not illustrated, represent a book of considerable value to railway officials and others interested in the line of material it presents. Illustrations and descriptive matter of new patterns, originated too late for use in this catalog, will be furnished on loose pages for later insertion.

NEW PUBLICATIONS

Standards for Electric Service.—Department of Commerce, Bureau of Standards, circular No. 56. Two hundred sixty-two pages. Copies can be secured from the superintendent of documents, government printing office, Washington, D. C., at forty-five cents per copy.

This circular is designed to be of value to public service commissions, central-station operators and municipal boards and commissions. It deals with the factors entering into adequate and safe electric service, and involving standards of adequacy, meters, central-station operation and power distribution. Included is an elaborate compilation of the rules and regulations of state commissions, city ordinances and state laws relating to this subject. Rules for the regulation of electric service by state commissions and ordinances for the same purpose in towns and cities are suggested. The circular will be of value and interest to electric railways concerned directly or indirectly with the supply of power for lighting and industrial motors.

Mechanical Engineers' Handbook. By Lionel S. Marks. McGraw-Hill Book Co., New York, N. Y. 1836 pages. Limp leather, $5 net.

The field of mechanical engineering has become so extended that it is no longer possible for a single individual, or a small group of individuals, to have so intimate an acquaintance with all its branches that critical judgment in the statement of current practice and selection of engineering data may be satisfactorily exercised. Only by the cooperation of a considerable number of specialists is it possible to obtain a high degree of elaboration in essential details, and it is for this reason that the handbook under review has been prepared by no less than fifty specialists well known in the various phases of the field of mechanical engineering.

The book divides itself into two main halves, the first half being devoted to the more theoretical topics and the last half to the statement and discussion of current practice. The more theoretical portion is subdivided into seven sections dealing with the following subjects: Mathematical tables, weights and measures, mathematics, mechanics of solids and fluids (including friction), heat, strength of materials, materials of engineering, machine elements. The portion treating of practice is divided into eight sections under the general headings of power generation, hoisting and conveyance, transportation, building construction and equipment, machine-shop practice, pumps and compressors, electrical engineering, and engineering measurements, mechanical figuration, etc. The number of contributors to these different sections varies considerably. In a few cases a section is the product of a single contributor, while in one case as many as thirteen contributors are listed.

This brief statement of the contents of the book will give some idea of its scope but can hardly indicate its character, because it is unquestionably the most thorough and comprehensive mechanical engineer's handbook in the English language. It may well be found on the desk of every engineer and of everyone who has contact with the engineering profession. In addition, it should be of great value as a textbook, the sections on mathematics, mechanics and the like being sufficiently detailed to serve as a basis for a course of study on the subject. Certain features of the make-up are very important in rendering the book's contents available. Both the front and back end pages contain an index to the major topics and a list of the more important tables. Thumb tabs are provided so that the reader, after looking at the index on the end pages and finding there the section number, can return immediately, by the use of the thumb tabs, to the section in which he is interested. The important reference tables given also on the end pages show the page references in each case. In general, the index is unusually simple and well arranged, and by judicious use of bold-face type, it has been made easy to pick out all of the main headings.

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Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of Street Railway Journal and Electric Railway Review

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STRIKES NOT CONCLUSIVE

The critical condition of the labor situation on the steam railroads as well as recent labor agitation on the electric railways in New York City and elsewhere emphasizes the necessity of some radical change in the method of settling disputes between employer and employee on public utility properties. The present plan of the employees striking when they wish conditions changed no longer represents the contest of relative strength of each side which it formerly did. Such a plan, as we said recently, may have been all right when the companies were smaller, and it may still be the most available method of settling disputes in industrial undertakings in whose service the public has only a minor interest. But in the vast aggregations of labor which now can at least be nominally marshalled under one banner, a cessation of work on any one of the major public utilities means vastly more to the public than it did at any previous time. Indeed, it is this dread of the public that it will be deprived for a longer or shorter time of utility services which have become indispensable that furnishes the means by which labor nearly always now hopes to win its battles. A realization of its dependence on the service makes the public unwilling to wait and see whether the employers can fill the places of their striking employees at the wages which the latter deem insufficient. It may be argued that the public will not support the demands of employees if they are unfair, and in these circumstances will exercise forbearance during the temporary delay necessary while the employers are rehabilitating the service. But we do not believe that this will usually be the case. In the first place, the points at issue are usually so technical that the public cannot easily determine the merits of the question in dispute, and in the second place the same methods can just as easily be used to advance unjust demands as those which are entirely reasonable. It is the method used, not the position taken in any case, which is reprehensible, and as the possession of irresponsible power usually means that it will be exercised without regard to the rights of others and for selfish ends, it is obvious that a very serious situation exists.

CAN LIBERTY OF ACTION BE ABRIDGED?

The fact is that in the development of our industrial conditions, public utility service has become as necessary to the community as police protection or the service of the mails and the fire department, and a complete interruption of any one of these is as unthinkable as that of any other. Unless some plan is worked out, there seems no recourse but to government ownership in which the utility employees will be on a semi-military basis, as in Germany, but this is an alternative which we believe the public would be loath to adopt except as a last resort, and which would be inimical not only to its interests but to those of labor as well. But can the right of the workman to stop work be abridged? And would not this be an infringement of his liberty of action? Some years ago this might have been so considered, but such is hardly the case now. Capital learned the power which comes from mobilization earlier than labor, but in the Northern Securities case and later similar ones before the Supreme Court it was found advisable in the public interest to set a limit to what a man could do with his property. And if with his property, why not with his labor? The common law has a maxim handed down from Roman times that the safety of the state is the first law, and while liberty of choice for investment and for work is a cherished ideal in this country, the abridgement of its free exercise which would be required to protect the public against abuses would be slight. Just how this can best be done remains to be determined, but that some plan is possible without seriously interfering with the Anglo-Saxon ideal of personal liberty is shown by the successful working of the industrial disputes investigation act in Canada, which inherits its common law from the same source as ourselves.

PROFIT SHARING A POSSIBLE HELP

One more thought before we close. The combinations in labor and capital which are such a characteristic of modern times have effected changes other than those relating directly to the relative size of the undertakings and the numbers of men employed in them. Principal among these changes is the absence of individual contact between employer and employee, with a considerable tendency on the part of the workman to consider his employer's interests and his own as widely separated if not absolutely antagonistic. It is useless to expect a manager of a property employing many thousands of men to be acquainted with any considerable number of his employees, but any plan to remove the thought of both the laborer and the capitalist that their interests are opposed would be beneficial. Personally, we believe that some system of profit-sharing with a minimum wage provision or some bonus plan for the men, depending either upon the financial success of the company during each year or upon the individual efforts of the men in their own lines of work,

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could be adopted to advantage to a greater extent than it now is on the larger public utility systems of the country.

KEEPING SUBSTATION RECORDS

Careful bookkeeping, or the keeping of complete records of transactions, is just as necessary for true success in substation operation as it is in any other business. From the point of view of a business man, the records of substation operation are the books of the railway company along that particular line of its business. An engineer judges of the correctness of a motor application from a graphic meter chart which shows the input to the motor while it is performing its specified task, or he judges of the accuracy of a wheel fit by the pressure diagram taken on the wheel press while the wheel was being forced in place. To him, therefore, the records of a system are to that system what the graphic meter records are to the motor or tool. But just as it is not sufficient for a business corporation to pile up book records which are never analyzed and for an engineer to accumulate graphic records which he never even looks at, it is, likewise, not sufficient simply to keep records of equipment. To secure results, records must be studied and analyzed as well as kept. That substation records, carefully kept and as carefully studied, have been of value to the Illinois Traction System, is rather well shown, we feel, in an article, printed elsewhere in this issue, which deals with the substation record practices of that company. Since the development of its record practices, substation costs have decreased and maintenance efficiency increased and, further, these results have been secured despite the facts that traffic has increased and the equipment grown older.

A POSSIBLE BY-PRODUCT OF THE SUBSTATION

The plan for utilizing the spare time of substation operators, as tried out on a small scale on the Illinois Traction System and described in last week's issue of this paper, is worthy of more than passing notice. Substation operation is not the most stimulating occupation in the world. Entering a few meter readings at intervals, resetting a circuit-breaker now and then, recharging the lightning arresters daily, cutting a rotary converter in or out as needed, etc., make up the daily routine. The regular duties are simple, but intelligence and reliability are necessary characteristics of the operator. Emergencies requiring quick, accurate thinking and promptness of action may arise at any time, and the lives of linemen and others may at times be in the hands of the substation employees. Here, then, we have a job which may be intellectually deadening, and yet which requires a clear head. The average operator also has a considerable part of his time on his hands. If work can be found which will vary the monotony of the routine and at the same time yield a profit, "two birds are killed with one stone." There are, of course, substations and substations. Of course, some substations are of such importance that the attendants must be constantly on the *qui vive*, as a short lapse of attention or a false move might cause great damage or interruption to service. Side occupations are here out of the question. On the other hand, some stations are so simple as to need practically no attention, only such as a ticket or baggage agent can give without interference with his duties. It would be interesting and helpful to learn from our readers whether or not they have found it practicable to utilize the by-product of the substation, *i.e.*, the operator's spare time, in doing work not normally appertaining to the substation.

COEFFICIENTS OF ADHESION

In last week's issue we published an abstract of an article in which a number of formulas for finding the tonnage rating of an electric locomotive for interurban service are given. In this article the formulas for tonnage capacity, where accelerating ability fixes the loading limit, are based on a coefficient of adhesion of 25 per cent.

The coefficient of adhesion, or the ratio of the pull at the rim of the drivers to the weight on the drivers, is affected by a number of things, important among which are rail conditions and the character of the tractive effort. For an intermittent tractive effort, such as is given by a steam locomotive, with an unsanded rail covered with a light snow, this coefficient may be as low as 10 per cent. With sanded rails and an electric locomotive which developed a uniform tractive effort, coefficients of adhesion as high as 41 per cent have been secured. The results of many tests indicate that 30 per cent is about the right figure for an electric locomotive on clean, dry rails. In fact, a number of electric locomotives have been so designed that their motors will slip the drivers at 33 per cent adhesion. The use of 25 per cent, therefore, seems to be conservative. This tendency toward the use of conservative figures in matters of this kind is to be commended as a general thing. A machine which fulfills its guarantee pleases its purchaser and acts as a stimulant for the wider use of apparatus of its kind. Further, tonnage rating calculations, as far as adhesion is concerned, are usually based on the dry rail assumption and reduced ratings are supposed to be used when rail conditions are bad. But the men in charge of trains sometimes forget about these reductions, and as there is a tendency to judge a machine by its general performance, the conservatively rated locomotive is more likely to come through with a clean reputation than one less conservatively rated.

The use of conservative values for the coefficient of adhesion has its disadvantages as well as its advantages, however. For one thing, if train crews in the course of operation find that a locomotive will start more tonnage than its rating calls for, they are liable to assume that its tonnage rating for continuous hauling is correspondingly low, and in line with this assumption overload the locomotive, unless proper operating rules are provided and rigidly enforced. Another objection appears when one attempts to compare the tonnage which an electric locomotive can start with that of a steam locomotive. The maximum tractive effort ratings of steam locomo-

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tives are usually based on coefficients of adhesion ranging from 22 to 25 per cent, while as a matter of fact many tests have shown that even with good rail conditions the upper value is rarely obtained. Comparisons of the starting tractive efforts of steam and electric locomotives are, therefore, manifestly unfair when a conservative value of the coefficient of adhesion for the electric locomotive is used, and, unless the individual making the comparison is fully informed, are liable to lead to faulty conclusions.

The disadvantages just cited are not intended to be arguments against the use of a conservative value for the coefficient of adhesion, but rather as arguments for careful operation and complete information in connection with the use of locomotives, particularly, on an interurban railway where, on account of the few locomotives in use, the status of this type of motive power is not likely to be as clearly defined as it is on a heavy electrification where many locomotives are in use.

SELLING POWER

The question of whether an electric railway should generate its own electrical energy or purchase it of an outside party has received considerable attention during recent years. When the railway is near a large central station, or when it traverses a district which is also traversed by a high-tension transmission network, it has been shown pretty conclusively that purchased energy is cheapest. It so happens, however, that many railways are not so fortunately located. This is particularly true of many of the interurban railways of the Central States. For them, purchasing energy would usually mean purchasing it from a number of small plants of heterogeneous character, a scheme not liable to commend itself to the railway official who is responsible for getting trains over the road. These railways, therefore, have felt it necessary to build their own power houses and transmission lines, and to organize adequate operating forces.

The close economy and the seeking out of new sources of revenue which have been necessary in order to keep out of a receiver's hands have turned the attention of the managers of many of these railways to the power house as another possible source of revenue. The widespread publicity given to power sales work by central station men has emphasized the value of this source in their minds, and there seems to be an increasing tendency on the part of these railways to enter the power field by selling energy, wholesale or retail, to municipalities, quarries, mines, grain elevators and stock companies organized for the purpose of retailing energy. In some localities, charter or other limitations forbid railway companies from carrying on business other than that of transportation, but elsewhere railways may be found which are entering the power sales field on a rather large scale. Energy is sold not only along the right-of-way, but outdoor substations and low-voltage transmission lines are built for the purpose of supplying energy to communities located some miles away. Even the demands of the farm customer have been given attention by some roads.

The power sales development work of two well-known railways, the Fort Dodge line and the Illinois Traction system are noted elsewhere in this issue. On the Fort Dodge line the power development work has been important enough to necessitate the installation of considerable additional generating equipment and the construction of a duplicate transmission line. The Illinois Traction System, in addition to supplying energy to outside parties from a number of its railway substations, has erected ten out-door substations for its power customers.

The most important reason for selling power is, of course, that of increased revenue. Also, since the peak loads due to power and lighting have some diversity with the railway peak, the load factor of both generating and transmitting plant is improved, and the cost of energy, by reason of the improved load factor and greater volume of output, is reduced. Another advantage is that such a source of revenue is fairly steady and sure, since it is not affected by as many variable factors as affect the revenues derived from the sale of transportation. On the other hand, the retailing of energy involves an organization which is quite apart from the transportation field, and this introduces into the general organization of a company complexities which may not be altogether desirable. Further, with a generating and transmitting equipment which may be satisfactory from the standpoint of railway operation, it may be impossible to meet the service standards for light and power which are set by regulative bodies. Thus it may be necessary to install additional facilities in order to meet voltage and frequency limitations and to guarantee continuity of service. Certainly more than one interurban railway, after considerable pressure has been brought to bear by prominent local citizens, has arranged to supply electric power to a small village only to find, after a year or so, that this same village would be satisfied with nothing less than metropolitan service and, through complaints to the public utilities commission, be the cause of much trouble and expense.

In any event, when a railway proposes to enter the power sales business, present conditions and future possibilities and liabilities should be carefully weighed. To be worth while a business must pay dividends, and it is not sufficient that the revenue from power sales simply augment the gross revenue of the road. The net revenues from such a source should, at the very least, pay a reasonable return on the investment necessary for carrying on the business. It does not seem worth while, therefore, to build an outdoor substation and a low-voltage transmission line for the purpose of supplying energy to a sawmill which only uses a few hundred kilowatt-hours per year, neither does it appear to be good engineering to operate a railway powerhouse several hours daily for the sole purpose of supplying street lights to a small country village. On the other hand, if a railway has ample first-class facilities for the generation and distribution of power or facilities which permit of easy extension, and if a power load of considerable magnitude may be developed, the development of that load will be well worth while.

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Fort Dodge Line—View of a Large Gypsum Mill and a Typical Freight Train

Building Up a Big Power Load on an Electric Railway

The "Fort Dodge Line" Has Developed a Large Power Load, Built an Ingenious Coal Storage Plant and Hauls 1400-Ton Freight Trains

THE Fort Dodge, Des Moines & Southern Railroad, originally a steam road, was partially electrified in 1906 when the steam locomotive-drawn passenger trains were replaced with high-speed electric cars. The freight service was not electrified until 1912. At that time the original 600-volt equipment was changed to 1200-volt, electric locomotives were purchased, new terminal facilities were procured and the property rehabilitated in general. Descriptions of the various changes were published in the ELECTRIC RAILWAY JOURNAL, issues for June 25, 1910, page 1094, and May 18, 1912, page 820. Since 1912, however, the heavy traffic which has been developed has necessitated several other interesting improvements and additions. Recently, the Crooked Creek Railroad, an 18-mile steam freight line connecting Webster City and Lehigh, Iowa, was purchased. As indicated on the accompanying map, it is proposed to extend this road, in the near future, until it connects with the Fort Dodge-Hope division of the main line. These additions will increase the route mileage of the system from 125 to 150 miles.

PASSENGER SERVICE

In the passenger service of this road, cars are operated with a one-hour headway between Des Moines and Boone, 43.13 miles, and with a two-hour headway between Boone and Fort Dodge, 43 miles, and between Boone and Rockwell City, 47.1 miles. Shuttle-car service is also operated between Ames and Kelly Junction, 7.3 miles, to meet all through trains. Observation parlor cars are attached to two through trains each way daily. The average schedule speed of the passenger trains is about 25 m.p.h.

The new terminal building at Fort Dodge, an exterior view of which is shown in one of the illustrations on page 346, is of fireproof construction. It contains a waiting room, baggage room, lunch room, two stores, nine living apartments and offices for the local power and lighting and street railway departments of the railroad. Fort Dodge is a city with a population of 20,000. Near it are located the mines and manufacturing plants of several large gypsum companies from which the railroad obtains a substantial share of its freight traffic. At Des Moines the passenger cars of "The Fort Dodge Line" use the fine terminal facilities of the Chicago, Rock Island & Pacific Railroad.

FREIGHT SERVICE

The freight service is operated by steam railroad men, following steam railroad rules and methods. The equipment includes seven 40-ton and four 60-ton, 600-1200-volt General Electric locomotives and more than 2000 standard freight cars. As the major portion of the road's earnings is from freight traffic, its terminal and yard facilities have been highly developed as compared with those of the usual interurban road of the Central States. At Fort Dodge three switching locomotives are required for service on the industrial sidings and in the classification yard. One train each of 1000 tons, 1400 tons and 700 or 800 tons, are run daily from Fort Dodge to Des Moines. The average gross freight tonnage of the road is about 4000 tons a day. One of the illustrations on page 346 shows a view of one of the 60-ton locomotives purchased in 1915. Some data relative to this locomotive are given in the table on the same page.

ROADWAY

The heavy traffic handled on the main line requires substantial roadway construction. The standards established as a steam road have been improved upon and

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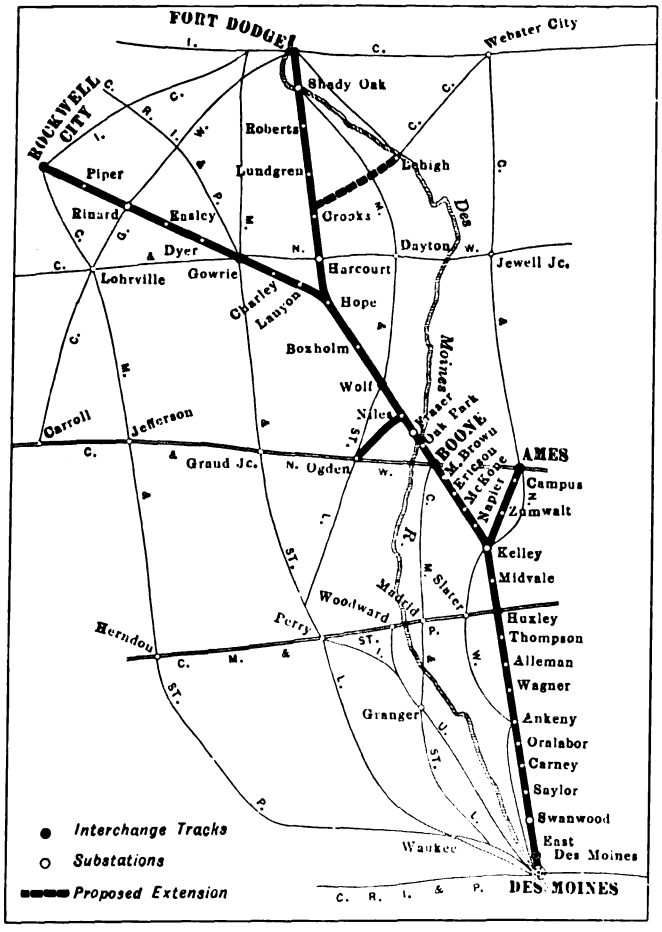
several pieces of heavy engineering work have recently been completed. The main line crosses the Des Moines River about 7 miles north of Boone. The river valley is deep thus requiring long, heavy grades to reach the bridge level. On the south side of the valley the tracks cross a series of deep ravines, each of which was formerly spanned by a high, frame-bent trestle. The larger of these trestles, which was 156 ft. high and 784 ft. long, has been replaced by a heavy steel structure. The other frame structures are being filled in, water passages being provided by large reinforced concrete pipes. In this work nearly 300,000 cu. yd. of dirt will have to be handled.

Several of the more hazardous locations on the road have been protected by the installation of General Railway Signal Company light signals. Twelve blocks are now in operation and it is expected that four more will be installed. The signal department reports the successful use of commercial 40-watt concentrated filament lamps in these daylight signals. These lamps may be focussed more accurately than ordinary mazda lamps, thus increasing the effectiveness of the signal illumination, it is said, from 30 to 50 per cent.

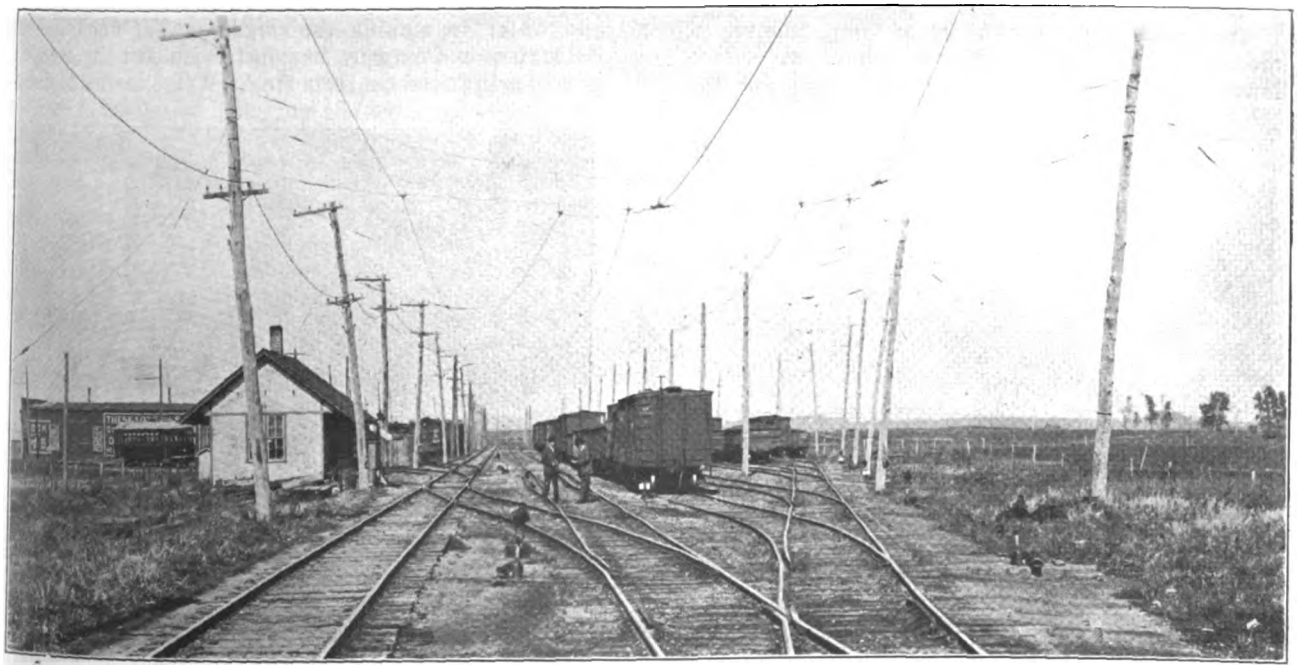


FORT DODGE LINE—MAP SHOWING PROPOSED ADDITIONS

The Fort Dodge Line has built up a comparatively large lighting and power load, which is fed from its railway transmission system. Energy is sold in bulk to municipalities for lighting purposes, is retailed at many of the smaller towns on branch transmission lines and is sold to coal and clay-working mines. Trolley current at a potential of 1200 volts is sold to grain elevators at various points along the line, and in the Des Moines River valley a number of sand-pump motors are fed by an alternating-current, 2300-volt distributing circuit. These sand-pump outfits require from 100 to 200 hp. each. At Fort Dodge, the company operates the street cars, lights the city and supplies energy for operating the gypsum mills, several clay works and other industries.

POWER GENERATION AND DISTRIBUTION

The power supply is obtained from a single generating station located on the Des Moines River at Fraser, about the midpoint of the main line between Des Moines and Fort Dodge. The fuel problem is simple because there are coal mines near the plant and the road operates one mine located at Ogden, 8 miles off the main line. The continued increase in power demand due to growing passenger and freight traffic and to the especially large power and lighting load, has required the installation of additional generating capacity. The units now in service are two Westinghouse 1250-kw., one General Electric horizontal 4000-kw., and one General Electric horizontal 6000-kw. turbine-driven generators,



FORT DODGE LINE—FREIGHT YARD AT EAST FORT DODGE

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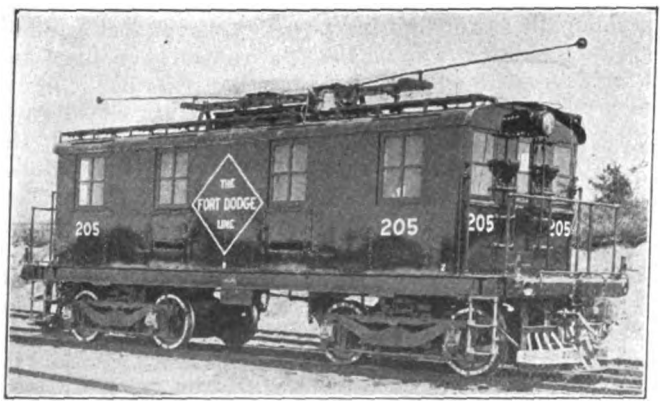
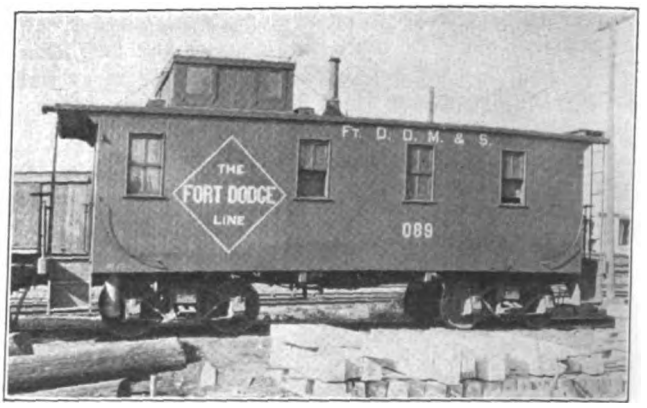


FORT DODGE LINE—STANDARD ELECTRIC FREIGHT LOCOMOTIVE



FORT DODGE LINE—TYPE OF STANDARD CABOOSE

Weight of locomotive					60 tons
Equipment					4-GE-251-600/1200-volt motors
Rated tractive effort					21,400 lb.
Speed at rating					14 m.p.h.
Grades, in per cent	Level,	0.5,	1,	1.5,	2
Tonnage capacity:					
Service *A* (switching)	1140				
Service *B* (rolling profile)	1140,	1140,	935,	690,	540
Service *C* (continuous grade)	1140,	800,	535,	385,	297

all of these units delivering energy at 2300 volts, 25 cycles.

The trolley circuit is fed from the power house and four synchronous-converter substations which are spaced about 20 miles apart. A fifth substation is being built at a junction where the load is especially heavy. This will reduce the average distance between substations to about 15 miles. The substations are connected with the generating station through a 22,000-volt, three-phase transmission system. There is also a duplicate transmission system carrying three-phase, 22,000-volt, 25-cycle current from the power house at Fraser, 37 miles north to Fort Dodge. The latter line was built to assure continuity of service at Fort Dodge.

WATER SUPPLY

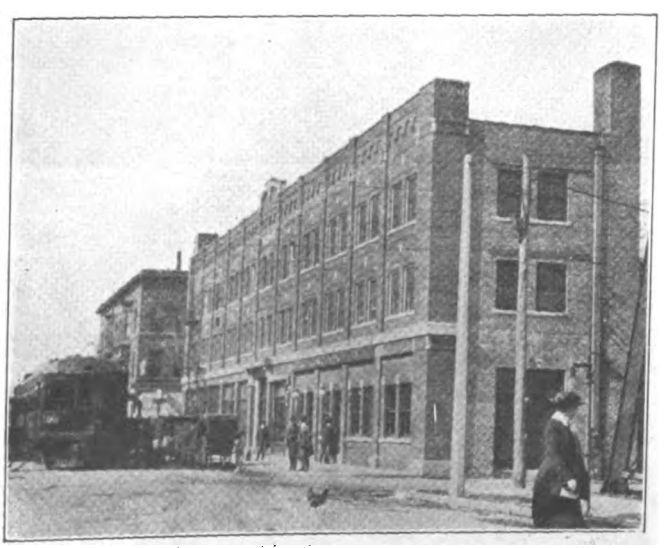
Circulating water for the turbine condensers is taken from the Des Moines River. The water is turbulent and carries considerable suspended matter. To assure an uninterrupted flow of screened water, a traveling screen of the Chain Belt Company's design was installed at the river end of the condenser circulating water intake.

This screen is driven by a 5-hp. motor, which moves the screen sections slowly around two drums. The lower drum is at the bottom of the intake and thus all the water drawn into the station must pass through the slowly-moving screens. As the screens travel around the drums they lift the accumulated rubbish above the intake level. It is then washed off by a spray and carried outside the building which houses the revolving screen. The power-plant engineers have attached to the driving shaft of the revolving screen a make-and-break contact which flashes a pilot light inside the engine room, when the screen is in operation.

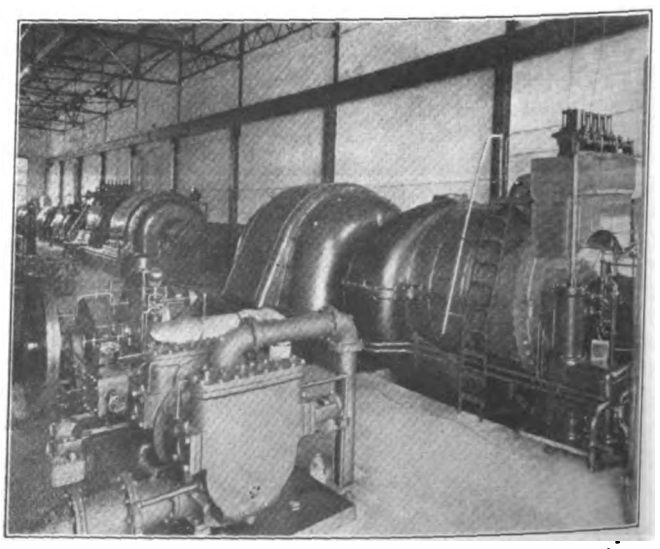
BOILER PLANT

The boiler equipment now includes two units of 500 hp. and four units of 400 hp., all equipped with Green chain grates. Iowa coal, which is very low in heat value and high in sulphur, is burned. Formerly there was trouble with poor ignition. The fire would die away at the front end of the grates and allow excess air to enter. This trouble was corrected by raising the front of the grate and inserting a protruding and sloping bridge at the rear. This bridge acts as a reflector and causes the coal to ignite as soon as it has left the hopper. These grates now burn from 40 to 50 lb. of coal per square foot per hour. The boiler settings are kept tight by painting with a mixture of roofing paint and asbestos.

The original concrete stack which was about 185 ft. high and 8 ft. in diameter, has been taken down because of the development of horizontal and vertical cracks. The failure was attributed to the use of too little cement and water in making the concrete. The John Boland Construction Company has just completed the erection of two reinforced concrete stacks, 9 ft. 6 in. inside diam-



FORT DODGE LINE—VIEW OF NEW TERMINAL BUILDING AT FORT DODGE



FORT DODGE LINE—TURBINE ARRANGEMENT AND POWER-HOUSE CONSTRUCTION

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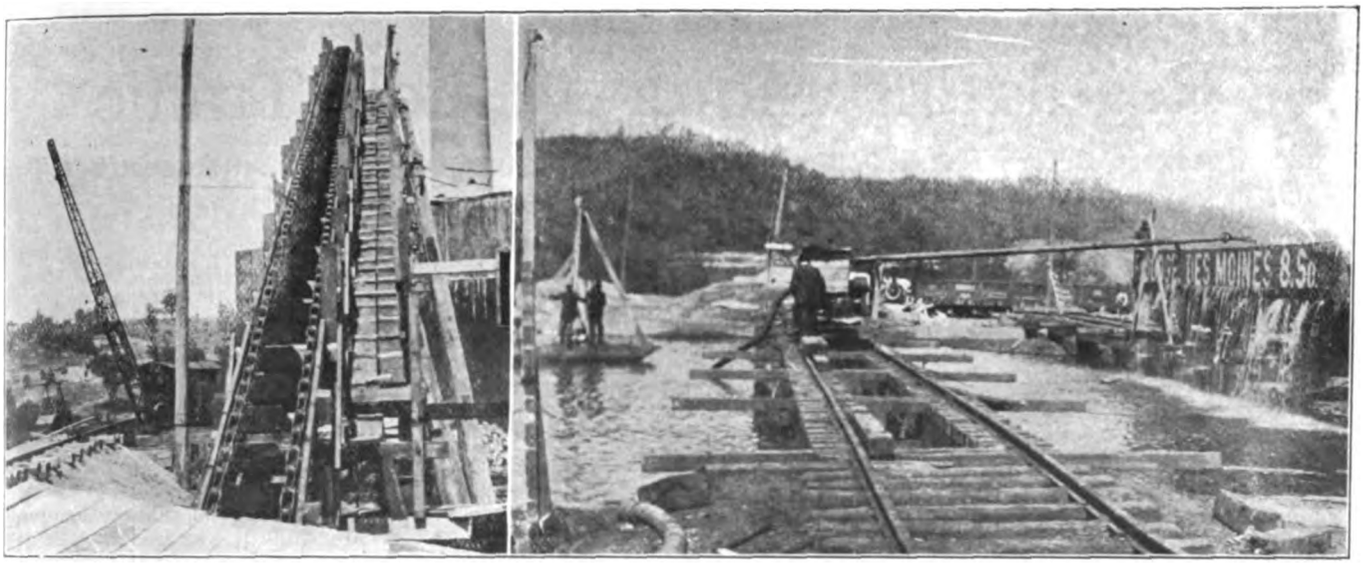

FORT DODGE LINE—METHODS OF HANDLING COAL—UNDER-WATER STORAGE PIT

eter and 212 ft. high. Each of these stacks has sufficient capacity to handle five boilers.

In former years the cost of cleaning boilers amounted to as high as $300 per month. One gang of cleaners was at work all of the time. The river water which was used contained from thirty to thirty-five grains of scale-forming material per gallon. A little more than a year ago a water-softening plant was installed which reduces the scale-forming material to about three grains per gallon. This is a continuous-process water softener manufactured by the William Graver Tank Works, East Chicago, Ill. The cost of operation of the water softener is about $40 per month, and its use has almost eliminated boiler cleaning. An extra supply of softened water is stored in a large wooden tank which formerly was used for engine water when steam locomotives were operated.

Under-Water Coal-Storage Plant

Iowa coal has such a high sulphur content that when stored in bulk it ignites rapidly, and because of the need for a large reserve supply of coal an under-water coal-storage plant, with a capacity of 6000 tons of Iowa screenings, has recently been built. This storage pit is near the boiler house and coal is unloaded into it by gravity from hopper-bottom cars. The pit is 121 ft. square and 18 ft. deep. Water for submerging the coal is delivered to it by the power-station service pump. The pit cost $12,000, not including the erection of the two trestles and tracks across the center.

The method of pumping coal from the storage pit is of particular interest. A centrifugal pump, driven by a 25-hp. motor, has been mounted on a trestle. A small barge which can be moved about as the coal is taken from the pit is used to support the suction pipe of the pump. With this outfit 40 tons of coal can be loaded into a car in thirty minutes.

The arrangement of tracks for delivering coal to the pit is such that incoming coal may be taken directly over the pit and dumped into the water, or may be run farther along and dumped into a hopper from which it is carried by a conveyor to the bunkers over the boiler, or the cars may be run still farther by gravity to a storage yard near by. Also the pumping outfit is designed to lift coal from the pit over the side wall into the hopper of the conveyor leading to the boiler-house bunkers.

The economy of this pit appears not only from its storage value and protection against spontaneous combustion, but also in another direction which probably would not appear except with Iowa coal. When this coal is stored under water, the clay dissolves out and thus materially increases the fuel value of the coal.

Acknowledgment is made to C. H. Crooks, general manager; Byron T. Mottinger, electrical engineer, and T. J. Richards, superintendent of the power and lighting department, for information contained in the foregoing account of recent improvements on this electrified railroad.

Proposed Inspection Tour in Connection with I. E. S. Lecture Course

The committee in charge of the inspection tour, which it is expected will be an outstanding feature of the lecture course to be given under the auspices of the Illuminating Engineering Society and the University of Pennsylvania in September, has issued the following preliminary information:

The general purpose is to assemble as many as may be interested in taking this trip and take them as a party to visit places of notable lighting interest. At each city there will be a local committee having charge of the entertainment of the visitors and seeing to it that they obtain as much as possible of value in the way of information and interest.

The cities of Pittsburgh and Washington will be visited in advance of the convention. During the lecture course there will be a week-end side trip to Atlantic City. Subsequent to the lecture course the party will visit New York, Boston, Schenectady, Buffalo, Niagara Falls, Cleveland and Chicago.

Arrangements will be made so that those desiring to do so may join the party at any point and leave it whenever desired, provided only that each delegate must register for that part of the trip which he proposes to take in order that arrangements for taking care of him may be completed.

The following is the itinerary: Pittsburgh, Sept. 16; Washington, Sept. 17; Philadelphia, Sept. 18 to 23; Atlantic City, Sept. 24; Philadelphia, Sept. 25 to 28; New York, Sept. 29 to Oct. 1; Boston and Lynn, Oct. 2; Schenectady, Oct. 3; Buffalo and Niagara Falls, Oct. 4; Cleveland, Oct. 5; Chicago, Oct. 6.

In order to make it impossible for passengers sitting in an end cross seat to put their feet on the adjoining longitudinal seat the Kansas City (Mo.) Railway has installed a cast grill on the rattan seat ends. This grill is made comfortable as a seat rest, but uncomfortable as a support for the feet.

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Regulating Motor-Vehicle Traffic

Three Speakers Before Pacific Claim Agents' Association in Tacoma on August 9-11 Told How to Regulate Motor Vehicles, Co-operate with the Drivers and Appraise Property Damages

BESIDES the general papers on the fundamentals of claim work, relations of claim departments with the public, and photographic and other aids in claim work, which were published in the ELECTRIC RAILWAY JOURNAL of Aug. 19 in connection with the proceedings of the eighth annual convention of the Pacific Claim Agents' Association in Tacoma, Wash., on Aug. 9-11, there were presented at this convention three papers discussing in detail various phases of motor-vehicle traffic closely related to claim department activities. To be specific, these dealt with the regulation of such vehicles, co-operation with their drivers and owners, and the appraisal of property damages, as shown by the accompanying abstracts.

Co-operating with Owners and Drivers of Motor Vehicles

BY J. W. BROWNE
Claim Agent Tacoma Railway & Power Company, Tacoma, Wash.

The increase of accidents under the heading of "vehicles colliding with cars" is a matter that should command the attention of all street railway men. Where this class of accident occurs, it is up to the claim department, in almost every case, to explain that the company is not at fault and at the same time to do it in a way that will make a friend instead of an enemy. The trouble is that the increase in motor-driven vehicles is so great that laws governing their operation are lacking and even the laws now on the state books are not properly enforced. It is comparatively easy to talk to claimants when they can be shown that they have violated a law or an ordinance; but where an accident is not covered by regulations it requires a great deal of tact to reject a claim and at the same time keep or make a friend for the company.

Our department has devised a "reckless-driving card," and all student trainmen are thoroughly instructed by the department in its use. On it appears the following:

REPORT OF CARELESS DRIVING
AUTOMOBILES AND OTHER VEHICLES

Date ..... *Time* .....
Location .....
Description .....
Auto. No. ..... *Vehicle No.* .....
Owner's Name .....
Driver's Name .....
Remarks: .....
.....
.....
Signed by
..... *Motorman*
..... *Conductor*

NOTE: If between sunset and sunrise state whether or not lights were burning on vehicle as required by ordinance.

When these cards are received at the claim department, a letter is written, such as the following:

We are advised that on Feb. 7, about 2.30 p. m., your automobile, Washington No. 1468, passed a standing car loading passengers at Division and I Streets without stopping, which it is unnecessary to state is a violation of the city ordinance and a very dangerous practice.

Every effort to promote safety in the city streets is of direct importance to you, as it also is to us. Every careless act, by whomsoever committed, is a menace to life and to property. To be sure, accidents will sometimes occur, and the purpose of this letter is to appeal to your own good judgment and to your personal interest to the end that we may have your co-operation in reducing accidents to the lowest possible minimum.

Safety First. It is far better to be safe than sorry.

This is the answer:

I have your recent letter advising me that my auto passed one of your standing cars while it was loading passengers. I thank you for calling my attention to this matter, and hope you will do so if such a thing ever occurs again, which I very much doubt. I fully appreciate the effort you are making for safety and protection to human life and will spare no pains to assist you in every way possible.

Another reply to the same kind of letter follows:

In reply to your kind favor of Aug. 25, we have instructed our drivers to be more careful in the future.

Thanking you for the courtesy shown, we are——

Here is an answer to a letter in which we called attention to the fact that there were not the proper lights on the auto:

We wish to say that it is a hard matter to put lights on a gasoline wagon which would be safe. In consequence of this, we have instructed our drivers positively to have their wagons at the plant before dark.

Thanking you, we beg to remain——

It is the exception when we receive a letter in which there appears any disposition to question our motives or to deny the occurrence which was referred to in our letter.

The use of safety zones can well and profitably be encouraged by the street railway, and it should be known that the company is advocating these zones not only for the benefit of passengers but also as a help and convenience to the motor vehicle driver. The best zone to adopt is a question which does not enter this discussion.

When accidents occur and the observers' statements show conclusively that the company is not at fault, then is the time to do a little missionary work and impress the claimant with the work done and money expended by the company in an effort to reduce accidents. Let the claimant read the statements and let him know that the company is anxious to make good any and all damages for which it is responsible.

In the company column of the daily papers there appeared the following advertisement:

SAFETY STOPS

For the single purpose of eliminating danger to the public so far as it is within our power to do so, in a single day's operation of twenty-four hours, we require our car operators to make the immense total of 25,582 safety stops.

This was followed up by repeating the above and adding:

Would it not be a good plan if you would try making a few safety stops each day at possible danger points and help avoid accidents both to the public and to yourselves? TRY IT.

Our company has posted in all garages and livery barns large cards with different accidents illustrated on them and cautious calling attention to the proper way to cross tracks and street intersections. We also have

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a set of blotters, one of which we mail with every request for a statement. These blotters, however, cover a number of accidents. It might be a good idea to make up a series of illustrated blotters and enclose one with each request for a statement, having the illustration conform to the particular kind of automobile accident as nearly as possible. Cards hung in cars giving the number of automobile accidents would also call the attention of the public to the dangers of motoring. In general, the best policy for co-operation with owners and drivers of motor vehicles consists of publicity on the part of the company as to what the company is doing in trying to reduce accidents, and of tact and courtesy on the part of the men who come into contact with the owners or drivers of motor vehicles.

Regulation of Motor Vehicle Traffic in Seattle

BY A. J. FALKNOR
Attorney Puget Sound Traction, Light & Power Company, Seattle, Wash.

About 40 per cent, a slight increase, of the accidents of the Puget Sound Traction, Light & Power Company for the first six months of 1916 consist of collisions between the street cars and the various types of motor vehicles. This shows how the regulation of such traffic with the view of diminishing the number and seriousness of the accidents is one of importance to all traction companies.

Many rules of conduct are and have been evolved through court decisions. All of the rules determining the relative rights of street cars and motor vehicles are not found in the statutes, but some through the application of common sense, developed and defined by the decisions of the courts. As far as Washington is concerned, from somewhat brief excerpts of court decisions,* it appears that two of the fundamental features of the regulation of motor-vehicle traffic in cities are as follows:

1. As the street car is operated on fixed tracks it has the superior right to that portion of the street where its tracks are laid, and it is the duty of the driver of motor vehicles to yield that right to the street car company. A motorman has the right to assume that the driver of an automobile will act accordingly.

2. A driver of an automobile must make reasonable use of his senses to guard his own safety and the failure to do so is negligence. If a person drives upon a street car track without using his eyes and his ears to learn if there is an approaching street car and a collision occurs, under the court's rulings he is not permitted to recover.

In Seattle a city ordinance† more definitely establishes the superior rights of the street cars over motor vehicles to that portion of the street over which the tracks are laid when the street car desires it in its operation. In addition to this general municipal provision, motor-driven vehicles are required to stop before passing any street car that is stopped to load or unload passengers, and not to turn or cross intersections at a greater speed than 8 m.p.h.—two very important municipal regulations looking toward safety, which if enforced would prevent many of the collisions which occur with motor vehicles.

A type of collision which has caused and is causing many of the accidents between street cars and the motor-drawn vehicles is due to the oversight of drivers or inattention as to the overhang of the street cars. Ordinary prudence requires drivers of motor vehicles to take notice that there is an overhang to a street car when rounding a curve.‡ In the decision quoted, however, the court stated in effect that if the conductor or motorman discovered the perilous position in time to prevent an injury by the stopping of the car after it had been started, it was the employee's duty, of course, to do so.

While it is possibly not legally the duty of a motorman and conductor, or either, to be on the lookout to warn drivers of motor vehicles as to the danger of

*Travers *vs.* Spokane Street Railway (25 Wash. 225, 243):
"The defendant company, at the place where the accident happened and the collision occurred, had the preference and superior right to the use of the track, and it was the duty of the plaintiff not to obstruct the use of said track or the operation of the cars thereon. It was his duty to turn out to allow such street car to pass, if he was driving on the track, and it was his duty to remain off the track and not attempt to cross the same in front of the moving car, except at a safe distance therefrom. A failure in either of these respects constitutes contributory negligence and defeats recovery, and entitled defendant to a verdict."

Pantages *vs.* Seattle Electric Company (55 Wash. 453, 456):
"The court was requested to give the following instruction: 'You are instructed that if you find that the motorman saw the automobile upon the track and there was nothing to obstruct the view of the occupants of the automobile of the approaching car, such motorman had a right to assume that the automobile would be turned off of the track and out of danger in time to avoid a collision, and the motorman had a right to indulge in such assumption until the danger of a collision became imminent.' This requested instruction clearly states the law of the case and should have been given."

Arpagus *vs.* Washington Water Power Company (86 Wash. 83, 86):
"This involves an inquiry as to the relative rights of the drivers of vehicles and street cars. These rights are mutual and reciprocal. Each must have a due regard for the rights and safety of the other. Street cars, being operated upon fixed tracks, have in a sense a right of way over that part of the street upon which the tracks are laid. The motorman is entitled to act upon the assumption that a driver or a pedestrian will exercise due care for his own safety (it is not necessary for him to stop the car until he sees that the other is in apparent danger); and further, that traffic going parallel with a car track will not turn abruptly in front of a moving car."

Helber *vs.* Spokane Street Railway (22 Wash. 319, 322):
"While it is true, as this and many other courts have frequently said, that street cars have not an absolute right of way through the streets, and that pedestrians and others have an equal right to travel on or across any street, yet this latter right must be exercised reasonably, and is qualified by the fact that cars run on fixed tracks, and, in the nature of things, cannot accommodate themselves as readily to emergencies, and cannot even stop with the same promptness or facility, as can pedestrians or drivers of free vehicles, who can instantly stop, or turn to right or left and avoid a collision with an advancing car. The universal knowledge of this fact has established a custom, which ought in justice to have the force of law, making it the duty of the party who can more easily and readily adjust himself to the exigencies of the case to do so, and to stop or turn to avoid a collision; and the motorman has the right to presume that such duty will be performed."

Briscoe *vs.* Washington-Oregon Corporation (84 Wash. 29, 31):
"The only negligence claimed against the street car company was that the car was traveling at an excessive rate of speed. But whether it was or not, there was nothing in front of the appellant to obstruct his view. The street was open; the street car was in plain sight upon the track; and there can be no doubt of the fact that the proximate cause of the accident was the plaintiff's own negligence."

Bowden *vs.* Walla Walla Valley Railway (79 Wash. 184, 187):
"The driver of an automobile, approaching such a crossing as the one in this case, must make reasonable use of his senses to guard his own safety, and the failure to do so is negligence. Such a person cannot take a last look 150 ft. or 175 ft. away from the crossing, and then shut his eyes and go blindly forward. While we shall not attempt to say within what distance respondents should have looked for an approaching car before attempting the crossing, the law does require that such a look must be taken within such a distance as to enable one to ascertain whether or not there is an approaching car in sight."

†"(22) Excepting as provided in Rule 19, street railway cars shall be entitled to the track, and in all cases where any team, automobile or other vehicle shall meet or be overtaken by any car upon any of the tracks of any of the street railways of this city, such team or vehicle shall give way to said car as soon as possible, and in no event shall any vehicle overtaken by such car proceed on such tracks for a greater distance than one block or after arriving at any street intersection; nor shall any person wilfully or purposely obstruct, hinder, delay or in any way interfere with any of said street railway cars, by placing, driving or stopping, or causing to be placed or driven at a slow pace or stopped, any team, vehicle or obstacle, in, upon, along, across or near the tracks of said street railways in any manner so as to obstruct or interfere with the movement and operation of the same, after being notified by the motorman or conductor, by the ringing of the gong or otherwise."

The exception referred to as Rule 19 has to do with fire wagons, ambulances, etc.

‡Gannaway *vs.* P. S. T. L. & P. Co. (77 Wash. 655):
"The respondents had ceased to be passengers on the car when the accident happened, and the appellant owed them no greater duty to look out for their personal safety than it owed to persons passing along the street generally. It is not a duty of street car companies to warn pedestrians on the streets that there is an overhang to an ordinary street car when it rounds a curve. This is a matter of common knowledge, and ordinary prudence requires that every one take notice of the fact."

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the overhang, it certainly is good and proper practice for such employees to be vigilant in the operation of their cars at places where the overhang may cause accidents, so that they may warn the thoughtless or unmindful driver of motor vehicles of the danger. Indeed, too much stress cannot be laid upon the duty of employees not to go blindly forward in the operation of their cars, relying upon their legal rights as established either by the courts or fixed in municipal ordinances, but to be constantly on the alert and to yield at such times and places as is necessary to avoid an accident. It is well, of course, for employees to know their legal rights, but it is also well that they be advised that it is better to yield their legal rights, if by so doing an accident can be avoided.

The question of enforcement of municipal ordinances which are being violated by motor vehicles is one that frequently arises and challenges the correct attitude of the street car company—that is, should the employees of the street car company report violations of municipal ordinances, especially those that involve safety to those traveling on the street cars? We create for us a great many fishhooks if we report these violations, and undoubtedly by not so doing wink at a practice that results in more collisions. Undoubtedly it is the duty of the company, irrespective of whom it hits, to report flagrant violations. To do so probably brings a few curses on the company, but in the long run it tends to the observance of ordinances that make for safety.

Moreover, as a preventive of collisions and accidents between street cars and motor vehicles, settlements, especially where the damage is not beyond that of the automobile, should not be encouraged. It is a type of accident that by litigation is greatly discouraged. Fight them. They will be more careful the next time and their friends will also.

It seems that for some of the more congested streets during certain hours of the day the time must come when motor vehicle travel in the interest of safety will be excluded. To balance the rights between the general public and the drivers of motor vehicles requires time, patience, and determination to do right by all factions; but inasmuch as the street cars are the general means of conveyance, and undoubtedly will remain so, they ought to be accorded exclusively the limited portions of the business districts required for their operation during the congested hours.

While the subject is one that is broad enough to include regulation of the jitney, still such general regulation having largely to do with the welfare and growth of the city, especially the suburban districts, involves really a greater subject than that of safety. The jitney will not find its permanent and legitimate place in this State until it has been subjected to a just, fair and reasonable regulation. It will not reach such place by being permitted to run wild. The settlement of the jitney question must be approached and determined from the standpoint of the general public. Undoubtedly the general public good will require the jitney to be subjected to reasonable regulations. If it can survive reasonable and just regulation, to the extent of its survival it will find its permanent and legitimate place. If it cannot survive just and reasonable regulation, it will disappear. It is not the province or purpose of this paper to determine what is just and reasonable regulation, but such regulation will require safety, comfort and convenience to passengers, regular schedules and reasonable fares, and a just and due regard to the rights of other transportation companies that have expended their money in the paving of streets, the establishment of lines of travel and the building up of rural communities.

Appraisal of Property Damage

BY F. M. HAMILTON
Superintendent Department Accident Investigation, Puget Sound Traction, Light & Power Company, Seattle, Wash.

The following carefully compiled statistics from our Seattle records show a remarkable decrease in every class of accident excepting "collisions with vehicles," this particular type having steadily increased until it now represents nearly 50 per cent of our accidents:

	1911	1912	1913	1914	1915
Collisions between cars	22	15	15	21	9
Collisions with vehicles	363	424	537	515	849
Collisions with pedestrians	176	149	139	116	89
Derailments	25	9	8	5	10
Defective car or track	79	21	56	28	18
Boarding moving cars	114	32	49	38	11
Boarding and leaving still cars	172	151	172	184	150
Leaving moving cars	209	125	110	106	46
Persons while on cars	361	351	384	427	321
Miscellaneous	257	76	83	84	66

The steadily ascending curve of vehicle accidents is undoubtedly due to two principal causes: First, the constantly increasing number of motor vehicles, and, second, the almost criminal carelessness of many drivers and chauffeurs.

We have in our organization a man specially assigned to the appraisal of property damages, and investigating accidents wherein property loss is involved. We were fortunate in securing a practical mechanic, who is familiar with automobile prices, cost of parts, market values, etc. He has been with us several years, during which time he has had occasion to call frequently at almost every garage in town and is well known to the various automobile agents and garage owners. It may be added he has an intimate knowledge of these gentlemen and is able to distinguish between the fair and the unfair.

After the accident reports reach the office they are classified, and all reports involving property damage are turned over to him. The advisability of calling on the owners of damaged property is left to his judgment. It is generally considered advisable to call in all cases where there is apparent liability on the part of the company, or where the liability is doubtful but personal injury exists. To call upon owners of damaged property usually suggests the idea of the possibility of recovery from the company, and such calls are avoided as much as possible.

Each case in which it is considered advisable not to call is allowed to investigate itself, statement blanks being mailed to the witnesses for their version of the accident. Frequently the owner thus slighted by the company appears in his own behalf at our office, and is turned over to the appraiser. If the latter is absent from the office, an arrangement is made for him to inspect the property. Suits are seldom filed against the company in cases where neither the company deemed it advisable to call nor the party to come to the office.

In a case where it is considered advisable to call, an effort is made to interview the owner of the property and to learn his version of the accident. Moreover, careful inquiry is made to ascertain whether any personal injuries resulted from the accident, especially where women or children are involved. The reason for this is obvious, for when a property damage claim is rejected and a suit is instituted against the company, any slight personal injury is often greatly magnified. If any injury is complained of arrangements are made, if possible, for examination by the company's physician, or an effort is made to ascertain the name of the attending physician.

Property damage, as far as our company is concerned, comprises principally damage to vehicles, in which is included damage to contents, which often

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amounts to a considerable sum; store windows, which are frequently broken by stones from the gads of repair crews in the downtown district; damage to buildings from escaping steam from our steam mains, and damage to clothing.

We leave it entirely to the owner of a vehicle to select his own shop where he wishes repairs made. Almost every owner favors a particular shop, and he is naturally suspicious of other suggestions. As a matter of fact, each prominent make of car is generally repaired at the shop representing that particular type.

To deal with large firms or corporations who own a number of commercial vehicles and who are acquainted with our methods of procedure is much easier than to deal with the individual. The vehicle is usually sent to a repair shop, and our appraiser is notified. He goes over the extent of repairs with the repair man, and usually no trouble ensues. It is understood that no responsibility is assumed on his part as to liability, which is later determined by the results of the investigation. It has taken a long time to reach this stage, however, as the appraiser has often been accused of authorizing the work done and making all kinds of promises. Yet he has managed to hold his own, though compelled at times to do so before the court. In cases where liability is conceded on the part of the company, it is not always discreet so to state to the owner of a vehicle before an agreement has been reached as to the extent of the damage.

The individual owner of a commercial vehicle usually raises the question of hiring a vehicle to operate during the time necessary to make repairs. And in cases where a specially constructed vehicle is damaged and cannot be temporarily replaced, the losses in revenue are to be considered. In some cases it is necessary to send to other cities on the Coast for parts, and sometimes to the Eastern factory. The appraiser takes account of these important items, and reports the reasonable time necessary to make repairs.

It is generally conceded in cases of liability that the claimant is entitled to be paid the whole of his damages, but it is not always easy to agree as to what constitutes "whole." Unfortunately our cars have at times collided with new automobiles, still in possession of the dealer. In one instance of recent date, an auto was on its way to be delivered, the bill of sale being in the pocket of the driver, when the street car prevented its delivery. The question of depreciation arises in such cases and is difficult to determine. The agent usually operates his own shop, and his mechanics are willing to testify in his interests. A similar condition obtains in cases where automobiles have been in collision when almost new. The owners are frequently informed by the agents that the machine will never be as good again, no matter what repairs are made. In such cases, where an agreement as to the extent of damage or depreciation cannot be satisfactorily reached, our appraiser is authorized to call in two or three auto experts to give their judgment of damages, and in the event of a suit they are called in as witnesses. This is also done in cases where the repair man and the owner are in collusion.

Cases are not infrequent where the owner of a private automobile refuses to have any repairs made until the company decides what, if any, settlement it will effect. Others will demand that all slightly damaged parts be replaced with new parts, though not intending to order the work done until the company settles. In the event of their claims being rejected, they usually have few repairs made, and sue for large sums, grossly exaggerating their damages. It is necessary to anticipate their actions and fortify the position of the company by additional testimony. The appraiser has a record of claims filed against the company, and on his daily rounds he picks up much valuable information.

The appraiser is frequently brought in touch with the insurance adjusters in his work, and they can often work together to advantage. The insurance companies frequently take the initiative where the damaged auto is insured, and they usually effect a saving when possible. The difficulty of the appraiser grows out of the fact that he is endeavoring to determine a fair estimate of the damages, which is usually conceded in the event of a settlement being effected, but is immediately exaggerated when a suit is filed against the company.

The prime factor in the appraisal of property damage is to be always fair, both to the claimant and the company, and to build up a reputation by fair dealing which will convince all parties, even the most radical, however questionable their actions may have been, that the claim agent at least did the right thing.

Electrical Week Poster Selected

THE Society of Electrical Development has selected the poster shown in the accompanying illustration for use in Advertising America's Electrical Week which will be celebrated Dec. 2-9, 1916. The idea of the picture is taken from the Arabian Nights story of Aladdin's Lamp. The ancient Aladdin summoned an all-powerful slave by the mere rubbing of a certain mysterious lamp. The modern Aladdin pushes a button and the genie, Electricity, appears with a service of light, heat and power which rivals the treasures which the slave of the old story had to offer. The object of the Electrical Week is to make electricity popular and to drive home into every city and hamlet in the country the message "Do It Electrically." The official poster depicts the service which electricity is ready to give and the design is fitting for such a national undertaking as America's Electrical Week.

AMERICA'S ELECTRICAL WEEK POSTER

Boston Elevated Railway Wins Appeal in Damage Case

The Massachusetts Supreme Court has set aside a verdict of $2,500 against the Boston Elevated Railway obtained by a woman plaintiff named Langley for injuries suffered when she was knocked down by two brakemen of the rapid transit lines, who were engaged in a friendly scuffle while off duty at the Sullivan Square terminal station. The men were waiting for a car to take them homeward. The full bench holds that to consider a carrier liable for acts and defaults of the servant as servant or employee it must be proved that the person so acting or failing to act was, in a legal as distinguished from a popular sense, in the employ of the defendant at the time of the acts complained of.

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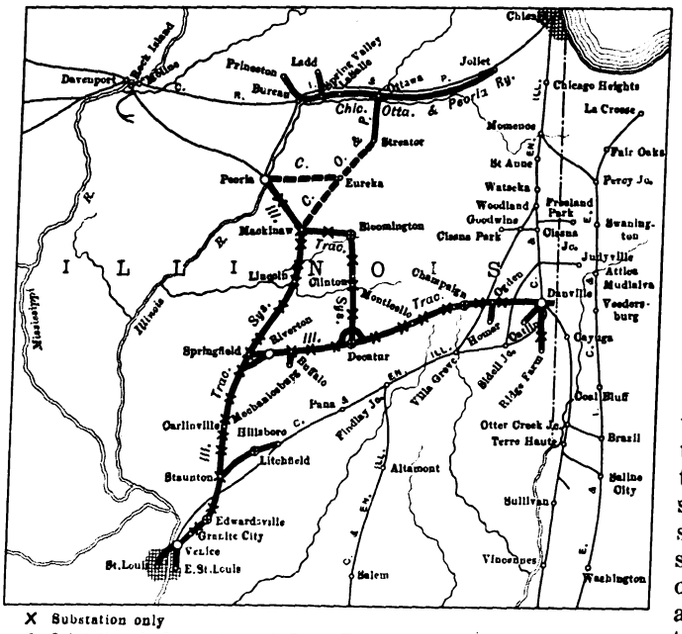
Substation Records Increase Efficiency

A Description of the Method of Compiling Substation Operating and Maintenance Records on the Illinois Traction System—Interesting Maintenance Cost Data Are Presented

By JOHN LEISENRING, Signal Engineer, and HARRY W. COE,
Assistant Superintendent of Substations, Illinois Traction System

ABOUT four years ago the maintenance and operation of the thirty-nine substations on the Illinois Traction System were combined with the signal and overhead department, and the headquarters of the combined offices moved to Springfield, Ill. Prior to that time but few records of burnouts or other substation troubles which occurred from time to time had been compiled. The practical necessity for adequate data on past performances was forcibly brought before the new organization by its inability to compare maintenance and operating conditions as they were with what they had been. This situation brought about the development of the present system of records described in this article.

Thirty individual substations are located at various points along the Illinois Traction System's 450 miles of lines and five others are operated in conjunction with the generating stations used primarily to supply the utilities of the cities in which they are located. These generating stations are located at Danville, Riverton, Peoria and Venice, Ill., and, with the exception of Riverton, all furnish power jointly to the interurban railway and to city properties. These stations supply three-phase, 25-cycle energy to the railway substations at 33,000 volts. The locations of substations and power houses are shown in the map which appears on this page. The capacity and type of equipment in the various stations, as well as the intervening distances, are listed in the table published on page 356.



X Substation only
⊕ Substation in Connection with Power House Supplying Local Utilities
O Substation in Connection with Generating Station for Interurban

ILLINOIS TRACTION SUBSTATION MAINTENANCE—LOCATION OF SUBSTATIONS AND POWER HOUSES ON SYSTEM

It is the standard practice in practically all substations to bring the transmission line loops into the station through wall bushings to disconnecting knife switches in a tower. Below the knife switches on one side of the tower, the leads to the station buses are opened through a standard automatic oil circuit breaker, and a similar circuit breaker is installed between the buses and each bank of transformers. Energy is supplied to some of the nearby towns and villages, and is required for the operation of the automatic block signal system. Where possible the special equipment required for these services is installed in the railway substations. However, ten additional outdoor substations furnish energy to small towns for power and lighting.

The substation maintenance organization consists of two repairmen with assigned territory, one meter inspector, one station inspector, and one general foreman whose gang is used on construction and on heavy or emergency maintenance work over the entire system. These men report to the assistant superintendent of substations, who in turn reports to the signal engineer. Due to the size of the system it has been found desirable to place the load or power dispatching in the hands of one man, who is located at Springfield, and issues, over the company's telephone lines, all instructions to substation operators for sectionalizing or distributing transmission line loads All repairmen in the department communicate frequently with this power dispatcher, who in turn transmits to them instructions from the heads of the department or other information as occasion demands.

The scheme of organization provides at least three ways by which information concerning operating conditions may be conveyed to the proper officials: Through daily substation operators' reports, through the system station inspectors' reports, and through the bi-monthly station inspection form. The daily substation report, which is shown in the reproduction on page 355, is practically a log sheet of the substation operation for the twenty-four hours prior to the hour of closing. It shows the hourly readings of meters, the operation of switches, the time of shutting down units, the time of starting them, the power interruptions, etc. The reverse side of this report is used to record the existing condition of station apparatus, the work done during the period of shutdown and other items of interest.

Besides this written report telephone reports are made promptly by the substation operators to the power dispatcher in case any unusual condition arises or if there is emergency trouble. This latter practice enables repairmen to get to the source of the difficulty quickly and thus prevent more serious trouble from developing. On account of the heavy freight traffic, as well as the operation of sleeping-car trains during the night hours, it is impossible for a number of the substations to shut down for cleaning and general inspection, except during short intervals between regular trains in the daytime. As a check on the operators during the night, they are required to report hourly by telephone from 6 p. m. to 6 a. m. to designated stations located centrally on the various divisions. A record of these reports is

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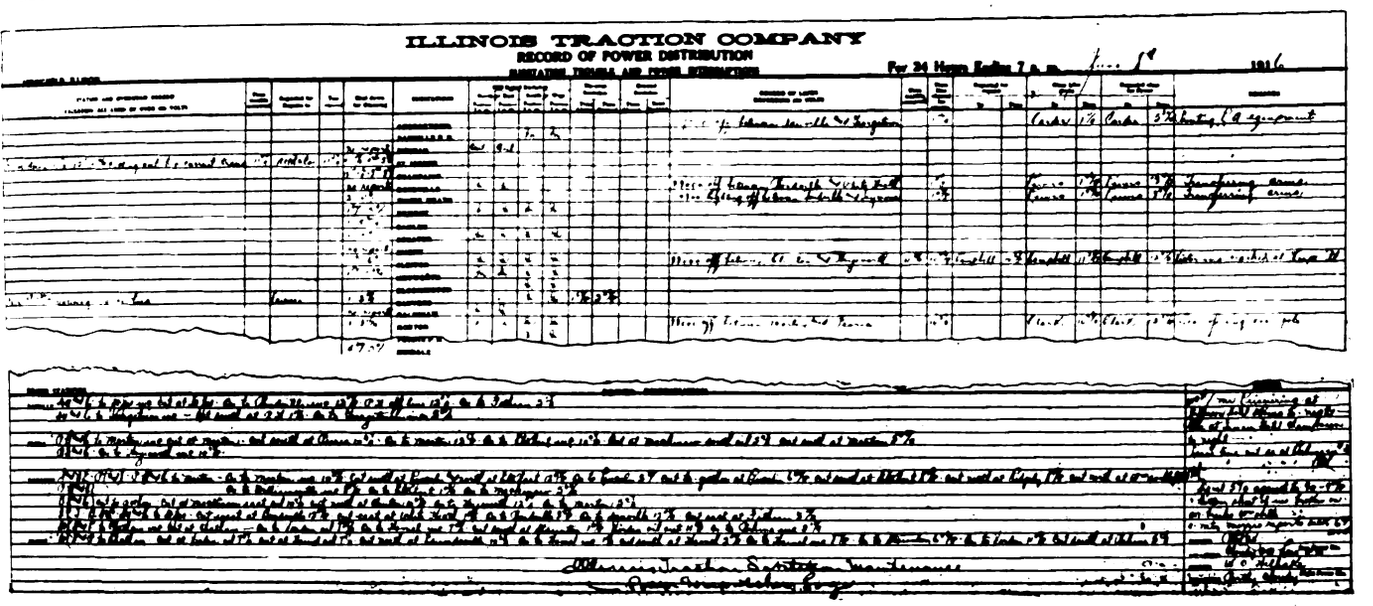
ILLINOIS TRACTION COMPANY
RECORD OF POWER DISTRIBUTION

ILLINOIS TRACTION SUBSTATION MAINTENANCE—POWER DISPATCHER'S LOG

sent to the signal engineer each morning. Reports made more than five minutes prior to or after the hour are not accepted by the checking station or indicated on the report form. The information shown on this report is followed closely, and an explanation of all failures is required from the operators.

Daily reports from the system station inspector and repairmen are also required. They show the date, the hours worked, the material used and work done. One of these forms is reproduced on page 354.

Orders are outstanding that each repairman or inspector shall make as thorough an inspection as is possible without causing unnecessary delays to train operation whenever he visits a station. This daily report form is made in a size convenient for carrying in the inspector's coat pocket, and a sufficient quantity for a month's use is bound together with duplicate sheets which are provided for record and reference. The originals are used to compile the distribution report of labor and material, which is made up each month for the accounting department.

SURPRISE INSPECTION RAISES STANDARD OF OPERATION

Every two months, and without notice, a thorough detailed inspection is made of each station by the assistant superintendent of substations. Each piece of

Detailed Record of Interruptions, Illinois Traction Substation Maintenance System

TABLE II—BLACK—POWER HOUSE AND LINE TROUBLE

JANUARY—FEBRUARY—MARCH

1— 1/5—7.01 a.m. to 7.20 a.m.—Mindale to Emery—Line oil switch open at Mindale.
2— 1/5—6.55 a.m. to 7.32 a.m.—Champaign to Decatur—Trouble at storeroom—Danville unable to carry load
3— 1/6—4.36 p.m. to 4.31 p.m.—Stallings to Anderson
4.51 p.m. to 6.08 p.m.—Stallings to Hamel—Pole on fire at Granite and at Ruth—Venice unable to carry load.
4—1/16—6.45 p.m. to 7.06 p.m.—Ridgely—Smokestack on wire
5—1/16—8.26 a.m. to 8.54 a.m.—White Heath to Oakley—Pole in bad order at Decatur—Danville unable to carry load.
6—1/16—9 p.m. to 9.29 p.m.—Stallings to Gillespie
9 p.m. to 9.39 p.m.—Stallings to Behme
9 p.m. to 9.44 p.m.—Stallings to Anderson
9 p.m. to 9.54 p.m.—Litchfield
Pole in bad order at Ruth—Venice having transformer trouble
7—1/21—1.26 a.m. to 3 a.m.—Litchfield—Work on roof
8—1/30—10.40 a.m. to 5.25 p.m.—Litchfield—High-tension trouble
9—1/31—10.30 a.m. to 1.02 p.m.—Champaign to Decatur—Poles on fire at Staleys—Trouble in tower at Decatur
10— 2/1—8.26 p.m. to 9.30 p.m.—St. Joseph
8.24 p.m. to 9.54 p.m.—Bondville
8.24 p.m. to 9.13 p.m.—White Heath
8.24 p.m. to 10 p.m.—Bement
8.24 p.m. to 9.13 p.m.—Oakley
8.24 p.m. to 9.48 p.m.—Emery
8.24 p.m. to 9.48 p.m.—Danvers
8.24 p.m. to 9.30 p.m.—Mackinaw
8.24 p.m. to 9.30 p.m.—Mindale
8.24 p.m. to 9.30 p.m.—Union
High-tension trouble and stations unable to carry load.
11—2/23—2.25 a.m. to 4.05 a.m.—Mackinaw—High-tension trouble
12— 3/3—12.55 a.m. to 3 a.m. — Georgetown — Renewing high-tension insulation
13— 3/5—6.03 a.m. to 8.25 a.m.—Stallings—High-tension trouble
14— 3/4—10.21 p.m. to 10.30 p.m.—Chatham
10.21 p.m. to 10.41 p.m.—Virden
10.21 p.m. to 10.41 p.m.—Anderson
10.21 p.m. to 10.48 p.m.—Behme
10.21 p.m. to 10.48 p.m.—Gillespie
10.30 p.m. to 11.20 p.m.—Staunton
10.21 p.m. to 11.05 p.m.—Hamel
10.21 p.m. to 11.20 p.m.—Edwardsville
10.21 p.m. to 11.38 p.m.—Stallings
10.21 p.m. to10.48 p.m.—Litchfield
High-tension trouble
15— 3/6—8 a.m. to 8.20 a.m.—Stallings—High-tension trouble
16—3/14—3.40 p.m. to 3.52 p.m.—Decatur to Champaign — High-tension trouble
17—3/15—6.43 a.m. to 7.23 a.m.—Stallings—High-tension trouble

GREEN—SHUTDOWNS FOR MAINTENANCE

JANUARY—FEBRUARY—MARCH

1— 1/3—10.30 p.m. to 1 a.m.—Turning alternating-current rings—Chatham
2—1/10—9.18 p.m. to 12.35 a.m.—Gillespie—Changing armatures
3—1/15—10.46 a.m. to 2.06 p.m.—Litchfield—Working on building
4—1/17—7.30 p.m. to 10.08 p.m.—Elkhart—Ridgely running backwards
5—1/30—7.25 p.m. to 8.20 p.m.—White Heath—Replacing choke coil insulator found in bad order
6— 2/2—11.10 a.m. to 11.30 a.m. and 12.20 p.m. to 12.35 p.m.—Edwardsville—Repairing alternating-current end of armature
7— 2/4—10.04 a.m. to 10.25 a.m.—White Heath—Repairing choke coils
8— 2/5—2.27 p.m. to 2.58 p.m.—Harristown—Work on alternating-current lightning arresters
9— 2/8—9.25 a.m. to 9.40 a.m.—Illiopolis—Tying in bus insulation
10—2/10—2.26 p.m. to 3.06 p.m.—Harristown—Work on alternating-current lightning arresters
11—2/10—7.47 a.m. to 8.38 a.m.—Riverton—Work in power house
12—2/11—1.25 a.m. to 5 a.m.—Buffalo—Rewiring switchboard
13—2/12—12.48 p.m. to 1.05 p.m.—Bement—Repairing roof
14—2/13—1.30 p.m. to 1.40 p.m.—Clinton—Repairing roof
15—2/13—2.53 p.m. to 3.30 p.m.—Harristown—Work on alternating-current lightning arresters
16—2/13—6.35 a.m. to 2.15 p.m.—Riverton—Work on transformers
17—2/20—9.22 p.m. to 9.40 p.m.—Union—Work on alternating-current lightning rings
18—3/11—1.52 a.m. to 5.07 a.m.—Bondville—Work on oil cells

RED—SHUTDOWNS FROM EMERGENCY

JANUARY—FEBRUARY—MARCH

1— 1/1—11.45 a.m. to 12.15 p.m.—Heyworth—Alternating-current rings flashing
2—1/16—8.28 a.m. to 9.12 a.m.—Anderson—Transformer in bad order
3— 2/9—12.40 p.m. to 2.52 p.m.—Fithian—Loose armature coils
4—2/20—7.46 p.m. to 8.15 p.m.—Union—Alternating-current rings flashing
5— 3/7—11.14 a.m. to 4.30 a.m.—Edwardsville—Armature in bad order
6—3/25—11.30 a.m. to 12 noon—Stallings—Rheostat in bad order
7—3/30—4.08 p.m. to 7 p.m. on 3/31—Georgetown — Armature in bad order

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Form No. 154—8-27-15—100 B—04991

ILLINOIS TRACTION SYSTEM

Daily Substation or Wiring Report

Location and Job No. Andersonson Sub.

N. H. Cox, Foreman — June 12 — 1916, Date

Pay Roll for Today.

NAME	POSITION	Hours	Rate	Amount
F. C. Borman	Maintainer	10		

Amount of Pay Roll . . . . . /10

Material used Today

No.	ARTICLE	EST. COST
3	Charging resistance tubes.	

Total Amount . . . . . .

REMARKS: Have installed 3 new Charging Resistance tubes on North End of South set - A.C. Electrolytic Arresters, at Andersonson Substation

ILLINOIS TRACTION SUBSTATION MAINTENANCE—MAINTAINER'S DAILY REPORT

3-23-15—9126

ILLINOIS TRACTION SYSTEM

RECORD OF TROUBLE

CLASS OF TROUBLE Substation — DATE 6/10, 1916

DIVISION Springfield — TIME OFFICE NOTIFIED 3 30 P — NOTIFIED BY Operator

REPORTED FOR REPAIRS TO Cox — TIME DISPATCHED 3 35 P — TIME REPAIRED 6/12-1916.

EXPLANATION OF DELAY

REMARKS: Grounded phase of transmission line broke resistance tubes on the North line of the South set of 33000 volt. Electrolytic Lightning Arresters at Andersonson Sub. New tubes installed.

ILLINOIS TRACTION SUBSTATION MAINTENANCE—CARD RECORD OF STATION TROUBLES

Andersonson — 6/12-1916

Lightning Arresters-33000 New charging resistance tubes installed on North line of South set 3 old ones broken by surge due to the grounding of transmission line.

Work done by Borman

ILLINOIS TRACTION SUBSTATION MAINTENANCE—CARD RECORD OF MAINTAINER'S WORK AT A CERTAIN STATION

ILLINOIS TRACTION SYSTEM

REPORT OF SUBSTATION REPAIRS

STATION: Anderson. DATE: June 12, 1916.

EQUIPMENT	NECESSITY FOR REPAIRS	WORK DONE
Lightning Arresters.	Charging Resistances B. O.	New ones installed.
.....	.....	.....
.....	.....	.....
.....	.....	.....

REMARKS: Three new charging resistance tubes installed on north line of south set of 33,000-volt A.C. lightning arresters. Old ones broken by surge due to transmission line wire grounding.

SIGNATURE: F. C. Borman.

ILLINOIS TRACTION SUBSTATION MAINTENANCE—MAINTAINER'S REPORT OF REPAIRS MADE

ILLINOIS TRACTION SYSTEM

INSPECTION REPORT

Mackinaw SUBSTATION — May 3, 1916

Condition of	Report	Attn'd	Remarks	Condition of	Report	Attn'd	Remarks
A. C. Lig. Arr. E line	✓			Field Switch	✓		
A. C. Lig. Arr. W line	✓			Commutator	✓		
A. C. Lig. Arr. S line	✓			Oscillator	✓		
Ground Wiring	✓			Speed Limit Device	✓		Opened at 540 R.P.M.
Entrance Tubes	✓			Field Connections	✓		
High Tension Ins	✓			Field Coils	✓		
Voltage Detectors	✓	✓	Made new one.	Rheostat	✓		
Tower Switches	✓		Sometime Ant.	Switch Board	✓		
Transformer Switches	✓			Low Voltage Release	✓		
Line O. B. Setting	✓			D.C. Motors	✓		
Line Current Trans	✓			Inst. Fuses	✓		
Line Oil Cells	✓		Sour in oil.	D.C. Switches	✓		
Line O. B. Bushings	✓			Circuit Breakers	✓		
Line O. C. Bushings	✓			Setting R.C.B. No. 1	1900		
Line O. B. Trip	✓			Setting R.C.B. No. 2	—		
Line Ammeters	✓			Setting R.C.B. No. 3	—		
Trans. O. B. Setting	9			Setting F.C.B. No. 1	1000		
Current Transf	✓			Setting F.C.B. No. 2	1000		
Oil Cells	✓		Sour in oil	Setting F.C.B. No. 3	1000		
Oil Coil Bushings	✓			Alarm Bells	✓		
Oil Switch Bushings	✓			D.C. Lightning A. E	✓		Maintainer Test
Tripping Dev	✓			D.C. Lightning A. W	✓		Fuses Blown
Ammeters	✓			D.C. Lightning A. S	✓	✓	Maintainer Test
Station Trans.	✓			Station Appearance	✓		Fair.
Oil in Gauge	✓			All Tools on Hand?	✓		
Entrance Bushings	✓			Dope Buckets	✓		2 Full
Fan-Motor No. 1				Apparatus Grounded	✓		
Fan-Motor No. 2				Alert F. Extinguishers	✓		2 - OK
Pump and Motor				Pyrene Extinguishers	✓		1 - OK
Rotary Appearance No. 1				Powder Extinguishers	✓		
Rotary Appearance No. 2				Sand and Buckets	✓		6 - OK
Rotary Appearance No. 3				Rail Return	✓		
A. C. Brushes	✓	✓	Need cleaning.	Lighting Circuits	✓		
A. C. Brush Holders	✓						Make new cards for Card Holders on switchboard - Old ones dirty & faded
D. C. Brushes	✓						
D. C. Brush Holders	✓		Outside ring eccentric				
Slip Rings	✓						
Oil Rings	✓						

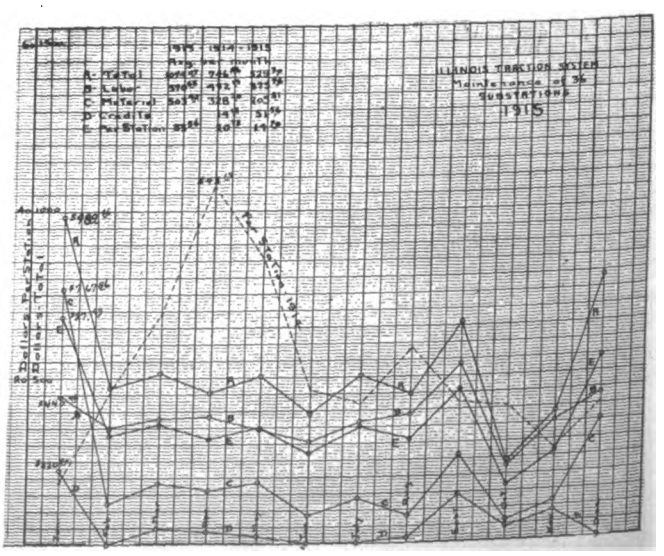
SIGNAL EQUIPMENT — LIGHTING EQUIPMENT

Condition of	Report	Attn'd	Remarks	Condition of	Report	Attn'd	Remarks
Oil Switch	9	✓	Clean Top	A.C. Lig. Arr.	✓	✓	Clean Top
Oil B. Setting	✓			Oil Switch	✓		
Bell Alarm	✓			Oil B. Setting	10		
Ammeter	✓			Bell Alarm	✓		
Transformer	✓			Watt-Meter	✓		
				Volt Meter	✓		
				Ammeters	✓		
				Transformers	X		Sour in oil

NOTE—Items checked in column headed "Attn'd" must be attended to by Substation attendant before next inspection. Attendants are to keep all copies of reports until following inspections are made.

Signed N. H. Cox, Inspector

ILLINOIS TRACTION SUBSTATION MAINTENANCE—STATION INSPECTION REPORT



ILLINOIS TRACTION SUBSTATION MAINTENANCE—CHART OF STATION MAINTENANCE COSTS

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apparatus is examined as to its operative condition and cleanliness. A special form, which is reproduced on the opposite page, is used to record this inspection. One column on this form is used to indicate that apparatus requires the attention of a repairman and the other that it requires the attention of the operator. Tachometer tests are made on the speed limit devices, and other tests are made with instruments that are not entrusted to the average repairman. A copy of this inspection report is left at each station so that the operator may benefit by the inspection and eliminate the defects before the next inspection. From the information so collected lists are prepared and are given to the division maintainers for their information and attention. These maintainers attend to their assignments as quickly as possible and in the order of their importance. When the repairs are completed at any one station a report is made to the general office, so that the defect may be checked off the list.

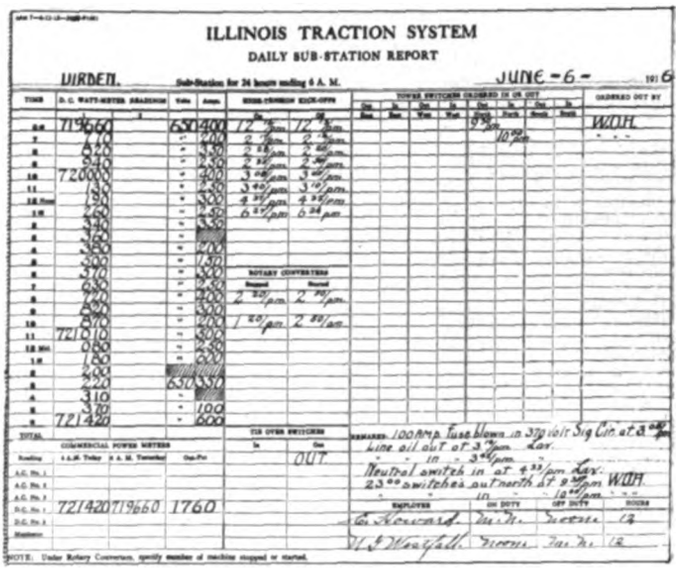
CARD RECORD OF TROUBLE VALUABLE

Card records are kept for each station showing all troubles, their nature and cause if possible, the dates they occurred, and when repairs were made. This has proved of immense value not only as a record of the efficiency of the various operators and repairmen, but also as a measure of the reliability of the apparatus. It also aids in locating chronic troubles due to special conditions existing at any particular station. Prior to the use of this inspection and record system it was a common occurrence to have as many as six or eight items needing attention at each station on every inspection report. This number has been reduced to such an extent that the inspectors now frequently find a number of stations in perfect condition, both as regards operation and appearance. As a matter of record and for comparison purposes, sheets are made up from these inspections to show the relative station condition. Each piece of apparatus is given a weight in units, dependent upon its importance, and a percentage is figured for each substation by dividing the sum of the units found to be in perfect condition by the total of possible units obtainable at that station. This has resulted in an increase in percentage from a system average of 82 to 98.5 during the past three years.

POWER DISPATCHER IMPORTANT FACTOR

The power dispatchers, referred to in a previous paragraph, play an important part in the organization, as they are constantly in touch with both the power houses and substations as well as with the maintenance men in both the substation and overhead departments. In addition to the work of handling the loads at the various stations the power dispatcher has charge of both the high and low-tension distribution lines. All requests for clearing any line or section of the line must be made through him, and orders in turn are issued by him to the proper stations. A complete daily log record of substation trouble and power interruptions is kept by the power dispatcher. These daily log sheets are filed and have proved to be a very valuable record of past performance, particularly when interruptions or other station troubles occur repeatedly. A reproduction of one of these log sheets is shown on page 353.

A synopsis of this log sheet is prepared each morning in a mimeograph form and divided according to the various classes of work handled by the department in order to show the conditions during the previous twenty-four hours. This report is placed on the superintendent's desk each morning. It keeps him in direct touch with the entire system and informs him of all



ILLINOIS TRACTION SYSTEM

DAILY SUB-STATION REPORT

VIRDEN. JUNE -6- 1916

TIME	A.C. WATT-METER READINGS	Volts	Amps.	RING-CRANKING KICK-OFFS	TOWER SWITCHES CLOSED IN OR OUT	CLOSED OUT BY
AM	719660	650	400	12 10 pm 12 10 pm	9 10 pm	W.O.H.
7	670	"	400	2 10 pm 2 10 pm		
8	640	"	350	2 55 pm 2 55 pm		
9	640	"	350	3 25 pm 3 25 pm		
10	720000	"	400	3 40 pm 3 40 pm		
11	180	"	400	3 40 pm 3 40 pm		
12 Noon	180	"	400	4 35 pm 4 35 pm		
1 PM	280	"	450	6 57 pm 6 24 pm		
2	340	"	550			
3	360	"	600			
4	360	"	700			
5	300	"	750			
6	270	"	800	ROTARY CONVERTERS Started Stopped		
7	290	"	800			
8	290	"	800	2 20 pm 2 30 pm		
9	290	"	700	1 20 pm 2 30 pm		
10	270	"	700			
11	721810	"	300			
12 MN.	060	"	300			
1 AM	180	"	300			
2	190	"	600			
3	190	650	850			
4	210	"	100			
5	210	"	100			
6	721420	"	600			

TOTAL — TIE OVER SWITCHES: In OUT

COMMERCIAL POWER METERS	Reading	A.C. No. 1	A.C. No. 2	A.C. No. 3	D.C. No. 1	D.C. No. 2	Stationary
		721420	719660		1760		

REMARKS: 100 Amp Fuse blown in 33 volt Sig Cir. at 8 45 pm Line oil out at 3 pm Lay. " " 10 " 3 45 pm " " Neutral switch in at 4 35 pm Lay. 23 00 switches out north at 9 10 pm W.O.H.

EMPLOYES	ON DUTY	OFF DUTY	HOURS
C. Howard	8 A.M.	5 P.M.	13
W. A. Westfall	5 P.M.	8 A.M.	15

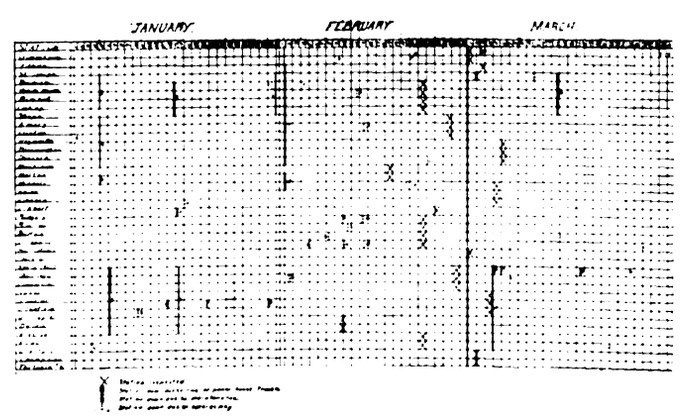
NOTE: Under Rotary Conversion, specify number of machine stopped or started.

ILLINOIS TRACTION SUBSTATION MAINTENANCE—DAILY SUBSTATION REPORT

troubles regardless of their importance, as many of the minor disturbances may not come to his notice at the time they occur. After these morning reports have served the purpose of the superintendent they are filed, and at the end of the month they are combined into a comparative form, which shows the number of cases of trouble and the number of hours of operative interruptions. This provides a concise method of comparing month by month and division by division the perfection of the operation obtained. Copies of these reports are sent to the office of the assistant general manager in charge of operation and to the vice-president executive.

GRAPHIC RECORD OF INTERRUPTIONS

The comparative frequency and duration of station interruptions and a classification of the causes are also shown graphically. The manner in which this is done is indicated on the chart in the accompanying illustration. Horizontal distance denotes intervals of time and in the spaces opposite the various stations the nature of the interruptions and their length are shown in different colored inks. Green is used to designate station shutdowns for maintenance work. These shutdowns are pre-arranged, and do not affect the operation of trains. Red is used to show shutdowns due to emergency causes, arising within the stations. Black is used to indicate transmission line interruptions caused by either line or power house trouble, which affects the operation of the substations. Detailed information concerning each interruption could not be shown on the



ILLINOIS TRACTION SUBSTATION MAINTENANCE—CHART OF SUBSTATION INTERRUPTIONS

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TABLE I—LIST OF SUBSTATIONS, APRIL 1, 1916

Location	Miles	Capacity, Kw.	Apparatus
Georgetown	0.00	600	Two 300-kw. G.E. Rotaries
Danville	9.86	1,600	One 300-kw. Stanley One 300-kw. G.E. One 1000-kw. G.E.
Fithian	13.74	300	One 300-kw. Stanley
St. Joseph	8.92	300	One 300-kw. G.E.
Urbana	8.79	...	...
Bondville	9.58	300	One 300-kw. G.E.
White Heath	8.16	300	One 300-kw. G.E.
Bement	12.70	300	One 300-kw. G.E.
Oakley	12.80	300	One 300-kw. G.E.
Decatur	9.22	1,050	One 300-kw. G.E. One 750-kw. G.E.
Harristown	7.27	300	One 300-kw. West.
Illiopolis	8.47	300	One 300-kw. G.E.
Buffalo	8.80	300	One 300-kw. West.
Riverton	7.55	1,000	Two 500-kw. G.E.
Springfield Belt	6.32	500	One 500-kw. G.E.
Chatham	10.42	300	One 300-kw. G.E.
Virden	13.69	600	Two 300-kw. G.E.
Anderson	11.31	300	One 300-kw. G.E.
Behme	10.10	300	One 300-kw. G.E.
Gillespie	6.97	300	One 300-kw. G.E.
Staunton	8.55	400	One 400-kw. G.E.
Litchfield	16.20	300	One 300-kw. G.E.
Staunton	0.00	...	...
Hamel	8.20	600	Two 300-kw. G.E.
Edwardsville	8.16	300	One 300-kw. G.E.
Stallings	7.55	300	One 300-kw. G.E.
Venice	9.25	3,600	Two 1800-kw. G.E.
Decatur	0.00	...	...
Emery	9.40	300	One 300-kw. G.E.
Clinton	12.26	300	One 300-kw. G.E.
Heyworth	11.30	300	One 300-kw. G.E.
Bloomington	11.46	750	One 750-kw. G.E.
Danvers	11.27	300	One 300-kw. G.E.
Mackinaw	9.64	500	One 500-kw. G.E.
Peoria	0.00	3,600	Two 1800-kw. G.E.
Morton	9.05	300	One 300-kw. G.E.
Mackinaw	7.63	...	...
Mindale	8.83	300	One 300-kw. G.E.
Union	9.50	300	One 300-kw. G.E.
Lincoln	10.52	300	One 300-kw. G.E.
Elkhart	10.58	300	One 300-kw. West.
Ridgely Junction	12.89	300	One 300-kw. G.E.
Springfield Belt	5.35	...	...

Average distance between substations.....9.80 miles
Total number of substations.....39
Total number of rotary converters.....44
Total kilowatt capacity.....22,600
Approximate kilowatts per mile of track.....51

chart, but each case of trouble is numbered and a key prepared giving the actual duration or character of trouble and its cause when known. The date that each station is visited by the regular system inspector is also shown on this chart, indicated by an X opposite the station and under the proper date.

EFFECT OF METHODS ON COSTS

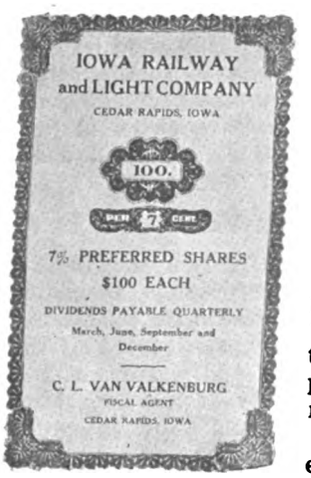
As a proof that the care exercised in substation maintenance is warranted and that the system of records has a value besides that of being a record alone, the cost of station maintenance has gradually decreased each year since this system was put into effect. This result was obtained in the face of more severe operating conditions, which included an increased loading and more frequent train service, and the natural depreciation of the equipment. A curve showing the monthly cost of maintenance for the system per station for the year 1915 is shown in one of the accompanying illustrations. Separate curves show the labor and material costs. For comparison purposes the per station cost for the previous year is shown graphically, and the detail costs for the two previous years noted. In addition to the very desirable result of reducing the actual cost maintenance, it has been found that because all cases of trouble are thoroughly investigated, both operators and maintainers are more careful about their work. This has reduced the number of cases of trouble, and when troubles do occur the quality of the repair work has been considerably improved.

An athletic association has been organized among the employees of the Kansas City (Mo.) Railways and the Kansas City Light & Power Company, with 250 members. C. F. Cole, auditor of the railways company, is president. Plans are being made for a ball park. A clubhouse will be established eventually.

Selling Stock Locally

Iowa Railway & Light Company Meets with Success in Marketing Major Portion of $2,350,000 of Preferred Stock Among Customers

IN the ELECTRIC RAILWAY JOURNAL of Aug. 12, page 264, the editors described the extensive plans followed by various properties of H. M. Byllesby & Company, Chicago, Ill., in selling securities directly to patrons. This story, however, had to do almost entirely with lighting properties, and it may now be interesting to describe similar work of a company more closely connected with electric railway operation.



IOWA STOCK SALE—FRONT OF DOUBLE POST-CARD CIRCULAR GIVEN TO CUSTOMERS

The Iowa Railway & Light Company, Cedar Rapids, Iowa, which is an Iowa corporation, has largely marketed its preferred stock in cities and towns in which it renders service. The company is not a holding corporation, but owns all its properties outright. Thus the company's securities attach directly on the actual property.

The company owns and operates a 47-mile interurban railway on private right-of-way between Cedar Rapids and Iowa City and between Cedar Rapids and Mount Vernon. There are facilities for receiving and discharging freight over 2.2 miles on the average, as well as through traffic arrangements with the Chicago & Northwestern Railway, the Chicago, Milwaukee & St. Paul Railway, the Illinois Central Railroad, the Chicago, Rock Island & Pacific Railway and the Waterloo, Cedar Falls & Northern Railroad. The company also owns and operates local street railway systems in Marshalltown, Boone, Tama and Toledo, the total length of all its railway lines being 68.52 miles.

Besides the railway properties, the company owns eight steam plants, having a total generating capacity of 33,500 hp., with an increase of 2000 hp. upon the completion of the hydroelectric plant at Cedar Rapids. Moreover, three central stations are located in the cities of Cedar Rapids, Marshalltown and Boone. From these electricity is distributed through 355 miles of high-tension lines to intervening and adjacent communities. In all the company furnishes electric light and power service in more than 100 cities and towns, having a combined population of more than 200,000. The company is now serving 21,000 consumers with electric light and power.

A SEASONED INVESTMENT SECURITY

Iowa Railway and Light Company

7% Cumulative Preferred Stock

Dividends Payable Quarterly—March, June, September and December
Net Earnings over Two and One-Half Times the Annual Preferred Stock Dividend Requirements.

Shares, $100 each

These Preferred Shares offer a safe investment where your funds will yield an assured 7% income, based on this successful, established Iowa Corporation.

For information, address or call on

C. L. VAN VALKENBURG, Fiscal Agent

Third Floor Dows Building Phone 1280 Cedar Rapids, Iowa

IOWA STOCK SALE—PLACARD FRAMED AND PLACED IN VARIOUS LOCAL OFFICES

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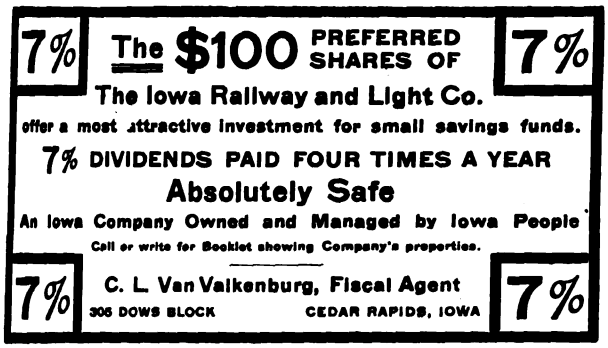
Until 1913 the ownership of the securities of the Iowa Railway & Light Company was somewhat restricted, but with the acquisition of numerous properties and a demand for extensions, the company adopted the policy of giving local investors an opportunity to secure a share of the earnings in the form of dividends on its 7 per cent cumulative preferred stock. The preferred shares are in $100 denomination, full paid and non-assessable, and preferred as to assets and dividends, subject to redemption at $102.50, with dividends payable quarterly and cumulative.

At the present time there is outstanding $2,350,000 of the preferred stock, the major portion of which has been sold locally and largely to the small investor. The company has now nearly 1500 local stockholders located in the various towns receiving electric light and power, street railway and interuban railway service. More than 600 in Cedar Rapids are owners of the securities. One town of 500 inhabitants has more than fifty stockholders, and all smaller communities are represented by stockholders for various amounts.

The sale of the securities has been handled by C. L. Van Valkenburg, fiscal agent of the company, who is located in one of the executive offices. In inaugurating a sales campaign the local papers were used, together with printed announcements which were attached to the



IOWA STOCK SALE—SPECIMEN ADVERTISING CIRCULAR (3⅜ IN. X 6 IN.) USED IN WORK

light bills. Some of the advertising matter is shown in the accompanying illustrations. A systematic campaign of education was used on the 700 employees throughout the system. Special lists were circularized and literature was sent out from time to time about the advantages to be derived from being a stockholder in a strong local utility. A special effort was made to induce small investors to buy the stock; to this end a partial payment plan was adopted whereby an amount as small as $5 could be invested. This carried no obligation on the part of the investor to make payments at any specified time, but interest at the rate of 7 per cent was paid annually and credited quarterly to the partial payment account. When partial payments and accrued interest amounted to $100 a certificate for one share of stock was issued and sent to the investor. The price of the shares was the same, whether bought outright or not.

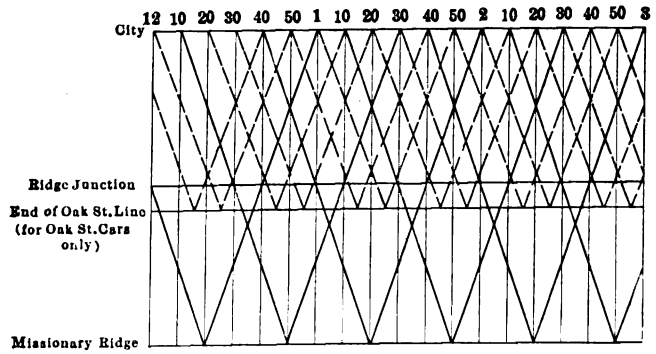
Investment in the preferred stock has enabled the company to pay back a portion of its profits to its customers, and it has paid the company substantial dividends in the increased interest and friendliness of the people living in the cities and towns served by it. The company believes that it is possible to build a closer relationship with the public through the sale of its securities than by any other way. The mailing of detailed financial reports with the dividend checks gives the public full information at first hand. This results in an intelligent understanding of what the company is doing and creates a strong local interest in its favor.

Double Routed Cars

Novel Schedule Satisfactorily Solves Difficult Routing Problem in Chattanooga, Tenn.

THE accompanying diagram shows the way in which the Chattanooga Railway & Light Company solved a routing problem. The schedule was devised by J. R. Anderson, superintendent of transportation. The company's Oak Street line is 3.83 miles long from the city to the end of the line. At a point known as Ridge Junction which is 0.58 mile from the end of the Oak Street line the Missionary Ridge cars leave the Oak Street line to the Ridge, which is 3.32 miles from Ridge Junction or 6.57 miles from the city terminus. The running time on the Oak Street line is fifty minutes for the round trip and on the Ridge line eighty minutes for the round trip. The headways are ten minutes on the Oak street line as far as the Junction, and the cars leaving the city on ten minutes and forty minutes after the hour go to Missionary Ridge, or a thirty-minute headway.

A complete cycle is as follows: A car marked "Missionary Ridge" leaves the city say at 12.10 p. m., goes to the Ridge (over the Oak Street line as far as Ridge Junction) and returns to the city at 1.30 p. m. The sign on the car is then changed to Oak Street by means of a simple tilting sign device, and it leaves the city at



SCHEDULE DIAGRAM SHOWING DOUBLE-ROUTED CARS OF THE CHATTANOOGA RAILWAY & LIGHT COMPANY

1.30 p. m. for the Oak Street service. It then makes two round trips on the Oak Street line, leaving at 1.30 p. m. and 2.20 p. m. On the 2.20 trip the car is due in the city at 3.10, so the sign is changed on its return to the city to "Missionary Ridge," and on the 3.10 trip the car repeats the cycle.

As will be seen this schedule leaves a space of twenty minutes at the end of the Oak Street line when the car goes to the Ridge, but the end of the Oak Street line is a junction point with the East Lake line which leads to the city, and this is therefore not a serious drawback. It should be remembered that the end of the line is only 0.58 mile from the Junction to the end of the line.

The signs on these cars are double signs set at right angles to each other and pivoted so they can be tilted by the conductor from the inside of the car by a small lever which holds the sign in either position.

This schedule has been in operation for two years and has given satisfaction in every particular.

Approximately 600 employees of the light and power division of the Portland (Ore.) Railway, Light & Power Company, with their families, enjoyed the sixth annual picnic of the company at Estacada Park, near Portland, on July 15. The picnic was conducted under the auspices of the Employees' Beneficial Association. A special train of ten cars carried the pleasure seekers. In order to enable all who desired to attend the company declared a holiday for all light and power employees.

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"Bob's wedding was to take place in Los Angeles on Thursday—"

"It was just one delay after another the day we were going to leave

Mother and I had scarcely finished dressing when the 'phone rang. It was Dad—speaking from La Salle street station. "You haven't another minute to lose," he said. "The 'Golden State Limited' pulls out at eight-five and it's now seven-thirty-two. Don't wait for the taxi. Take the Elevated. It's your only chance."

In an emergency, when every minute counts, Elevated trains give gratifying service. No matter where you wish to go, in or about Chicago, use the Elevated to cover the distance quickly. Special Express service throughout the day and evening on the Northwestern and South Side, also on the Logan Square branch of the Metropolitan, makes Elevated transportation even speedier and more convenient now than ever.

City salesmen, messengers and others whose business requires considerable traveling about the city find that the Elevated brings them quickly to all the important business centers as well as to the residential districts.

SAFETY SPEED SERVICE COURTESY

CHICAGO ELEVATED RAILROADS

A Remarkable Record

Eight years without one fatal accident

One billion, two hundred millions of passengers—equivalent nearly to the entire population of the world—have been carried by the Chicago Elevated Railroads during the past eight years without a single fatal accident while on their trains

Wins "honorable mention" for Chicago Elevated

In recognition of the results obtained from its safety work, the American Museum of Safety has recently awarded "Honorable Mention" to the Chicago Elevated Railroads in the Brady medal contest among Electric Railroads

Safety first, last and always

Every practicable mechanical improvement—of which the recent installation of 250 new all-steel cars is only one instance—as well as every possible human precaution has been adopted by the Elevated to insure and maintain safety

Civic pride alone, aside from individual interest, should induce Elevated patrons to co-operate in the elimination and prevention even of minor accidents. A little caution of this nature will help not only to improve the already good service of the Elevated, but also to bring the coveted Brady Medal to Chicago this year

SAFETY SPEED SERVICE COURTESY

CHICAGO ELEVATED RAILROADS

A dozen vacations in one for you right here in Chicago

Even if you are not going to leave the city for a Summer outing, you still can enjoy any number of delightful vacation pleasures. Whether it's bathing, boating or fishing—tennis, baseball or golf—or, just day-dreaming on the lake shore or in the cool of shady trees—all these recreations are within quick and easy reach of your home on the Elevated.

There will be lots of sultry days and nights this Summer when you'll long to escape from the oppressive heat Take a cool, airy, pleasant ride on the Elevated. Bring the little folks—all the family. There are scores of delightful places to go, in and about Chicago. You can travel twenty-one miles, in one direction, for only 5c—on the Elevated.

Express trains on the Northwestern and South Side throughout the day and evening; also on the Logan Square branch of the Metropolitan. Special service to and from the baseball and amusement parks

SAFETY SPEED SERVICE COURTESY

CHICAGO ELEVATED RAILROADS

"Two strikes—the bases full—and then—"

Most of us simply can't help the baseball habit—it's bred in the bone. Of course you enjoy seeing a good game of baseball. But—with two high-class big league clubs within such quick and easy reach of everywhere in Chicago, via the Elevated—isn't it a wonder that you don't take in the ball game oftener than you do?

You may be a blooded plutocrat the the day—but you're just a fan at the ball game—because baseball is our greatest humanizing institution. The open air puts pep and punch in jaded nerves—brings color to faded cheeks; the uncertainty is thrilling—the excitement a bracing tonic. It's a sport that's always keen and clean—a sport that's good for you.

ELEVATED SERVICE TO THE BASEBALL PARKS

American League

(Out of or 35th Street stations. On baseball days all regular or local trains stop at this station. Express trains operate on the loop at 7:15 p. m. giving those visiting or going to the ball grounds all express service to the best advantage of the fans. Special trains leave the loop at 2:00 p. m. only at 35th Street.

National League

(In or to Addison Street on Wilson Avenue branch. On baseball days all express and local trains stop at this station. Express trains operate on the loop at 1:15 p. m. giving those visiting or going to the ball grounds all express service to the best advantage of the fans. Special trains leave the loop at 2:00 p. m. only at Addison Street.

SAFETY SPEED SERVICE COURTESY

CHICAGO ELEVATED RAILROADS

Golf here—golf there—golf everywhere in Chicago

And, if you're a golf enthusiast, there's a different public course for you every weekday The Elevated makes each of Chicago's six well-kept public golf courses easy to reach and worth reaching—brings even the most distant public golf course close to your home. It's like having a membership privilege in six different country clubs—without the expense—when you can get to these six different public courses, so easily and so quickly on the Elevated.

"Jackson Park" South Side "L" trains for the

two famous golf courses in Jackson Park (now open)—Oak Park Elevated or "Garfield Park" trains on the Metropolitan for the Garfield Park course (open May 1)—"Englewood" trains on the South Side "L" for the course in Marquette Park (now open)—Northwestern trains to Diversey Station for the Lincoln Park course (open May 15)—"Garfield Park" Metropolitan trains for the Harlem Race Track course (now open).

For business, for pleasure, for shopping, the Elevated brings you near to everywhere in Chicago. Frequent, speedy express service throughout the day and evening.

SAFETY SPEED SERVICE COURTESY

CHICAGO ELEVATED RAILROADS

Chicago Elevated Advertisements—Samples of Copy Used in Daily Papers—Reproduced About Half Size

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Chicago Elevated Service Advertised

Utilizing the Natural Interests of the Public Is the Basis of This Comprehensive Publicity Campaign

CONVINCED that its train service is superior even to that furnished by taxicabs, because it is faster and more dependable, Britton I. Budd, president of the Chicago Elevated Railroads, has well under way an advertising campaign which is reminding the Chicago public of these advantages. As a matter of fact, this claim for superior service is based on the experience of the company's claim department. Some time ago this department was of the opinion that its claim adjusters could make more calls in a day if an automobile was substituted for transportation by the elevated lines. After about a year's experience with automobiles it was found that the adjusters could not make as many calls a day as they had made when they used the elevated cars.

REPRODUCTION ON REDUCED SCALE OF LARGE COLORED POSTER

The advertising campaign is to take several forms, and includes one advertisement in the local newspapers each week, advertising signs and posters on the elevated structure and at points where they can be seen from the cars of the steam railroads. Bulletin boards have also been installed in every elevated station, and under a title "Where to Go, and What to See," are inserted a series of removable cards listing all points and attractions of interest. These cards are changed from time to time to fit the seasons and the attractions. In addition to the general advertising, circular letters are being sent to the various wholesale houses having salesmen calling on the retail stores in the city. In connection with the latter, a form letter used by the elevated railroads for this purpose as well as a copy of a letter which accompanies it, and was written by a Chicago wholesale house, is reproduced herewith:

CHICAGO ELEVATED ADVERTISEMENTS—A LESSON ON QUICK SERVICE

CHICAGO ELEVATED RAILROADS
CHICAGO, Aug., 19, 1916.
JOHN DOE, ESQ.,
Chicago, Ill.

Dear Sir:

The inclosed letter from the president of one of Chicago's well-known grocery specialty houses suggested to me that perhaps your company might be interested in obtaining a supply of the pocket maps of the Elevated System for your city salesmen's use.

I feel that if you look into the situation thoroughly you will find that the Elevated will save your salesmen's time and your money, as well as allowing them to do their work most efficiently and effectively.

Let me know just how many of these pocket maps you can use and I shall be glad to supply you. Either direct a letter to me, telephone Central 8280, and ask for my office, or send a messenger.

Very truly yours,
CHICAGO ELEVATED RAILROADS,
H. A. JOHNSON,
Chairman Publicity Committee.

CONDENSED BLUING COMPANY
CHICAGO, June 20, 1916.

B. I. BUDD, President,
Chicago Elevated Railroads,
Edison Building, Chicago.

Dear Sir:

For a long time I have been thinking that it would be a good plan for your company to supply sales managers who have men working different territories in Chicago with small pocket maps of Chicago and the Elevated System.

I say this because I know that whenever we have had salesmen working the city—and sometimes we have had more than a dozen covering different sections of the city—I have invariably instructed them to use the Elevated to reach the larger and more prosperous neighborhood business centers. In doing this they are able to get to and to cover one location quickly and immediately thereafter to take the Elevated and go to the next nearest neighborhood business center on the line.

Very truly yours,
CONDENSED BLUING COMPANY,
JOHN PUHL,
President.

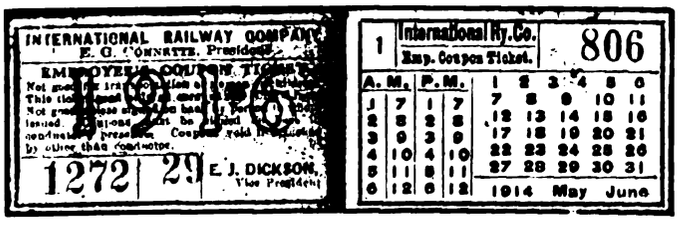
CHICAGO ELEVATED ADVERTISEMENTS—LETTERS SHOWING THE CO-OPERATIVE SPIRIT

In order to give some idea of the scope of the newspaper advertising, as well as the character of the posters employed by the Chicago Elevated Railroads, a number of the advertisements are reproduced, as well as one of the typical posters.

Employees Coupon Tickets in Buffalo, N. Y.

IN order to facilitate the collection of fares, especially during the rush hours, the International Railway, Buffalo, N. Y., is issuing a new ticket form for the use of employees. This form is shown in an accompanying illustration.

The form which has been in use for the last two years



EMPLOYEES COUPON TICKETS USED ON THE INTERNATIONAL RAILWAY, BUFFALO, N. Y.

necessitated the punching by the conductor of the date and time on the ticket tendered by the employees, thus causing delay. Under the new system, employees' tickets are handled in the same manner as any other ticket. These are used almost exclusively by trainmen and carhousemen.

The officials of the Citizens' Street Railway, Clarksville, Tenn., are showing a commendable spirit which is gaining much good-will for the company. When the power failed one evening during a recent storm and tied up several cars, President Beech dispatched autos to take passengers to their destinations.

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7 Per Cent Return—But Not for Railway Department

Illinois Commission in Jacksonville Rate Case Says Increase in Rates to Give Such Return Would Injure Both Company and Public

AS NOTED in a preliminary statement in the ELECTRIC RAILWAY JOURNAL of July 29, page 204, the Illinois Public Utilities Commission recently handed down a decision involving the gas, electric and street railway rates of the Jacksonville Railway & Light Company, Jacksonville, Ill. After taking into consideration all the elements of value, tangible and intangible, the commission found the fair value of the company's property to be $200,000 for the gas department, $190,000 for the electrical department and $175,000 for the railway department, a total of $565,000.

Taking into consideration the nature and inherent risks of public utility investment in general, the commission allowed 7 per cent as a fair rate of return upon the value of the gas and electric properties as stated above, and it fixed several schedules of gas and electric rates that would remove unreasonable features and still allow this rate of return. The commission did not reduce the electric railway rates, however. for it said that the 7 per cent rate of return would not be obtained on the value of the street railway property under the existing rates of fare. Nevertheless, to increase these rates would result very probably in depriving the street railway department of a large portion of its present business, and in the opinion of the commission such an increase consequently would work an injury upon both the company and the public instead of conferring a benefit on the company.

With regard to the separate operation of the gas, electric and street railway departments of the company, the commission said:

"In a case such as the one at bar, where two or more services are furnished under one general management, questions of the allocation of property and operating expenses frequently arise. Equity does not demand that the consumers of one service should be called upon to bolster up the revenues obtained from the users of another class of service. It is axiomatic that, in all fairness, a person should pay for only what he receives, and a user of water, for example, should no more be called upon to help in the upkeep of an electric light plant owned by the same company than he should be expected to contribute to the revenues of an independently owned electric company whose product he does not use. To hold otherwise would be to countenance a form of unfair discrimination. The principle applies to the distribution of property between the several departments of a combined utility. Since each service must stand upon its own feet, it must be permitted to earn a return upon all property that properly belongs to it. To assign the property of one department arbitrarily to the service of another might result in grave injustice, inasmuch as the department from which the property is subtracted may thereby be deprived of a return thereon, a result that is clearly confiscation."

On the subject of depreciation, the commission stated that the general tendency of utilities involved in rate-making procedure was to argue that either nothing or some merely nominal amount should be deducted from the cost-new figures to cover "past or accrued depreciation." Almost in the same breath, however, strenuous arguments would be advanced for a liberal allowance to cover the depreciation that would take place in the future. In general, the commission could not hold that there could be one rate for depreciation in a property for the time that had passed, and another for the time that was to come, with the date of the rate proceeding as the dividing line. However, in its opinion, the statement that depreciation should be taken into account in the proper management of a public utility seemed to admit of little argument. Lack of consideration of the fundamentals involved had many times placed the affairs of such corporations in the hands of receivers.

The commission decided, therefore, that taking into consideration all elements of depreciation—both physical and functional, including obsolescence and inadequacy—it was desirable to protect the company's property by making regular and adequate provision for depreciation as it matured. It held that sufficient sums should be set aside from the gross earnings to provide reasonable depreciation funds, which should be carried in a separate account and drawn upon only to cover future accruing depreciation, both physical and functional. The depreciation funds should receive full credit for earnings that might accrue either from interest or otherwise, and they should be subject to an annual audit by the accounting staff of the commission. With the consent of the commission, a large portion of the funds from time to time might be invested either in readily marketable bonds or in extensions and betterments to existing property. In this particular case, to cover future accruing depreciation for the street railway department, the company is required to set aside on June 30, 1917, an allowance of $9,000, and thereafter annually to increase this sum by an amount equivalent to the $9,000 plus 4 per cent of the cost of all additions and betterments (exclusive of replacements) made after the date of the order.

Motor Horn for Use as Fog Signal

One of the most successful of the modifications of construction of the famous Klaxon motor horn is the adaptation of the horn as a fog or warning signal for use on electrically-operated railways. According to the *Electric Railway & Tramway Journal*, London, one such horn has recently been installed on the Charing Cross & Hampstead Railway near Golder's Green Station, and is working with entire satisfaction. The apparatus is put into, or out of, operation by the signalman near whose cabin the born is fitted. The horn forms part of an electric circuit, which is completed by the wheels of a train passing over a treadle and so forming contact with a lever on the train. The completion of the circuit causes the horn to emit a powerful warning signal, the sound being produced by a self-contained electric motor, rapidly rotating a hardened cam wheel, the cams striking against the tempered center button of a chrome vanadium steel diaphragm, causing vibrations at the rate of 30,000 per minute. So loud is the noise thus created that it can be heard a distance of from 2 to 4 miles, according to conditions, and is, of course, amply powerful to warn the driver of a train. On one of the metropolitan suburban lines a similar horn is being used to serve as a warning to drivers to slow down before approaching an important junction. As a fog signal the invention offers striking advantages over the employment of detonators because, in the first place, it can be brought instantly into use by the signalman from his box; and, secondly, for the reason that the expense of detonators and a platelayer's time to affix them is saved, the initial outlay on installing the horn being the only expense incurred, no matter how frequently it is used.

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1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

ASSOCIATION NEWS

1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

Nominations Committee Presents Choice of Officers for Coming Year—T. & T. Association Adopt Resolutions—Entertainment Committee Met August 18 to Outline a Program — Exhibit Space Engaged to Date Aggregates 50,000 Square Feet.

Convention Dates

Secretary Burritt is now engaged upon completing the program for association meetings at the Atlantic City convention. The detail program is not yet available, but it has been decided that the meetings of the affiliated associations will be held in the afternoons beginning with Monday, and that the sessions of the American Association will be held in the mornings, beginning with Tuesday.

Charles L. Henry, president of the American Electric Railway Association, spent several days in New York recently going over convention matters.

Reduced Rates to the Convention

The passenger department of the Trunk Line Association, which includes practically all the railroads of Pittsburgh, Pa., and Buffalo, N. Y., has granted a rate of 2 cents a mile in each direction with a minimum of $1 for the round trip. These tickets will only be good going and returning by the same route, and will be sold and good going Oct. 7 to 9, and returning to reach the original starting point not later than Oct. 17.

Entertainment Committee Meets

The committee on entertainment met on Aug. 18 and outlined a program of entertainment which will, in general, be similar to that of previous years.

W. G. Kaylor was elected vice-chairman, after which a number of sub-committees were appointed to take charge of the various features of the program, which include a reception on Monday night, an informal dance on Tuesday night, a carnival on Wednesday night and the grand promenade, concert and ball on Thursday night.

Arrangements will be made to secure golf privileges for those interested.

The following members of the committee were present at the meeting: W. G. Kaylor, E. F. Wickwire, J. N. Shannahan, E. P. Waller, W. V. Dee, R. F. Hayes, C. G. Chamberlain, and F. J. Derge representing F. R. Coates.

Choice of Engineering Officers for Coming Year

The report of the committee on nominations of the Engineering Association for the year 1915-1916, which is made before the convention in accordance with the constitution and by-laws, has been presented, as follows:

To the American Electric Railway Engineering Association:

Your committee on nominations begs leave to report as its selection the following names for officers for the coming year:

For president—F. R. Phillips, superintendent of equipment Pittsburgh (Pa.) Railways.

For first vice-president—G. W. Palmer, Jr., electrical engineer Bay State Street Railway, Boston, Mass.

For second vice-president—W. G. Gove, superintendent of equipment Brooklyn (N. Y.) Rapid Transit System.

For third vice-president—E. R. Hill, consulting engineer Norfolk & Western Railway Company, New York, N. Y.

For secretary-treasurer—E. B. Burritt, New York, N. Y.

For members of the executive committee—C. S. Kimball, engineer maintenance of way Washington Railway & Electric Company, Washington, D. C.; C. L. Cadle, electrical engineer New York State Railways, Rochester, N. Y.; C. F. Bedwell, assistant engineer Public Service Railway, Newark, N. J.; J. W. Welsh, electrical engineer and traffic agent Pittsburgh (Pa.) Railways.

Respectfully submitted,

E. O. ACKERMAN, WM. S. TWINING, A. T. CLARK,
S. L. FOSTER, PAUL WINSOR, Chairman.
Committee on Nominations.

New Company Members of Association

In the issues of this paper for June 3 and July 29, lists of the manufacturing company members which had joined the association were published. Since that time a number of companies have affiliated with the association, bringing the total membership of manufacturing companies up to 181. The names of the new companies follow:

Armstrong Cork Company, Pittsburgh, Pa.; Automatic Ventilator Company, New York, N. Y.; E. C. Atkins & Company, Inc., Indianapolis, Ind..

Barrett Changer Company, Chicago, Ill.; Bemis Car Truck Company, Springfield, Mass.; Berry Bros., Inc., Detroit, Mich.

W. H. Coe Mfg. Company, Providence, R. I.; Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y.; Corliss Carbon Company, Bradford, Pa.

Joseph Dixon Crucible Company, Jersey City, N. J.

Federal Motor Truck Company, Detroit, Mich.; David B. Flower, Philadelphia, Pa.

Gurney Ball Bearing Company, Jamestown, N. Y.; Macdonald Ticket & Ticket Box Company, Cleveland, Ohio; Miller Trolley Shoe Company, Boston, Mass.

Naugle Pole & Tie Company, Chicago, Ill.

Page Woven Wire Fence Company, Monessen, Pa.

Railway & Industrial Engineering Company, Pittsburgh, Pa.; Roller Lock Nut Company, New York, N. Y.

Safety Car Device Company, St. Louis, Mo.; Scranton Bolt & Nut Company, Scranton, Pa.; T. H. Symington Company, New York, N. Y.

Universal Trolley Wheel Company, Northampton, Mass.

Secretary Burritt of the association also announces that the following railways have become members since July 15, 1916; Bartlesville Interurban Railway; Frankford, Tacony & Holmesburg Street Railway; Jersey Shore Electric Street Railway; Northampton Traction Company; Rutland Railway, Light & Power Company; Shelburne Falls & Colerain Street Railway.

The total number of exhibitors is now 116, to whom have been assigned a total of 49,798 sq. ft. of space. The following companies have engaged space since the last list was printed on Aug. 12, 1916: Edward Alcott, Automatic Ventilator Company, Bemis Car Truck Company, Barron G. Collier, Inc., Differential Car Company, Inc., Federal Motor Truck Company, Gurney Ball Bearing Company, Macdonald Ticket & Ticket Box Company, Miller Trolley Shoe Company, National Pneumatic Company, Page Woven Wire Fence Company, Roller

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Lock Nut Company, Root Spring Scraper Company, Union Switch & Signal Company and J. G. Wilson Corporation.

Changes in T. & T. Constitution

The executive committee of the Transportation & Traffic Association has adopted by letter ballot two resolutions which have a bearing on the organization of the association and the efficacy of its committee work. The plan outlined was suggested at the San Francisco convention in a report presented by Mr. Shannahan. The executive committee of the American Association failed, however, to give its approval to the proposed amendment for reasons which did not relate to the measures that are to be carried into effect by the adoption of the resolutions in question, and it was then discovered that the same result could be brought about through executive committee action.

Accordingly, these resolutions have been adopted:

"There shall be the following standing committees: Standards, rules, passenger traffic, express and freight traffic, training of transportation employees, schedules and time tables. In addition to the standing committees, there shall be joint committees with the Engineering Association on block signals and on transportation engineering; with the Accountants' Association on transportation accounting, and with the Claims' Association on claims transportation, together with such other committees as may be appointed from time to time.

"The committee on standards shall have eleven members, including a chairman and vice-chairman. The committee shall consist of the chairman of each of the standing committees of the association and an equal number of members at large of the association not members of any other Transportation & Traffic committee, representing severally, because of familiarity with the subject, each of the branches of electric railway operation covered by the standing committees, and a chairman at large.

"The committee on rules shall consist of seven members, including a chairman and vice-chairman, three representing city companies, three interurban companies, and one a city and interurban company.

"The other standing committees shall consist of six members, including a chairman and vice-chairman.

"Generally speaking, the vice-chairman shall succeed the chairman when the latter leaves a committee.

"Joint committees shall consist of three members of the Transportation & Traffic Association, including a co-chairman, with the exception of the committee on block signals, which shall consist of four members from the Transportation & Traffic Association.

"Where joint engineering and transportation and traffic subjects come up for consideration by the committees on standards, they shall usually be handled by the joint committee on transportation-engineering. If, however, at any time, because of the character of the subject, it appears wise or advisable, a special joint committee, composed of not less than three members from each association, may be appointed to consider and submit joint recommendations on the subject under discussion to the two committees on standards."

The other resolution deals with the duties of the first vice-president, and also outlines the work of the subjects committee and the time it shall submit its report. It follows:

"The first vice-president shall have the following duties: He will assist in committee appointments, and to this end will familiarize himself with the personnel of the transportation and traffic departments of member companies. He will keep in touch with committee work, and the progress made, in order to aid the president in making committee reports as effective as possible. He will submit to the president on June 1 a recommended list of appointments for the new committee on subjects, which will, if approved by the president, be appointed not later than Aug. 1, and will report to the new executive committee ten days after the convention adjourns. He will prepare for submission to the last meeting of the executive committee at the convention a tentative list of recommended committee appointments for the ensuing year."

The purpose of this change is to permit the work by the new committees of each year to be begun promptly after each annual convention.

Buildings and Structures Committee

A meeting of the buildings and structures committee of the Engineering Association was held in New York on the morning of Aug. 26 to discuss some of the final work of the committee prior to the Atlantic City convention. Those in attendance were: C. F. Bedwell, Newark; R. C. Bird, New York; C. S. Kimball, Washington; William Roberts, Akron; H. E. Funk, Brooklyn, and F. F. Low, Boston.

The committee plans this year to submit to the association a suggested standard type of oil house and equipment, as well as a standard type of fence for parks and for carhouse, terminal and shop properties. The committee will also resubmit in its report a set of general specifications and form of contract, revised in accordance with criticisms and suggestions received from member companies in reply to a circular letter sent out by the committee.

Other Committee Events

President Nicholl of the Transportation & Traffic Association, acting under the authority of the executive committee, has appointed the following committee on subjects: H. C. Doneker, chairman; R. P. Stevens, James E. Gibson and F. W. Coen.

Prof. J. G. Swain, of Harvard having resigned from the committee on award for the A. N. Brady medal, which is given each year to the electric railway having done the most during the past twelve months to conserve the life and health of its employees and passengers, the Hon. Halford Erickson, formerly chairman of the Wisconsin Public Service Commission, has accepted the invitation of the American Museum of Safety, under whose auspices the contest is held, to serve in the place left vacant by this resignation.

The contest for this year closed on June 30 and the reports of those companies, intending to enter, must be submitted on or before Oct. 15. The committee on the conditions of the contest, appointed by this association and consisting for the present year Arthur W. Brady, chairman; Wilbur C. Fisk and C. S. Sergeant, has revised the rules in the interest of clearness. Copies may be obtained from the American Museum of Safety, 18 and 20 West Twenty-fourth Street, New York City.

The City Light & Traction Company, Sedalia, Mo., in a recent newspaper advertisement announced that May 31 would be known as "Street Car Riders' Subscription to Concert Day." Consequently every cash fare received on the cars was turned over to the Sedalia Park Board to assist in providing concerts during the coming summer. Heretofore the company has made a cash donation, as have the various progressive business houses of Sedalia, in order to furnish free band concerts at Liberty Park throughout the summer.

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COMMUNICATION

Units for Comparing Costs for Track Upkeep

BROOKLYN RAPID TRANSIT SYSTEM
BROOKLYN, N. Y., Aug. 21, 1916.

To the Editor:

Your recent editorials on the subject of units for comparison of track upkeep costs are very timely. In one of them you ask whether a new unit for this purpose is desirable. It would seem to be perhaps more pertinent to state, as you do later, that some better unit than any one of several cited is necessary.

The reference to the wide use of the simple unit, "cost per mile of track," as being due to the lack of an adequate supply of clerical help in the way department covers one of the fundamental reasons for the failure to use other units of more usefulness. However, clerical help alone will not suffice. There must be careful accounting in the field as well as in the office, and efforts must be directed toward the securing of details which are properly classified to cover the several main parts of track structures which cause most of the maintenance expense.

There is but little question in the writer's mind that a unit for reasonably satisfactory comparison of maintenance costs may be found for any one system, but even then its use must be controlled by a knowledge of detail extending over the complete period during which it is applied, or very misleading conclusions will be drawn.

To attempt such comparisons with units similarly devised and applied on other railway systems would be out of the question, unless the person making the comparison is possessed of as complete a knowledge of the details of all the systems of track being compared as he is of his own.

I do not believe that the steam railroads attempt such comparison between themselves, and it is plain that they have a great many more construction and maintenance features in common as well as a much smaller number of variable factors affecting maintenance costs and more ability to control all of them.

Local conditions, even on one system, affect the track upkeep more than is usually realized, and in such a multiplicity of ways that, even with the most careful accounting, any unit of costs which the writer has seen is of little help if there is no one present during the analysis who is familiar with all the construction details, the various city paving projects which have extended over a number of years, or the excavations and disturbances made by foreign corporations. Any one of these factors may raise the maintenance unit unduly, but most records will not show the reason; hence, there will be no explanation for widely divergent costs, and if there be none, of what use is the comparison? You simply learn that one track costs more to maintain than another without knowing why.

The writer is inclined to believe that, within a very wide range, the conduct of transportation, or in other words the number of cars or wheels operated, does not have the important bearing on track maintenance costs usually ascribed to this factor. Its main influence is on actual costs of doing work under varying headways. Of course, the rails may wear out faster on one line than another, but this only advances the date of renewal and, given the same type of track under the extremes of light and heavy car traffic, there is seemingly no good reason why the strictly maintenance charges under average conditions for one track should be more than for the other. For this reason, the car-mile or ton-mile may be omitted from consideration as a desirable unit of comparison for the present at least.

Let us first try to get some definite data on our own lines, comparing the same type of tracks on different streets, regardless of car traffic. Get information covering three principal factors, viz.: pavement maintenance, joint maintenance and costs due to corrugation of rails. Then compare these items individually, compare the totals, and base the comparisons on the simple cost per foot of track per year of service. Such a unit may be called the cost-per-foot-year.

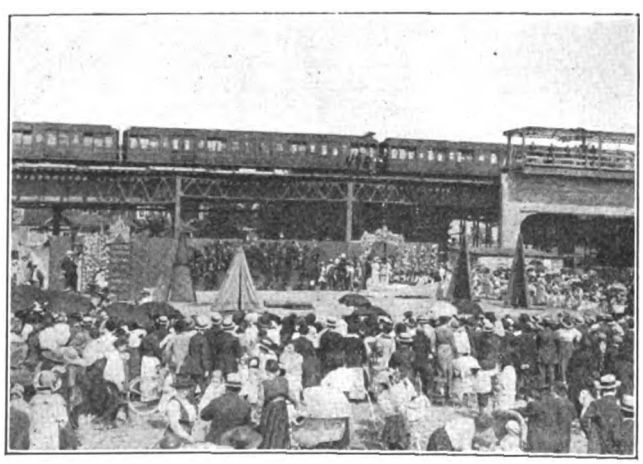
If such data are secured for a number of years, the influence of other variables will become more evident, and they may be included or discarded as may be found desirable. But it must also be borne in mind that the history of the maintenance charges and the reasons for their incurrence form a valuable adjunct to any data of this nature, if the correct analysis is to be made from the data obtained.

R. C. CRAM,
Assistant Engineer Way and
Structure Department.

Pageant Marks Opening of New Line

RARELY has a more elaborate or unique celebration marked the opening of an electric railway than the one staged at the recent opening of the New Utrecht Avenue Elevated Line of the New York Municipal Railway. The large crowd which gathered for the ceremonies witnessed the first official train which passed over the new elevated structure, the last train to be run on surface tracks in the street under the elevated line, and the beginning of trolley car service.

The accompanying illustration shows the arrival of the first train. In the foreground is the scene of the



PAGEANT AT OPENING OF NEW ELEVATED LINE IN BROOKLYN, N. Y.

pageant which, with a civic parade, a baby parade and a banquet, completed the festive arrangements.

The striking events in the history of New Utrecht, the section of Brooklyn served by this line, were depicted by the pageant in which nearly a thousand children participated. Twenty-two scenes were enacted on a special stage constructed for the event, while the sloping land around the stake formed a natural amphitheater affording excellent accommodations for the crowd of nearly 5000 people. At the end of the pageant the Boy Scouts and the Navy Reserves were massed on the stage while the band played "The Star-Spangled Banner."

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Short Circuit Test—Set for Field Coils—Electric Water Heater for the Car Shop—An Ingenious One-Man Emergency Line-Truck—Special Cars for Summer Travel—Coiled Spring Holds Armature Bearing Tight—Solving the Double-Overhead Trolley Problem in Havana

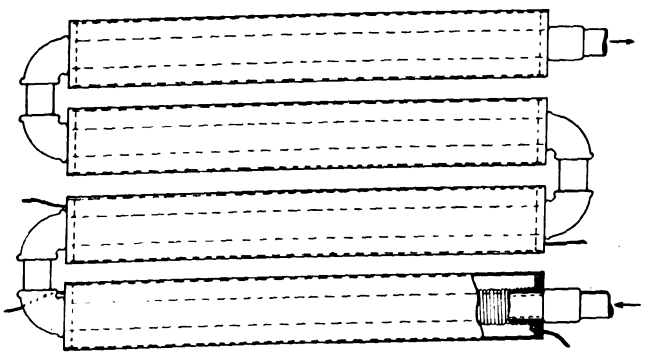
A Home-Made Electric Heater

This Cheap Device Heats a 40-Gal. Boiler of Water in Forty Minutes

BY W. F. M. WERTH
Superintendent of Power, Detroit United Railway, Detroit, Mich.

On the British Columbia Electric Railway, with which the writer was formerly connected, the garage is equipped with a 40-gal. boiler which supplies hot water for washing cars. It has been found convenient to use electric current for heating the boiler, and after some experimenting a device was developed by which it was satisfactorily accomplished.

The 1-in. inlet pipe to the boiler includes four 24-in. lengths of pipe of the same diameter. Around these lengths are wrapped the heating elements, the lengths of pipe being set on a slight incline to facilitate circulation through the tank. Each of the four 2-ft. lengths of pipe are first wrapped with asbestos tape, given a half lap so as to give a double thickness, and over this are wound about 85 ft. of No. 22 soft iron wire with fourteen turns to the inch. Over this wire asbestos paper is wrapped, and plugs of the same material are placed at the coil ends so as to prevent as much radiation as possible. The four coils around the pipe are connected up in parallel on a 220-volt lighting circuit.



DETAILS OF WATER HEATER USED BY BRITISH COLUMBIA ELECTRIC RAILWAY

This device will heat the 40-gal. tank as hot as the water can be conveniently used in forty minutes. The cost for material used in preparing the heating element was $3.62 and the labor cost was $2.76, making the total cost of the device about $6.40.

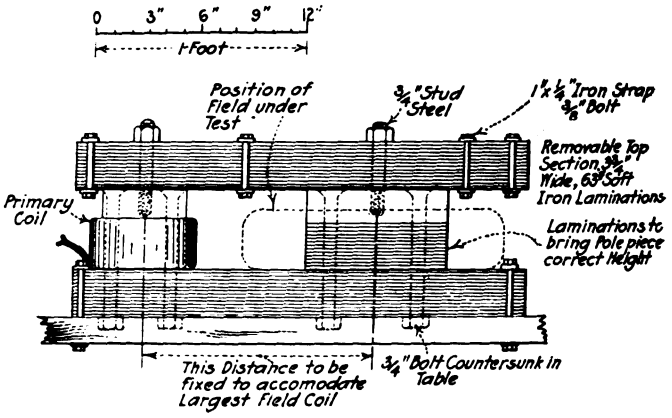
A Coil-Testing Transformer

It Consists of Laminations and a Primary Winding, the Coil Under Test Forming the Secondary

BY GEORGE F. FABER
Formerly General Superintendent Atlantic City & Shore Railroad

In response to a request for details of the testing transformer used in the Atlantic City & Shore Railroad shops, the testing corner of which was described in the ELECTRIC RAILWAY JOURNAL of July 3, 1915, page 24, I submit the following:

The transformer consists of a laminated iron core with a primary winding, the coil under test forming the secondary. The top and bottom sections of the iron core are each built up of 63 lb. of soft iron lamina-



TRANSFORMER FOR TESTING FIELD COILS ON ATLANTIC CITY & SHORE RAILROAD

tions, varnished on one side before assembly to minimize eddy currents. The bottom section is bolted securely to a heavy wooden table, and as is shown in the sketch, each pole piece is fastened to it by two ¾-in. machine bolts, countersunk and bolted, the table top being counterbored to receive the nuts. The top section of the core is bound together with four ⅜-in. machine bolts and ¼-in. x 1-in. iron straps, the whole being held to the top of the pole pieces by two ¾-in. steel studs, and is removable. The distance between the top and bottom sections and between pole pieces is governed by the size of the field coil to be tested.

The primary coil is wound with four layers of twenty-seven turns each of No. 11 double cotton-covered wire. This takes a current of 15.5 amp. at 110 volts with a closed magnetic circuit. The current increases in proportion to the number of turns or layers which are shorted in the field coil under test. As the current varies according to the type of field coil tested, it is necessary for the operator to interpret his reading and base his deductions on the results of experience.

Line Car for One-Man Operation

Automobile Emergency Rig Supersedes Horse-Drawn Wagon in Utica, N. Y.

BY H. G. THROOP
Superintendent of Line and Buildings, New York State Railways, Syracuse, N. Y.

A searchlight used at night in the location and repair of overhead line troubles is one of the many interesting features of an automobile emergency car which has just been placed in service by the New York State Railways (Utica Lines). The line car is an exceedingly light outfit capable of being operated by one man and is expected to be a very efficient piece of apparatus. Trolley and feeder trouble in this city has been handled up to a recent date by an ordinary horse-drawn line wagon with a crew of three men.

The device, which is shown in the accompanying illus-

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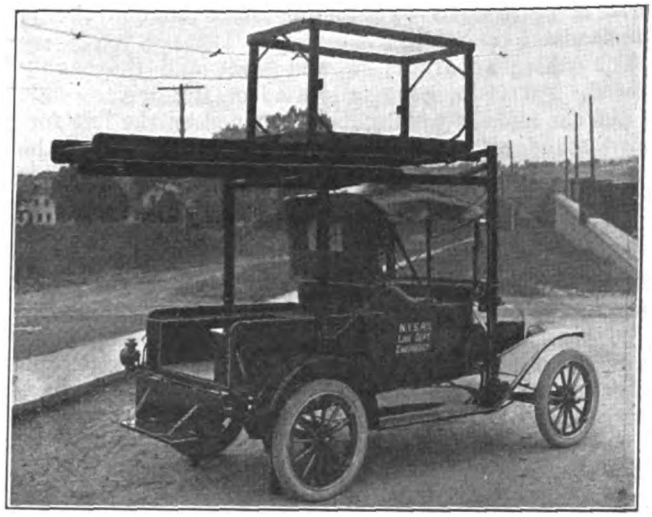
EMERGENCY LINE CAR—LADDER AND PLATFORM IN FOLDED POSITION



EMERGENCY LINE CAR—PLATFORM IN OPERATING POSITION AND TAILBOARD LOWERED

trations, was built by the addition of a folding A-ladder and a toolbox body to an ordinary Ford runabout. The ladder and body are, however, applicable to almost any of the standard make automobiles. The A-ladder consists of three sections which fold up on a four-legged wooden tower which is in turn securely fastened to the automobile chassis sills by braces and U-bolts. The A-ladder is pivoted on a rod bolted to the top of the wooden tower and has attached to one end two spiral springs connected to the sides of the ladder and adjusted in such a manner that one man can easily raise the ladder to its maximum height. The height of the ladder in its raised position is 18 ft. above the ground, which is sufficient for reaching any trolley or span wire. The ladder is easily locked in its upright position by notches cut in the covers of the tool boxes along the side of the body. When the ladder is raised these covers fold down over the sides, holding it securely in its upright position. The tailboard, unfolded, forms a step to reach the first rung of the ladder. When the ladder is raised the whole machine is stable enough to permit a man on top of the ladder to do the required repairs to overhead wires. Spuds which can be lowered under the rear of the car are provided, so that if it is necessary to make the ladder absolutely steady these can be dropped down onto the ground. These spuds are operated by a rack and pinion and are normally locked up.

When the ladder is folded a platform with a folding railing is available for repair of low wires, the cutting down of broken spans, etc. This platform is 9 ft. from the ground. The folding railing requires no hooks or locks as it locks automatically when raised. This plat-

EMERGENCY LINE CAR—SHOWING SEARCHLIGHT, GONG, CLOSED TAILBOARD, AND LOWERED SPUDS

EMERGENCY LINE CAR—VIEW SHOWING LADDER IN RAISED POSITION

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form is reached by two folding steps on one of the standards of the tower.

The whole apparatus is well built and thoroughly braced. An 11-in. gong is located on the driver's side of the car and a searchlight is provided on the left forward standard of the tower for use in lighting the road, hunting wire trouble or making repairs. This light operates from a storage battery.

The body in the rear provides plenty of room for tools and supplies. The additional weight applied to the Ford chassis is not over 250 lb. and the guaranteed load for the chassis is 800-lb. The whole layout is designed as a one-man emergency rig which can be built and maintained at a low cost, at the same time making it possible to get to trouble quicker than can be done with a heavy truck.

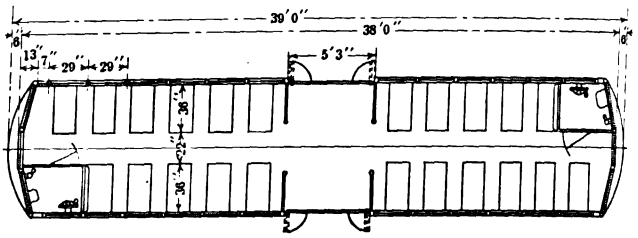
The device was designed by C. M. Gray, chief draftsman and the writer. A patent on this equipment has been applied for.

Center-Door Cars for Benton Harbor, Mich.

Reasonable Weight with Ample Strength for Service Conditions Are Features of the Design

Double-truck, double-end, straight-sided, center-door cars have recently been put in the street railway service operated by the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich. In addition to operating an interurban service in the rich fruit-belt district around these cities, this company also furnishes a street railway service between the two towns above mentioned and thereby serves a total population of about 16,000 people. Although there is an all the year around street railway traffic, it reaches its height during the summer months when the resorters visit this section from all parts of the Central West. These cars were purchased from the American Car Company, St. Louis, Mo. and are primarily for the purpose of handling this summer traffic.

These cars are arranged with a center drop platform, with entrance and exit doors on each side, and the two motorman's cabs in the diagonal left-hand corners of the body. Six transverse reversible seats and one stationary seat on each side of the center entrance furnish accommodations for forty-four passengers. The general dimensions of the cars are as shown in the following table:



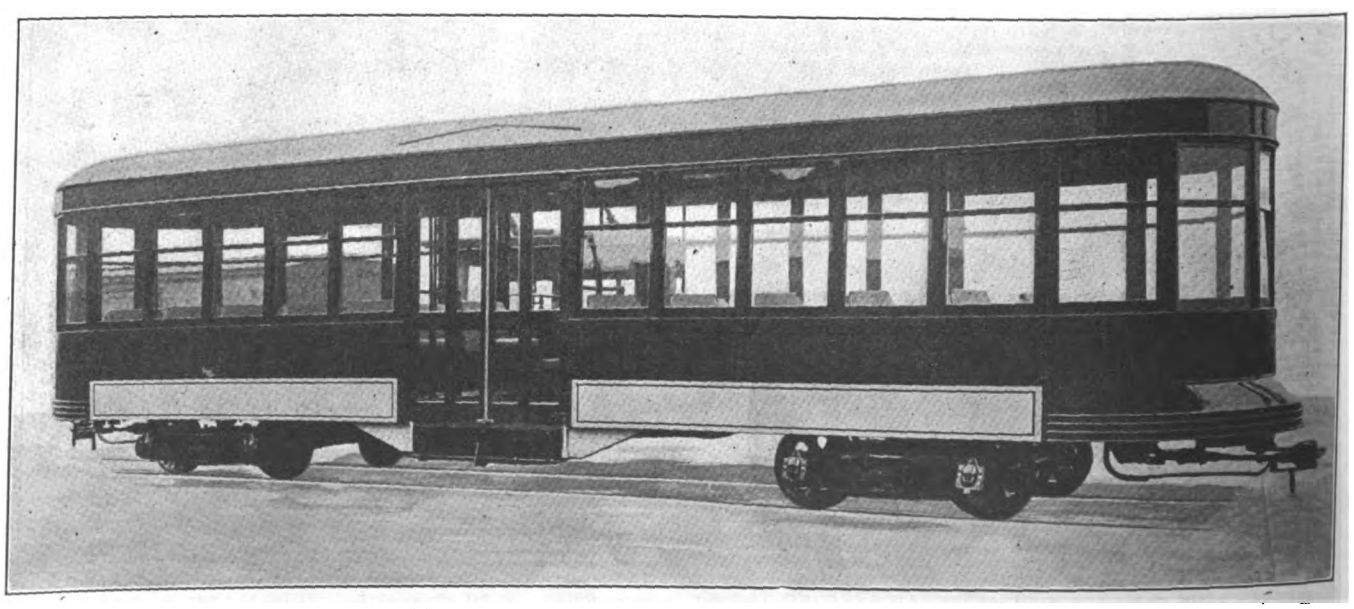
FLOOR PLAN OF BENTON HARBOR CENTER DOOR CAR

Length over buffers	39 ft.	0 in.
Length over vestibules	38 ft.	0 in.
Length of center platforms	4 ft.	6 in.
Width over outside sheathing	8 ft.	2 in.
Width of aisle	....	22 in.
Distance from center to center of side posts	2 ft.	5 in.
Seat centers	2 ft.	5 in.

CONSTRUCTION DETAILS

Underframe members were selected with a view to providing a light weight car which would be amply strong to meet the service conditions. The side sills are formed of 5/16-in. x 2½-in. x 2½-in. angles with 4-in., 5.25-lb. channels for the cross sills. The center platform knees are made of plates reinforced with angles and securely fastened to the side sills. The tongued and grooved 13/16-in. yellow pine floor is secured to nailing strips bolted to the underframe members. Over this, ⅝-in. hard-maple floor strips are fastened down with screws to form the aisles and passageways. The body corner posts are ¼-in. x 1½-in. x 1½-in. angles extending from the side sills to the side plates. The intermediate posts are of 3/16-in. x 1½-in. x 1½-in. T-iron sections also extending from the side sills to the side plates. The 5/16-in. x 1½-in. carlines are securely riveted to the tops of the side posts. The side sheathing, below the belt rail, is made of 3/32-in. steel plates riveted to the sill angles, the window posts and the seat rests, which are formed of ⅛-in. x 1¼-in. x 1¼-in. angles. The vestibules are sheathed on the outside with wood, and the letter boards are formed of No. 16-gage sheet steel. The roof and the vestibule hoods are sheathed with ⅜-in. tongued and grooved poplar covered with a No. 8 cotton-duck weatherproofing. The side-sill angles are reinforced at the car ends with 6-in. channel-iron bumpers and anti-climbers are securely riveted to these.

There are twelve windows on each side of the car with square stationary top sashes made continuous from the vestibule corner posts to the center door-posts. The lower sashes are fitted with O. M. Edwards locks and com-



SIDE VIEW OF BENTON HARBOR CENTER DOOR CAR

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pression rollers. Each window is provided with a pantasote curtain mounted on a spring roller and fitted with Acme Supply Company's protected groove fixture without a pinch handle. Other inside finish includes an agasote headlining, cherry panels, molding, doors and sashes, and eight Railway Utility ventilators. The center doors open outwardly and are of the double folding type. They are equipped with operating mechanisms under the control of the conductor. The steps on each side of the center drop platform extend the full length, and they raise and lower with the opening and closing of the door. As a safety measure they are covered full length with Feralun step treads.

The car body is mounted on Brill 39-E trucks having a 4-ft. 10-in. wheelbase and equipped with 33-in. driving and 21-in. pony wheels of the Griffin FCS type. These wheels have 3-in. treads and ¾-in. flanges and they are mounted on 4½-in. driving axles requiring 3¾-in. x 7-in. MCB journals. Other car specialties include Brill-Hovey type radiating drawbars, Little Giant hand brakes, General Electric motors with split gears, Brill Dumpit sand boxes and International Register Company's type C-21 combined transfer and coin registers. A plan and elevation of one of these cars is shown in the accompanying illustrations.

Overhead Line Problems in Havana

Narrow Streets in the Cuban Metropolis Make Overhead Construction Difficult

By the terms of its concession, the Havana Electric Railway is obliged to use the double overhead trolley system with two wires completely insulated from ground, and under the extraordinary conditions which have had to be met the company's overhead system is probably more complicated, costly and difficult of maintenance than any to be found in America. Streets in all but the outlying districts are so narrow that the curves at intersections have to be of very short radius. The density of traffic, especially in the central districts, and the diverse development of different sections, made it desirable to operate direct lines between all of the principal districts into which the city is divided. This method of car routing has made a complicated network of curves necessary at the track intersections.

The accompanying illustrations will give an idea of some of the practical problems encountered. Not only are the streets so narrow that in many cases the fenders project over the sidewalk when the cars are passing around a curve, as shown in one of the views, but during the past five years the public streets of substantially the entire city, including all of the streets containing railway tracks, have been repaved and provided with new sewers, storm drains, water pipes, gas pipes and connections between the mains and the buildings, as well as new curbs and sidewalks.

The railway feeder cables were originally underground, but during this general reconstruction it was found absolutely necessary to take them out of the ducts and carry them overhead on messenger cables supported from the tubular steel poles of the trolley structure. The same lead-covered cables which were used underground have been thus transferred. To appreciate fully the complication and excessive weight of this feeder construction, it must be remembered that a double trolley system requires about three times as much feeder cable as is usually installed for a single trolley system.

The last annual report of the company, from which most of the facts already mentioned have been taken, also gives data on the cost of maintenance of the railway overhead construction as shown in the following table:

	Miles Single Track	Total Cost of Maintenance	Maintenance Per Mile
1911	64.17	$35,866	$558.92
1912	65.70	34,154	519.86
1913	71.82	28,533	397.57
1914	80.10	24,164	301.68
1915	86.35	22,955	265.84

1915 Over 1911

Increase of mileage	34.6 per cent
Decrease, total maintenance	36.0 per cent
Decrease, maintenance per mile	52.4 per cent

HAVANA—NARROW STREET WITH OVERHEAD FEEDERS SUPPORTED ON BRACES

HAVANA—NARROW STREET SHOWING HOW FENDERS PROJECT OVER SIDEWALK WHEN CAR IS ON CURVE

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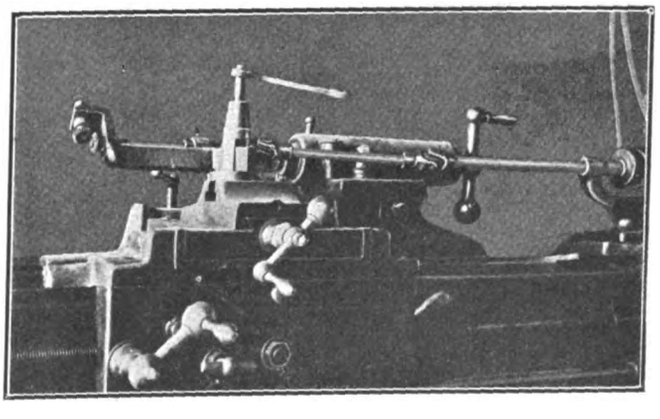
In this work of reconstruction, double overhead trolley wires were installed over all new track, and existing lines were maintained and reconstructed as necessary. Round No. 000 hard-drawn copper wire is used for all main lines, and hard-bronzed wire of the same form and size at places of especially severe wear. When partly-worn trolley wire is replaced because of too many weak spots, all the best parts are culled out and used provisionally over track in construction or else installed in the yards and the branches of lighter traffic.

One improvement made in the double overhead system since its installation is the use of a single-pole roller-bearing trolley base for the old-fashioned double-pole type. This improvement was begun in 1913, and at the end of 1915 only fifty-seven of the old bases remained in use. While it is still too early to determine the full effect of these changes, the average life of the trolley wheels during 1915 was 48.1 per cent greater than in 1913 and 29.9 per cent greater than in 1914. The company believes that it is probably impossible to get as long life from either trolley wheels or trolley wires in a double trolley system as in the ordinary system because it is impracticable to align the trolley wires accurately. This is especially true in Havana, owing to the severe local conditions.

The company has in all 401 motor cars, of which 378 are closed passenger cars, one is an open car, two are parlor cars, one is a sightseeing car, thirteen are electric locomotives and the remaining eighteen are freight or service cars.

A Unique Home-Made Slotting Device

A home-made slotting device, of simple construction yet effective as a tool, has been invented by C. C. West, master mechanic of the Galesburg Railway, Lighting & Power Company, Galesburg, Ill. The design of this tool is such that it may be mounted, with slight changes, on any machine lathe in order to provide for the power

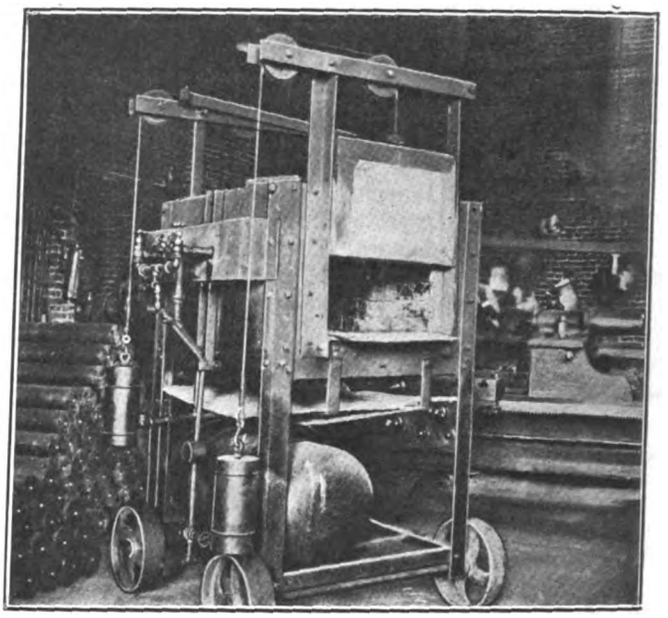


VIEW OF UNIQUE HOME-MADE SLOTTING DEVICE

end of the equipment. The saw frame is arranged to fit into the lathe tool post, and it is as readily put into position as any lathe cutting tool. The power is transmitted from the line shaft by a bell cord belt to a small pulley, which may be clamped or bolted to the lathe bed base. This pulley is mounted on a slotted shaft in order to give free longitudinal movement to the slotting saw. Two universal joints in the shaft permit free angular movement of the tool post. As shown in the accompanying illustration, a pair of small beveled gears transmit the power to the slotting saw, and the slotting operation is performed with the armature fixed between the lathe centers. The longitudinal movement of the slotting saw is obtained through means of the tool post control.

Portable Furnace Reduces Labor

A portable fuel-oil furnace for heating steel bolsters and platform knees preliminary to bending them in a bulldozer has greatly reduced the labor of handling these pieces in the repair shops of the Omaha & Council Bluffs Street Railway, Omaha, Neb. This portable fuel-oil furnace is shown in the accompanying illustration. Heavy bends are made in this shop by equipping the wheel press with dies, and whenever work of this nature is undertaken the oil furnace is moved to a point beside

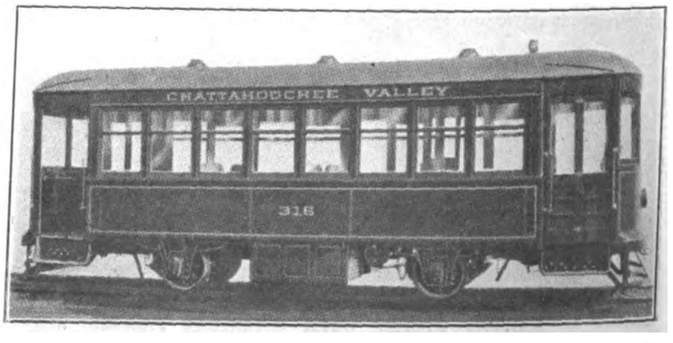


PORTABLE FUEL-OIL FURNACE IN THE SHOP OF OMAHA & COUNCIL BLUFFS STREET RAILWAY

the press, the work of handling thus being reduced to a minimum. The dimensions of the interior of the furnace are 12 in. x 18 in. x 36 in. It is provided with counterbalanced doors at both ends so that long sections of steel may be heated. The furnace is mounted on a substantial angle-iron frame which in turn is supported on 14-in. steel wheels. The oil is carried in a storage tank mounted beneath the furnace and air is supplied through hose connections to the shop compressed-air system. The complete furnace weighs approximately 3000 lb., and it may be moved about the shop without difficulty by three men.

Storage-Battery Car, West Point, Ga.

The illustrations herewith show a 22-ft. combination passenger and smoking car of the storage-battery type that has recently been put into service by the Chattahoochee Valley Railway, a steam road which operates between Standing Rock, Ala., and West Point, Ga., a distance of 17 miles.



STORAGE-BATTERY CAR FOR CHATTAHOOCHEE VALLEY RAILWAY

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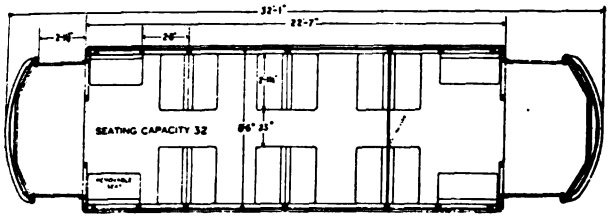
The 6400-lb. battery load necessitated a steel underframe of rugged construction. Accordingly, sills of 2½-in. angle, end ills of 8-in. channel and stringers and crossings of 5-in. channel are used. The floor is a single thickness of maple. In the body frame, which is constructed of ash and yellow pine throughout, the corner posts are 3⅞ in. thick, the side post 2¼ in. thick, and the posts are built with a sweep of 1⅞ in. The platforms are inclosed with stationary round-end vestibules, sheathed on the outside with sheet steel. At each platform opening there is a double folding door, and a partition door separates the white passengers

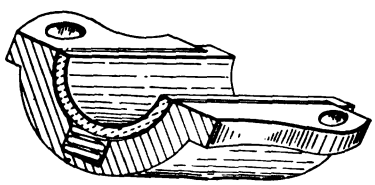


PLAN VIEW OF STORAGE-BATTERY CAR

from the colored. The inside of the car is finished in ash, stained cherry and mahogany. The roof is of the plain arch type strengthened with concealed rafters. The covering is of cotton duck laid over a poplar sheathing. Three exhaust ventilators, located along the roof center line, are used. This car, which has a seating capacity of thirty-two, was purchased from The J. G. Brill Company through the Railway Storage Battery Company of New York.

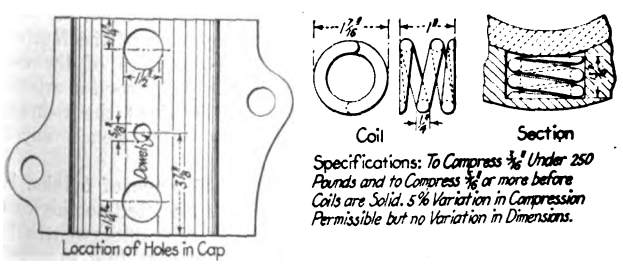
Eliminating the Loose Armature Bearing

A device that is claimed to be a panacea for loose armature bearings has just been perfected by George J. Smith, superintendent of rolling stock and shops of the Kansas City (Mo.) Railway. This device takes the form of two coil springs set in recesses in the axle



ASSEMBLY OF MOTOR AXLE BEARING, SHOWING LOCATION OF SPRINGS

cap as shown in the accompanying illustration. Experience has demonstrated that dowel-pin wear is eliminated by these spring clamps because the bearing is held tight in the axle cap. Inasmuch as armatures are now lubricated with oiled waste, it is unnecessary to provide oil reservoirs, and the motor axle caps are made solid. They are afterward bored out on jigs to fit the



PLAN, SECTION AND ELEVATION OF MOTOR AXLE-BEARING SPRINGS AND PLAN OF BEARING

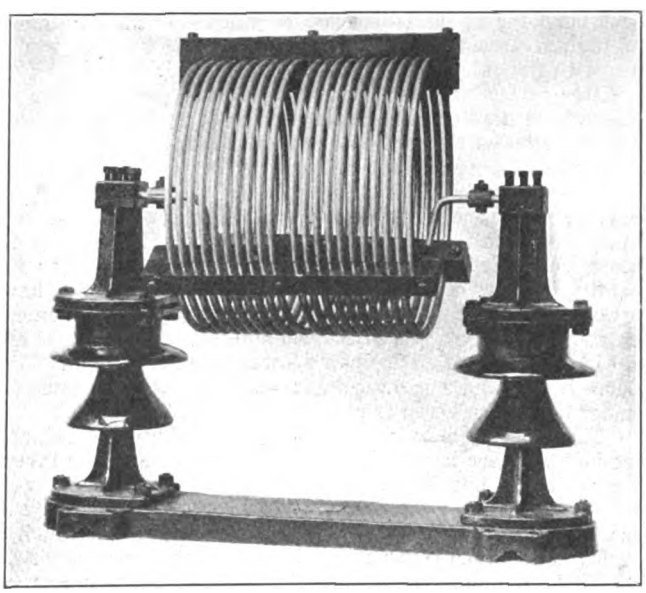
bearings and recessed to receive the springs, which will give about 250 lb. pressure per ¼-in. compression. These springs are 1 in. long and made of ¼-in. spring steel. It requires 250 lb. to compress these springs 3/16 in., and the coils become solid when the spring is compressed 5/16 in.

In the GE-57 and GE-67 motors two springs set in recesses in the axle cap hold the armature bearing in place. In the GE-80 motors, however, on account of the waste packing the design had to be changed and four ¾-in. x 1-in. springs made of ⅛-in. wire were substituted. In connection with the use of these springs all-bronze bearings have been adopted and the thickness of the babbitt has been reduced from ⅜ in. to ⅛ in. Cast-steel shells have been abandoned and the bronze bearing substituted, so that when the babbitt wears through the wear will be within the clearance allowed between the armature and the pole pieces.

A Recent Air-Cooled Choke Coil

The illustration herewith is of an air-cooled choke coil which recently has been placed on the market by the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa. This choke coil, of which there are two types D-9 and D-15, is made in two sizes, 9 in. and 15 in. in diameter, and both sizes are listed for outdoor or indoor mounting up to 130,000 volts. A separate line of 9-in. coils for indoor mounting up to 49,000 volts is also available.

These coils are made up of a helix of aluminum rod in the 200 and 400 amp. and of copper in capacities of



RECENT DESIGN OF AN AIR-COOLED CHOKE COIL

600 amp. and above. A feature of their design is the thorough bracing of each turn of the coils, making it unnecessary to reduce the diameter of the center of the coil and thus sacrifice much of the inductance in order to prevent sagging. The construction of the insulator supports is such that (except in the case of the 9-in. outdoor coils below 49,000 volts) the insulators may be inverted so that the coils can be mounted either upright or suspended from the ceiling.

The type D-9 indoor coils are mounted on porcelain pillar insulators which in the standard form are bolted to sheet steel bases. They can be adapted to mounting on pipe up to 1¼ in. size by the omission of the sheet steel base and the substitution of special pipe clamp castings.

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NEWS OF ELECTRIC RAILWAYS

VALUATION DEADLOCK IN DALLAS

In Spite of Concessions by Utilities the Mayor Contends for Valuation Below Option Cost of Properties

Notwithstanding the fact that the traction interests of Dallas, Tex., have made numerous concessions in an attempt to reach a settlement of the traction and lighting controversy, the deadlock remains unbroken. The valuation of the traction and lighting properties is the point in dispute, the city officials holding out for the valuation of $7,100,000 as fixed by E. W. Bemis, while the traction officials remain steadfast in their determination to fix a valuation of $8,500,000. Agreement has been reached on practically all other points, and the traction interests have offered to put the new interurban terminal building, recently erected in Dallas at a cost exceeding $750,000, in with the Dallas properties at a valuation of $8,500,000.

J. F. Strickland and C. W. Hobson, heads of the interests that hold options on the Stone & Webster properties in Dallas, have just issued a long statement to the public of Dallas in which the position of the traction interests and their offers to make certain improvements are fully set forth. The proposals of the traction interests include the expenditure of not less than $2,000,000 in street railway extensions and improvements and lighting equipment; the construction of at least one interurban line into Dallas; a reduction of 2 cents in the light rate and the expenditure of $5,000,000 in and around Dallas within the next three years. Mr. Strickland said that he and his associates were ready to give bond for at least $500,000 to guarantee the fulfilment of the agreement for these improvements if the city would agree to the valuation figures of $8,500,000.

After reviewing the various stages of negotiations up to the present deadlock the statement issued by Mr. Strickland and Mr. Hobson to the people of Dallas is in part as follows:

"We have done all that we possibly can do toward effecting a settlement. The vital point of difference with the Mayor, who represented the city in our conferences, was upon the valuation of these properties. The Mayor has all along contended for a valuation of $7,100,000, but has recently, in view of the many valuable concessions we have agreed to, offered to recommend to the people a settlement on some figure between $7,100,000 and $8,500,000, but we are not in a position to settle upon a lower valuation than $8,500,000. If we and our associates purchase these properties under the option given they will cost us $8,500,000.

"The property is here and can be seen and inventoried, and we believe there is no substantial difference as to the inventoried items, but Professor Jackson says the property is worth more than $10,000,000, while Professor Bemis says it is worth only $7,100,000. We certainly do not know which is right. The whole thing seems to be largely a matter of individual opinion upon a subject concerning which learned men can and frequently do most earnestly disagree. The only definite information we have been able to obtain is that the owners have paid $9,700,000 in cash for the properties in question, and that we have been unable to negotiate for clear titles for less than $8,500,000.

"The vital questions for all to consider, it seems, are:

"1. What is the fair value of these properties when rearranged, improved, extended and operated under the direction of our Mayor and the City Commissioners, managed and largely owned by Dallas people with a view of giving the best possible service at the lowest possible cost?

"2. Will the immediate and permanent reduction in rates, large expenditures for improvement and extensions, the plan for two additional interurbans into Dallas, together with new local companies incorporated under our Texas laws and under control of our City Commission and home directors, and the final and satisfactory settlement of the street railway and electric lighting problems overbalance the difference in the value of these properties?

"The difference between Professor Jackson's appraisal and Professor Bemis' appraisal is approximately $2,900,000. We understand that the owners of the property at one time offered to do a little better than split the difference by compromising on a valuation of $8,500,000. This compromise plus the great advantages since obtained by the Mayor are still available in effect, because the owners have given a short option on the property for $8,500,000 cash, which will be exercised if a fair agreement can be reached regarding new franchises."

MAYOR MITCHEL SECURES COMPROMISE

New York Lines Reinstate Employees Convicted of Misdemeanors—Other Dismissals Subject to Arbitration

Once again the dove of peace has settled over New York City traction affairs, and the possibility of a second strike on the city lines has passed for the present at least. On Monday, Aug. 21, Mayor Mitchel settled the dispute between the New York Railways and the Amalgamated Association of Street and Electric Railway Employees of America. The company consented, "at the personal request of the Mayor," to reinstate all employees who had been convicted of misdemeanors in the recent strike, and to submit the other discharges in question to arbitration. The union, also in deference to Mr. Mitchel's persuasive powers, agreed not to raise an issue about the "within-the-family brotherhood" organized by the non-union employees of the green-car system at the suggestion of President Theodore P. Shonts and General Manager Frank Hedley.

It took four conferences with the representatives of the company and the union to smooth out the differences, but the Mayor was able to accomplish the task without waiting for Chairman Oscar S. Straus of the Public Service Commission, who was rushing from Maine, where he went recently for a vacation. As soon as the peace agreement had been signed a telegram was sent to Mr. Straus en route, and he returned to Maine.

At a meeting on Friday, Aug. 18, the board of directors of the New York Railways, after receiving a committee representing employees of the company, authorized a statement which follows in part:

"Reports of the managing officials show that the only failures to reinstate employees since the agreement of settlement was made were in the case of fourteen men who had been tried and convicted of crime in the courts of justice. There were during the strike thirty-seven arrests of employees for violence, but every man accused was reinstated upon being acquitted.

"This board does not understand that the agreement of Aug. 7 constituted any undertaking to reinstate employees who had violated the criminal law of the State. It is, and has for many years been the firmly established policy of the company, in the interest of public safety, not to employ men who have been convicted of crime as conductors or motormen, or in any positions in which they come in contact with the public. We do not feel free to deviate from that policy.

"The board is willing, however, under the last clause of the settlement agreement, to submit to arbitration the question at issue as regards the re-employment of the fourteen men found guilty of crime. The committee of the men claim that the question is not properly a matter for arbitration on the ground that Clause V required the company to reinstate all employees, no matter what offences any of them had committed.

"The board recognizes that this difference of opinion involves interpretation of a document submitted to this company by the Mayor and Mr. Straus and underwritten by them. This company, therefore, is quite willing to submit to Mayor Mitchel and Chairman Straus the determination as to whether or not under the terms of this agreement,

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the question at issue is properly one for arbitration. It must be understood that this shall not be regarded as a precedent in dealing with questions of efficiency in the future."

This communication called Mayor Mitchel back from his military work at Plattsburg and resulted in conferences throughout Monday with the disputing parties. At the end Mayor Mitchel authorized the following statement:

"1. At the personal request of the mayor, the New York Railways will reinstate in their former positions the fourteen men held and convicted of offenses committed in connection with the strike.

"2. The discharge of the twenty-eight men accused of stealing fares, of the two men accused of insubordination, of the two men accused of drunkenness and of the two men failing to report, will be submitted to arbitration to determine whether or not these cases were in fact discharges for the causes named or for activities in the strike or in connection with the union. The above cases submitted to arbitration, having arisen during the strike or immediately thereafter, are to be considered in a class by themselves, and not to be taken as precedents in dealing with similar cases hereafter."

On Tuesday, Aug. 22, a joint investigation of the dismissals of the thirty-four employees by the company, which were left to arbitration by Mayor Mitchel, was begun by representatives of the company and the union. Preliminary discussion between General Manager Hedley and Attorney James L. Quackenbush for the company, and Organizer William B. Fitzgerald and Louis Fridiger and others representing the union, indicated that the cases might be disposed of without going to a board of arbitration. Both sides seemed willing to make as many concessions as possible, and there were many indications that they would be able to dispose of the controversy without appeal. Although up to Friday morning none of the thirty-four employees had been reinstated, the interval had been profitably spent in examining all papers and available data in each case.

Mayor Mitchel's peace efforts were instrumental on Wednesday, Aug. 23, in leading the Third Avenue Railway to promise to re-employ twenty motormen and conductors recently dismissed by it upon conviction of misdemeanors during the strike. Several cases still remain to be settled, either by mutual agreement or by arbitration.

LEGISLATION SUGGESTED TO SECURE NEEDED EXTENSIONS IN SEATTLE

In a recent communication to the City Council, Assistant Corporation Counsel Walter F. Meier stated the best method of procedure for the city to employ to force extensions of existing street railway lines in Seattle would be to appeal to the next Legislature to enact a law empowering the City Council to compel reasonable work along that line. The communication was directed to the Council in response to a resolution recently adopted by that body, calling upon the legal department for a report on litigation instituted to compel extensions; the status of such litigation and the best method of procedure to obtain extensions. In his statement to the Council Mr. Meier suggests that the City Council prepare and obtain the passage of a statute authorizing either the city or the Public Service Commission to compel extensions of railway lines when the public necessity and convenience require.

The communication said in part:

"The state constitution expressly reserves to the Legislature the power to alter, amend or repeal all laws relating to corporations. Under similar constitutional provisions the courts of other jurisdictions have held that such reserved power authorized the Legislature to make all reasonable regulations necessary to require corporations to carry out the objects for which they were formed. In addition, our constitution further provides that all common carriers—and street railways are such—are subject to legislative control. Under these reserved powers the Legislature may, in our opinion, enact laws which would empower the city to compel reasonable extensions."

The lines in Seattle which the City Council desires to have extended are owned and operated by the Puget Sound Traction, Light & Power Company.

EMPLOYEES ORGANIZE LOCALLY

New York Plans for Having Employees Deal Directly with Companies Without Outside Interference

In keeping with the promise made by T. P. Shonts, president of both the New York Railways and the Interborough Rapid Transit Company, that employees would have an opportunity to deal directly with the companies without interference, the companies invited the men on Aug. 13 to choose their own representatives to take up direct with the management questions of better wages and working conditions. Circulars distributed by the companies announced that elections to select representatives would be held by all classes of operatives as well as motormen and conductors, and that joint meetings of representatives of the men and of the companies would be called at once thereafter. The circulars to the men on the New York Railways said in part:

"The purpose of such joint meetings will be to discuss and act upon matters of mutual interest, and to consider and adopt measures for further promoting co-operation between the company and its employees. For the purpose of voting the company will be divided into departments, each of which will be entitled to representatives as follows:

Chief engineer's department	4
Car equipment department	4
Motive power department	1
Transportation department:	
Motormen	7
Conductors	7
All other transportation employees	2
Grand total all employees' representatives	25

"The unit of representation shall be each department, as above mentioned, and each department's employees may choose one representative for every 250 men employed. Ten names signed to a nominating petition shall be sufficient to place any employee's name on the official ballot as a representative of the class of employment in which he is engaged. It should be clearly understood that any ten employees may nominate any one of their fellow employees that they see fit, but no employee shall be permitted to sign any more than one nominating blank."

The plan of the Interborough Rapid Transit Company is practically the same as that proposed for the New York Railways, with the exception of classes of employees growing out of the different kinds of service, so that the grand total of representatives is fifty-four. It is provided in both plans that no officer of the company, or anyone in authority over other employees, shall be eligible for election as a representative.

At an election held on Aug. 17, 9710 employees of the Interborough Rapid Transit Company out of 11,000 eligible men elected their fifty-four representatives from 199 candidates. At a similar election on Aug. 18, employees of the New York Railways chose their twenty-five representatives out of eighty-five nominees. A total of 1846 votes was cast out of 5400 eligible votes. The representatives in each case are now organizing the general committee.

A similar plan of the New York & Queens County Railway, announced on Aug. 14, provides for five departments, each of which is entitled to representatives, as follows:

Car equipment department	3
Power department	1
Line department	1
Track department	2
Transportation department:	
Motormen	3
Conductors	3
Grand total	13

Representatives as planned were elected on Aug. 18 by the employees of this company, and an informal conference with company officials was held on Aug. 19. The men expressed a desire to take up matters through the heads of departments, and on Aug. 21 they presented certain suggestions as to wages and working conditions which are now under consideration.

The New York Railways has distributed to employees copies of a pamphlet which presents the company's side of the controversy leading up to the strike of Aug. 4, and its attitude toward the employees since the agreement was reached. The paper voices the company's desire to meet committees of the men at any time. The New York & Queens County Railway has issued a similar pamphlet.

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HARRISBURG STRIKERS SEEK JITNEY AID

Are Circulating Petition for Referendum to Remove or Vitiate Present Jitney Regulations

The striking employees of the Harrisburg (Pa.) Railways during the last week have centered their efforts on the procuring of signers to a referendum petition to compel the City Council to amend the present jitney regulations. The licensed jitneys operating in Harrisburg are few because of stringent regulations passed last year. To protect the public the Council then provided that jitneys must pay a license fee of $50 a year and file a $2,000 bond to cover indemnities in damage cases.

As the striking employees have been unable to prevent the Harrisburg Railways from operating its cars, and as the city officials have ordered all unlicensed jitneys off the streets since normal street-car service has been resumed, the strikers are bending every effort to force the Council to change the jitney regulations so that more buses can run and the company's revenues be thus cut. The petition was opened for signers on Aug. 21, and before ten days the signatures of 20 per cent of the qualified voters must be procured for the referendum to go before the Council for consideration. If Council refuses to amend, then the people will decide at the November election whether the present ordinance shall stand or fall. By the evening of Aug. 23 more than 1300 signers had been secured, and it is practically conceded that the 1754 names necessary will be procured by Aug. 31. Whether the council will amend as petitioned, none of the five city commissioners will discuss.

On Aug. 17, Supt. F. M. Davis announced that the receipts of the railway are now 65 per cent of normal. A number of union organizations have announced that any member who rides on the cars will be fined $5. Most of the union men have to walk to their work as a result. The company has announced that Paxtang Park, an amusement resort operated during the summer, will not be opened any more this year. Traffic to this park is one of the big sources of the company's revenue during the summer.

On Aug. 21, three owners of unlicensed jitneys petitioned Judge Charles V. Henry for an injunction to prevent the city officials from enforcing the present jitney regulations. Argument was heard on the injunction proceedings on Aug. 22, and judgment was reserved.

CONSTRUCTION PROGRESS IN CLEVELAND

Track Relocation Question Not Settled—Labor Shortage Cuts Track Replacement Program in Half

The Commissioners of Cuyahoga County, Ohio, are planning to award the contract for the construction of the subway approaches to the Superior-Detroit Avenue bridge at an early date, notwithstanding the fact that no agreement has yet been reached as to the expense of relocating the tracks of the Cleveland Railway in order to allow the work to proceed. The commissioners declined to enter an agreement by which the county, the city and the company would each pay one-third of the expense, on the ground that the city had agreed to see that this work was done when the original arrangement was made. They still adhere to that stand. The commissioners say that the subways will be completed in 175 working days from the date of beginning the work. The company has been officially notified to relocate its tracks, but this seems to be a form only. President Stanley said the company cannot proceed with this work without knowing that the funds will be forthcoming at once.

Appraisers have completed their work on the property that will have to be appropriated along Detroit Avenue and West Twenty-fifth Street to be used by the county for subway approaches to the new bridge from the west side. It is estimated that about $500,000 will be expended for this property, and appropriation proceedings will be necessary in some cases.

Street Railway Commissioner Fielder Sanders has notified Mayor Davis that, on account of inability to secure laborers, the Cleveland Railway will spend only about half the sum it had planned in replacing tracks in various parts of the city this year. The company had appropriated $1,000,000 for this purpose.

Commissioner Sanders recently stated that the next lot of cars made for local use will be of steel. He recently inspected a number of steel cars in Cincinnati and is much pleased with them. The cars will be made in the company's shops, he said, and work on them will be begun as soon as details in regard to the entrance are decided. He favors cars with entrance and exit both in the center, similar to the trailers now in use in Cleveland.

Mayor Davis has promised to use his influence in having arrangements made for seats for conductors. Failing in this, he said he would aid in having a state law passed requiring seats for the men.

A peculiar ticket selling scheme was recently discovered in Cleveland. A man had prepared books containing three coupons each, which he was selling for $1. The purchaser was to sell the three coupons at 25 cents each and would then receive forty 3-cent street car tickets. The persons to whom the coupons were sold could present the coupons and 75 cents and get other books of coupons with receipts entitling them to forty tickets when the coupons were sold. Assistant County Prosecutor Doerfler ordered the man to return all money and close up his business.

GRIEVANCE COMMITTEE APPOINTED IN TOLEDO

The employees of the Toledo Railways & Light Company, Toledo, Ohio, on Aug. 18 chose a grievance committee to consult with President Coates regarding a few matters which the men do not consider satisfactory. One of them is that the company is employing non-union men in preference to members of the union. Several other minor grievances will be presented.

President Coates said the report that the company is trying to get rid of its union employees is ridiculous. The company has a good set of men and wants to keep them. The men are all receiving two weeks' vacations with pay, and the company is endeavoring to treat them right. If they have any grievances, however, he was willing, he said, to meet the committee and use his best efforts to adjust them.

John Quinlivan, business agent of the Central Labor Union, said the men will not ask for a closed shop. They have a three-year contract under the open-shop plan and will not break it. He expressed the opinion that the men have no grievances that cannot be quickly and easily adjusted. Harry Power, business agent of the local branch of the Amalgamated Association of Street and Electric Railway Employees of America, expressed the same opinion.

NIGHT SERVICE OFF IN CHATTANOOGA

All street cars of the Chattanooga Railway & Light Company, Chattanooga, Tenn., ceased operation at 10 o'clock on Tuesday night, Aug. 22, on the order of General Superintendent E. D. Reed, who said it was a precaution against threatened violence by strike sympathizers to passengers and operators. The order was issued after a rock had been thrown through a car window, injuring a woman, and after windows in another car had been broken by pistol shots. Hundreds were compelled to walk home from the business districts.

Trouble in Chattanooga has been brewing since the middle of July, when it is alleged some employees of the company called in outside men to assist them in organizing. C. Cline, an organizer of the Amalgamated Association of Street Car and Electric Railway Employees of America, has come to Chattanooga to try to bring about a recognition of the union and the reinstatement of some men who it is claimed were discharged because they expressed a desire to organize.

The company has issued a statement signed by 190 employees, stating that they do not desire organization. According to Mr. Reed, since the trouble with the labor organizers has arisen, about twenty of the employees have joined the strike. On Monday morning seven or eight failed to show up for duty, and five or six dropped out during the day. The others were among the number that were induced to leave their cars during a riot on Market Street on Monday night.

Fearing further attempts at violence with the coming of darkness, the company on Wednesday night ordered all cars except those on the Oak Street line to the carhouses at 6.30 p. m. Oak Street cars stopped running at 8 p. m. M. J. Horan, claim agent of the company, stated that if stoning of the cars and the use of firearms had not been resorted to the

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company would have been able to maintain its schedule. The cars were not taken off for lack of men.

Although a few more employees left the service on Wednesday, there were many applicants for places with the company. It was said that there would be little trouble filling vacancies with men on the waiting list as soon as the scattered disorders growing out of the strike agitation had ceased. During the day and up until the time the cars were run in no single instance of trouble had been reported. Telephone calls threatening the officers of the company, however, had been received in the general offices.

Superintendent Reed and General Manager F. W. Hoover conferred with Mayor Littleton on Wednesday afternoon concerning the stopping of car service. According to report, Mayor Littleton did not believe the franchise of the company would be endangered by taking cars out of service in the evening, and he agreed that it was for the protection of the public and probably the best thing that could be done.

Cleburne Strike Settled.—The differences of the Cleburne (Tex.) Traction Company with its employees, which have tied up street railway traffic for nearly two weeks, have been satisfactorily settled.

Annual Outing of Cincinnati Street Railway Men.—Beginning on Aug. 17 the employees of the Cincinnati (Ohio) Street Railway held a three-day outing at Coney Island. Handsome prizes were awarded in the different contests.

Patrons Try to End Strike.—A committee made up of patrons of the Buffalo (N. Y.) Southern Railway residing in Lackawanna, Orchard Park and Hamburg is attempting to adjust the differences between the management of the line and its employees. A strike on this railway has been in existence for almost four months.

Strike Averted by Employees.—A threatened strike of the motormen and conductors of the Dallas (Tex.) Consolidated Electric Street Railway, said to have been brought to a climax by the reported discharge of a veteran conductor who had been with the company for twenty-five years, has been averted. About 200 trainmen, in a meeting at the carhouses, voted unanimously to leave the matter in the hands of Richard Meriwether, superintendent of the line.

Arkansas Association Appoints Executive Committee.—President O'Brien of the Arkansas Association of Public Utility Operators has appointed an executive committee consisting of the following members: C. J. Griffith, Little Rock, chairman; H. C. Couch, Arkadelphia; J. F. Christie, Jonesboro; S. E. Dillon, Hot Springs; S. C. Dowell, Walnut Ridge; B. C. Fowles, Pine Bluff; H. C. Hoagland, Fort Smith; A. E. Main, Mammoth Spring, and J. A. Wells, Warren.

San Francisco Municipal Railway Employees Disciplined.—Four employees of the San Francisco Municipal Railways have been discharged and two have been suspended for a period of thirty days for interfering with municipal railway equipment on the evening of July 14, when an attempt was made by strike sympathizers to cause a strike of employees of the United Railroads of San Francisco. As noted in the ELECTRIC RAILWAY JOURNAL of July 29, several cars of the municipal line were stalled across the United Railroads' tracks at Geary and Market Streets, thereby tying up the entire Market Street line of the latter company. This was done by throwing the emergency brakes on the municipal cars just as they crossed the private company's tracks.

Trustees Manage New Dallas Terminal.—Management through a board of trustees has been decided on by the Dallas Interurban Terminal Association for the new interurban terminal. Edward T. Moore, administration official of the Stone & Webster street railway and electric-lighting properties in Dallas, has been chosen as a member of the board of trustees, and has been charged with the duties of active head of the terminal association. Mr. Moore succeeds Oliver M. Chadwick, Boston, now with the Massachusetts National Guard on the Mexican border. The two other members of the board of trustees are Fred H. Farnham and Charles W. W. Wetterer, both of Boston. Mr. Wetterer formerly lived in Dallas.

Cleveland Officials Deny Purchase by Nickel Plate.—Officials of the Lake Shore Electric Railway and the Cleveland, Southwestern & Columbus Railway, both of Cleveland, Ohio, have denied the newspaper reports that their properties are to be purchased by the Nickel Plate Railway to complete its proposed rapid transit plan. Plans for the entrance of these roads to Cleveland over the Van Sweringen lines have been discussed, they said, but that did not mean amalgamation. The auditors of these companies denied that any investigations or appraisals of any kind had been made to that end. The Nickel Plate line recently purchased a tract of land 50 ft. by 400 ft. near Rocky River on the west side of Cleveland, only a short distance from its present station. It is said that a new suburban station will be built on this land, and some profess to see a feature of the proposed rapid transit service in the move.

New Steps in Cincinnati Loop Work.—The Cincinnati (Ohio) Rapid Transit Commission, on Aug. 18, asked Frederick L. Spiegel, its legal counsel, for an opinion on its procedure in awarding contracts for the proposed rapid transit loop. Advertisements for bids for making the borings will be published as soon as this opinion is received. Chief Engineer Krug reported the completion of the location of the entire line. Levels have been completed and a pencil profile made. The Beechwood subdivision is considered by Mr. Krug as a very difficult section, and five different lines, with profiles, have been located for the consideration of the commission. Traffic surveys on the cars of the Cincinnati & Columbus Traction Company, the Cincinnati, Georgetown & Portsmouth Railroad and the eastern and suburban divisions of the Interurban Railway & Terminal Company have been completed, and the work on the other lines will be finished within a few days.

Wages Increased in Bangor.—Announcement has been made by Edward M. Graham, vice-president and general manager Bangor Railway & Electric Company, Bangor, Me., of a general increase in the wages of conductors, motormen and carhouse employees of the company. All the men mentioned are to receive 2 cents an hour additional. This follows an advance in wages of 1 cent an hour made on Jan. 1 of this year. Under the new scale of wages men will receive 23.5 cents an hour during the first and second years, 24.5 cents an hour the third year, and 25.5 cents an hour the fourth year and thereafter. All employees who have been with the company at least eleven years, and reach the age of sixty-five, are entitled to a pension. At seventy years they must accept a pension. The company also maintains a life insurance policy for all employees, without cost to them. The company is paying $40 a month to dependents of its married men who are with the militia on the Mexican border, and $20 a month to dependents of single men. To the married men in its employ who have more than four children to support the company pays 50 cents a week extra for each child beyond the fourth. There is also a loan fund, under which the employees are permitted to borrow in time of need, only nominal rates of interest being charged.

PROGRAM OF ASSOCIATION MEETING

New England Street Railway Club

Plans have been completed for a men's outing of the New England Street Railway Club at Springfield and Holyoke, Mass., on Sept. 21 and 22. The outing will begin at noon on Sept. 21, with a general gathering of members and friends at Springfield. The first event on the program will be a buffet luncheon at the rooms of the Springfield Board of Trade. Following this, the buildings of the celebrated municipal group on Court Square will be inspected, and then special cars will be taken for the Eastern States Industrial and Agricultural Exposition grounds, where a coliseum larger than Madison Square Garden, New York, will be seen under construction. The party will then take special cars for Riverside Park, and a clambake dinner will be served late in the afternoon, followed by a display of fireworks. On the morning of Sept. 22 the members and guests will be taken in special cars to the site of the Hooker Street carhouses and shops in Springfield, where an extensive new plant is under construction. The party will then be taken to Holyoke, where the recently completed shops of the Holyoke Street Railway will be visited. After this there will be a trip to the summit of Mount Tom for luncheon, the party returning in the afternoon to Springfield.

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Financial and Corporate

ANNUAL REPORTS

Augusta-Aiken Railway & Electric Corporation

A comparative statement of income, profit and loss of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., and its subsidiaries for the calendar years 1914 and 1915 follow:

	1915	1914
Gross earnings from all sources	$732,990	$738,372
Operating expenses, including taxes	381,255	393,886
Net earnings from operation	$351,735	$344,486
Interest charges	348,568	276,422
Surplus	$3,167	$68,064
Dividends on preferred stock	.....	45.000
Net surplus for year	$3,167	$23,064

The company in 1915 secured an increase of $33,710 or 10.9 per cent in gross electric earnings, which failed, however, to offset the decreases of $29,343 or 8.0 per cent in gross railway earnings and $9,750 or 15.4 per cent in gross earnings from other departments. The operating expenses in the electric division decreased $5,429 or 5.2 per cent, in the railway division $19,748 or 9.8 per cent, and in the other departments $9,564 or 25 per cent. The taxes were greater by $11,250 principally on account of a large assessment on the hydroelectric development, which was in operation for a full year as compared to only six months in 1914.

As a result of the saving in operating expenses, the net earnings from operation showed an increase of $7,249 or 2.1 per cent. On account of an increase in bond interest and interest on floating debt, however, the surplus at the end of 1915 was only $3,167 as compared to $68,064 at the end of the preceding year, so that dividends could not be declared. The dividend payment on the company's preferred stock was $45,000 in 1914 and $90,000 in the two preceding years.

Owing to the depressed business conditions on account of the war, the railway earnings continued unsatisfactory until Oct. 1, at which date they were more than $50,000 less than for the twelve months immediately preceding. A decided improvement was evident after that date, however, and at the present time the receipts are in excess of those in 1913.

Kansas City Railways

The comparative income statement of the Kansas City (Mo.) Railways for the years ended May 31, 1915 and 1916, the first two years of operation under the new franchise, follows:

	1916	1915
Operating revenues	$7,065,940	$6,757,175
Operating expenses	$4,186,561	$4,114,004
Taxes	413,006	445,749
Total	$4,599,567	$4,559,753
Operating income	$2,466,373	$2,197,422
Miscellaneous income	629	582
Gross income	$2,467,002	$2,198,004
6 per cent on investment	1,953,747	1,858,513
City's surplus	$513,255	$339,491

The operating revenues of the company for the year ended June 30, 1916, showed a gain of $308,765, or 4.57 per cent, over those of the preceding year. The operating expenses increased $72,557, or 1.76 per cent, while taxes fell off $32,743, or 7.35 per cent, so that the total expenses increased only $39,814, or 0.87 per cent. The operating income, therefore, showed an increase of $268,951, or 12.23 per cent.

After the deduction of 6 per cent on the investment, the city's share for the two years was approximately $850,000. It is not yet known what portions of this belong to Kansas City, Kan., and Kansas City, Mo., but it is estimated that about $50,000 will go to the Kansas side and $800,000 to the Missouri side. Of the latter amount, approximately $113,000 has been given to the Missouri city in cash. The city was short of funds in 1915, and instead of investing this sum in improvements for the company took it and put it in the city treasury. It was some time after the reorganization before the new railway took active control of the finances, and in the meanwhile money was being earned. The city claimed its share of this in cash, according to the agreement of July, 1914, and the claim was allowed.

The $113,000 and the total left of the $800,000 have been placed to the credit of the city on the books of the company toward the $6,300,000 agreed upon under the new franchise, as the intangible value of the property. After this amount has been reached the city and the company will divide the surplus, the city taking two-thirds and the company one-third.

At the annual meeting of the company the following directors were elected to represent the city: William T. Kemper, Davis M. Pinkerton, John W. Wagner and John Wiles. Frank C. Niles was not re-elected, but is still acting. His successor will be appointed by the Kansas City Court of Appeals during its next session, which will probably be in October. For his place three men have been suggested by Mayor George Edwards.

Directors representing the company were elected as follows: Robert J. Dunham, chairman; C. W. Armour, George S. Hovey, Philip J. Kealy, James E. Gibson and Clyde Taylor. Mr. Hovey succeeds Edward F. Swinney, a local banker. Mr. Swinney construed the plan of reorganization, which provides for the complete separation of the traction company from the electric light company, to prevent him from acting both as individual trustee under the Kansas City Light & Power Company first mortgage and as a director of the Kansas City Railways.

1915 RETURNS FOR GEORGIA LINES

All Electric Railways in State Except Two Show a Surplus from Operation

The report of the Railroad Commission of Georgia for the calendar year 1915 contains a summary of the financial operations of electric railways within the State during the year, as reproduced herewith. The gross earnings for the seventeen railways noted amounted to $8,507,133, with operating expenses of $4,342,562, so that the net for the combined lines totaled $4,164,571. Two of the lines, however, showed slight deficits, so that the combined net of $4,165,350 for fifteen companies was reduced by a combined deficit of $779 for two lines. The report of the commission contains comparative figures for the last three years for different groups of utilities, but the inclusion of street railway, power, gas and electric light companies in one group makes the individual progress of these industries undeterminable.

EARNINGS OF GEORGIA ELECTRIC RAILWAYS FOR YEAR ENDED DEC. 31, 1915

	Gross earnings	Operating expenses	Net earnings	Deficits
Albany Transit Company	$16,834	$14,656	$2,178	....
Athens Railway & Electric Company	213,742	79,777	133,964	....
Atlanta Northern Railway	122,633	95,356	27,276	....
Augusta-Aiken Railway & Electric Corporation	574,955	230,139	344,816	....
Chattanooga Railway & Light Company	17,165	12,882	4,282	....
City & Suburban Railway	22,523	19,172	3,350	....
Clarkesville Railway	1,037	1,057	.....	20
Columbus Railroad	333,992	198,778	135,214	....
Covington & Oxford Street Railway	6,991	6,207	783	....
Fairburn & Atlanta Railway & Electric Company	24,428	20,966	3,462	....
Gainesville Railway & Power Company	33,601	19,334	14,266	....
Georgia Railway & Power Company	5,708,707	2,751,483	2,957,223	....
Macon Railway & Light Company	430,869	297,225	133,644	....
Rome Railway & Light Company	179,448	108,031	71,416	....
Savannah Electric Company	794,213	462,623	331,590	....
Valdosta Street Railway	10,931	9,052	1,879	....
Waycross Street & Suburban Railway	15,057	15,817	.....	759
	$8,507,133	$4,342,562	$4,165,350	$779

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MAY RETURNS POORER THAN APRIL'S

Comparison of Electric Railway Earnings for May, 1915 and 1916, Shows Improvement in East and South, but Depression in West

A comparison of electric railway statistics for May, 1916, with figures for the corresponding month of 1915, made by the information bureau of the American Electric Railway Association, indicates an improvement in the traction business of the East and the South, together with a depression in the West. Returns for May, representing 6659.27 miles of line of companies scattered throughout the country, show an increase in operating revenues of 8.69 per cent, in operating expenses of 6.43 per cent and in net earnings of 12.14 per cent, while returns representing 5025.58 miles of line show an increase in taxes of 11.87 per cent and in operating income of 9.09 per cent. As a whole the returns make a poorer showing than a similar comparison for the previous month, though, of course, they are not strictly comparable because of the difference in the miles of line represented.

Of the three groups shown in the accompanying table, the Eastern, represented by 4047.25 miles of line, or about 60 per cent of the total mileage, shows an increase in operating revenues of 10.08 per cent, in operating expenses of 5.77 per cent and in net earnings of 16.49 per cent. Returns representing about 68 per cent of this mileage show an increase in the amount of taxes paid of 13.96 per cent, and in operating income of 14.18 per cent.

The Southern group, represented by 689.36 miles of line, shows an increase in operating revenue of 10.50 per cent, in operating expenses of 6.54 per cent and in net earnings of 16.22 per cent. Returns for 70 per cent of this mileage indicate an increase in taxes of 10.43 per cent and in operating income of 13.74 per cent.

The Western group, represented by 1922.66 miles of line or about 30 per cent of the total mileage shown, has gained 4.51 per cent in operating revenue and 8.16 per cent in operating expenses. Its loss in net earnings is 1.45 per cent. Moreover, returns for about 95 per cent of this mileage indicate an increase in the amount of taxes of 8.02 per cent and a loss in operating income of 3.52 per cent.

REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR MAY, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
*United States**	Amount	Per Cent Increase	Amount	Per Cent Increase
Operating revenues	$16,306,162	8.69	$13,082,307	7.51
Operating expenses	$9,631,314	6.43	$7,825,380	6.17
Net earnings	$6,674,848	12.14	$5,256,927	9.56
Taxes	.....	...	$899,230	11.87
Operating income	.....	...	$4,357,697	9.09
Operating ratio, per cent:				
1915	60.32	...	60.56	...
1916	59.06	...	59.81	...
Miles of line represented	6,659.27	...	5,025.58	...
*Eastern District**				
Operating revenues	$11,525,227	10.08	$8,670,744	8.85
Operating expenses	$6,624,615	5.77	$5,054,580	5.36
Net earnings	$4,900,612	16.49	$3,616,164	14.14
Taxes	.....	...	$576,701	13.96
Operating income	.....	...	$3,039,463	14.18
Operating ratio, per cent:				
1915	59.82	...	60.22	...
1916	57.47	...	58.29	...
Miles of line represented	4,047.25	...	2,748.58	...
*Southern District**				
Operating revenues	$833,379	10.50	$563,240	7.19
Operating expenses	$474,902	6.54	$306,452	2.64
Net earnings	$358,477	16.22	$256,788	13.18
Taxes	.....	...	$41,983	10.43
Operating income	.....	...	$214,805	13.74
Operating ratio, per cent:				
1915	59.10	...	56.82	...
1916	56.98	...	54.41	...
Miles of line represented	689.36	...	478.78	...
*Western District**				
Operating revenues	$3,947,556	4.51	$3,848,323	4.64
Operating expenses	$2,531,797	8.16	$2,464,348	8.36
Net earnings	$1,415,759	*d*1.45	$1,383,975	*d*1.38
Taxes	.....	...	$280,546	8.02
Operating income	.....	...	$1,103,429	*d*3.52
Operating ratio, per cent:				
1915	61.96	...	61.83	...
1916	64.13	...	64.03	...
Miles of line represented	1,922.66	...	1,798.22	...

NOTE—Letter *d* denotes a decrease.

*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River, exclusive of Greater New York. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

The operating ratio of all of the districts, except the Western, has somewhat decreased, the United States as a whole showing a falling off from 60.32 per cent in 1915 to 59.06 per cent in 1916. The operating ratio of the Western district has increased from 61.96 per cent in 1915 to 64.13 per cent in 1916.

Illinois Northern Utilities Company, Dixon, Ill.—The Illinois Public Utilities Commission recently approved the consolidation of the Illinois Northern Utilities Company, the Freeport Railway & Light Company and the Tri-County Light & Power Company under the name of the first corporation. These companies are engaged in furnishing electricity, gas, heat, and street car transportation in the northwestern portion of Illinois, and have outstanding capital stock issues that are divided as follows: Illinois Northern Utilities Company, $7,000,000; Tri-County Light & Power Company, $340,000, and Freeport Railway & Light Company, $851,300—total, $8,191,300. In addition to the bonded indebtedness, which it is not proposed to change, the constituent companies have a floating indebtedness of $560,331, which under the plan of the consolidation is to be cancelled and extinguished, without the issuance of additional bonds or other liens upon the property and without drawing on the treasury of the companies. The capital stock authorized for the consolidated company is the total of the outstanding issues for the constituent utilities.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—Attorneys for the Kanawha Traction & Electric Company have filed a mortgage, dated Aug. 1, with the court at Parkersburg to the Fidelity Trust Company and Van Lear Black, trustees, to secure $5,000,000 of bonds which will be in serial issues of such amounts as the needs of the company require. Series A will be of an amount sufficient to refund the $1,100,000 of two-year 5 per cent notes which will soon become due, and $150,000 of bonds of the Marietta Traction Company, which mature early in 1917. Provision will be made to refund the $150,000 of bonds on the street railway lines in Parkersburg, issued by the Parkersburg Gas, Electric & Railway Company. Payment for these bonds will be made either at their redemption date, in 1918, or at their maturity. Bonds will also be provided to care for the $550,000 of bonds of the Parkersburg, Marietta & Interurban Railway, maturing in 1942.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—Theodore Luce, Detroit, Mich., representing the bondholders' committee, was the purchaser of the plant of the Lake Erie, Bowling Green & Napoleon Railway, which was offered at receiver's sale on Aug. 5. The sale price was $140,000. There were no other bidders.

Lancaster & Southern Street Railway, Millersville, Pa.—Henry A. Hitner's Sons Company, Philadelphia, Pa., on Aug. 15 purchased at public auction the property of the Lancaster & Southern Street Railway, including rails, cars, etc., for $20,575. It is the intention of the buyers to dismantle the property and start work during the next thirty days, selling the rails, which are all 60 lb. to the yard, for relaying purposes, possibly for export. References to the receivership and proposed sale of this company's property were made in the ELECTRIC RAILWAY JOURNAL of March 4 and July 29.

National Properties Company, Philadelphia, Pa.—Holders of 6 per cent preferred stock of the National Properties Company have received notice that the company will exchange the 7 per cent preferred stock of the American Railways now held in the treasury for National Properties preferred, on the basis of ten shares of the latter for nine shares of the former, accrued dividends on the stock being adjusted in cash. Offer to exchange will be open until Sept. 1 to holders of record on Aug. 14.

Northern Texas Traction Company, Fort Worth, Tex.—The application of the Northern Texas Traction Company to the board of equalization has resulted in a refusal to grant a reduction in the $9,600 tax levied on the franchise valuation of the company. George H. Clifford, general manager of the company, presented the application on the ground that the franchise valuation, while equitable in former years, had become discriminatory through the operation of motor buses, which had cut deeply into the earnings of the traction company. Figures presented disclosed a reduction of more than

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$225,000 in the company's revenue for 1915, and it was asserted that the seventy jitneys now in operation in Fort Worth would cut the earnings for 1916 by at least $150,000.

Public Service Corporation of New Jersey, Newark, N. J.—A financial report just issued by the Public Service Corporation of New Jersey shows that during the month of July the gross business of the company increased $383,795 or 12.4 per cent over the corresponding month last year. The balance available—after payment of operating expenses, fixed charges, sinking fund requirements, etc.—for amortization, dividends and surplus was $438,421, and the increase in surplus available for dividends was $90,172. For the seven months ended July 31, 1916, the gross increase in total business was $2,771,097, an increase of 13.2 per cent. The balance available for amortization, dividends and surplus totaled $2,972,189, while the increase in surplus available for dividends amounted to $700,336.

Sapulpa & Interurban Railway, Sapulpa, Okla.—The Midland Valley Railroad, Franklin Bank Building, Philadelphia, Pa., operating 365 miles of steam railroad, is reported to be considering the purchase of the Sapulpa & Interurban Railway, which is to be sold at public auction soon under foreclosure. The Midland Valley Railroad is said to be planning the extension of its line from Glen Pool to a point north of Kiefer, coming into Sapulpa over the interurban tracks.

Sheboygan (Wis.) Electric Company.—Kelsey, Brewer & Company, Grand Rapids, Mich., representing the American Public Utilities Company, have purchased the Sheboygan Railway & Electric Company. The Sheboygan Electric Company, the successor corporation, will hereafter be operated as a subsidiary of the American Public Utilities Company. The Wisconsin Railroad Commission has authorized the Sheboygan Electric Company, all the common stock of which will be owned by the American Public Utilities Company, to issue $1,500,000 of first mortgage bonds, $350,000 of preferred and $200,000 of common stock to refund all outstanding securities and to provide funds for extensions and improvements. On June 30, 1916, the Sheboygan Railway & Electric Company had outstanding $605,000 of stock and $1,205,000 of bonds.

Shore Line Electric Railway, Norwich, Conn.—The Connecticut Public Utilities Commission on Aug. 18 authorized the sale of the Norwich & Westerly Traction Company, the Groton & Stonington Street Railway and the New London & East Lyme Street Railway to the Shore Line Electric Railway. The property of the Norwich & Westerly Traction Company sold for $1 600,000; that of the Groton & Stonington Street Railway for $525,000 and that of the New London & East Lyme Street Railway for $700,000. The purpose of the sale, it is said, is to enable the three merged lines to pay off their indebtedness. As a result of the transaction all the properties formerly operated from the office of the Shore Line Electric Railway will be owned and operated by it.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—A special meeting of the stockholders of the St. Joseph Railway, Light, Heat & Power Company will be held on Sept. 28 to authorize the company to issue not to exceed $15,000,000 of its first and refunding mortgage sinking-fund 5 per cent thirty-year gold bonds for the purpose of retiring $5,000,000 of its first mortgage bonds and $326,000 of first mortgage bonds on St. Joseph & Savannah Interurban Railway now outstanding, and for the further purpose of providing funds for acquiring other properties, for making betterments, extensions and improvements, and for other corporate purposes. The stockholders will also vote upon a proposition to authorize the company to join with the St. Joseph & Savannah Interurban Railway in the execution of a mortgage upon all the properties securing the payment of the principal and interest on the $15,000,000 of bonds.

Tennessee Railway, Light & Power Company, Chattanooga, Tenn.—E. W. Clark & Company, Philadelphia, Pa., are offering at 99 and interest $2,500,000 of two-year 5 per cent secured notes of the Tennessee Railway, Light & Power Company, which replace the $2,500,000 of one-year 6 per cent secured-note participating receipts due on June 22, 1916. The new notes are dated June 1, 1916, and are due on June 1, 1918, but subject to redemption at 100 and interest on any interest date upon thirty days' notice. The denomination is $1,000. These notes are the direct obligation of the company, and are secured by pledge of $2,500,000 of Tennessee Power Company first-mortgage 5 per cent gold bonds and $2,500,000 of Nashville Railway, Light & Power Company stock. Pro rata amounts of stock and bonds must be deposited with the trustee to secure such additional notes as may be issued.

DIVIDENDS DECLARED

Cities Service Company, New York, N. Y., monthly, 1½ per cent, preferred and common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

Northern Texas Electric Company, Fort Worth, Tex., 3 per cent, preferred; quarterly, 1 per cent, common.

Terre Haute Traction & Light Company, Terre Haute, Ind., 3 per cent, preferred.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE ELECTRIC RAILWAY, SANFORD, ME.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,	'16		$44,761	*$29,906	$14,855	.....	.....
1 " "	'15		44,197	*35,661	8,536	.....	.....

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

1m., June,	'16		$177,844	$106,556	$71,288	$43,205	$28,083
1 " "	'15		163,745	123,865	39,880	33,625	6,255
12 " "	'16		1,971,153	1,259,356	711,797	492,746	219,051
12 " "	'15		1,982,599	1,299,352	683,247	472,112	211,135

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

1m., June,	'16		$64,368	*$39,263	$25,105	$17,586	$7,519
1 " "	'15		60,968	*34,019	26,949	19,160	7,789
12 " "	'16		800,890	*431,849	369,041	211,409	157,632
12 " "	'15		780,504	*375,107	405,397	211,518	193,879

BATON ROUGE ELECTRIC COMPANY, BATON ROUGE, LA.

1m., June,	'16		$17,551	*$8,303	$9,248	$3,492	$5,756
1 " "	'15		15,409	*8,967	6,442	2,168	4,274
12 " "	'16		203,811	*105,018	98,793	34,933	63,860
12 " "	'15		180,954	*110,822	70,132	25,227	44,905

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., June,	'16		$10,733	*$9,388	$1,345	$1,104	$241
1 " "	'15		10,420	*7,960	2,460	1,123	1,337
12 " "	'16		118,880	*101,051	17,829	13,320	4,509
12 " "	'15		118,966	*98,844	20,122	13,463	6,659

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., June,	'16		$30,946	*$19,045	$11,901	$6,552	$5,349
1 " "	'15		27,832	*17,856	9,976	6,595	3,381
12 " "	'16		381,701	*223,402	158,299	78,611	77,688
12 " "	'15		338,169	*208,227	129,942	78,608	51,334

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., July,	'16		$672,190	$20,033	$652,157	$10,470	$641,687
1 " "	'15		297,625	14,370	283,255	40,834	242,421
12 " "	'16		6,833,862	209,504	6,624,358	461,115	6,163,243
12 " "	'15		4,003,721	153,578	3,850,143	490,000	3,360,143

COLUMBUS (GA.) ELECTRIC COMPANY

1m., June,	'16		$67,952	*$27,808	$40,144	$28,649	$11,495
1 " "	'15		56,285	*27,079	29,206	28,678	528
12 " "	'16		782,754	*332,320	450,434	344,143	106,291
12 " "	'15		696,498	*318,141	378,357	346,031	32,326

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., June,	'16		$242,379	*$147,443	$94,936	$66,736	$28,200
1 " "	'15		218,658	*123,237	95,421	71,027	24,394
12 " "	'16		2,759,843	*1,634,506	1,125,337	789,862	335,475
12 " "	'15		2,551,263	*1,444,742	1,106,521	777,210	329,311

DALLAS (TEX.) ELECTRIC COMPANY

1m., June,	'16		$146,620	*$98,196	$48,424	$36,470	‡$13,954
1 " "	'15		133,276	*87,913	45,363	33,395	11,968
12 " "	'16		1,901,135	*1,177,150	723,985	424,032	‡313,153
12 " "	'15		1,968,303	*1,145,474	822,829	401,072	421,757

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., June,	'16		$68,127	*$37,077	$31,050	$8,864	$22,186
1 " "	'15		58,584	*31,325	27,259	8,714	18,545
12 " "	'16		790,638	*413,726	376,912	106,073	270,839
12 " "	'15		672,517	*385,290	287,227	104,567	182,660

EL PASO (TEX.) ELECTRIC COMPANY

1m., June,	'16		$83,157	*$43,454	$39,703	$4,760	$34,943
1 " "	'15		72,931	*40,496	32,435	4,194	28,241
12 " "	'16		1,046,570	*537,643	508,927	53,478	455,449
12 " "	'15		997,414	*540,820	456,594	50,329	406,265

*Includes taxes. †Deficit. ‡Includes non-operating income.

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Traffic and Transportation

COMPANY ASKS JITNEY REGULATION

Puget Sound Traction, Light & Power Company Circulates Petitions to Be Presented to City Council of Seattle

The Puget Sound Traction, Light & Power Company, Seattle, Wash., recently began to publish in the regular advertising space of the daily newspapers a form of petition to the City Council of Seattle, asking for the regulation of jitney transportation in that city. Printed forms of the same petition were distributed by many individual citizens, improvement clubs and other organizations. A great many of these petitions have been signed and forwarded to the offices of the company, and will be duly presented to the City Council.

The petition, which was addressed to the City Council, read as follows:

"The undersigned, a resident of Seattle, believes that reliable and adequate transportation is essential to the welfare and growth of the community. To insure such transportation service requires organization, systematic operation and proper public regulation.

"We have one system of transportation operating under public regulation as to routes, frequency of service and rate of fare. Another form of transportation, the so-called jitney buses, is being operated through the streets without such regulation. It is my belief that such vehicles should be placed under the control of the city as to routes, frequency of service and rate of fare, and that the operators of such buses should be held to the same strict observance of regulations in these particulars as is the case with street car companies.

"I respectfully urge that the following requirement be included in such regulation as the city may see fit to enact: All jitney buses must operate continuously over fixed routes, between fixed termini, between 6 a. m. and 12 o'clock midnight, at a regular rate of fare."

In *The Electrogram* of Aug. 17 the company explained to the public that it was only a part of its civic duty and plain honesty in its public dealings for it to come out frankly on the subject of jitneys, 260 of which are now operating in Seattle. Prior to the demand of the company for jitney regulation, efforts had been undertaken by the improvement clubs from many sections of the city. The part taken by the company helped to give more general expression to the widespread opinion of the members of these clubs and other Seattle citizens who think that the transportation facilities of the city should be orderly, dependable, responsible and properly regulated by the city.

The company emphasized the fact that its suggestion for jitney regulation was very simple, asking only for the jitneys to be required to give real service to the public if they are allowed to use the streets for profit. No question of taxes, payment for improvements, etc., was raised.

SEATTLE LOW-FARE MOVES FUTILE

In a recent communication to the City Council, Assistant Corporation Counsel Walter F. Meier stated that a new application to the Public Service Commission for an order to compel the Puget Sound Traction, Light & Power Company to sell six tickets for a quarter would be necessary in order to get a final determination of the question. He further advised the Council that the reason why the Superior Court had refused to permit the enforcement of the commission's previous order to sell the tickets, was that no valuation of the company's properties had been made. Until such valuation was made, the court declared, it would be unable to determine whether the forced reduction of the company's gross revenues by reason of the sale of tickets would be just and equitable. An appeal to the Supreme Court from this decision of the Superior Court was begun but not perfected. For this reason, Mr. Meier held, a new application would be necessary to get the matter before the courts. In concluding his statement to the council, Mr. Meier said: "There is not now pending in the courts any proceedings that would offer the city an opportunity to determine whether or not an order such as that made by the Public Service Commission would be sustained by the Supreme Court."

An effort to compel the sale of 4-cent tickets without transfer privileges on street cars was begun in October, 1911, when the City Council, over the Mayor's veto, passed an ordinance to compel such sale. Judge Rudkin of the Federal Court granted a temporary injunction upon the application of the company, and made it permanent Aug. 15, 1913. He held that the Public Service Commission law superseded the city's power in the matter. No appeal from this opinion was ever taken by the city. On Sept. 15, 1913, the Council asked the legal department of the city to make application to the Public Service Commission to obtain the sale of tickets. An order was made, but on Jan. 23, 1914, the superior court, upon application of the company, held it void. It was shown that $5,000 a month reduction in earnings had been suffered by the company during the time it obeyed the city's ordinance. The court decided the city could not alter the franchise granted the company. The Public Service Commission and city both gave notice of appeal from the court's decision, but no appeal was perfected. An attempt to obtain a stipulation from the company's attorneys permitting the perfecting of such an appeal also failed.

Company Aids Highway Development.—In order to facilitate work on the improvements of the highways south of Tacoma, Wash., the Tacoma Railway & Power Company recently reduced the freight charge on sand and gravel from 50 cents to 20 cents. The new rate became effective on Aug. 14.

Street-Traffic Rules to Be Enforced.—Following a harrowing collision in New Albany, Ind., between an automobile and a hearse, the city administration has determined on a policy of strict enforcement of the city traffic regulations. One patrolman has been detailed by the police department as city traffic officer, and will devote his attention to keeping the street-railway lines clear and the other traffic operating in accordance with the rules.

Jitneys in Tulsa to Be Consolidated.—After two years of unsatisfactory service and indifferent success, the various jitney lines in Tulsa, Okla., are to be consolidated. A thorough system will be maintained covering every part of the city, and transfers will be given from one line to another. As an inducement to grant a franchise including all streets not covered by traction lines, the city will receive a certain per cent of the gross earnings secured from the operation of the combined lines.

Washington Jitney Act Upheld.—The Supreme Court of Washington recently upheld the act of the 1915 Legislature providing for the bonding of jitneys, by affirming the decision of the lower court of Spokane County in the case of E. Bankson against Joseph Laflam, a jitney driver, and his bonding company, the Pacific Coast Casualty Company. The Superior Court had awarded the plaintiff the full amount of the bond, $2,500, for the injuries he had sustained while riding in the Laflam jitney.

Birmingham Line Asks Increase in Freight Rates.—Hugh Morrow, attorney Birmingham Railway, Light & Power Company, Birmingham, Ala., recently told the Alabama Public Service Commission that the company had been operating its freight department at a loss, and that its petition for permission to establish a minimum charge of 25 cents for the transportation of packages between points in Birmingham was intended only to place the street railway on a parity with steam railroads and express companies. The minimum charge of the street railway has been 15 cents.

Jitney Permits in Los Angeles.—The Police Commission of Los Angeles on Aug. 15 granted a permit to the Motor Bus Union to operate a line of buses between Los Angeles and Hollywood, a distance of more than 8 miles. Fifteen vehicles, each carrying more than ten persons, were put in commission on the new line. It was announced by the jitney

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bus interests that these cars would tentatively be operated on a five-minute schedule. The Police Commission also adopted a resolution urging the City Council to pass as soon as possible an ordinance transferring jurisdiction over motor buses from the police body to the Board of Public Utilities of the city.

Bus Line Operation Said to Be Satisfactory.—The success of the auto bus line operated by the Joliet & Eastern Traction Company between Chicago Heights, Ill., and Hammond, Ind., is said to be entirely satisfactory. This line was established to take care of Joliet and Gary patronage. With only two buses making six round trips daily, 4615 passengers were carried in July, an average of almost 149 daily. The gross receipts from this branch of the service were $836. During July of this year there were 700 more tickets sold in Joliet for Chicago Heights than in July, 1915, and the bus line is given the credit for most of the increase.

United Railroads Files Amended Traffic Complaint.—The United Railroads of San Francisco, in an amended complaint filed on Aug. 17 in the United States District Court, predicts chaotic traffic conditions on Market Street if the city is permitted to parallel the tracks of the private company from Twin Peaks Tunnel to Third and Market Streets. During the rush hours at the present time, it is pointed out, as a result of the number of cars operated per hour by the United Railroads and the municipal line, the streets are almost impassable from Geary Street to the ferry. Cars are strung along in a slow-moving, almost impenetrable line, and the jitneys and regular automobile traffic add to the jam. This complaint was used in the argument which opened on Aug. 22 before Judge Van Fleet upon the application of the United Railroads for a permanent injunction preventing the city from constructing parallel tracks on Market Street.

Jitneys Still Running on Market Street.—A demurrer by the city of San Francisco to the petition for a permanent injunction by the Jitney Bus Association to prevent the enforcement of the recently enacted jitney ordinance was argued before Judge Crothers on Aug. 19 and taken under submission. The judge announced he would render a decision the following week. Meantime a temporary injunction remains in force, and the jitneys continue to operate on Market Street at all hours of the day. Attorney Daniel A. Ryan, representing the jitney drivers, in support of his motion for a permanent injunction contended that the ordinance was in the nature of a franchise. This being the case, he argued, the ordinance cannot be enforced for sixty days. Alexander O'Grady, assistant district attorney, declared the ordinance is supplemental and restrictive of the ordinance already in effect, and therefore is not a franchise. As noted in the ELECTRIC RAILWAY JOURNAL of Aug. 19, Mayor Rolph on Aug. 4 signed an ordinance prohibiting the use of Market Street, between Sixth and Fremont Streets, by jitneys between 10.30 a. m. and 4 p. m.

Safety Council Organized in Kansas City.—The Kansas City Railways was largely instrumental in the organization in Kansas City, Mo., on Aug. 22, of a local council of the National Safety Council. The welfare department of the company, through E. B. Atchley and Julien H. Harvey, held several conferences with John Woodhead, chairman of the division of public and industrial safety of the Federation to Protect Life and Property, and W. T. Grant, chairman of the civic committee of the Commercial Club. The result of these conferences was a meeting on Aug. 22, at which eleven of the seventeen local members of the National Safety Council were represented. E. G. Trimble, a member of the executive committee of the National Safety Council, acted as temporary chairman, and B. S. Brown, secretary of the Federation to Protect Life and Property, as temporary secretary. Mr. Harvey was elected pesident, his nomination being the occasion for many appreciative remarks on the safety work of the railway company. The other officers are all representatives of manufacturers who have shown an active interest in their membership in the National Safety Council. Besides Mr. Harvey and Mr. Atchley, G. J. Smith, superintendent of rolling stock and shops, and R. D. Allison, chief clerk to A. E. Harvey, superintendent of way and structures, were among the men who attended the organization meeting of the local council.

Personal Mention

L. D. Gray has been appointed superintendent of the Freeport Railway & Light Company, Freeport, Ill., to succeed F. E. Kruesi.

Ralph Pierce has succeeded Charles E. Caster as electrical engineer of the Burlington Railway & Light Company, Burlington, Iowa.

William Peoples has succeeded P. McDonough as master mechanic of the Norwood, Canton & Sharon Street Railway, Canton, Mass.

William Perrine has been appointed superintendent of the Central Illinois Public Service Company, Anna, Ill., to succeed Harry Grooms.

J. A. Basnier has been appointed master mechanic of the Chicago, Aurora & De Kalb Railroad, Aurora, Ill., to succeed William E. Jones.

W. C. Miller has been appointed general manager and purchasing agent of the Fox & Illinois Union Railway, Yorkville, Ill., to succeed F. M. Zimmerman.

R. W. Lamar has succeeded T. A. Elder as vice-president of the Central Indiana Lighting Company, Columbus, Ind., a subsidiary of the Middle West Utilities Company.

H. K. Relf, claim agent Spokane, Portland & Seattle Railway, Portland, Ore., who was elected president of the Pacific Claims Agents' Association at the meeting in Tacoma on Aug. 9, 10 and 11, was born at Superior, Wis., in 1871. He entered railway service in 1887, and after a varied experience both in railroad work and in outside business he became in 1898 district claim agent of the Northern Pacific Railroad at St. Paul. He left this position in 1903 to become clerk to the general superintendent of the coast lines of the Atchison, Topeka & Santa Fé Railroad at Los Angeles, Cal. In 1905 he returned to claim-agent work with the Northern Pacific Railway, at Tacoma, and stayed in this position until 1909, when he became claim agent of the Spokane, Portland & Seattle Railway at Portland. In 1910 he also became claim agent of the Oregon Electric Railway, which is controlled by the Spokane, Portland & Seattle Railway, and in 1911 claim agent of the Spokane & Inland Empire Railroad.

William McClellan, consulting engineer, New York, N. Y., has been appointed dean of the Wharton School of Finance and Commerce of the University of Pennsylvania. Mr. McClellan, who was born in Philadelphia, was graduated from the Arts Department of the University of Pennsylvania in 1900. In 1903 he obtained the degree of doctor of philosophy, and in 1914 the university presented to him the degree of electrical engineer. For a time after 1903 he was an engineer in charge of construction for the Philadelphia Rapid Transit Company. In 1905 he became a supervising engineer with Westinghouse, Church, Kerr & Company, New York. In 1907 his present association with H. T. Campion of Philadelphia in the engineering business commenced. In 1911 he was appointed electrical engineer and chief of the division of light, heat and power of the Public Service Commission for the Second District of New York, resigning this position in 1913. Mr. McClellan is vice-president of the American Institute of Electrical Engineers and one of the two representatives of this institute on the joint conference committee of engineering societies. He is also president of the joint Pan-American engineering committee. He has always been interested in steam railroad electrification and was for a number of years chairman of the electrification committee of the New York Railroad Club.

OBITUARY

George Lakey Lord, for the last ten years sales manager of the railway department of the West Disinfecting Company, died of heart disease on Aug. 17. He was sixty-nine years of age. Prior to his work with the West Disinfecting Company, he was connected with newspapers in the Middle West.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

West Coast Electric Railway, Sarasota, Fla.—Application for a charter has been made by this company to construct a line from Tampa to Venice, via Palmetto, Bradentown, Sarasota and Bee Ridge. Capital stock nominal, but may be increased to $1,000,000 with an equal amount of bonds. Officers: P. D. Lacey, president and treasurer; T. Z. B. Everton, vice-president and secretary, and A. E. Townsend, general manager. [July 22, '16.]

Lakeland, Bartow & Winter Haven Interurban Railroad, Winter Haven, Fla.—Chartered to construct a line from Lakeland to Bartow and Winter Haven, twenty-five miles. Capital stock, $750,000. J. L. Wilson, Altoona, Pa., president. [July 8, '16.]

***Toxaway-Western Railway, Toxaway, N. C.**—Incorporated to construct a line from Toxaway to Sapphire. Capital stock, $75,000. Directors: James Moltz and E. S. Moltz, Williamsport, Pa., and J. S. Adams, J. G. Adams and H. C. Jarvis, Asheville, N. C.

FRANCHISES

Peoria, Ill.—The Peoria & Chillicothe Interurban Company has petitioned the Council of Peoria to enter the city over the tracks of the Peoria Railway. [March 25, '16.]

Lawrence, Kan.—The Kansas City, Kaw Valley & Western Railway has received a thirty-year franchise from the City Commissioners of Lawrence.

Cumberland, Md.—The Cumberland Electric Railway has asked the Council for a franchise to construct an extension on Green Street from Brooke Avenue westward to the city limits.

Blackwell, Okla.—An election will be held in Blackwell on Sept. 12 on the proposal to grant a franchise to the Oklahoma Railway.

Roanoke, Va.—The Roanoke Railway & Electric Company has received a franchise from the Council of Roanoke to construct an extension in the southeastern part of the city.

TRACK AND ROADWAY

***Broomfield, Ark.**—Plans are being made for the construction of an electric railway between Lamar and Broomfield. M. L. Powers, Broomfield, is interested.

Northern Electric Railway, Chico, Cal.—Plans are being considered by this company for the extension of its tracks out J Street to Twelfth Street, Marysville, connecting their line with the Yuba construction shops.

Tidewater Southern Railway, Stockton, Cal.—It is reported that the proposed branch of the Tidewater Southern Railway from Hatch Junction to Irwin will be completed by Jan. 1.

Central Florida Interurban Railway, St. Cloud, Fla.—It is reported that this company expects to begin construction of its proposed line from Hopkins to St. Cloud about Sept. 1. Wylie & Reynolds, St. Cloud, engineers. [July 29, '16.]

West Coast Electric Railway, Sarasota, Fla.—It is reported that construction on this company's proposed line from Tampa to Venice, via Palmetto, Bradentown, Sarasota and Bee Ridge, will be begun about Sept. 1. A. E. Townsend, Sarasota, general manager. [July 22, '16.]

Tampa (Fla.) Electric Company.—Preliminary to the paving of Michigan Avenue from Twenty-second Street to Campabella Avenue and of Campabella Avenue north to the city limits, the Tampa Electric Company is reconstructing the track, using a heavier rail.

***Bloomington, Ill.**—A new interurban line to connect Bloomington and Chicago is being proposed. L. E. Fischer, formerly general superintendent of the Illinois Traction System, is interested.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—This company has a force of men tearing up the track on North Center Street, Bloomington, preparatory to the laying of new rails and ties.

Peoria (Ill.) Railway.—This company has begun a survey, preparatory to asking for a franchise to extend its East Peoria line from Main Street to Bloomington Street and to build an extension on Cole Street, 1½ miles. The tracks on East Washington Street, East Peoria, will be moved to the center of the street, following the widening of the street, which is now in progress. The main line from Peoria to East Peoria will be double-tracked, although the proposed extension to Bloomington Street will be single track.

Urbana & Champaign Railway, Gas & Electric Company, Urbana, Ill.—This company is relaying its track on Main Street, Champaign, Ill.

Arkansas Valley Interurban Railway, Wichita, Kan.—This company is considering the construction of an extension northward from Newton to Gossel.

Owensboro (Ky.) Traction Company.—This company has completed the survey for the extension of the Breckenridge Street line to the Elmwood Cemetery and construction will begin shortly. Construction of the Rose Hill Cemetery extension is under way.

***Williamsport, Md.**—It is reported that surveys are being made for an electric railway from the Potomac River, near Williamsport, Md., to Millville and Harpers Ferry, W. Va., and Leesburg, Va. Martin & Seibert, attorneys-at-law, Martinsburg, W. Va., may give information.

Vicksburg Light & Traction Company, Vicksburg, Miss.—This company will construct new tracks on Farmer and South Washington Streets.

Great Falls (Mont.) Street Railway.—It is reported that during September this company will connect its lines on Central Avenue and First Avenue North, through Fourth Street, eliminating handling the South Side line by operating the cars down Central Avenue to Park Drive.

Missoula (Mont.) Street Railway.—According to reports, the Missoula Street Railway will begin work immediately on the extension of its lines to the factory of the Great Western Sugar Company. The cost of the extension is estimated at $25,000.

Salem & Pennsgrove Traction Company, Salem, N. J.—Operation has been begun on the first section of this company's line from the ferry landing at Pennsgrove, N. J., past the Du Pont Works and on toward Pennsville. The line when completed will extend from Pennsgrove to Salem. [March 11, '16.]

New York Consolidated Railway, Brooklyn, N. Y.—Bids will be received by the Public Service Commission for the First District of New York until Aug. 30 for the supply of special work (order No. 9), frogs and switches for use in the construction of the Culver line in Brooklyn.

Northern Ohio Traction & Light Company, Akron, Ohio.—At a special meeting on Aug. 15, stockholders authorized the issue of $14,075,000 first lien and refunding bonds, of which $4,000,000 will be used for immediate improvements. Plans for improvements include the double-tracking from East Akron to Springfield Lake.

Youngstown & Niles Railway, Youngstown, Ohio.—Surveys have been completed and right-of-way obtained by this company for its proposed line from Steelton to Niles, via McDonald. Double-track will be laid and automatic block signals installed. All rails have been ordered. [May 20, '16.]

Sapulpa & Interurban Railway, Sapulpa, Okla.—The Midland Valley Railroad, Franklin Bank Building, Philadelphia, Pa., operating 365 miles of steam railroad, is reported to be considering the purchase of the Sapulpa & Interurban Railway, which is to be sold at public auction soon under foreclosure. The Midland Valley Railroad is said to be plan-

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ning the extension of its line from Glenn Pool to a point north of Kiefer, coming into Sapulpa over the interurban tracks.

London & Port Stanley Railway, London, Ont.—The improvements planned by this company are still in the hands of the engineers, who are figuring the cost of building the 30 miles of new track which will double-track the road from London to Port Stanley, the number of cars needed and other details, with a view of submitting a by-law to the people of London next January. If the plans are approved the new cars will be similar to the all-steel double-truck cars now in use.

Johnstown (Pa.) Traction Company.—This company contemplates the construction of an extension to Seward, about 7 miles.

Dallas, Tex.—Notwithstanding the concessions made by the traction interests in Dallas, Tex., the deadlock in regard to a new franchise still continues. J. F. Strickland and C. W. Hobson, heads of the interests that hold options on the Stone & Webster interests in Dallas, have issued a statement to the public, given in greater detail on page 370, in which the position of the utilities is fully explained. The proposals of the traction interests include the expenditure of not less than $2,000,000 in railway extensions and improvements and lighting equipment within eighteen months from the time a new franchise goes into effect, and the expenditure of $5,000,000 in and around Dallas within three years, including the construction of at least one interurban line into Dallas. In regard to the latter point the offer is that two interurban railways having a mileage of not less than 30 miles each will be built out of Dallas, the construction of the one to begin within six months after the franchise became operative, and that of the second to begin within six months after the gross receipts per mile of track within Dallas reach the mark set in 1913, the year preceding the European war, it being estimated that this condition will exist at the time the first interurban line is completed. It is further stated that each interurban line would be completed within eighteen months from the date of commencing the work. At the present time an agreement has been reached on practically all points involved in the Dallas case except the matter of valuation. The city officials are holding out for a valuation of $7,100,000, while the traction officials remain steadfast in their determination to fix a valuation of $8,500,000.

Texas Electric Railway, Dallas, Tex.—The Texas Electric Railway, the consolidated Strickland lines, plans a number of extensions as soon as the consolidation, as recently arranged, is perfected. One of the first lines to be built will be that from Cleburne to Hillsboro. Another extension will be southward from Waco to Temple, Austin, Houston and Galveston. In connection with this extension it is reported that negotiations are under way for the purchase of the Trinity & Brazos Valley Railway, extending from Cleburne via Hillsboro, Teague, Jewett, Houston, to Galveston. The Trinity & Brazos Valley Railway will be electrified and connection will be made with the present interurban line from Fort Worth to Cleburne, thus giving an electric line from Fort Worth to the Gulf.

Houston (Tex.) Electric Company.—This company is reconstructing its track along the Houston Heights Boulevard from Thirteenth Street to Nineteenth Street, using an 80-lb. T-rail in place of the lighter rail formerly in use.

Marlin-Temple Interurban Company, Marlin, Tex.—Officers of this company have closed a contract with S. D. Hanna, Marlin, as chief engineer of the line, and work of running final surveys, elevations, profiles and securing right-of-way will be rushed to completion. It is said that actual construction work will begin in a short time and the line will be in operation by Jan. 1. [July 29, '16.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—It is reported that the Plain City branch of the Ogden, Logan & Idaho Railway will be electrified in the near future. It is also stated that the line will be extended about 2½ miles west of Plain City into the sugar beet fields of Warren.

Petersburg & Appomattox Railway, Petersburg, Va.—This company, which operates a line between Petersburg and Hopewell, reports that it contemplates the construction of an extension to City Point, about 2½ miles.

Seattle & Rainier Valley Railway, Seattle, Wash.—This company which, according to reports, will succeed the Seattle, Renton & Southern Railway Company, will take immediate steps to re-establish the old line on Dearborn Street, Seattle, abandoned about six years ago, when Dearborn Street and intersecting thoroughfares in that district were regraded. The new construction proposed will consist of tracks on Dearborn Street from Fifth Avenue South to Rainier Avenue, and on Fifth Avenue South from King Street to Dearborn Street. By this construction the company will avoid the Weller Street grade. It is claimed by officials of the company that its power bill will thereby be reduced $1,700 per month. The Seattle & Rainier Valley Railway is incorporated under the laws of the State of Delaware, with Marshall Sampsell, Chicago, as president, and Walter M. Brown, Chicago, general manager.

Charleston (W. Va.) Interurban Railroad.—This company will construct an extension of the Cabin Creek Junction line to Montgomery, 10 miles, and also to a string of coal mines south of the Junction.

SHOPS AND BUILDINGS

Pacific Gas & Electric Company, Oakland, Cal.—This company will construct an office building at Sixteenth and Clay Streets, Oakland, at a cost of $200,000, for the use of the company's Oakland departments.

Joliet & Eastern Traction Company, Joliet, Ill.—This company has made extensive improvements at the station which it recently leased from the Elgin, Joliet & Eastern Railroad to provide for the better handling of freight.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.—This company will construct a new passenger and freight terminal at Fourth Street and Court Avenue, Des Moines.

United Traction Company of Pittsburgh, Pittsburgh, Pa.—This company's one-story carhouse at Braddock Avenue and Thirteenth Street, Braddock, has been sold for $8,500 to George Matta, Braddock.

Port Arthur (Tex.) Traction Company.—This company has purchased a half block of property near the center of the city and will construct carhouses and offices.

POWER HOUSES AND SUBSTATIONS

Urbana & Champaign Railway, Gas & Electric Company, Champaign, Ill.—The installation of two large boilers, each capable of generating 500 hp., will form part of the important changes which are being conducted at the power plant of this company. Ten carloads of machinery have arrived for this work. A 1500-kw. turbo-generator will be installed after Sept. 1 and two more boilers, each having a capacity of 500 hp., will be installed within the next few weeks.

Bay State Street Railway, Boston, Mass.—Plans have been filed with the Quincy department of building inspection by the Bay State Street Railway for the structure that will enlarge the company's power plant at Quincy Point to twice its present size. It will be constructed of brick and stone, at an estimated cost of $70,000.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—This company will install a 5000-kw. General Electric turbine in its powerhouse before winter.

New York Municipal Railway Corporation, Brooklyn, N. Y.—Bids will be received by the Public Service Commission for the First District of New York until Sept. 13 for the construction of station finish for stations at Twenty-third Street, at Twenty-eighth Street and at Canal Street on the Broadway subway.

Northern Ohio Traction & Light Company, Akron, Ohio.—Among the improvements planned by this company is the construction of a new substation at Canton.

Ohio Electric Railway, Cincinnati, Ohio.—This company is arranging to install new apparatus in its powerhouse at Lima that will entail an expense of about $75,000.

Mansfield Railway, Light & Power Company, Mansfield, Ohio.—Ground has been broken for the new power station of the Mansfield Railway, Light & Power Company. The initial installation will provide for a generating capacity of 7000 kw. and transmission lines will be erected to Mansfield and Ashland.

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Manufactures and Supplies

TRACK SPECIAL WORK BUYING ACTIVE

Large Amount of Reconstruction and Maintenance Work Being Done in Middle West

Seventy-five to 100 per cent more special track work material has been purchased by electric railways for installation this year than was purchased last year. This estimate is based on statements from the sales departments of several manufacturers. One company reports that its 1916 orders from electric railways total twice those for 1915.

Most of the special track work material, of course, is for city properties, and maintenance and reconstruction work rather than extensions have required the new material. In several cities of the Central States comparatively large programs are being carried out. Des Moines is reconstructing practically all the track in its entire business district, Kansas City has done a large amount of reconstruction work, Indianapolis has been rearranging its tracks to permit rerouteing traffic in the retail store districts, Minneapolis, St. Paul, Detroit and Davenport are making extensions, St. Louis has been doing reconstruction work, and in Chicago the track department has more than 2000 men at work on construction and maintenance work.

On most properties track work progress has been hampered by lack of men at any wage near that ordinarily paid. One company which has been paying $2.25 per day for labor has had to compete for men with other local utilities that have been paying as high as $3 for day labor. Such conditions of course mean instability of forces and difficulty in carrying out any definite construction program.

The girder rail situation, with no large quantities, unless previously ordered, available until after next July, has put a damper on track work construction progress. Consequently the amount of special track work ordered, even though large as compared with 1915, is nowhere near as large as might have been expected had rail deliveries and labor conditions been better.

While special track work deliveries are quoted generally for ten to twelve weeks the manufacturers state that some rush orders can be accepted. This of course means that a road in the northern states can order special track work now and receive it in time for installation before winter closes the construction season.

Contracts for their 1917 rail and special track work requirements have been made by a number of electric railways. Some steam roads, it is stated, that have contracts for 1917 rail deliveries have tried to have these deliveries anticipated but have been unsuccessful, the rail makers replying with statements of their embarrassment in fulfilling orders for 1916 delivery. The southern steam railroads lately have made comparatively large purchases of special track work for 1917 delivery.

Manufacturers are urging electric railways to buy now because they cannot see any possibility of being able to quote lower prices within a year. High prices, of course, are accounted for by war demands for steel, high labor costs and high costs of raw material. Roughly, the costs of labor and material for special track work manufacture are one-third higher than they were a year ago. Stories are related of how green men in the special track work plants have been broken in to do certain rough work and then after five or six weeks' work these men have left to go into plants manufacturing shrapnel. Here they get $5 to $6 a day as machinists. Thus while the price of labor is higher than ever before, the work performed per man is even of less value than it was before the present wage scale went into effect.

Another reason for the increased selling price of special track work is the great increase in the price of manganese ore. Its price formerly was around $40 per ton, and during the war period this price has touched $400 per ton. The price is now about $200 per ton. Manganese steel finished products, such as small special work castings, are now quoted at about $400 per ton.

LUMBER PRICES FOR 1915-1916

"Lumber prices have gone up somewhat in 1916 as compared with prices in 1915, but the increase is far below the percentage of increase in the cost of almost any other article in the world of commerce," declares R. S. Kellogg, secretary of the National Lumber Manufacturers' Association. Here is the average f.o.b. mill value per 1000 ft. of the principal kinds of lumber:

Softwoods	Average values per M 1915	1916	Hardwoods	Average values per M 1915	1916
Yellow pine	$12.50	$15.02	Oak	$19.00	$21.76
Douglas fir	10.50	14.20	Maple	15.00	15.53
White pine	18.00	18.32	Chestnut	16.00	17.49
Western pine	14.50	14.01	Birch	16.50	17.24
Cypress	20.00	21.94	Basswood	19.00	18.66
Redwood	13.50	16.64	Hickory	23.50	30.42
Cedar	15.50	18.12	Elm	17.00	18.08
White fir	11.00	12.91	Ash	22.50	24.35

TO STUDY INDUSTRIAL SITUATION IN FRANCE

Industrial Commission Investigation to Determine How to Meet Conditions After War

The American Industrial Commission, formed under the auspices of the American Manufacturers' Export Association and composed of fifteen representatives of various prominent commercial industries of the United States, sailed to-day for France aboard the steamship Lafayette. This commission has the official sanction of France and the United States in its mission, which is to make a scientific study of industrial conditions in France and to determine the most advantageous method whereby resources in this country may be made to cooperate in the rehabilitation that will follow the war.

The project was suggested by the French Trade Commission which visited this country during the winter of 1915-16. Literature dealing with the visit of the commission has already been circulated throughout France.

William Wallace Nichols, assistant chairman of the Allis-Chalmers Manufacturing Company, Inc., is chairman of the commission. Mr. Nichols said that the commission is made up of exporters, importers, factory architects, engineers and others, all members of the various branches of commercial industry. The idea of the commission has been fostered by the American Manufacturers' Export Association, he said, following the suggestions of the French industrial commissioners while here.

A list of members of the commission follows:

William Wallace Nichols, chairman, assistant chairman Allis-Chalmers Manufacturing Company, Inc., 50 Church Street, New York; E. V. Douglass, general secretary, secretary American Manufacturers' Export Association, New York; A. B. Farquhar, president A. B. Farquhar Company, Ltd., York, Pa.; James E. Sague, formerly vice-president American Locomotive Company, New York, and Public Service Commissioner, Poughkeepsie, N. Y.; F. J. Le Maistre, E. I. du Pont de Nemours & Co., Wilmington, Del.; Curt G. Pfeiffer, vice-president George Borgfeldt & Co., New York; John R. MacArthur, MacArthur Brothers, New York; Dr. C. O. Mailloux, consulting engineer, New York; E. A. Warren, vice-president University Winding Company, Boston, Mass.; Samuel W. Fairchild, vice-president Fairchild Bros. & Foster, New York; Noble Foster Hoggson, president Hoggson Brothers, Inc., New York; J. G. Butler, Jr., director Commercial National Bank, Youngstown, Ohio, and vice-president Brier Hill Steel Company; E. E. Russell, J. I. Case Threshing Machine Company, Racine, Wis.; A. Swasey, president Warner & Swasey, Cleveland, Ohio, and George Burdett Ford, of George B. Post & Sons, New York.

The American Manufacturers' Export Association, which is mainly responsible for the forming of the American Industrial Commission to France, was incorporated in 1911 and includes 500 of the leading American organizations engaged in manufacturing every class of products in the United States.

The association is co-operative in character and exists to promote and foster commercial relations between American manufacturers and foreign nations. Regarding the commission the association says:

"When the French Trade Commission was in America, during the winter of 1915-16, it was suggested that a similar commission might be organized to make a reciprocal visit to France.

"As the feasibility of the project was studied its impor-

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tance became increasingly manifest, and despite serious obstacles imposed by unprecedented conditions resulting from the heavy burdens incident to the European war, with all their enormous responsibilities, the American Manufacturers Export Association has finally succeeded in organizing such a commission of men well known in their respective lines of industry and eminently able to render the great service expected of them."

MARKETS FOR AMERICAN MATERIAL IN FAR EASTERN COUNTRIES

Bureau of Foreign and Domestic Commerce to Investigate Markets for American Electrical Goods and Railway Equipment and Supplies

Continued interest in markets of the Far East, Australia and South Africa has led the Bureau of Foreign and Domestic Commerce, Department of Commerce, to undertake an investigation of the field for American railway equipment and supplies in that section of the world. Frank Rhea, of the division of valuations of the Interstate Commerce Commission, has been appointed special agent to make the investigation and is already engaged in making arrangements for conferences with manufacturers, contractors and selling agents, which will be held during a preliminary trip to the principal manufacturing centers in this country. This preliminary trip will be made in September.

When Mr. Rhea has learned what information the manufacturers in this country want concerning railway conditions across the Pacific, he will go abroad and make careful study on the ground of the conditions as they affect railway construction, equipment, traffic, the probable extension or reconstruction of railways, tramways, etc. While all specific opportunities for securing orders will be promptly reported, the real purpose of the investigation is to gather together the fundamental facts and conditions that will enable the American manufacturer to consider intelligently the different fields and to determine whether or not it is to his advantage to begin an active campaign there to create new markets for his goods.

Manufacturers and others who wish to get in touch with Mr. Rhea before he leaves this country should address the division of commercial agents, Bureau of Foreign and Domestic Commerce, Custom House, New York. This is the new office opened in New York by the bureau to keep in closer touch with business houses interested in foreign trade.

There was a time when American electrical goods met with considerable competition in the Far East, but the war has greatly handicapped the principal European competitors and American manufacturers are making a serious effort to take advantage of the situation and get possession of the market. In order to accomplish a great deal of preliminary study that is still needed, the Bureau of Foreign and Domestic Commerce, Department of Commerce, has selected R. A. Lundquist, consulting engineer of Minneapolis, to study the market for electrical goods in China, India, Australia, South Africa and a number of other countries in the Far East.

Special Agent Lundquist's part in the campaign will be to ascertain the type, qualities and cost of electrical apparatus with which American goods come into competition, as well as to look into the general opportunities for the sale of certain goods. Before leaving on the trip Mr. Lundquist will spend some weeks in the principal business and manufacturing centers conferring with manufacturers, exporters and business houses generally on the scope of the investigation.

Mr. Lundquist was graduated from the University of Minnesota in 1905 with the degree of electrical engineer, following which he was associated for six years with prominent electrical houses. Since 1911 he has been in business for himself in Minneapolis, specializing in hydroelectric and transmission line work. He is the author of "Transmission Line Construction—Methods and Costs," and has contributed numerous articles to the technical press. He is chairman of the Minnesota section of the American Institute of Electrical Engineers.

ROLLING STOCK

Pekin (Ill.) Railway is in the market for two steel cars costing about $3,500 each and seating twenty-eight people.

Cumberland County Power & Light Company, Portland, Me., is contemplating the purchase of four express and locomotive cars for freight service.

TRADE NOTES

Westinghouse Traction Brake Company, Wilmerding, Pa., has received an order for magnetic brakes for the two cars recently ordered by the Fonda, Johnstown & Gloversville Railroad.

National Pneumatic Company, New York and Chicago, announces the receipt of orders from the Boston Elevated Railway for forty-two pneumatic door and step-control equipments for elevated cars and 152 equipments for Lindall articulated cars.

Samuel H. Powell has been appointed manager of the buying department of Wm. P. Bonbright & Company, Inc., 14 Wall Street, New York, to take effect Sept. 1. Mr. Powell has been associated with N. W. Halsey & Company in a similar capacity for ten years.

Smith-Ward Brake Company, New York, N. Y., reports the receipt of orders for brake adjusters for thirteen cars of the Worcester (Mass.) Consolidated Street Railway, and ten cars of the Springfield (Mass.) Street Railway. This company has also received orders for brake lever struts from the Connecticut Company and the Springfield Street Railway.

National Safety Device & Manufacturing Company, Chicago, Ill., has appointed the Lord Manufacturing Company, New York, N. Y., as exclusive Eastern electric railway agent for the New England States, New York, Pennsylvania, New Jersey, Delaware, Maryland and the District of Columbia for the sale of air rectifiers designed to eliminate frost in air systems.

The National City Company, New York, N. Y., has purchased the business of N. W. Halsey & Company, dealers in investment securities, and has also absorbed the bond-selling department hitherto conducted by the National City Bank. This new company will immediately take over all of the assets and liabilities of N. W. Halsey & Company, and the large amount of securities owned by this house will be marketed by the new owners. The headquarters of the new company will be in the National City Bank Building, 55 Wall Street, New York. Halsey, Stuart & Company, Chicago, are not affected by this change.

Heywood Brothers & Wakefield Company, Wakefield, Mass., report the receipt of the following orders for seats: Northern Texas Traction Company, ten cars being built by the American Car Company; Keokuk Electric Company, Keokuk, Iowa, one car being built by the St. Louis Car Company; Binghamton Railway, sixteen city cars being built by the Cincinnati Car Company; Boston Elevated Railway, forty-two elevated cars being built by the Pressed Steel Car Company; New York Central Railroad, twelve multiple unit cars being built by the Standard Steel Car Company; Northern New York Development Company, ten electric cars being built by the Laconia Car Company.

Root Spring Scraper Company, Kalamazoo, Mich., reports the recent receipt of the following orders for snow scrapers: Binghamton Railway, thirty-two No. 2 air operated; Muskegon Railway & Light Company, two No. 2 hand operated; New York State Railways, Rochester Lines, four No. 6, hand operated; Syracuse Lines, one No. 6, hand operated, and twelve No. 3, air operated; Utica Lines, ten No. 2, air operated; Schenectady Railway, ten No. 2, air operated, and twelve No. 3, air operated, for interurban cars; Bay State Street Railway, ten No. 2, hand operated, and fourteen No. 2, air operated; Illinois Traction System, two No. 5, air operated; Laconia Car Company, six No. 2, hand operated; Kelley-Powell, Ltd., Winnipeg, two No. 3; Massachusetts-Northeastern Street Railway, twenty-four No. 2, hand operated; Michigan Railway, twenty No. 2, air operated, and twenty Root life guards; Newport News & Hampton Railway, Gas & Electric Company, two No. 6; Ottawa Car Company, three No. 2, and Saginaw-Bay City Railway, two No. 6.

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BRINGING PUBLIC RELATIONS WITHIN REACH

Of all the subjects that are difficult to make concrete and tangible, one of the worst is public relations. This term has been applied to a very complicated set of conditions, and it is as yet far from exact definition. Like others vitally interested in the electric railway industry, the editors of the ELECTRIC RAILWAY JOURNAL have endeavored to vizualize the subject somehow so that it could, as it were, be brought down out of the clouds within reach from the ground. The natural result of this endeavor has been the preparation of an outline, at first without the idea of publication. It was later considered, however, that others might find such a compilation useful, and it is printed on page 386 in this issue for convenience of reference. The outline attempts to list answers to the "Why" and the "How" of public relations. It is not put forth as a complete syllabus but is tentative and suggestive only. In stating that public relations need definition, we do not refer to that friendly attitude or state of mind which is necessary on both sides if relations between any two parties are to be pleasant and profitable. That such a state of mind must exist goes without saying. What we do refer to are the factors which go to produce this attitude. There is no more important study to which managers can address themselves than to that of these factors. The basis of this study must be the truism that no transactions can be carried on continuously that are not profitable to both parties. The managers have then two big tasks: to insure the twofold profitableness of their business, and to convince the public of the exact conditions surrounding this business.

ELECTRIC ROADS IN THE PRESENT STEAM CRISIS

The crisis in the steam railroad strike brings to the forefront, of course, the very serious question of what the public will do for its transportation in case there should be a serious interruption of service on the steam railroads next week. Among the substitutes, that which promises to be the most useful in this emergency are obviously the electric railway systems of the country. The electric roads are by no means as extensive, measured in aggregate amount of track, as the steam railroads, there being only about 46,000 miles of electric railway track in the United States as compared with some 387,000 miles of all kinds of steam railroad track. The electric roads also cannot approach the steam railroads, of course, in speed or weight of trains. Nevertheless, during the past fifteen years, many miles of electric railway track have been built connecting the larger cities of the country, and it is very probable that in case of serious impairment to the service of the steam railroads owing to strikes, the electric roads can be of great assistance to the public in the transportation of both passengers and freight. It is in the north central states that the interurban electric railway business has received its greatest development. Thus, between Buffalo on the east and St. Louis on the west, and between the Ohio River on the south and the middle of Michigan and Wisconsin on the north, there is a network of connecting electric lines most of which are now doing considerable freight business in standard freight cars, in addition to a very large passenger business. In the Eastern states the number of high-speed electric interurban lines which have been built is not so large. Nevertheless, it is possible to travel from Washington, D. C., to Portland, Me., and beyond by electric cars, as well as practically all the way across New York State, and most of these electric railway companies in the East also do a freight business, although not on so extensive a scale as those in the central states. The traveling will be slower than on the steam railroads in most cases, but there is no doubt that the electric lines will be able to help out greatly both in passengers and freight in case the nation-wide strike occurs, not only in short distance travel, as in carrying steam railroad commuters in the neighborhood of the large cities to and from their business, but even in through service to a considerable extent as well.

EMPLOYEES BEHIND THE SCENES

The general public has little conception of the varied classes of employees, apart from those engaged in the car service, who are required to carry on the affairs of a large electric railway system. Occasionally a group of linemen or trackmen is noticed and now and then a glimpse is had of a few power plant or substation employees, but the great body of patrons sees little of any but uniformed men. A suggestion of the large number of employees who work behind the scenes, as it were, on a large urban system, is found in the recently printed agreement of the Boston (Mass.) Elevated Railway and the Amalgamated Association as to wages and working conditions. Among these are no less than fifty-two blacksmiths and horseshoers, twenty-one blacksmiths' helpers, five brass finishers, two harness makers, ten masons, 103 machinists, thirty-four outside carpenters, seventy-five painters, two plumbers, four riggers, eight roofers, eight steamfitters, thirty-one structural iron painters, forty wiremen, 216 woodworkers, forty-nine armature room workers, two boiler

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room engineers, sixty firemen, five hoisting engineers, 162 mechanics, eighty-three oilers, 183 carhouse repairmen, 267 car cleaners, thirty-six switchboard operators, twenty car shifters, seventy-eight power station men, twelve stock room clerks and many other classified workmen. Here are more than 1500 employees whose pay ranges roughly between 20 and 41 cents per hour, the great majority of whom the traveling public never recognizes as on the electric railway payroll, but who, with their dependents, represent a pretty substantial community. These figures do not show the actual percentage of what might be called non-transportation employees in the company's service, who total approximately 4000 out of roughly 10,000 on the entire payroll. It would be incorrect to say that for every motorman or conductor, guard or brakeman in the service another employee is engaged in collateral or auxiliary duties, but something like this expresses the relationship between the blue uniform men and the other employees, in a rough sort of way. When occasion permits, it is a good thing for a local public to be given some idea of the other side of the organization from that which is visible, as a means toward a better appreciation of the magnitude of the problem which the utility in question is trying to solve.

EDUCATING THE PUBLIC

The policy of this paper, in common with that of most of the progressive railways, is strongly in favor of publicity. Fresh evidences arise every day to indicate the necessity for continuous and patient presentation of the street railways' problems to the public.

A short while ago a street railway man was riding in a city street car in company with a man who held an official position of responsibility with a small savings bank in the city. In the course of conversation, the banker criticized the service of the company and expressed his belief that it should be obliged to purchase more modern and comfortable cars than those in use on the particular line on which they were riding. As a matter of fact the cars were poor and fully deserved the criticism. The service was about average, being neither very good nor very bad, as urban traction service goes.

The street railway man turned the conversation to matters of more immediate concern from the viewpoint of a banker and began to discuss the subject of investments. Within a few moments of his condemnation of the obsolete cars, the banker was telling the other man that his bank had refused to purchase a part of a new issue of bonds which that particular electric railway company had just attempted to float. The obvious reasons for the bank's attitude in this case was, of course, that they were not satisfied that the loan would be a safe one, despite the fact that the company in question is both conservatively financed and efficiently managed.

Just how this banker, as an ordinary citizen and user of the street cars, thought that the street railway could buy new cars when the banks would not loan it new funds for additions and betterments, is not clear. Of course the real fact was that he never stopped to consider the railway's problem in just that light. As a man acquainted with business and financial matters, we might expect him to know better. The question is that when a man in that position does not understand nor stop to consider the fundamental economic side of the question, how can the average clerk, mechanic, laborer and professional man be expected to appreciate it?

It seems clear that it is not only to the advantage of the street railways that they should seek to make these mutual problems more public, but that it is almost a necessity for them to do so. As to whether the publicity should take the form of paid advertisements in the newspapers, notices in the cars, lectures to civic associations or any other way, is a matter of local policy. The broad underlying principle is that if the street railway wants the public to deal reasonably and patiently with it and to make allowances for its financial and operating difficulties, it must at least make the public acquainted with the fact that such difficulties exist and that the fault is not wholly on the side of the company.

SHORT RIDES BY JITNEY

Within recent years organized labor, through its leaders, has been closely studying the businesses from which its members draw their livelihood. In most cases this study has been prompted by a desire to ascertain the most effective and destructive methods of waging labor wars, and as advancing civilization develops new methods they are pressed into service, just as the European antagonists utilize the latest discoveries of science in their warfare on each other.

A case in point is described in an interview with an official of an electric railway labor organization, as reported in a Philadelphia newspaper recently, in which a new plan of campaign, to be followed in prosecuting the strike recently declared against the street railway company in Harrisburg, Pa., is outlined. As a matter of fact, this strike has been a failure. The cars are running again on the regular schedule, and traffic is approaching normal. The loss in travel now concerns only those workers in industrial plants whose action can be controlled through the channels of organized labor. Such people have been patronizing the jitneys. The interesting feature concerning the recent pronouncement in the Harrisburg case relates not to the strike, which the company has won, but to the prosecution of a guerrilla warfare after the main issue has been settled.

The labor union representative in this case announces that efforts will be directed to divert the short haul rider because, as he states, this is the profitable portion of the business. As every operating official knows, it is, moreover, the only portion of the business which can be handled by the jitneys without bankruptcy to themselves. On the other hand, organized labor is to encourage workmen to ride on the electric cars for long distances because, as is stated, the larger the number of people who take the long, unprofitable rides, the more money the company will lose. It

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remains to be demonstrated, of course, how completely will be the control which the affiliated labor organizations can exercise in carrying out such a plan of campaign. It will require considerable instruction to workmen to enable them to segregate the unprofitable from the profitable rides. It is doubtful in most cases also whether the men would take the trouble to differentiate, even if they could.

At first glance, these tactics appear to contain a new menace to the electric railway. In the long run, however, we venture the prediction that education of this character will be helpful. If the day laborer and the skilled mechanic can be educated to the point where they realize what portion of the electric railway business is unprofitable, the information will become common property. The labor unions will find that their campaign of education has been a boomerang, for instead of hurting the companies it will, in the long run, inure to their lasting benefit.

SAVING POWER ON SMALL ROADS

If the papers presented at recent railway association meetings may be considered as "the straws that show which way the wind blows," there is a rapidly increasing tendency to use devices which promote the more intelligent use of equipment by motormen. Much has been published in these columns and elsewhere dealing with the theory underlying the use of such devices, and operating data representing the experience of a number of roads have been presented. Possibly, a part at least of what has been published has not been of much interest to the men who actually "run the cars," because of the technical style in which it has been written. In an article in this issue, William Arthur has stated the fundamentals of energy saving in plain every-day English. The advantages that arise both directly and indirectly from the use of energy-saving methods are pointed out, and the necessity for a fair basis for comparing the performances of the various motormen operating like cars in similar services is emphasized. He has also formulated some simple rules for "power saving," copies of which, placed in the hands of car crews, might be made the basis of an energy-saving campaign.

Many small street railway systems cannot afford—or at least feel that they cannot—the more elaborate and satisfactory apparatus and the organization necessary to secure the best results obtainable therewith. Published reports indicate, however, that on elevated roads even so simple a device as the coasting board may reduce the energy consumption 5 or 10 per cent. While elevated roads, with their fixed stopping points, afford better opportunities for the effective use of such devices than the small street railway, some saving on the latter might be effected by the use of boards or some other cheap and simple device. If boards are used it would not, of course, be necessary to locate one at every stopping point, but locations should be made at down-grade sections of track and at points where stops are frequently made. For such a device the cost in maintenance would be low, and the close personal contact between motormen and their superior officers, the absence of extremely heavy rush-hour traffic, and the easy schedules usually maintained on small systems would tend to make the saving, expressed in percentages, comparable with those obtained on elevated roads.

There is no doubt of the widespread existence of energy-saving opportunities on large and small roads alike. The seizing of these depends upon intelligent cooperation between the men on the platform and the men in the office. The latter must furnish the former with the knowledge and the incentive to expend the electrical energy produced or purchased by the company with the same care that he spends his own cash.

RECONCILING WHEEL AND RAIL CONTOURS

An inconspicuous statement of fact in the report of the work done by the Engineering Association committee on standards at the recent meeting in New York City, when considering the proposed revised standards for wheel tread and flange contours, showed that this committee appreciates the necessity of the joint action of the equipment and the way committees in arriving at a standard wheel contour. Wear on both the wheel and the rail is dependent absolutely on the line of rolling contact, and if the maximum wear life is to be obtained from both, it is very necessary that the line of contact between the wheel and the rail provide as nearly as possible a full tread bearing particularly in street railway service. The standards committee therefore is to be commended for requiring that the differences between the equipment committee and the way committee regarding wheel tread contours and rail head contours be reconciled.

The recent article by R. C. Cram on curved heads for grooved-girder rails in Brooklyn, N. Y., undeniably showed that the rate of rail head and wheel tread wear was increased by load concentration. To remedy this difficulty, he proposed a curved-head rail, which would provide a full wheel tread line of contact on average worn wheels. Such a move solves the problem so far as grooved-girder rail is concerned, but the application of a curved head on a plain girder or T-rail produces an unbalanced section, and obviates one of the greatest advantages of this type of rail, namely, that it is a symmetrical section thus making either side the gage side.

C. H. Clark, engineer maintenance of way Cleveland (Ohio) Railway, has been able, however, to provide a full line of contact between the wheel and the plain girder rail by tilting the axis of the rails inward until they are practically at right angles to the wheel tread slope. No particular difficulty was experienced in tilting the rail at this angle because Mr. Clark builds his track on steel ties and arranges with the manufacturers of these to bend the ends so that they will tilt the rail at the correct angle to the wheel. Some of this tilted-rail track has now been in service more than a year, and from the beginning of service, the area of wheel and rail wear indicated that a full line of contact was being obtained. The method employed in Cleveland and the one suggested by Mr. Cram show that the way engineers appreciate the value of a full line of contact between the wheel and the rail.

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Improvement of Public Relations

Outline of Some of the More Important Methods of Bettering the Relations Between the Railway Company and the Public

DURING the last few years electric railway companies have been paying a great deal of attention to methods of improving their relations with the public which they serve, and many articles have been written on the subject. To aid in the study of this subject the following outline has been prepared of the objects of establishing good public relations and of some of the methods by which this result can be accomplished.

OBJECTS OF ESTABLISHING GOOD PUBLIC RELATIONS

(A) To secure the maximum patronage.

(B) To secure good treatment and popular support:

(I) When questions of fare increases or service changes arise.

(II) When questions of franchise extensions or alteration of franchise conditions arise.

(III) When labor difficulties confront the company.

(IV) When accident cases are being tried by jury.

(V) When competition of any kind threatens.

(VI) When discriminating taxation is imposed.

METHODS OF ESTABLISHING GOOD PUBLIC RELATIONS

(A) By giving as good service as the rate of fare warrants.

(B) By having a clean internal corporate history as regards finances and relations with labor.

(C) By convincing a large majority of the public that this is the case.

(D) By having the city or a considerable number of the citizens interested financially in the enterprise.

(A) A company tends to give as good service as the rate of fare warrants:

(I) Through having the franchise conditions fair to the company:

(a) By having a long-term or indeterminate franchise.

(b) By reducing the burdens under the franchise which are not directly reflected in service (such as pavement charges, excessive taxes, etc.).

(c) By providing an extra fare zone for very long distance riders or possibly charging for transfers.

(II) Through introducing all possible economies in the service, compatible with good service:

(a) By studying the practice of other companies and applying the lessons thus learned where suited to the case.

(b) By employing competent engineers and transportation officials, yet not letting administration expenses become excessive.

(III) Through providing attractive, comfortable and sanitary cars and equipment and safety features for the protection of passengers:

(a) By maintaining a high standard of maintenance for track, cars and other equipment, so that breakdowns are infrequent and cars are always clean.

(b) By purchasing new equipment as a substitute for old equipment when conditions warrant.

(c) By paying regard in new and old equipment to the features that directly affect the public, like comfortable seats, good heating, lighting and ventilation, attractive exterior and interior finish, adequate and neat car designs, easy riding track, tasteful overhead work and buildings.

(d) By the adoption of inclosed platforms and other approved safety devices.

(IV) Through providing competent and courteous train crews:

(a) By paying a fair wage and requiring only reasonable hours.

(b) By exercising care in the selection and training of employees.

(c) By employing superintendents who will administer discipline impartially but sympathetically so as to stimulate loyalty in the force.

(d) By special instruction on the subject of neatness and courtesy to old and new men.

(e) By having the company officials set examples of neatness and courtesy for the men.

(f) By interesting the employees in the financial results of the enterprise:

(1) By adopting a bonus scheme based on individual performance.

(2) By basing the wage rate on the gross or net receipts.

(g) By conducting welfare work:

(1) By club rooms, reading rooms, restaurants, etc.

(2) By pensions for superannuated employees.

(3) By mutual benefit associations.

(4) By co-operative buying.

(5) By presents to the men at Christmas or other stated occasions.

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(V) *Through fulfilling other obligations, expressed or implied, that the company owes to the public, such as in the matter of:*

(a) Suitable operating schedules.

(b) Maintenance of paving.

(c) Willing settlement of just damage claims.

(d) Prompt payment of taxes.

—

(B) A company can have a clean internal corporate history as regards finances and relations with labor:

(I) *Through publishing adequate reports for stockholders:*

(a) By giving detailed financial statements, in comparative form so as to make examination of old reports unnecessary.

(b) By neglecting the whims of individual auditors and using the official classification so as to permit of ready intercompany comparisons.

(c) By avoiding such meaningless expressions as: "The property has been well maintained during the year."

(d) By informing the stockholders as to any unusual actions of the board of directors and in general giving them, besides the annual reports, enlightening communications during the year on matters affecting the company.

(II) *Through avoiding even the suspicion of secret deals with politicians:*

(a) By explaining fully to the stockholders all unusual financial items.

(b) By insisting that the public be admitted to franchise and similar hearings.

(c) By appealing to the public directly in case the city council declines to act in such improvements as skip-stops, rerouting of cars, near-side or far-side stops, etc.

(III) *Through establishing adequate depreciation accounts:*

(a) By determining through competent authority the depreciable life of the items of property.

(b) By maintaining a property ledger showing a continuous inventory with a complete depreciation record.

(c) By co-operating with regulatory bodies in formulating official rules for depreciation accounting and following them when issued.

(IV) *Through paying the employees fair wages and treating them fairly and liberally along welfare lines, as explained under* **A** *IV.*

—

(C) A company can convince a large majority of its public in regard to its clean history:

(I) *Through a proper method of newspaper publicity:*

(a) By having a publicity agent or a designated official in direct charge of press relations.

(b) By voluntarily furnishing the newspapers through such an official with financial, operating and general data of interest to the public.

(c) By giving reporters an opportunity to inspect improvements, new equipment, etc., and furnishing them with complete facts in regard thereto.

(d) By giving reporters prompt and explicit information on points which they themselves raise.

(e) By having occasional articles written by company officials on matters about which the newspapers desire full information.

(f) By publishing occasional advertisements on:

(1) Questions before the public.

(2) Problems in the industry.

(3) Announcements of fare and schedule changes, new service, etc.

(II) *Through having the leading officials prominent in local affairs as a result of:*

(a) Active membership in civic associations and town improvement organizations.

(b) Co-operation with the local board of trade.

(c) Membership in social clubs.

(III) *Through having its officials recognized as men on whose word the public can rely, as a result of:*

(a) Frank explanations of company policies.

(b) Honest criticisms of and efforts to avoid corporate evils.

(c) Refusal to act under cover at any time.

(d) Insistence upon the rigorous keeping of all promises to the employees and the public.

(IV) *Through treating the complaints of the public courteously:*

(a) By having a definite and tactful officer of the company to handle complaints.

(b) By giving him ample authority to settle minor complaints and full information for overcoming unjust complaints.

(c) By having him arrange in the case of major complaints a direct approach without delay to the responsible higher official.

(d) By instilling in this higher official a sense of his duty in standing ready to serve immediately in such cases.

(e) By having complaints solicited by newspaper, placard or billboard advertising, house-to-house canvasses or car canvasses, and having them adjusted promptly wherever possible.

—

(D) A company can have a considerable number of the citizens interested financially in the enterprise:

(I) *By encouraging local investment in its securities:*

(a) By making some of its securities readily available to the local public through the company's own offices or through local banks.

(b) By issuing the securities in small denominations.

(c) By permitting the purchase of the securities on a partial-payment basis.

(II) *By having a profit-sharing agreement with the city.*

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Signals on the Scranton & Binghamton Railway System

Performance Records Show That This Road's Signal System, Which Is Used To Direct Train Movements as Well as to Protect Them, Provides a High Degree of Reliability, the Average Number of Causes of Interruption being One in 37,000 Signal Movements.

SCRANTON & BINGHAMTON SIGNALS—INTERMEDIATE SIGNAL

SINCE the Scranton & Binghamton Railway developed its method of operation by signal indication, as described in the ELECTRIC RAILWAY JOURNAL for Oct. 3, 1914, the degree of success accompanying the operation of its signal system has been subject to much discussion, owing to the use of signals for the direction of trains as well as for their protection. In the accompanying paragraphs there is published a complete record of the signal performance extending over six months, including last winter. This shows that the signals have behaved in a thoroughly normal manner, an average of twelve out of 3000 trains operated being delayed during the course of a month because of the safeguards imposed by the signals. The average delay from this cause was three minutes per train.

As might be expected in an installation where so many movements are made, there have been false-clear indications, one of them appearing during the period covered by the record herein published. Yet in no case has any such failure been accompanied by circumstances that made a collision a possibility.

This disposes of the argument that, under this method of operation, a false-clear indication would be certain to result disastrously if the train movements were not controlled primarily by train orders. As a matter of fact, in no case has a false-clear indication caused a train even to enter an occupied block, but in every instance thus far the failure has been immediately caught by some employee who observed the improper position of the semaphore at the end of the block as the train left it.

During the period covered by the records the railway's schedule called for a thirty-minute service in each direction from Scranton to Brookside, which includes about 8 miles of signaled territory, while on the rest of the signaled road the service was hourly. The road and its signal system are in operation for twenty-one hours each week-day and for twenty hours each Sunday.

The signaled territory under consideration covers 22.8 miles of single track divided into eighteen blocks. Each block is arranged to include the track between a pair of passing sidings, the latter being located at intervals of about 1 mile. The home signals at each siding are of the semaphore type, and two intermediate signals of the light type are installed at about the center of the block. In general, the signal arrangement is that of the Union Switch & Signal Company's T. D. B. system with the exception that "direction indicators" have been added. The latter device is a normally unlighted, or dark, single-lens light signal mounted on a pole a short distance beyond each semaphore signal governing entrance into a block. When a train enters the block this signal will display a white light if (*a*) the direction controlling relays have established the proper direction of traffic for the movement of this train and (*b*) the semaphore signal in the rear of this train has gone to the stop position.

Motormen, therefore, are required to obtain the indication of a clear semaphore signal to enter a block, and they must have a lighted direction indicator to proceed through the block to the intermediate signal. Only one of the two direction indicators for a block can be lighted at any one time. If a train should enter one

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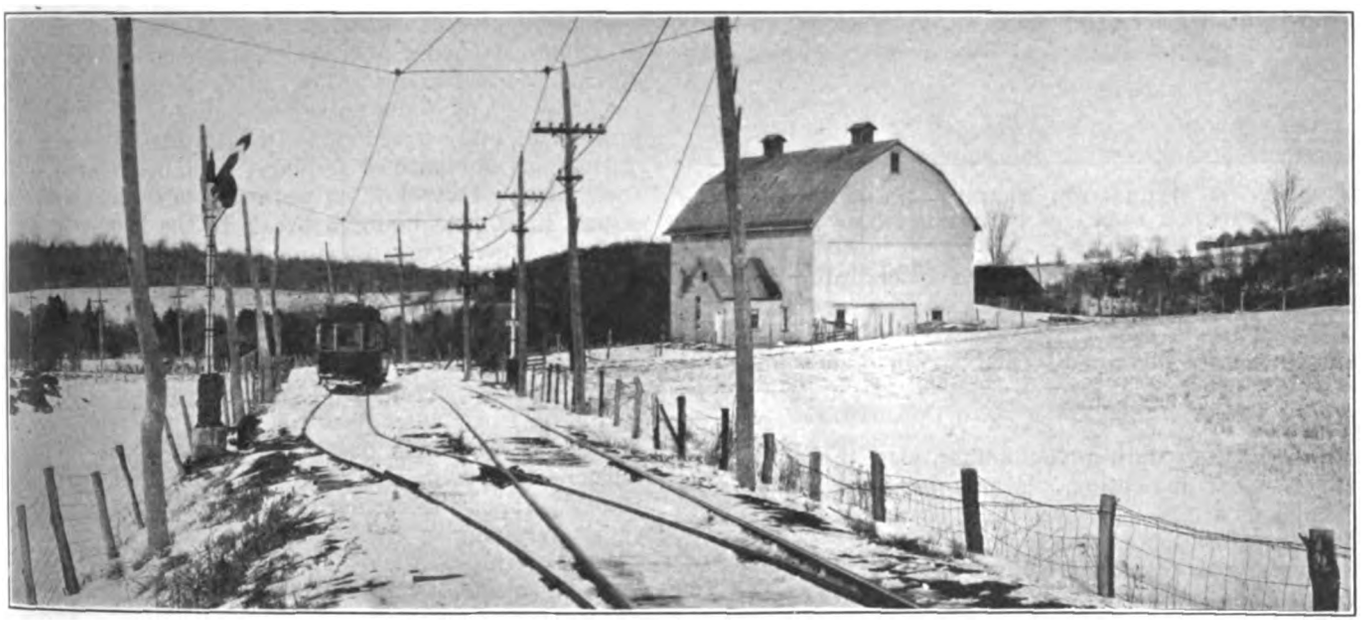
end of a block simultaneously with another train at the opposite end, one of the two would be prevented from running into the block as far as the intermediate signals before being stopped, as would be the case with a standard signal arrangement.

Trains are permitted to advance meeting points on the authority of a clear home signal supplemented by the direction indicator and are required to wait at a stop signal for a period of time sufficient to allow an opposing train to get through the block, after which, if the signal remains at stop, the waiting train may flag itself to the next home signal in advance. In case of an extended interruption, the trains are moved by time card and train orders issued from the operating office at about the center of the line, this office being connected by telephone to the various points along the line. The feature of the operating methods, therefore, is not the elimination of the dispatcher—for whom an equivalent is provided in cases of emergency—but rather the advancement of meeting points under clear signals. A great many delays are thus eliminated.



SCRANTON & BINGHAMTON SIGNALS—HOME SIGNAL AT PASSING SIDING

RECORD OF INTERRUPTIONS

The record of "causes of signal interruptions," which is shown in the accompanying table, averages one cause of signal interruption to 37,000 signal movements, or three and one-third causes of interruption per month. A cause of signal interruption, it may be said here, is defined by the railway company as a derangement of the signal system in which one or more signals fail to give the proper indication. This should be differentiated from the "interrupted signal movements," resulting from causes of signal interruptions. One cause of interruption for one signal, if it is not promptly remedied, may produce a large number of interrupted signal movements, the record of the latter showing operating conditions, while the former covers only signal line, apparatus, track and maintenance conditions. Thus, in February, 1916, four causes of signal interruptions resulted in sixteen interrupted signal movements, delaying eight trains for twenty-six minutes. A little consideration will show that this information does not give the number of times that trains passed deranged signals, as those data were not considered essential for the purpose of securing an operating and signal efficiency record. A signal failure is considered only as the action of a signal in which a false-clear indication is given.

The data given in Table I cover a six-month period beginning with September, 1915. The record for that month, it may be said, was an unusually unfortunate one. In practically every case of deranged signals a considerable time elapsed between the occurrence of the interruption and the restoration of the normal operation of the signals, and to this may be ascribed the larger number of interrupted signal movements which appear in the table for this period.

During the month there were six interruptions, of which one was due to the grounding of the signal mains because a broken lighting wire connected them to a telephone line. This occurred at night, and some time elapsed before the cross was located and repaired. Another of the interruptions was due to lightning, which blew a high-tension fuse and affected a number of signals. A third interruption, which affected one signal for forty-five minutes, was caused by high voltage at the power house, which so affected a semaphore signal just starting to clear that a motor circuit controller was broken, and the signal failed to make the movement to the clear position.

During September, also, one power failure occurred, this being caused by a badly worn dog in a power-house circuit breaker which allowed the circuit breaker to open the primary power circuit, affecting all signals until repairs were made. Another of the interruptions was brought about by a short-circuited track section, which put one block out of commission for about four hours. This was caused by a track laborer, who, in driving a staple, so bent it as to cross certain power and

TABLE I—SIGNAL OPERATING RECORD—SCRANTON & BINGHAMTON RAILWAY

	September 1915	October 1915	November 1915	December 1915	January 1916	February 1916
Signal movements	124,429	125,919	129,000	123,054	122,399	114,946
Causes of signal interruptions	6	3	0	2	5	4
Signal failures	1	–	–	–	–	–
Interrupted signal movements	217	36	0	9	59	16
Trains operated	3,273	3,370	3,168	3,276	3,259	3,060
Trains delayed	36	14	0	4	12	8
Total minutes delay	82	46	0	8	51	26
Signal movements per interruption	20,738	41,973	–	61,527	24,479	28,736
Train movements per train stop	91	241	–	819	272	382

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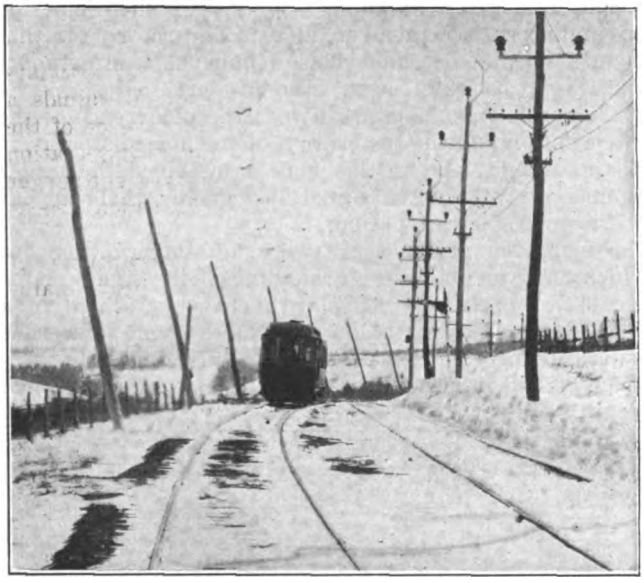


SCRANTON & BINGHAMTON SIGNALS—HOME SIGNAL WITH DIRECTION INDICATOR TWO POLES IN ADVANCE

track circuit cables. The sixth interruption for the month was caused by blasting in a quarry near the line, flying stones breaking the 2200-volt signal main and shutting down the signals until the line was coupled up.

RESULTS OF BAD RAIL CONDITIONS

During the month of September, also, there appeared a false-clear indication. It was caused by bad track conditions at a point where the railway runs at one side of a turnpike. Here, the low rail was covered for some distance with dirt that evidently had been thrown by an automobile running close beside the rail. This practically insulated one of the rails from the car, preventing shunting, and the block cleared while a train was stopped on this section of rail. The improper action of one of the signals was reported by the motorman, but as a matter of fact passing cars cleared the rail of most of the dirt and corrected the condition, the trackmen completing the cleaning. This signal failure, it may be said, was the only one to occur during the six months of operation under consideration here, during which time there were 739,747 signal movements.

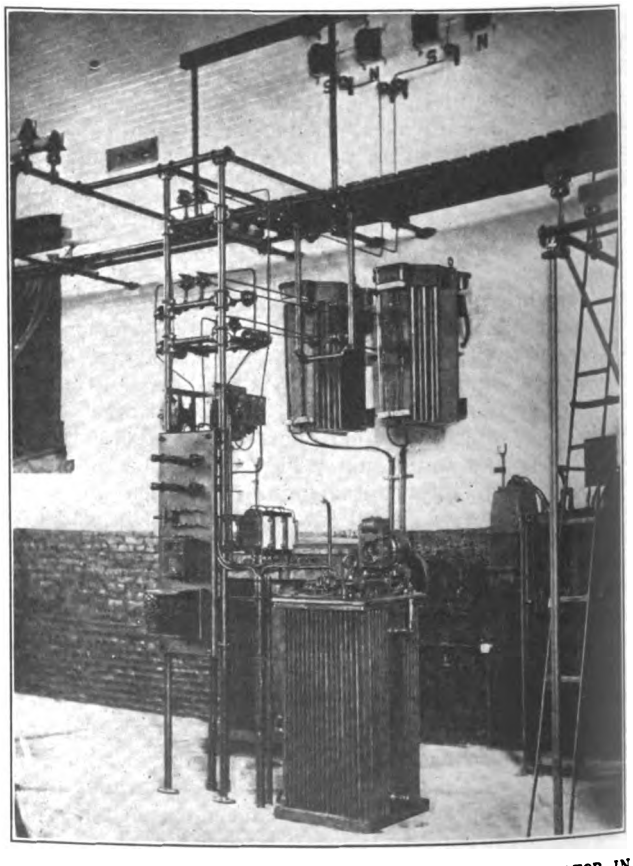
The difficulty of keeping the surface of the rail clean in those sections of track which lie alongside the turnpike mentioned was in evidence also during the month of October, when two signal interruptions occurred on successive days because of bad rail conditions. At that time the turnpike had been heavily oiled to lay the dust, and the mixture of oil and dust was carried by wagon wheels onto the track at a crossing, thus insulating the rails from the car wheels at two points. In the case of one signal interruption, a car using power over a crossing upset the balance of current flow between the two rails and blew the fuse on the track side of the relay at the nearest signal. The other interruption, primarily due to this cause, was brought about by the fact that the partly-insulated rails caused an abnormal number of partial movements of a semaphore signal with such rapidity as to cause injury to certain contacts. This left the signal in stop position and prevented it from clearing until repaired. Neither interruption involved any great waste of time in the actual clearance of the difficulty, but in each case there was some delay in getting word of the difficulty to the signal maintainer. This resulted in one interruption causing a shutdown of the signal for about two and one-half hours, and in the other case forty-five minutes.

The third interruption that occurred during the month of October resulted in a similar effect on a signal, and was caused by a car moving slowly in a certain portion of a block under conditions such that a large number of partial track relay movements were produced. Subsequently, improvements were made in the motor circuit controller so that it would be better able to stand the strains. After a time test of this improvement, all of the signals had their controllers changed, and interruptions from this cause ceased.

During the month of November there were no interruptions or failures of the signal system, the operation being 100 per cent perfect. In December, however, there were two interruptions, one being caused by poor contacts in a control mechanism, and the other by a flaw in the metal of a brake stud which, by repeated abnormal movements of the signal mechanism, broke a pin that fastened a gear to its shaft and prevented the signal from clearing. The latter interruption lasted two hours, but since only one signal was affected the number of interrupted signal movements was small.

During the month of January, 1916, five interruptions took place. Two of them were due to trouble with the signal lines, one being a break in the 2200-volt main and the other being due to a short-circuit of a control wire with a 600-volt feeder, burning out the lamps in an intermediate light signal as well as a relay. During this month, also, there were two failures of one relay, which gave trouble intermittently for several days and which had to be replaced. The difficulty was found to be due to badly worn back contacts in the relay. Intermittent trouble also developed in one of the insulated track joints. This was traced to original but unnoticed faulty assembling, which brought about intermittent short-circuiting at the joint.

During the month of February two of the interruptions were due to snow and ice on the rail. This caused abnormally frequent movements at two signals and broke



SCRANTON & BINGHAMTON SIGNALS—VOLTAGE REGULATOR IN POWER HOUSE

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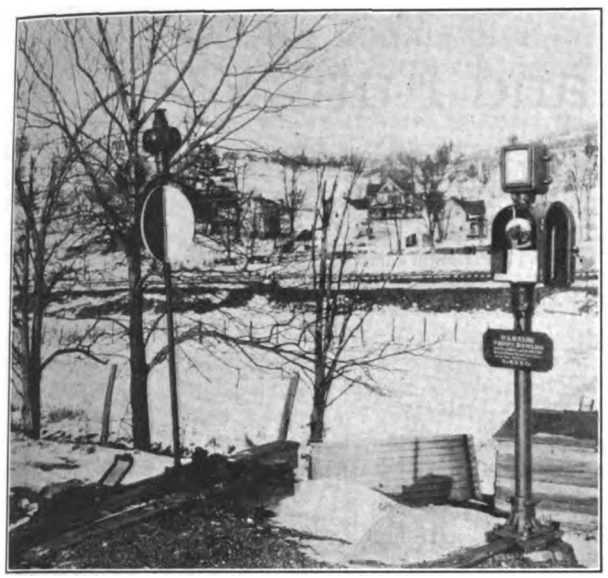

SCRANTON & BINGHAMTON SIGNALS—SWITCH INDICATOR AT OUTLYING PASSING SIDING

certain connections in the signal mechanisms, thereby preventing them from clearing. The other two interruptions during February were due to wrong connections made by a lineman in repairing broken line wires.

From the foregoing detailed account of the signal interruptions it will be seen that of the twenty interruptions that occurred during the period under consideration four were chargeable to the line department. The signal department is charged with eight, of which some might have been prevented while others could not have been avoided. Two interruptions were chargeable to the power department, and one each was due respectively to unavoidable causes and defective materials. Two interruptions were caused by defective track circuits and two to bad track, the latter condition being responsible also for the one signal failure that occurred.

VOLTAGE REGULATION

Reference was made in one of the preceding paragraphs to the use of a voltage regulator. This device was introduced for the signal system because of the fact that the railway company's power house, which supplies both lighting and railway power, is subject to violent fluctuations of load that make it difficult to maintain an even voltage. In consequence, the 2200-volt signal mains are fed through a regulating transformer, as shown in one of the accompanying illustrations, the secondary coil being shifted in accordance with the direction of rotation of a small motor mounted above the machine and operated by the current flow induced by changes in the primary voltage. The device has been in operation for a number of months, and it maintains the voltage of the signal mains practically constant at all times, the maximum variation being between 108½ and 111½ volts.

The primary object for the installation of this regulator was to obtain more constant voltage on the 2200-volt line. Prior to the installation of the regulator, the variable load on the generators caused such wide variation in the voltage across the terminals of the lamps in the light signals as to decrease their visibility on the low voltage, and to decrease the life of the lamps on the high voltage. With the installation of this regulator it was possible materially to increase the sensitiveness of the track circuits to the presence of a high resistance shunt, such as would be encountered when a car passed over particles of dirt on the rails or when the car ran over a stretch of rusty rail.

Prior to the installation of the regulator, the track circuits were adjusted for satisfactory operation of the relays on the lowest potential on the signal mains. The relays, of course, were considerably over-energized when the potential on the signal mains assumed its highest value. Naturally, even though the shunting was sufficient on the lower value of potential, the relays would be more difficult to shunt on the higher potential. By a combination of circumstances, a car on a track circuit which had considerable dirt on the rails resulted in the one signal failure described above. The relays on the lower potentials were sufficiently sensitive to shunt even with some dirt on the rail so that it may be said that this voltage variation has been the one cause of signal failure since the signals were installed, aside from the track conditions to which reference has previously been made. Naturally, since the regulator has been installed, all of these difficulties have disappeared.

SIGNAL LAMP RENEWALS

In the territory protected by block signals there are thirty-six semaphore signals and thirty-six intermediate signals of the light type. Each of the semaphore signals is equipped with two lamps in multiple, making a total of seventy-two lamps for the semaphore signals. The light signals have two separate lights, one red and one green, and as each one has two lamps in multiple there are 144 lamps for the intermediate signals. Near the entrance to each block, also, there is installed the direction indicator, which is equipped with two lamps, thus adding seventy-two more lights, and this gives a total of 288 lamps on the block-signaled territory.

This number of lamps involves somewhat less than 9000 lamp days during the course of a month, and the average number of lamp burnouts per month during the period under consideration was two and two-thirds. Of course, this figure includes all burnouts whether or not they were the cause of signal interruptions. As a matter of fact, none of the signal interruptions during the period under consideration was due to this cause.

MAINTENANCE ORGANIZATION

The signals are maintained by a signal supervisor, who devotes only part of his time to this work, as he has charge also of the crossing bells, power wiring, repairs to motors and wiring about machines that are used in connection with the railway company's general lighting and power business. Reporting to the supervisor is a repair man who looks after crossing bells, passenger station lighting and light repairs to the overhead construction and trolley wire, and although he is really a lineman he devotes a part of his time to the signal maintenance and repairs. Whenever heavy work is required on the signals the line gang is called upon, this being a construction gang that is engaged in erecting overhead construction for the extensions of the road which are now being built.

Operation on the Scranton & Binghamton Railway is in charge of R. W. Day, general manager; R. L. Koehler, general superintendent; J. C. Meixell, superintendent of transportation; W. R. Hornberger, signal supervisor, being directly responsible for the operation of the signal system.

In the first three months of 1916 there were in Los Angeles, according to the traffic bureau of the police department, 1840 vehicle collisions, in 1224 of which it is charged that the drivers were guilty of an infraction of some traffic ordinance. There were 389 injuries reported from these accidents, among which were 126 serious injuries and twenty-two deaths. In accidents involving pedestrians their own negligence was responsible for 50 per cent of the injuries received.

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The Present and Future Development of Interurban Railways

By F. W. DOOLITTLE
Consulting Engineer, New York, and Formerly Director of the Bureau of Fare Research
American Electric Railway Association

Although electric interurban railways are of great economic importance to the communities which they serve, their financial returns have not been satisfactory. The author of this article analyzes the factors which have caused failure in the past and outlines conditions under which better results may be expected in the future.

IN the development of public utilities it is hard to find an instance where any project, so valuable to the community served and in general so well conceived and constructed under such apparently favorable circumstances as the interurban railway, has resulted in so many cases so disastrously to those who have engaged therein. In any new work there must be cases where human foresight is defective and where the future fails to develop the promises of the early years, but the distressing frequency with which the foreclosures and reorganizations with the accompanying shrinkage of investment have occurred in the history of electric interurban railways indicates that the early investors were unusually optimistic and not sufficiently aware of the hazards of their undertakings. In view of this situation it will be of interest to examine the facts as to the economic status of the interurban railway and its history from the standpoint of a commercial enterprise.

The primary purpose of the electric interurban railway is to provide transportation for people and for commodities and not to serve as an agency to develop communities. In so far as the development of communities may be accompanied by an increase of traffic sufficient to warrant the years of unremunerative operation, a private company is justified in devoting its funds to this purpose, but to project lines on the basis of community development alone is to doom the enterprise to failure and to make more difficult the securing of funds for legitimate railway purposes. It is probable that in no other respect were the early projectors of interurban railways so frequently led astray by their optimism as in connection with their estimates of probable future business. Unquestionably, the electric interurban has done much to develop communities but the process has in general been accompanied by such conditions as have made the results less satisfactory from a financial basis than investors had a right to anticipate, with the unfortunate result that private capital has lately looked with less favor on such investments.

GREATEST DEVELOPMENT FROM 1898 TO 1906

The history of electric traction,* so far as interurban railways are concerned, may be divided roughly into three parts. From 1888 to 1897 may be termed the preparatory period as during these years experiments in the application of electricity to street railways disclosed the many advantages which this form of motive power had over animal traction and the very promising, though short-lived systems of propulsion by cable. The advantages of electric power encouraged street railway operators to extend lines into the less well settled parts of cities and eventually into suburbs. Later developments have indicated that many of these extensions were unwarranted and that they have remained until the present burdens on other and more profitable lines.

Beginning in the late nineties, for convenience let us say 1898, many lines were projected and built, first as continuations of suburban lines and later as independent projects to connect larger centers of population with outlying villages and with cities of larger size at some distance. This movement continued, and a considerable amount of mileage was constructed up to and including 1906. The financial difficulties of 1907 brought to a close the second period which may be termed that of development, and from that time to the present a very small amount of electric interurban mileage has been projected and built.

While the financial depression beginning late in the year 1907 would have restricted the development of interurban railways, it is evident that other causes have been effective deterrents, inasmuch as the recovery in other lines of industry was accomplished within about two years. In 1912 and at the present time business conditions have been excellent for the development of new enterprises, but it appears that interurban railways have not enjoyed the prosperity of other lines of commercial activity. The explanation undoubtedly lies in the fact that many electric interurban railways have not justified the anticipation of their projectors.

STIMULUS GIVEN BY PROGRESS IN ELECTRICAL DESIGN

One of the principal causes of the rapid growth of interurban railways in the decade preceding 1907 was the possibility of high-speed operation brought about through the invention and perfection of the transmission of high voltage current, together with the development of the rotary converter and improved transformers. The progress in the art of transmission and application of electric power was rapid and held out great promise of providing a satisfactory and economical source of power. Unquestionably the later developments have justified many of the claims which electrical men have at any time made for their apparatus, but the advantages derived from the perfection of the transmission and application of electric current were allowed to outweigh certain of the handicaps to be experienced

*For a brief but very interesting historical sketch of transportation, from its earliest recorded forms to the modern high-speed electric interurban railway, see address by Chas. T. Henry, president Indianapolis & Cincinnati Traction Company, 1911, Proc. A. E. R. A. Page 220.

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by new lines. Funds for the projection of interurbans were obtained through directing attention to the development of the art rather than to the development of traffic or the difficulties thereof.

It would be interesting and instructive to trace the growth in mileage of electric interurban railways were accurate data available for the purpose. Prior to 1912 the United States Census contained no specific figures of interurban development, but data disclosed in that year indicate that slightly more than 16,000 miles out of 41,000 operating in the United States were to be classed as interurban lines. Of this mileage nearly one-half lies in the east north central division, which contains the states of Ohio, Indiana, Illinois, Michigan and Wisconsin; Ohio leading with more than 2700 miles. The accompanying table gives the mileage reported in 1912 census, together with the rank of the several states and division.

THE AVAILABLE STATISTICS ANALYZED

While not conclusive it is at least important to note that of the 7800 revenue cars other than passenger cars in service in 1912, nearly 75 per cent were in service in 1907 and only 14 per cent in 1902. In a general way this locates the period of growth of interurban railways in the five years preceding 1907, although the movement continued into the two following years. The revenue car-hours operated in these years is also significant, there having been 92 per cent as many car-hours made by express and freight cars in 1907 as in 1912, and but 16 per cent as many in 1902 as in 1912, indicating an increase of about 500 per cent in the first five years of the decade and an increase of only about 9 per cent in the last five years. In 1907 the freight revenue of electric roads was five times as great as in 1912, but from 1907 to 1912 the revenue did not double.

It is difficult to get comparable figures from the various reports of the State commissions. The Illinois Railroad & Warehouse Commission reports miles of line constructed by years since 1900. The maximum amount of construction was in 1906, and is reported as 168 miles. This is 20 per cent of the total construction of 847 miles in the years 1900 to 1914 inclusive. In the three years 1904 to 1906, inclusive, 392 miles or 47 per cent of the total for fifteen years were reported. The Public Utilities Commission of Ohio reports total miles constructed from 1908 to 1915, inclusive, as 364, of which 216, or 60 per cent, were built in 1908 and 1909.

One of the serious difficulties in a study of interurban electric railway statistics lies in the fact that it is difficult to define with accuracy and to distinguish between urban, suburban and interurban railways. A considerable portion of the mileage of certain interurban railways, particularly those in the more densely settled part of the United States, lies in political subdivisions which, while termed town or township organizations, are quite comparable to the villages and other incorporated municipal divisions of the Western States. Another difficulty is met in connection with the mileage of interurban railways lying within the corporate limits of the various municipalities served. Further, it is not always clear on what basis an electrified division of a steam railroad is to be considered. A part of the lines of the Long Island Railroad Company lying in the Borough of Queens has a traffic very similar to that of New York, Westchester & Boston and of the San Francisco-Oakland Terminal Railway. The latter is generally classed as an interurban electric railway. The Westchester is in many respects a suburban electric railway, although it serves to connect several cities of considerable size with New York. The electrified division of the Long Island Railroad is not usually considered to be an interurban railway, although the difference between it and some others which are so classified is not obvious. In the general use of the term it is probable that the classification "interurban" is associated with an electric railway system such as the Illinois Traction or the Pacific Electric Systems or those systems in Indiana and Ohio which, though having less mileage, are nevertheless typical interurban developments. A road such as the Bay State Street Railway Company is an interesting variant. It has resulted from the consolidation of a large number of small urban systems in adjacent communities.

Due to these variations in type, accurate and consistent definitions are difficult, but for the present purposes the following will be considered as essential and characteristic features of the electric interurban railway. Car mileage is made chiefly outside of city limits. The lines serve in general more than one primary center of population as distinguished from a suburban system which serves in general one primary center and one or more secondary centers of population. The terms primary center and secondary center as here used are relative and correspond roughly to the usual designations "terminal" and "subterminal." In the past it would have been of assistance in framing a definition of the interurban railway to point out that a distinction between an electric interurban and an electrified division of a steam road lay in the fact that the latter

INTERURBAN TRACKAGE

1912 Census

Geographic Division	Miles	Rank	Per Cent of All Electric Railway Track	Rank
Total	16,366	..	39.9	..
East North Central	7,193	1	60.9	1
Middle Atlantic	3,459	2	34.4	3
Pacific	1,825	3	43.6	2
New England	1,388	4	26.2	7
South Atlantic	856	5	28.9	5
West North Central	821	6	26.5	6
Mountain	338	7	33.6	4
West South Central	322	8	23.4	8
East South Central	164	9	12.7	9
State:				
Ohio	2,747	1	67.5	4
Indiana	1,777	2	77.2	2
New York	1,617	3	35.1	21
Pennsylvania	1,575	4	38.2	19
Illinois	1,343	5	43.0	16
California	1,095	6	42.0	17
Michigan	911	7	60.5	6
Massachusetts	796	8	26.4	28
Washington	428	9	41.3	18
Iowa	427	10	53.1	9
Wisconsin	414	11	51.4	10
Oregon	301	12	55.3	7
Maine	273	13	50.9	11
New Jersey	268	14	20.3	31
West Virginia	257	15	63.5	5
Kansas	243	16	53.8	8
Maryland	234	17	33.7	23
Texas	200	18	27.9	25
Connecticut	174	19	17.4	32
Colorado	134	20	28.6	24
Virginia	132	21	23.5	30
Kentucky	127	22	25.7	29
Oklahoma	109	23	43.1	15
New Hampshire	107	24	43.3	14
South Carolina	90	25	44.4	13
Utah	90	26	34.5	22
Missouri	83	27	8.3	39
Idaho	69	28	77.4	1
Georgia	65	29	14.8	33
North Carolina	52	30	27.4	27
Minnesota	39	31	7.0	43
Vermont	28	32	27.5	26
Tennessee	28	33	7.5	42
Nebraska	26	34	10.5	36
Arizona	17	35	37.7	20
Florida	15	36	9.1	38
Louisiana	14	37	4.7	44
Wyoming	11	38	48.0	12
Rhode Island	11	39	2.8	45
Delaware	11	40	12.0	35
Mississippi	9	41	7.8	41
Nevada	8	42	70.7	3
Montana	8	43	7.9	40
North Dakota	4	44	13.8	34
New Mexico	1	45	10.4	37

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interchanged equipment with the steam roads, but this distinction is gradually disappearing.

Owing to the difficulty of definition and classification pointed out above, there are practically no regularly published statistics available, concerning the financial and operating conditions of interurban railways as distinct from other types of electric traction. Various items appear, of course, from time to time in the ELECTRIC RAILWAY JOURNAL and other technical publications, and in financial journals, such as the *Commercial & Financial Chronicle* and *Wall Street Journal.*

An examination of these various sources of information furnishes some interesting data concerning the number of receiverships of electric interurban railways, together with the mileage and outstanding securities involved. For the past seven years the ELECTRIC RAILWAY JOURNAL has published early in January of each year a statement showing the extent of receiverships of suburban and interurban railways during the preceding twelve months. The accompanying table is summarized from this source:

ELECTRIC RAILWAY RECEIVERSHIPS IN SEVEN YEARS—1909 TO 1915

	Length of Line		Outstanding Securities—Capital Stock		Outstanding Securities—Funded Debt	
Type	Miles	Per Cent	Amount	Per Cent	Amount	Per Cent
City lines	1,374	34	$71,418,500	36	$152,791,990	60
Suburban and Interurban Lines	2,631	66	127,984,700	64	100,826,875	40
Total	4,005	100	$199,403,200	100	$253,618,865	100

UNDUE OPTIMISM THE CAUSE OF MANY FAILURES

The financial difficulties here outlined are to a considerable extent the result of over-development and of an unwarranted optimism as to the traffic which was or would become available. A more detailed study of the causes indicates that the almost complete failure of electric railway construction, begun after the financial depression of 1907 and 1908, is due to a variety of causes in addition to those already pointed out. Failure to earn results, both from high costs and low revenue, and in the case of interurban railways, both factors are in evidence. A very important and frequent cause of financial difficulty is that fixed costs have exceeded the preliminary estimates. This situation arises, of course, in many lines of business, but it has been particularly true in the case of the interurban railways, due to the fact that in making preliminary estimates there has been a relatively small amount of information available. It is further worthy of note that there are but few industries upon which it is possible for communities to place such large burdens as have been repeatedly placed on electric railways. An interesting example of the fact that costs may frequently largely exceed estimates may be found in the case of the Philadelphia & Western, which it was proposed to construct for some 10 miles west from the western part of the city of Philadelphia from the proceeds of a bond issue of $1,500,000, principal amount to be sold at 90 per cent of par. After construction was completed it was found that more than $4,000,000 cash had gone into the property.

The undue optimism which underestimates cost of construction and fixed charges is also in evidence in connection with operating expenses. It has been the common experience in all lines of industry that the cost both of labor and material has increased largely during the last fifteen years. Many interurban lines proceeded with construction at a time when the plans they were adopting had not been sufficiently tested to warrant the assumption that the results could be regularly achieved. A frequent burden of expense to those interurban roads which are the result of the consolidation of a number of small roads arises from the varying equipment and standards of the several lines combined. It has been found that powerhouses were not well located for the economical production of power, and that the size of the units was not economical for use in connection with the combined properties. Similarly the location of carhouses and repair shops, which may have been advantageous in connection with the property for which they were originally built, proves a handicap to operation when the properties are later consolidated.

In addition to the fact that expenses have greatly exceeded the original estimates it is of importance to note that revenues have invariably been less than estimated. This is due, in part, to a slower rate of development than had been assumed and in part to the construction of lines and operation within territory which is fundamentally deficient as a producer of traffic. The writer hopes, at some later time, to have an opportunity to present the results of a study of the general subject of estimating future business. Certain conclusions only need be pointed out at this time.

Estimates as to future population are distinctly unreliable, and comparison with the growth of towns apparently similarly situated is unwarranted. Estimates as to the probable traffic to be developed are likewise unreliable when based on a comparison of gross revenue per capita received by other lines in the territory they serve. If any one cause for the failure of electric interurbans to earn satisfactorily is to be emphasized it is this, that neither population nor revenue per capita can safely be estimated on the performance of other communities.

COMPETITION MET FROM STEAM RAILROADS AND AUTOMOBILES

Unexpected competition has been met with from steam roads which, with increasing density of passenger traffic, have been able to operate more frequent trains and thus attract to themselves certain passenger traffic which had been counted on for the interurban lines. In the meantime, passenger rates on steam lines were generally reduced from 3 cents to 2 cents per mile. This took away from the interurban its advantage from the lower fares, as it has not been found possible to operate at a rate much below 2 cents per passenger mile.

Within the last few years the good roads movement and the increased use of automobiles has introduced a serious type of competition. In the territory of one of the interurban companies in New England there were, early in the summer of 1916, 26,000 automobiles registered, exclusive of those in the principal city served by the company. If these 26,000 automobiles take but 10 cents a day from the interurban its revenues are affected to the extent of nearly $1,000,000 a year. Nor is the competition for the passenger business the only serious result of the increased ownership and use of the private automobile. In certain localities express and freight service is regularly given by motor trucks and vans. These combine high speed on the road with short delays at terminals and due to the fact that they rely on others, notably the electric railway companies, to maintain the streets and highways for their use, they are able, under certain circumstances, to furnish service at a less rate than it can be rendered by the interurban. From the standpoint of a competitor, the automobile truck has distinct advantages in that it can make its charges to those cities, also receiving electric interurban service, sufficiently less to attract business, while in other communities where electric lines do not run the auto truck can charge a rate sufficiently high to offset any loss that might accrue on its competitive

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business. A regulated utility does not have this opportunity. It is very likely that, within the next few years, much more attention will be given to the question of construction and maintenance of highways than has been given to it in the past. At the present time many cities and states are finding that the so-called permanent roads which they have constructed are wearing out before the bonds issued for the original construction have matured, the life of the highways having proven to be much shorter than was anticipated. Quite likely some effort will be made to place the burden of maintenance of highways more largely on motor vehicles, which are the chief destroying agency. Such a development would, of course, limit to some extent the competition experienced by electric lines from motor vehicles.

One difficulty not foreseen by the early projectors of interurban lines has been found in connection with the acquiring and operation of terminals. Many communities have been unwilling to permit the delivery or carriage of express and freight to and through the business districts over the lines of electric railways, and for this reason the development of freight and express business has been greatly retarded. The Illinois Traction System has met this difficulty in certain cases by the construction of belt lines located outside of the city limits. Such lines serve not only to avoid the restrictions imposed by the ordinance, but also provide excellent sites for the location of industries. These belt lines intersect the steam lines entering the city, and the traction company is able, by means of interchange agreements, to serve as either originating or delivering carrier for shipments handled in connection with the steam lines as well as handle traffic between points on its own line.

The increase of passenger fares on certain interurban railways during the past few years has served to make this business show smaller losses and is a recognition on the part of regulating bodies, where such have jurisdiction, that the original rates of fares of interurban roads were too low. In addition to the problem of finding satisfactory and adequate terminals for the handling of other than passenger business, freight business has been retarded in growth by rate schedules which for various reasons have proved to be unbalanced. A few interurbans have suffered a decline in revenues from a decline in business prosperity of the region served. This is particularly true in the case of certain lines in operation in the Northwestern States. Here a very marked activity in commercial lines was succeeded a few years ago by a very marked decrease, and in a number of communities by a considerable decrease in population. Roads which were built to serve these communities have, of course, suffered severely for this reason.

In 1915 the steam roads in the United States hauled a ton of freight 9 miles for every passenger carried 1 mile, and they received $3 of freight revenue for every dollar of passenger revenue. They also hauled a freight car 6 miles for every passenger car 1 mile. This indicates that the bulk of transportation in the United States is freight transportation, and suggests that the interurban, which is fundamentally in competition with the steam roads, as a carrier must develop its freight business. In Ohio, where the interurban development is typical, the revenue from passenger fares, together with that from baggage and parlor and special cars, was $16,000,000 in 1914, while that from express, milk and freight was only $1,800,000. The Illinois Traction System in 1915 was receiving only about 20 per cent of its revenue from freight service. As has been suggested above, franchise restrictions account, in part, for the apparent underdevelopment of the freight business. A further factor is the difficulty which electric lines have had in effecting interchange, joint rate through billing and switching absorption agreements with steam lines.

In recent years, however, the Interstate Commerce Commission has taken a hand, and the electric lines, backed by shippers and commercial organizations, have been able to make satisfactory arrangements for entering the freight business on the same basis as the steam roads.

Thirty years ago many of the shorter steam lines found themselves in the present situation of the electric lines. The solution of the problem for them differed somewhat, and they are now found as a part of larger systems, having been acquired after their inability to get favorable traffic agreements with their larger connections had forced them into receiverships.

POSSIBILITIES OF RELIEF

The place of the electric interurban in the economic scheme of the country is that of a transportation agency and not primarily that of a device for promoting growth of communities. In so far as it may be self-supporting as a transportation agency, it may serve the other purpose as well, but privately owned it must earn or go out of business. In many cases in the past it has not earned and has been forced to accept a large shrinkage in value in order that it might continue to operate. Even with these measures, many roads are still in doubtful condition, and will be until they receive some measure of relief. The form that this relief may take must in general be that of increased fares for passenger traffic and of a better adjusted scheme of rates for freight business so arranged as to secure greater diversity of traffic and adequate terminal facilities for freight carrying roads. This will tend to increase the density of traffic and to avoid the serious seasonal variations now met with.

Montreal & Southern Counties Railway

St. Cesaire-Granby Extension Forms a New Milestone in Canadian High-Speed Electric Railway Development

ANOTHER rung in the ladder of development undertaken by the Montreal & Southern Counties Railway has just been added by the placing in operation of the new 16½-mile extension from St. Cesaire to Granby. This new line, which marks a milestone in high-speed electric railway development in Canada, was placed in operation on April 30, 1916.

The Montreal & Southern Counties Railway is a suburban and interurban railway, connecting the south shore of the St. Lawrence River with Montreal via the Victoria Jubilee Bridge. The interurban arm of the development stretches in an easterly direction for a distance of 47.5 miles through the counties of Chambly, Rouville and Shefford, the present terminus being Granby. A description of the older portion of the line together with a map of the region was published in the ELECTRIC RAILWAY JOURNAL for March 28, 1914, page 702.

From a limited service inaugurated in 1909 between Montreal and St. Lambert, a distance of 3½ miles, extension after extension has been added until at the present time a majority of the municipalities of the south shore have been brought into such close communication with Montreal through frequent service as to make commuting a pleasure.

Construction work on the new extension was begun

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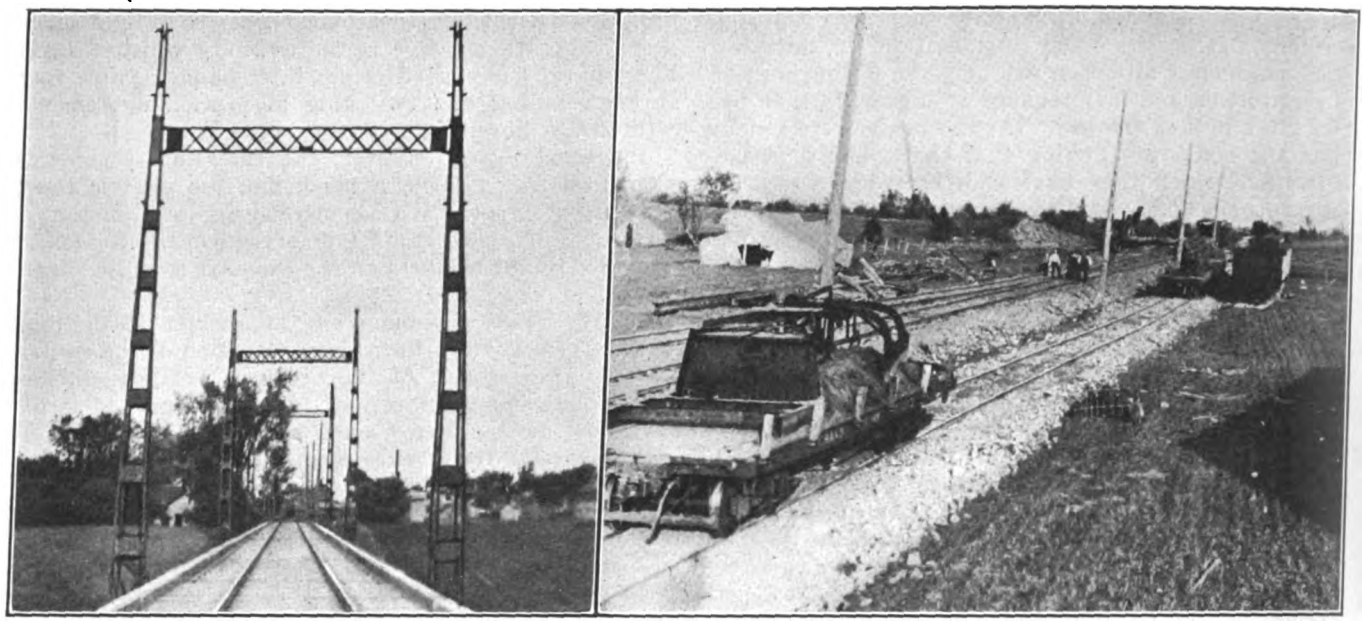

MONTREAL & SOUTHERN COUNTIES RAILWAY—OVERHEAD CONSTRUCTION OF YAMASKA BRIDGE; ALSO VIEW SHOWING METHODS OF TRACK CONSTRUCTION

in October, 1913, when a contract was let for the construction of the concrete piers for the steel bridge across the Yamaska River at St. Cesaire. This bridge, which is of the deck girder type, is 240 ft. long and is supported on four piers spaced 80 ft., center to center. The steel work was supplied and erected by the Hamilton Bridge Company of Hamilton, Ont.

In the spring of 1914 a contract was let for the construction of the roadway. Work was commenced May 25, 1914, and sufficient force was employed to complete the work and place the road in operation by Oct. 15 of the same year. On Aug. 5, however, all construction work was suspended due to England's declaration of war, and it was not resumed again until May 19, 1915, from which date the work was carried on uninterruptedly until its completion Dec. 12, 1915.

LINE CONSTRUCTION

The type of construction used on this section is similar to that employed on the previously electrified extensions. The bonding consists of No. 0000 concealed type triplex bonds with $\frac{7}{8}$-in. terminals for compressing into the web of the rail. The overhead construction is of the standard catenary type with 7/16-in. Siemens-Martin grade stranded galvanized steel messenger cable, from which, at intervals of 15 ft., is supported a No. 0000 American standard grooved hard-drawn trolley wire. The hangers are of the floating type, especially designed to absorb shocks, and consists of a three-bolt malleable-iron Detroit ear, to which is riveted a $\frac{3}{4}$-in. wide by $\frac{1}{8}$-in. thick strap-iron hanger.

Within the town of Granby the construction is cross span with 28-ft. steel poles set in concrete. The remainder of the line is constructed with 40-ft. cedar poles 7 in. in diameter at the top. On tangent track the poles are set 150 ft. apart, while on curves the spacing is either 75 ft., 90 ft. or 105 ft., according to the degree of curve. The minimum clearance between poles and rail is 6 ft. on tangent track and 6 ft. 6 in. on curves. Bracket type construction was used wherever possible. A 10-ft., T-iron bracket on which is mounted a malleable iron pin and porcelain insulator carries the messenger wire. The messenger wire is allowed to ride free in the recess in the insulator, thus permitting free adjustment of line between anchors, which are located a half mile apart. Throughout the yards and on a number of the curves cross-span construction is used.

Supplementing the trolley wire throughout the entire distance is a 816,000 circ. mil aluminum feeder, with taps every quarter mile. The feeder is carried on glass insulators with oak pins, which in turn are carried in $3\frac{1}{2}$-in. x $4\frac{1}{2}$-in. x 4-ft. B. C. fir cross-arms. On all curves double cross-arms are used, and the wooden pins are replaced by malleable iron ones. The feeder taps consist of No. 00 stranded weatherproof wire, a four-bolt aluminum clamp being used to attach it to the feeder. A Garton-Daniels lightning arrester is installed at each tap.

On the top of the same poles which support the trolley feeder and telephone is carried the 25,000-volt, three-phase transmission line. The insulators are supported on steel pins with porcelain bases. No. 4 B & S gage copper wire is used for transmission and No. 8 B. W. G. galvanized-iron wire is used as ground wire. The ground wire is grounded every quarter mile.

The telephone dispatching system already in use was extended from St. Cesaire to Granby. The line wires are No. 10 B & S gage hard-drawn copper, and are carried on side blocks. This line is transposed every third pole in order to counteract the effect of induction. The instruments are of the Northern Electric Company selector type.

BUILDINGS

A substation equipped with three 185-kva. step-down transformers, a 400-kw. synchronous motor-generator set, and the necessary control apparatus for converting the 25,000-volt, 63-cycle alternating current to 600-volt direct current, was constructed just outside of Granby.

At Abbotsford the company erected a station building to provide accommodations for the passenger, freight and express traffic. A three-story brick block was purchased at Granby, the main floor and basement of which is used for station purposes.

The work of electrification was carried on by the company itself under the direction of G. J. Meyer, chief engineer and general superintendent. Other company officers are: E. J. Chamberlain, president; Frank Scott, vice-president; J. A. Yates, secretary, and W. B. Powell, general manager.

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The Fundamentals of Power Saving

The Author Explains the "Why" of Power Saving in Simple Language, Shows that Power-Saving Methods Save Brakeshoes, Reduce Load Peaks and Increase Safety, and Formulates Rules for Power Saving by Motormen and Conductors

By WILLIAM ARTHUR
New Haven, Conn.

AT FIRST blush one would expect to find that a process so common as the starting, running and stopping of a train or trolley car would long ago have been reduced to an exact science, and that the possibility of saving power by attention to the engineer's or motormen's method of notching up and braking would be quite limited. Yet the reverse is true. If left to themselves few motormen will handle a trolley car in an efficient and economical manner. They do not understand the basic principles—"the reasons why"—of economical car operation, and usually no incentive is held out to cause them to change their present wasteful methods.

In what follows, effort will be made to state in simple terms the fundamental principles governing efficient trolley car operation; it being understood that in general most of what is said applies equally well to local services on either steam or electric railroads—in fact, to any service requiring frequent starts and stops. In a technical sense, much has already been written on this subject. However, many of those most interested in power-saving methods—inspectors, foremen, instructors, chief motormen and others—have usually little time or opportunity wherein to study the more abstruse presentations of the subject, and the present article is written with these men in mind.

FUNDAMENTAL PURPOSE OF CAR OPERATION

Right at the beginning it is well to define why trolley cars are operated at all. Their fundamental purpose is to transport the public safely, comfortably, conveniently and as swiftly as the local needs demand. In doing this, car equipment must not be abused. No efforts at saving energy will be countenanced which prejudice any of these primary considerations. As we shall see, these requirements do not necessarily conflict with economical operation, but rather, in most respects, are its natural accompaniment.

HOW CAN POWER BE SAVED?

Let us ask ourselves the following question: Suppose it to be assumed that a motorman is required to operate a car between two points a quarter-mile apart. How can he make the trip with the least expenditure of energy? The answer depends entirely upon the time allowed.

Case A.—Suppose that there is no time limit. Obvi-

Rules Relating to Methods of Power Saving

A motorman can save power by attention to the following:

1. Be alert, and whenever possible have the brakes off, ready to start the moment you get the bell.
2. Notch up at as fast a rate as a proper regard for safety, for the comfort of the passengers, and for the care of equipment, will permit. Endeavor to avoid a jerky start; gather speed swiftly, yet smoothly. If likely to make a very short run, notch up to full series quickly; wait for a few seconds before moving to the parallel notches. This both saves energy and reduces the draft of power required from the power station. Move to the parallel position only as often as it is necessary to maintain the schedule.
3. Shut off power as soon as possible, but not so soon as to cause you to lose time.
4. Coast for as long a time as possible.
5. Apply the brakes at as late a time and at as low a car speed as is possible, having proper regard to safety and to the need for stopping at the proper place.
6. When braking, do so at as high a rate as is possible, having regard for the comfort of the passengers. Slow down the car without jerks. Whenever possible, make one application do the work. Ease the brakes a little just before the final stop. This will avoid a jerk.
7. Avoid unnecessary stops; for instance, when coming up behind a team, if there is a chance you may be stopped, at once shut off power and coast up to the obstruction, sounding your bell loudly as you approach. The chances are that very often you will not be forced to stop at all, and you will have saved power. To do this requires that you keep a good lookout for possible obstructions.
8. In stopping to pick up passengers, stop at the right place; otherwise, the passengers will have to walk some distance, and time will be wasted. Remember that time wasted in the end means energy wasted.
9. Whenever necessary, do your part to help the passengers in and out of the car. This will shorten the stop and so save both time and energy.
10. Report promptly any car which is in any way defective. Report a car which seems to start too slowly or which does not run freely. Report defective or weak brakes. Report dragging brakes. Such reports will make for greater safety and better economy in operation.
11. Report any sections in the run or places at which you regularly meet obstructions, or have to run slowly, due to low voltage or other reasons.
12. Avoid arriving at your destination or meeting point ahead of schedule time. The only way you can have done this was to have used more power than was necessary.
13. Avoid delays and lost time in every way, having due regard to other considerations. Remember at all times that time saved is, in the end, energy saved, and that time wasted is energy wasted.

A conductor can save power by attention to the following:

1. Be alert. Remember that the total energy used by a car depends almost as much upon how you do your part as it does on how the motorman does what is expected of him.
2. Avoid delays of all kinds. Remember that time wasted at any point in the run is, in the end, energy wasted.
3. Make the stops as short as possible, having regard to the safety and convenience of the public. Economy must begin only when safety has been assured, but it should begin then. Where necessary, assist the passengers in and out of the car. This is good policy, and will save both time and power.
4. Give the motorman a clear signal just as soon as you are ready to have him start.
5. As soon as the car starts, call out in a clear voice the name of the next street or stopping point, so that as early as possible passengers may signify their desire to stop. Your bell in time will often prevent the motorman from throwing his controller handle over to the parallel position unnecessarily, and so you will have helped to save energy.

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ously, then, the most economical operation would be for him to start the car, and then when it has gained speed shut off power and coast until the car stops, judging the speed at which power is shut off, so that the stored energy will just carry the car the required distance. By this plan the total energy input to the motors, except that wasted in resistance, is usefully utilized for propulsion, *i.e.*, in overcoming resistance to car motion. If, however, power is held on too long the speed will rise higher than is necessary; the run will be made in shorter time than before, and the car will over-run the stopping point unless the brakes are applied, *i.e.*, unless the extra energy put into the car is absorbed at the brakeshoes.

Case B.—If the motorman be told to make the run in ten seconds time less than before, he obviously can only do so, assuming the same acceleration rate, by keeping power on longer and applying his brakes to make the stop. In other words, time is gained at the expense of energy consumption.

Case C.—If, however, he again repeats the run and accelerates sufficiently fast, he can shut off power earlier than before, and then coast to a stop, making the trip in the same decreased time as before, but without using the brakes. In other words, the required ten seconds can be gained by correspondingly quicker acceleration and without wasting energy at the brakeshoes. If in the cases A and B the motorman had already accelerated the car at the highest practicable rate, then the saving in time (ten seconds) in case C could have been made only by keeping power on longer and using the brakes.

EFFECT OF LOSING TIME AT STOPS

If in maintaining a certain schedule the motorman loses time—say, in responding to the bell or in notching up or in braking at too slow a rate—he wastes energy to the same degree, because the actual running time has been decreased. If the conductor loses time in giving the signal or in other ways, he causes energy to be wasted proportionately. In this matter we are apt to consider the motorman too much and the conductor too little. Economical car operation depends upon the team work and joint efficiency of both.

From what has been said, it will be clear, after a little thought, that for any given schedule, other conditions remaining the same, the following relations exist:

(*A*) As the acceleration rate increases, the time power needs to remain on decreases; the coasting time increases, the braking time decreases, the maximum speed is lowered (for short runs), and the energy consumption is lowered.

(*B*) An increase in braking rate will produce the same general result as an increase in acceleration rate.

(*C*) The effect of a change in the length of stop is exactly similar to that caused by corresponding changes in either the acceleration rate or the braking rate.

MONEY SAVING DUE TO POWER SAVING

The difference between the least and most efficient possible car crews, in practice, is usually found to be represented by almost 50 per cent saving in energy consumption for the same service. This has been repeatedly demonstrated by careful tests and affirmed by many independent observers.

Suppose that the inefficient crew uses 3 kw.-hr. per car-mile and the efficient crew only 1.5 kw.-hr. for same service, *i.e.*, 50 per cent reduction as above; then assuming an over-all efficiency from trolley to busbar of 80 per cent, and with power at 1 cent per kw.-hr., poor operation will waste approximately $4 per car per day. This is a considerable percentage of the crew wages. The average saving to be made on any ordinary city system is, of course, much less than this, for all car crews are never so poor as the poorest, nor can they all be trained to reach the high point of efficiency attained by the best operators. It has, however, been repeatedly demonstrated that large savings can be made, and by proper means, steadily maintained.

Right here it might be said that up to a certain point passengers do not experience discomfort from high acceleration and braking rates. Discomfort arises more from jerky changes in the rate. Uniform acceleration or braking, even at rates as high as 2 m.p.h.p.s. or more is not uncomfortable, whereas sharp variations, say from 0.5 to 1.5 m.p.h.p.s. and back again, are quite uncomfortable. For years the writer traveled daily on a railway where acceleration rates as high as 2.5 and even 3 m.p.h.p.s. were common practice, and the public experienced no appreciable discomfort. These rates are unusual, however, and in any case trolley cars are rarely equipped with sufficiently powerful motors to make such rates possible, nor with ordinary city schedules are such high rates necessary. Economical operation can be realized by using reasonably high acceleration and braking rates. Nothing more is necessary.

The question now arises: How can we insure that the motorman and conductor operate the car so as to take advantage of these opportunities for saving energy; and, at the same time, how can we compare the relative efficiency and team work of two or more car crews operating similar services from day to day?

INSTRUCTION NECESSARY

The first thing to do is to give them suitable instruction, explaining in simple language the principles involved. This can be done through personal instruction by some properly qualified inspector, or by a series of lectures, at which, by the aid of a blackboard, 100 or more men can be taught at one time, or by the issuance of a small booklet of instructions on "Saving Power" distributed to each man concerned. Any or all of these methods would help to teach the men "how." Instruction, however, of itself is not enough. Experience has invariably shown that the gains which follow a power-saving campaign based on instruction only are temporary in character and disappear gradually when the first enthusiasm has passed. To make the gains permanent and to stimulate and retain the men's interest, it is necessary to have some means of comparing, on a fair and indisputable basis, their efficiency from day to day, and publishing at weekly or other intervals an efficiency record listing the relative standing of each man. How can this be done?

DEVICES FOR CHECKING MOTORMAN EFFICIENCY

It is obvious that through the use of suitable recording apparatus we could compare the men's relative all-day efficiencies, having as a basis any one of the three elements: power-on time, coasting time and braking time. Three types of apparatus are already available for this purpose, embodying each of the three principles above outlined, respectively.

In comparing men by the first method it is convenient to do this directly, and, by the use of a wattmeter or an ampere-hour meter, measure the actual energy input rather than the time element.

The second method is that utilized in the coasting time recorder.

The third method, recently developed by the writer, in one form simply records braking time. Since the energy wasted is chiefly that thrown away at the brakeshoes, it follows that by recording braking time the desired efficiency comparison is simply and easily made.

Each method possesses certain advantages and disadvantages, which, however, need not be here discussed.

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The point may be emphasized, however, that no matter how the efficiency check is made—so long as it is made upon some fair and effective basis—the net effect upon motorman and conductor is exactly the same. Recording devices of themselves do not save energy, but in each case they force the motorman to pursue the correct methods of operation at each part of the cycle; otherwise he gets a bad record.

SAVINGS OTHER THAN IN POWER

It should be remembered that the saving in energy is only one of the points of advantage which result from a power-saving campaign. The other points may be briefly summarized:

1. The saving in brakeshoes is considerable, and from experience at many places appears to average about 33 per cent.

2. On large systems peak loads are reduced and power station, transmission line, substation and feeder-copper capacity are increased in proportion to the power saving. Extensions to existing plant may therefore be postponed. Voltage conditions are improved.

3. The average load on car motors is usually reduced. This is in contradiction to the first impression one is apt to have, namely: that quicker acceleration will necessarily increase the load on the motors. Analysis shows that although the momentary load on the motors is increased, the average motor heating is decreased. This is equivalent to a gain in motor capacity to the same extent, or, put another way, is equivalent to adding new cars to those already operated. The full advantage of this, however, obviously can only be realized on routes requiring many cars to maintain the headway.

With the increase in motor capacity referred to above, the schedules may often be "jacked up" proportionately without exceeding the normal safe capacity of the motors. This leads naturally to the next consideration, which in certain situations may be of more importance than the consideration of the amount of power which is saved.

4. As an average figure, approximately 55 per cent of the total expense of operating a trolley system consists of items which are affected by a change in schedule speed. The platform expense alone is usually about 30 per cent of the total operating expense. This expense and the number of cars required to maintain a given service are, of course, reduced proportionately to the increase in schedule speed.

In connection with this there is another point: In situations where the public demand is for quicker service, necessitating higher schedules, if the men have previously been operating at high efficiency, such new schedules can only be given at the expense of higher energy consumption per car-mile, but having once, by the use of efficiency recorders, forced the men at all times to operate in a manner best calculated to save power, we have at the same time automatically trained them to get the best that can be gotten out of any trolley car, or conditions as a whole. The result is that if it becomes necessary to raise schedule speeds, we can do so simply by shortening the coasting period and correspondingly increasing the braking period, *i.e.*, having once by the use of a recording device taken the "slack" out of a system we can utilize this slack either to save power or to raise schedules—whichever may be of greater importance in the particular case. In any given case the most economical schedule speed will, of course, be that at which the sum of power expense and platform (and other speed-affected items of) expense is a minimum. Usually, however, the problem is simply that of saving power; and, as we have seen, the economies which are to be made in this direction alone are distinctly worth while.

5. The effect of correct operation upon safety must not be overlooked. As we have seen, the most efficient motorman is the one who on the whole is able to make his schedule with the lowest maximum speed, *i.e.*, by efficient manipulation he would each time find it unnecessary to reach the high speeds demanded by the inefficient operation of a poor motorman. This lower maximum speed makes for greater safety.

In addition, the efficient motorman, running as he does for a greater percentage of his time with power off, on the average has his car under better control. This again makes for greater safety. On the other hand, if effort is made to shorten the stop too much the danger to passengers increases. Safety first and always should be the slogan.

With the foregoing principles clearly in mind, a set of rules to form the basis of instruction to motormen and conductors on trolley cars has been tentatively drafted. They will, of course, need modification to suit local conditions. It is to be noted, however, that in every instance the element of time enters into the rule. This is striking evidence of the fundamental principle herein developed, that in the end power saving resolves itself into time saving, and time saving into power saving.

Report of New York Bureau of Franchises

The report of the Bureau of Franchises of the Board of Estimate and Apportionment of New York City for 1915 contains schedules showing the applications presented to the board during the year and the action thereon or the present status of each case. The question of additional motor-bus operation in Manhattan, which has not yet been settled, is reviewed in detail. Owing to the financial depression during the latter part of 1914 and early in 1915, applications for franchises were fewer than before. Only four franchises were granted, one being a grant to the Long Island Railroad in exchange for rapid transit easements.

The bureau has included in its report a résumé of its work since its organization in 1905, accompanied by tables and charts showing all matters passed upon during this period. As the type of street railway cars has undergone a decided change in the last few years, photographs are presented of the various styles used by the companies in the different boroughs.

Between 1905 and 1915, 172 applications for franchises were presented to the board, of which seventy-eight were granted, sixty-three withdrawn, filed or denied, and thirty-one are still pending. The greater number of the franchises granted were for surface electric railways, forty-one grants of this character having been made mainly for short extensions to existing systems. For these forty-one grants, the total minimum compensation required for the franchise contracts was $1,642,351. This total is composed of $87,500 in initial payments, $50 for past use of the streets and $1,554,841 for minimum annual payments. The annual payments are in all cases based upon a percentage of the gross receipts with fixed minima, but the actual payments usually exceed these limits. The total number of franchise years (original term) covered by the grants is 630.16, giving an average of 15.76 years per grant and a minimum revenue of $98,655 per year of average term. The total number of franchise years thus far expired amounts to 164.42, with an average expired term of 4.11 years, showing an average actual return on the annual payments of $122,661 per year of expired grant.

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LONDON POSTERS—MAP OF THEATER DISTRICT

London Underground Posters

New Line of Attractive Display Sheets by English Railway Corporation

THE London Underground Electric Railways Company, Ltd., has always made a specialty of issuing very attractive traffic posters, and for this work has employed some of the most prominent artists in the United Kingdom. Views of some of those issued have appeared in previous numbers of this paper, and samples of four of the most recent are published herewith. Unfortunately, in the reproduction and reduction, a great deal of the detail is lost as well as is all of the coloring, which makes these posters most attractive. The view which suffers most, perhaps, in this reduction is the one representing the theater district of London, and shown by the single cut. The original poster is 40 in. x 50 in., and it is drawn in the old style and colored brilliantly. The border is made up of a series of panels giving the names and locations of the different theaters in London.

Of the three posters grouped together, the first has a gilt border and the lettering has an emblazoned initial and is printed in various colors. The middle poster is in red and black, and the right-hand poster is in the early English or Dutch style. The originals of these posters are 25 in. x 40 in. in size.

Western Red Cedar Association Issues Standard Treatment Specifications

UNTIL recently different pole dealers have had different specifications for the application of preservatives. Railways have bought on these dissimilar specifications and also in accordance with their own specifications. Now the Western Red Cedar Association, after several months' investigation and study, has issued a standard set of specifications which all members will recommend for the butt treatment of red cedar poles by the open tank process. Three treatments are defined.

TREATMENT "A"—provides for a continuous submersion in hot carbolineum for a minimum duration of fifteen minutes.

TREATMENT "AA"—provides for a continuous submersion in hot creosote for a minimum duration of fifteen minutes.

TREATMENT "B"—provides for a continuous submersion in alternately hot and cold creosote for a minimum duration of six hours.

TREATMENT "A"—Carbolineum as Preservative

Poles shall be seasoned at least four seasoning months before treatment. (See seasoning calendar appended.) All fibrous inner bark and foreign substances must be thoroughly removed from that portion of the pole between the points one and one-half feet above, and one and one-half feet below the ground line.

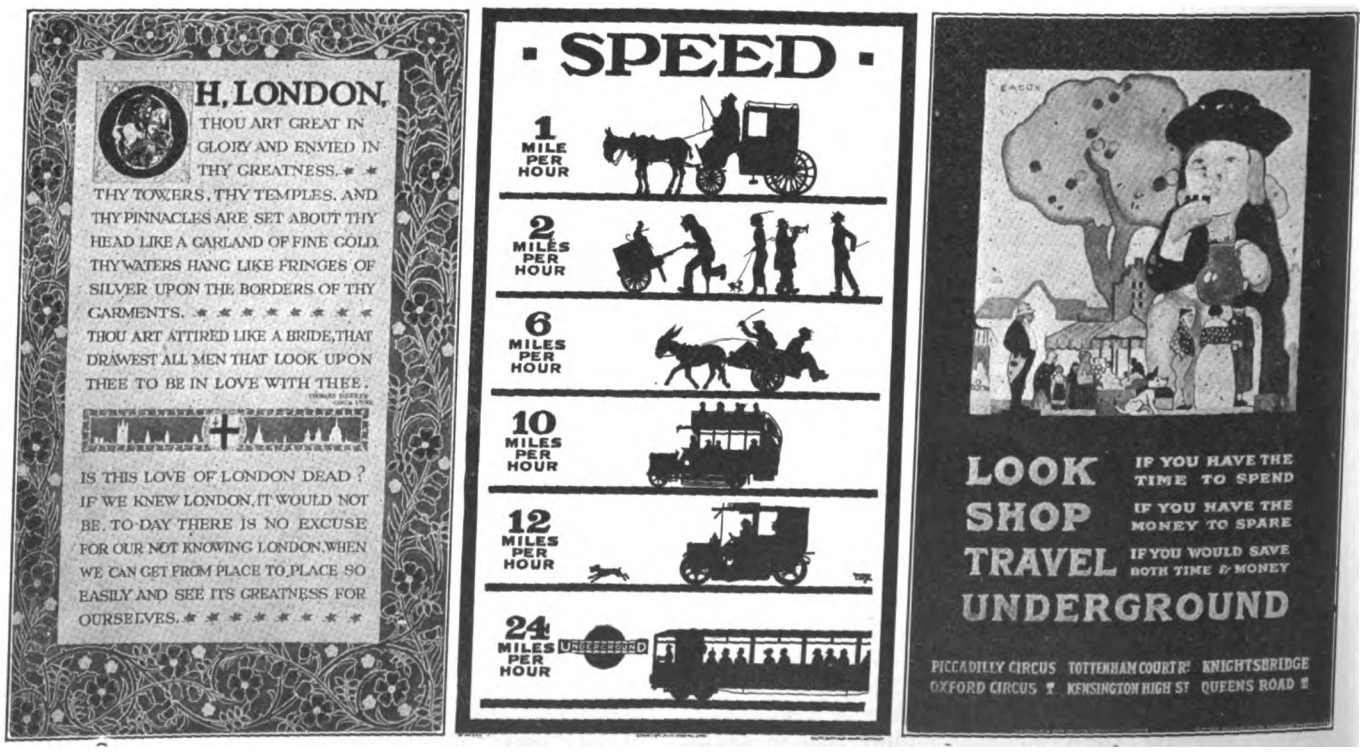
The poles shall then be placed in an upright tank with the butts fully and continuously submerged in the preservative, to the height as specified, for not less than fifteen minutes when the atmospheric temperature is 70 deg. Fahr. or higher, and a proportionately longer time when the temperature is below that point; that is, during the colder weather the time of immersion must be sufficiently longer to result in the wood becoming as thoroughly heated as it would be under a fifteen minute treatment when the atmospheric temperature is 70 deg. Fahr. or higher.

The preservative is to be that known as "Carbolineum," which must conform to the specifications shown on page 401.

The preservative shall be heated to a temperature of 215 deg. Fahr. at least once every four hours of treatment, and shall not be allowed to fall below 180 deg. Fahr. or reach above 230 deg. Fahr.

TREATMENT "AA"—Creosote as Preservative

Treatment "AA" is the same as Treatment "A" except that "Creosote," conforming to specifications later given, shall be used.



LONDON POSTERS—THREE ATTRACTIVE POSTERS

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TREATMENT "B"—Creosote as Preservative

The condition and preparation of poles for Treatment "B" is the same as for "A" and "AA."

The poles shall be placed in upright tanks with the butts fully and continuously submerged in the preservative, to the height specified. The duration of treatment shall be divided between a hot and a cold bath. The poles shall remain in the hot bath for four continuous hours, after which they shall be transferred to the cold bath, in which they shall remain for two hours. (See note.)

The preservative is to be that known as "Creosote," which must conform to the specifications shown herewith.

The preservative constituting the hot bath shall be heated to a temperature of 212 deg. Fahr. at least once every four hours and shall not be allowed to fall below 180 deg. Fahr. or reach above 230 deg. Fahr.

The temperature of the preservative constituting the cold bath shall not exceed 112 deg. Fahr. at the conclusion of the treatment.

Note: The intent of treatment "B" is to give poles as near a full sap penetration as possible. Experience has shown that, due to the variance in the density of the sap wood, some poles will not take a penetration as readily as others, but at least 75 per cent of the poles shall have an average penetration of one-half the sap wood. If necessary the duration of treatment shall be extended to accomplish this result.

SEASONING CALENDAR

Poles that has been properly piled for seasoning for a period of four seasoning months, shall be considered seasoned. In arriving at a seasoning month, the calendar months shall be rated as follows:

December, January or February equals one-eighth seasoning month.
March equals one-fourth seasoning month.
April equals one-half seasoning month.
May equals three-fourths seasoning month.
June, July, August or September equals one seasoning month.
October equals three-fourths seasoning month.
November equals three-eighths seasoning month.

REQUIRED ANALYSIS OF "CARBOLINEUM"

The carbolineum shall consist of the higher boiling fractions of pure coal tar and must not contain any admixture of any other tar oil or residue obtained from petroleum or any other source.

The specific gravity of the oil compared with water at 15.5 deg. C. shall not exceed 1.135 nor be less than 1.09 at 38 deg. C.

The flashing point shall not, in general, be below 140 deg. C.

The burning point shall not, in general, be below 170 deg. C.

The amount of distillate coming over at 300 deg. shall not exceed 15 per cent, of which not to exceed 2 per cent shall distill below 235 deg. C.

The tar acid in the distillate coming over below 300 deg. C. shall not exceed 2 per cent by volume of entire sample.

A sulphonation test of the fraction between 300 deg. C. and 360 deg. C. should yield in residue not more than one-tenth of 1 per cent by volume of entire sample.

The percentage of residue insoluble in benzol shall not exceed 0.25 of 1 per cent by weight.

REQUIRED ANALYSIS OF CREOSOTE

The creosote shall be a coal tar distillate obtained entirely from coal-gas or coke-oven tar and must not contain any admixture of any other tar, oil or residue obtained from petroleum or any other source, including coal-gas tar or coke-oven tar. The oil must be completely liquid at 38 deg. C. and shall be free from suspended matter.

The specific gravity of the oil shall not be more than 1.08 or less than 1.03 at 38 deg. C.

The oil shall not contain more than 3 per cent of water.

Up to 200 deg. C. the water-free oil shall render no distillate.

Up to 210 deg. C. the distillate shall not exceed 5 per cent.

Up to 235 deg. C. the distillate shall not exceed 25 per cent.

At 355 deg. C. the residue if it exceeds 5 per cent in quantity shall be soft.

The tar acids in the distillate coming over below 300 deg. C. shall not exceed 8 per cent by volume of the entire sample.

Open-Air Car Proves Popular in Vancouver

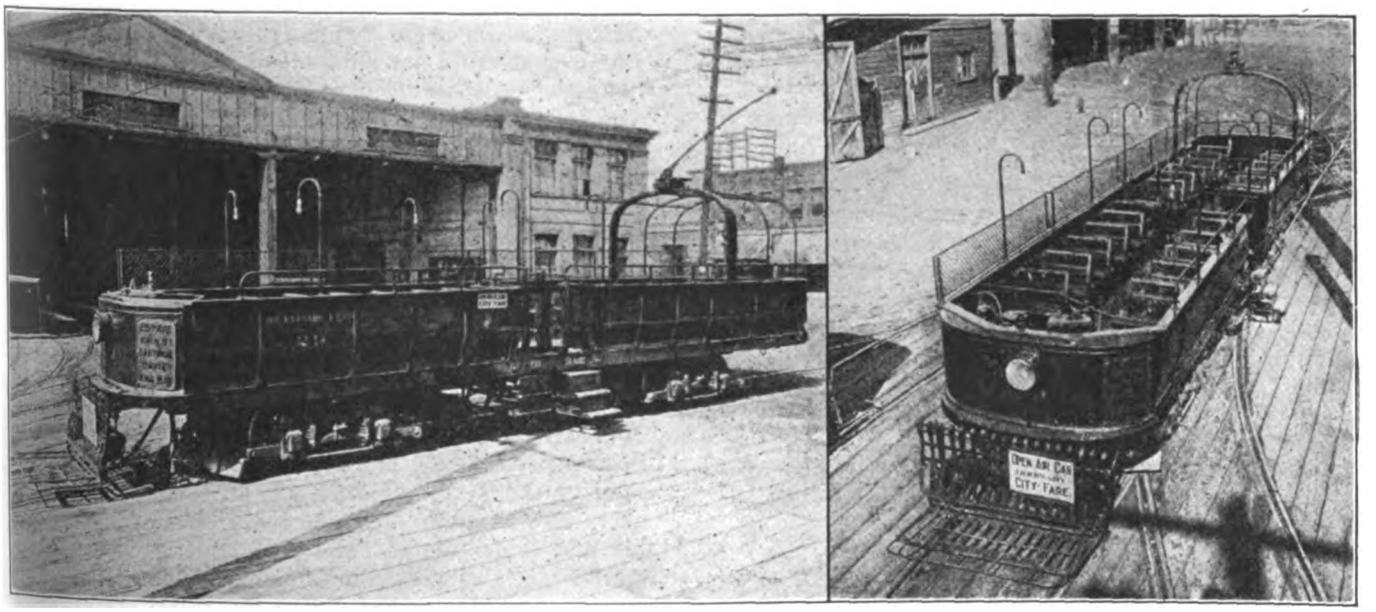
British Columbia Electric Railway Makes Good Use of Superseded Equipment

THE accompanying illustrations show an "open air" car recently put into service on the Vancouver city lines for summer travel. It is operated at regular fare and on regular runs, and has already become quite popular with the public, particularly during the evenings when there is heavy travel to the beaches and other open air resorts.

The car was originally a single-end prepayment car, with a seating capacity of forty, but it had been retired from service as it was not equipped with gates and other safety appliances required by the provincial government.

PARTICULARS OF VANCOUVER OPEN-AIR CAR

Length over bumpers	41 ft. 7¾ in.	Weight, per seat	641 lb.
Width over rails	8 ft. 3½ in.	Trucks	Brill No. 27-G-1.
Distance center to center of bolsters	22 ft. 2 in.	Wheels	33-in. chilled iron.
Height over trolley base	12 ft. 6 in.	Motors	Four GE-67.
Step heights, 15½ in., 9½ in., 9½ in., 10¼ in.		Air brakes	Westinghouse.
Seating capacity	54	Fender	Watson automatic.
Weight, body and equipment	12,500 lb.	Trolley base	Sterling.
Weight, trucks and motors	22,100 lb.	Trolley retriever	Earll.
	34,600 lb.	Headlights	B.C.E. Ry.



SINGLE-END PREPAYMENT CAR AS REMODELLED FOR OPEN AIR, CENTER-ENTRANCE OPERATION IN VANCOUVER, B. C.

The present alterations included the removal of all the body structure above the sash rails, and of the end partitions. The step openings at both ends were closed and a new entrance and exit was made near the center. Three steps were arranged to swing under the car, controlled simultaneously with the gates by levers. Wood gates with clear glass panels were installed.

The trolley base was mounted on a 7-in. steel channel arch, to the rear of which was placed a guard made of 1-in. pipe with heavy wire netting over it. The seats were rearranged on 29-in. centers, and a circular one was built against the rear dash, giving a seating capacity of fifty-four.

Guard rails were placed along the open side and the standard wire guard panels, 18 in. high, along the devil-strip side. Eight 16-cp. lamps were mounted on standards along the sides, and for signaling from conductor to motorman a push-button and Faraday buzzer, the latter mounted on the front dash, were provided.

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1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

ASSOCIATION NEWS

1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

A List Is Published of Manufacturing Members Who Have Been Appointed to the Convention Transportation Committee—The Manila Company Section Meeting in July Was Enlivened by Several Interesting Features

Manufacturers Appointed on Transportation Committee

The regular transportation committee of the American Association has been augmented by the addition of the manufacturers listed below. While acceptances have at this date not been received from all of the appointees it is hoped that all those invited will consent to serve.

New England:

Warren L. Boyer, president Bemis Car Truck Company, Springfield, Mass.
Arthur Hale, sales agent Griffin Wheel Company, Boston, Mass.
J. E. Johnson, purchasing agent Laconia Car Company, Boston, Mass.
F. B. Kennedy, vice-president New Haven Trolley Supply Company, New Haven, Conn.
R. F. Gammons, vice-president United States Electric Signal Company, West Newton, Mass.

New York State (exclusive of New York City):

W. K. Archbold, president Archbold-Brady Company, Syracuse, N. Y.
H. M. Sperry, Publication Manager, General Railway Signal Company, Rochester, N. Y.
Frank H. Gale, advertising manager General Electric Company, Schenectady, N. Y.
F. D. Miller, president National Brake Company, Inc., Buffalo, N. Y.
John Taylor, president Taylor Electric Truck Company, Troy, N. Y.

New York City:

Bertram Berry, Heywood Brothers & Wakefield Company.
William Wampler, vice-president and general manager The Ellcon Company.
George P. Smith, secretary-treasurer, Smith-Ward Brake Company.
William A. Lake, The Pantasote Company.
Edward L. Leeds, general sales manager Niles-Bement-Pond Company.
W. R. Kerschner, president W. R. Kerschner Company, Inc.

New Jersey, Pennsylvania, Delaware and Maryland:

J. H. Horn, National Lock Washer Company, Newark, N. J.
J. C. McQuiston, manager publicity department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.
Ralph Moore, General Electric Company, Philadelphia, Pa.
M. Alpern, American Engineering Company, Philadelphia, Pa.
S. M. Wilson, The J. G. Brill Company, Philadelphia, Pa.
F. A. Estep, president R. D. Nuttall Company, Pittsburgh, Pa.

North and South Carolina, Georgia and Florida:

F. L. Markham, The J. G. Brill Company, Atlanta, Ga.
A. H. Sisson, Southern Car Company, High Point, N. C.

Tennessee, Mississippi and Alabama:

Frank Steffner, Chattanooga Armature Works, Chattanooga, Tenn.

Indiana, Ohio and Michigan:

Edwin Besuden, general sales manager The Jewett Car Company, Newark, Ohio.
W. I. Ohmer, Dayton Fare Recorder Company, Dayton, Ohio.
James H. Drew, president Drew Electric & Manufacturing Company, Indianapolis, Ind.
F. N. Root, manager Root Spring Scraper Company, Kalamazoo, Mich.
Elmer J. Smith, vice-president and general manager Peter Smith Heater Company, Detroit, Mich.
F. H. Williams, manager public utilities department, The White Company, Cleveland, Ohio.

Illinois and Wisconsin:

W. S. Hammond, Jr., vice-president Consolidated Car Heating Company, Chicago, Ill.
Frank Johnson, Ohio Brass Company, Chicago, Ill.
L. E. Gould, western manager ELECTRIC RAILWAY JOURNAL, Chicago, Ill.
H. J. Kenfield, president Kenfield-Davis Publishing Company, Chicago, Ill.
S. W. Midgley, general sales manager Acme Supply Company, Chicago, Ill.

Missouri, Kansas and Nebraska:

Edwin B. Meissner, vice-president St. Louis Car Company, St. Louis, Mo.
D. A. J. Sullivan, Galena Signal Oil Co., Kansas City, Mo.

Joint Meeting of the Manila Company Sections

A joint meeting of the railway and electric light company sections of the Manila Electric Railroad & Light Company was held July 11. The feature of the meeting was the announcement that D. H. Blaisdell, chief engineer of the power plant department of the company, had won the Doherty gold medal given for the best N.E.L.A. company section paper during the year. The paper in question was presented by Mr. Blaisdell at the September meeting of the Manila Section, and some twenty-five papers were submitted in the competition. Mr. Blaisdell was not in attendance at the meeting of July 11, being on a six months' vacation in the United States, but the correspondence between the secretary of the association and Vice-President Duffy relating to the award were read. Later Mr. Duffy spoke congratulating the section that it had won this medal, and saying that with the winning of the 1915 American Electric Railway Association company section medal by J. N. Bury, assistant superintendent of transportation, for his paper entitled "Courtesy," the Manila Company Section has the distinction of having one company section medal in both associations during the first two years of its existence. The speaker added that he believed that this honor was held by only one other company, namely, the Milwaukee company.

Other interesting features of the evening were an address on the advantages of company section work by the manager of the Eastern Extension Telegraph Company, and also the reading of some correspondence on the value of company sections, conducted between W. A. Smith, chairman of the Manila Company Section, N.E.L.A., and the chairman of the Brooklyn Company Section, N.E.L.A. The latter had written to the chairman of the Manila section for an outline of his views as to how company sections could be made more valuable and beneficial to employees and the member companies. It also asked for information about the Manila section. In reply, Mr. Smith described the character of the meetings in Manila, which he said were attended by an average of forty members, or sixty per cent of the total membership. In conclusion he said that to make the meetings attractive "members should be impressed with the value and importance to them of company section work, and of the opportunity it affords them to equip themselves for higher responsibilities and duties and thus advance themselves in position and salary, to the mutual benefit of themselves and the company."

A plan for caring for right-of-way that promises to be popular with farmers along the line has been adopted by the Kansas City, Kaw Valley & Western Railway. The company is leasing back to farmers, at nominal rental, the right-of-way adjoining their land under condition that they crop it. There are no restrictions as to the crops to be planted, except that the company expresses preference for forage, and this is what most of the farmers who have rented ground will plant. Alfalfa so far has proved the most frequent crop designated.

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COMMUNICATIONS

Unit for Comparing Track Upkeep Costs

UNION TRACTION COMPANY OF INDIANA
ANDERSON, IND., Aug. 25, 1916.

To the Editor:

I have read the editorials in your issues of Aug. 12 and 19 with considerable interest and am submitting a few ideas with reference to methods of keeping the costs of track maintenance, also some of the things which would enter into these costs. A system of track maintenance costs would undoubtedly be very enlightening to the track department of any railway company. Whether the unit used is track-mile, car-mile or ton-mile the information obtained would be of great value in determining which pieces of track were demanding large expenditures to maintain them in good condition. In my opinion the ton-mile unit would give the most satisfactory results as it is the tonnage of trains and their frequency which cause track to deteriorate, action of the elements and the speed of trains not being considered.

The speed of trains also, however, enters into maintenance costs of open track construction, as it requires more labor to keep up track where train speeds are high than it does where they are low. The speed factor would be difficult to include with the degree of accuracy desired where all classes of trains operate over the same track. This could probably be solved best by dividing a road into speed classes, where the speeds of trains varied materially on different portions of the road. A given rating could be determined by calculating the average speed of all trains between stops.

The resultant costs from the ton-mile unit would not be any more satisfactory than those by the track-mile method unless each different type of construction was accounted for separately. Costs must be kept on each different type of construction in order to determine which type is the best for the tonnage operated over it. Records of this character covering a period of years would enable the engineer to determine the most economical type of construction for a predetermined tonnage. The subsoil conditions in some localities will necessitate better construction to obtain satisfactory maintenance costs than in others. Paving maintenance costs should be recorded in connection with each type of track construction and kept separate from the track costs. It should be divided into two charges—one for repairs made necessary on account of defective track and one for repairs necessary on account of street traffic.

L. A. MITCHELL,
Superintendent of Roadway.

THE CINCINNATI TRACTION COMPANY
CINCINNATI, OHIO, Aug. 22, 1916.

To the Editors:

The editorials on "A Unit for Comparing Track Maintenance Costs" in your issues of Aug. 12 and 19 refer to a subject in which I have been greatly interested for years, but I am just as far from a satisfactory conclusion now as when the question first suggested itself to me. The trouble is that with any property that has been in existence for a number of years, and most of them go back fifteen years or more, a number of types of track construction are used, varying materially as to track foundation, drainage, kind and spacing of ties, paving foundation, paving and type and depth of rails. All of these enter as factors, regardless of the tonnage loads that pass over the tracks. Again, the proportion of tangent tracks to special work should be considered, but this will have to be handled separately.

The question of grades is also of considerable moment, particularly where sand is used, with resulting heavy rail depreciation. Consider points where the grades are between 8 per cent and 10 per cent, such as exist in this city in a number of instances, and up to and over 12 per cent in others, with curves in connection with tangent tracks, both horizontal and vertical. Conditions such as these naturally affect the cost of track maintenance, if indeed they are not governing factors. I agree with you that the whole subject is one which can well be taken up by the way committee of the American Electric Railway Engineering Association to determine if possible some definite plan of action.

I suggest, however, that the types of track recommended by the way committee be accepted as standard, and those types conforming most nearly to them be classed as similar construction, so as to start off with some basis for computations. Then the per cent of grades and, later, the extent of tonnage may be considered and weights determined. Special work would have to be handled separately, but would not involve quite as many features to consider as tangent tracks.

I suggest that the essential features of construction be divided into three classes for the various types, as follows:

Sub-structure, consisting of ballast, ties, sub-drainage and labor.

Superstructure, consisting of rails, fastenings, joints and labor.

Paving, consisting of paving foundation, paving, surface drainage and labor.

This classification is different from standard practice, but would simplify the keeping of cost data, and is suggested simply as an outline.

So far as grades are concerned, everything except the rails could be considered on the same basis, with some predetermined value, based on an increase for each per cent over 6 per cent. The question of deferred maintenance is one that should also be considered, but it is doubtful if anything but actual expenditures should be included. E. H. BERRY, Engineer of Roadways.

Selling Securities to Patrons

H. M. BYLLESBY & COMPANY
CHICAGO, ILL., Aug. 26, 1916.

To the Editors:

I just looked over the ELECTRIC RAILWAY JOURNAL of Aug. 12 and must say that you gave a very splendid treatment to the article concerning "Selling Securities to Patrons." This is by far the best description of what we are trying to do which has so far appeared.

The editorial entitled "Popularizing Utility Ownership," on page 256, I read with very keen interest. The reasoning, to my mind, is entirely correct and conforms with the conditions which we are forced to meet. It is seldom that this vital question is treated in so thorough a way, but it deserves such attention.

The interest which is spreading throughout the country is shown by the fact that the Colorado Electric Light, Power and Railway Association has asked me to present a paper on customer ownership at their convention in September, which invitation I have accepted.

W. H. HODGE, Publicity Manager.

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Eight-Hour Bill and the Electric Railways

Secretary E. B. Burritt of the American Electric Railway Association is in Washington urging the inclusion in the eight-hour railroad bill now before Congress of a clause exempting interstate electric railways from its provisions. Reports from Washington on Sept. 1 state that the Senate committee on interstate commerce at a meeting held on the night of Aug. 31 had agreed to amend the bill so as to make its provisions not applicable to electric interstate railroads or to steam railroads of less than 200 miles in length. As the measure was intended to cover steam railroad conditions, the justice of the exemption of the electric roads is obvious. Henry S. Lyons, secretary Boston Elevated Railway, has also been in Washington during this past week associated with Mr. Burritt in presenting the electric railway side of the case, and many telegrams have been sent to senators and members of the House by electric railway companies since the measure was announced, urging that this exemption be made.

Present reports indicate that there will be no strike next week on the steam railroads, but earlier in the week when the strike appeared imminent, the effect on electric railway traffic received very careful consideration by all electric railway companies. Undoubtedly the interruption of steam railroad service would make the facilities offered by the electric railways even more important than they are at present. Some interurban managers in the central states interviewed by a representative of this paper said that owing to their limited coal supply they feared that they would have to reduce rather than increase the number of their cars in operation if the strike should occur. They would thereby conserve their coal and other supplies and be able to keep their roads open longer, in case the steam railroad strike should be prolonged.

New Signal Installations on Electrified Steam Roads

The Chicago, Milwaukee & St. Paul Railway has completed the signaling of 134 miles of its electrified section, comprising stretches between Lennep and Three Forks and between Piedmont and Finlen. The signaling now being installed will cover the remainder of the 440-mile, 3000-volt d.c. electrification. The road, which is single track, uses the double rail propulsion return system. The power for the signals is transmitted by a 4400-volt, 60-cycle transmission line supplied by substations located thirty miles apart. Line transformers having a rating of 4400 to 110 volts are provided at each signal location.

The track circuits are fed from 0.5-kva. track transformers having a 110-volt primary and an 18-volt secondary. Two-position vane track relays are used with a reactor in series with the transformer leads. The normal pressure on the track element of this relay is one volt and on the local element, 110 volts. The line relays used in this installation are of two types, the three-position vane and the two-position single element vane.

On the heavy 2 per cent grades impedance bonds having a capacity of 1500 amp. per rail are used to carry the propulsion current. The impedance bonds used on lesser grades have a capacity of 500 amp. per rail. The light signals are of the three-light type, having red, green and white indications. Each lens is illuminated by a main lamp and a pilot lamp. The range of these light signals in day time is 3000 ft. under normal conditions and 2000 ft. under the most unfavorable conditions.

The Pennsylvania Railroad is soon to begin the work of electrifying its Chestnut Hill branch on which a 11,000-volt, 25-cycle a.c. propulsion system will be used. The signals and locking circuits will be controlled from forty-three two-rail return and twenty-seven single-rail return track circuits. The propulsion current will be carried by means of thirty-five 200-amp. impedance bonds and by six 75-amp. bonds. The remarkable success achieved by the position-light signals used on the Philadelphia-Paoli division has caused the Pennsylvania Railroad to continue their installation on the new electrification. The track relays will be of the brakeless centrifugal frequency type. The vane frequency line relays will draw their energy from 1-kva., 110-volt, 60-cycle transformers. At each signal location 3300 to 110-volt transformers will step down the power from the signal transmission line. The maximum length of track circuit will be 3800 ft. and the minimum 1000 ft.

The signal material for both the above mentioned installations is being furnished by the Union Switch & Signal Company, Swissvale, Pa.

English Tramways and the War

Some of the problems that have been confronting British tramway operations during the second year of the European war are well shown by the following extract from an editorial in *The Electric Railway and Tramway Journal* of Aug. 4:

"As to revenue, the great majority of our tramways have done remarkably well during the second year of the war. Some of the larger centers of population have scored continuous and notable increments, and our weekly traffic returns, as a whole, show a great preponderance of the plus over the minus signs. The working classes almost everywhere are earning more—in many cases much more—than average wages, and are spending their money freely, to the great benefit of the tramways.

"In respect of expenditure, it goes without saying that in almost all the items the cost has been higher. Wages have been advanced all round, allowances to dependents are steadily growing, and the cost of materials, fittings, etc., has not only gone up by leaps and bounds, but is befogged by the difficulty which exists in many lines of procuring supplies at any price whatever. The prices of certain materials and supplies have mounted much higher, and even where some attempt has been made to insure co-operative buying such things as tires have reached about $50 per ton—a price which before the war would have been deemed unthinkable.

"On the whole, it appears to be a fair and reasonable conclusion that our tramways have done well in the teeth of great difficulties. They are, perhaps, piling up a certain number of troubles for themselves when the war comes to an end, but they cannot avoid these, seeing that they cannot obtain either the labor or the materials to keep their tracks, cars, sheds and so on in proper order. The postponement of repairs and adequate maintenance consequently is unavoidable, and it is up to the managers to do their best to keep going their services during the war, and leave what may happen afterwards to the arbitrament of circumstances. They cannot do either less or more than that."

On Aug. 1, during the visit of Judge and Mrs. Elbert H. Gary to the Philippines, they were the guests of honor at a dinner tendered them by C. Nesbit Duffy, vice-president Manila Electric Light & Power Company. The dinner was attended by prominent government officials.

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Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Fool-Proof One-Man Car—Improved Paint Gun for Car Shops—Motor Problems Imposed by Modern Car Design—New Copper Clad Steel Wire—A By-product of the Babbitting Furnace—Serviceable Frogs Made from Scrap by Arc-Welding

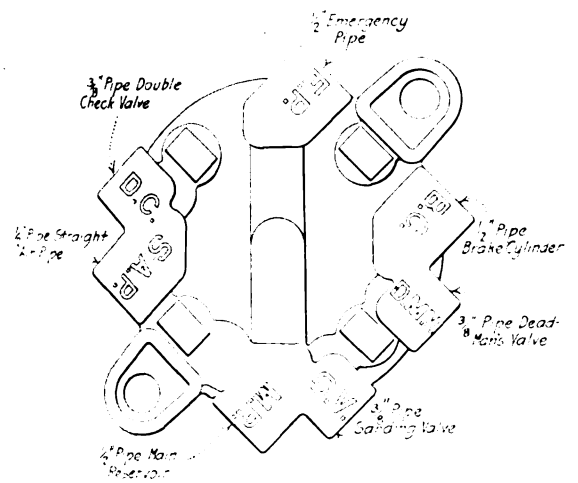
Equipment of the "Safety" Car

On This Car the Air Brake Valve Performs Several Extra Functions and Air Is Used Also in Connection with the Control

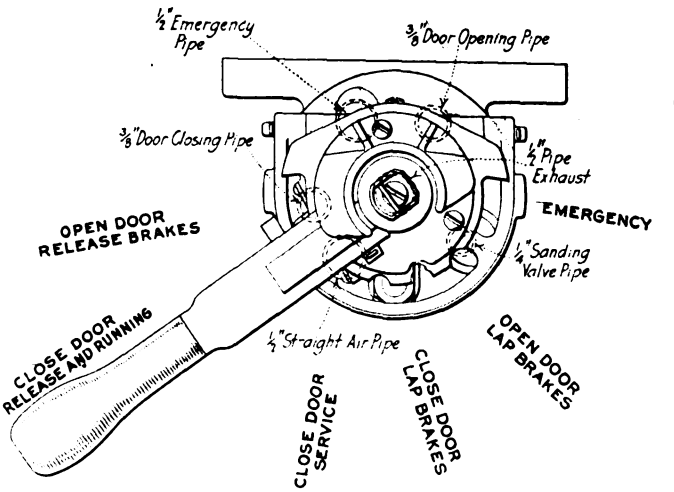
The flexibility of compressed air has been utilized by the Safety Car Devices Company, St. Louis, Mo., in the design of a safety car equipment. This provides for air operation of doors and steps, brakes, controller safety release and door locks, as well as the operation of other minor devices. The whole scheme of operation of the several parts is so interwoven that it is practically impossible to operate incorrectly without calling into play one or more of the safety devices. The following details relate to the one-man car brake and safety control equipment.

THE BRAKING EQUIPMENT

The brake equipment is of the Westinghouse semi-automatic type which embodies an automatic emergency feature whereby the brakes are automatically applied in emergency with full force in the event of the breaking of pipes, etc. The safety control devices insure that the motorman must be at his post and attentive to his duties before the car can proceed, and he must remain alert to keep the car moving. Should he become incapacitated or remove his hand from the controller handle for any reason when the power is on the power will be automatically cut off, an emergency application of the brakes will be made, sand will be applied to the rails, the front door will be opened and the steps lowered, and the rear door will be unlatched so that it can be opened by hand if so desired. An emergency application of the brakes will produce the same result.



PLAN OF TOP OF EMERGENCY VALVE



PLAN OF TOP OF BRAKE VALVE

Taking up the braking equipment more in detail, the following equipment for a single-end car may be noted:

The compressor is of the Westinghouse duplex gear-driven type which has been in operation for several years. In connection with this are used a CD-1 light-weight compressor governor, a main reservoir made of lighter than standard sheets and with brazed head and body seams, a safety valve and a Type-28 brake valve. There are also an air gage showing main reservoir pressure, a Type K emergency valve, a special light-weight brake cylinder, a supply limiting valve for the sander, and the necessary switches, fuse blocks, etc.

Through the brake valve the operator controls not only the brakes, but also the doors and steps and the sand valve. As indicated in an accompanying illustration, the handle has six positions: Release (doors open), release (doors closed), service, lap (doors closed), lap (doors open), and emergency (doors open). Two release and two lap positions are provided for the following reasons: When a car is stopped on a level it may be desirable to release the brakes immediately in order that a prompt start may be made when the entrance and exit of passengers is completed. Consequently there must be a position in which the brakes will be released when the door is opened to permit passengers to enter and leave the car, and another position in which the brakes will be released when the door is closed for the sake of safety while the car is running. To prevent any possibility of the doors remaining open while the car is running the brake valve handle is returned from release (doors open) position to release (doors closed) position by a spring as soon as the operator removes his hand from the brake valve handle. While the car is standing on a grade, the brakes must be held applied, and consequently there must be a brake lap position in which the doors will be open to permit the passengers to enter and leave the car, and also another brake lap position in which the doors are closed, as when a car is being retarded for a stop or a slow-down.

The brake valve also embodies a pneumatic sanding feature, whereby sand may be applied to the rail in any position of the handle by the mere pressing down of the handle.

The emergency valve operates to apply the brakes, open the front door, lower the steps, unlatch the rear door and blow sand onto the rails should the emergency

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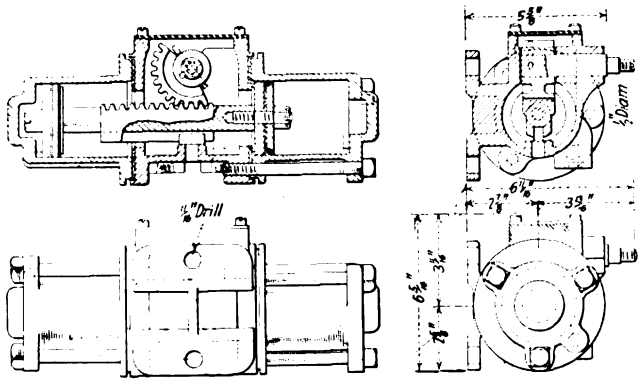
line be ruptured from any cause or should the operator make an emergency application. In addition, the valve operates to cut off the power to the motors should the motorman for any reason remove his hand from the controller handle with the power on. The supply limiting valve for the sander cuts off the flow of main reservoir air through the emergency valve to the sand box during emergency application when the main reservoir



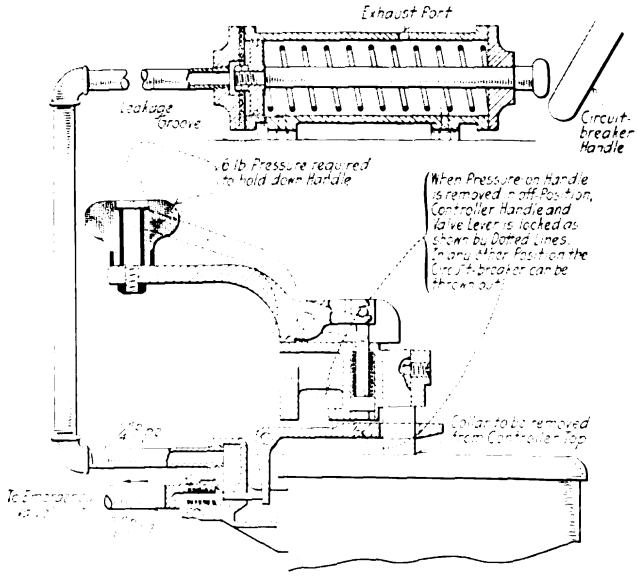
DETAILS OF DOOR AND STEP CONTROL CYLINDER

pressure has been reduced thereby to a predetermined safe pressure for the operation of the brakes. This valve is omitted if the automatic sanding feature is not desired, and in this case the sand valve connection in the emergency valve is plugged.

THE SAFETY CONTROL DEVICES

The essential safety control devices are the pilot valve and circuit breaker cylinder operated by the controller handle, the rear door unlatching device, the door and step controller and a double check valve which prevents the escape of air from the door and step controller through the brake valve in case the doors are opened by the emergency valve operating automatically or normally.

The controller handle attachment is illustrated in an accompanying drawing, the handle and valve being so



CIRCUIT-BREAKER CONTROL ACTUATED BY CONTROLLER HANDLE

designed that they can be applied to any type of manually-operated power controller. As explained above, if for any reason due to accident or carelessness the operator's hand is removed the brakes are automatically applied, the power circuit opens, the front door opens and the rear door unlatches.

The door and step controller is in the form of a double-acting cylinder, a portion of the piston rod of which has a rack machined thereon. This meshes with a pinion the shaft of which is connected by a series of rods and levers to the car door and steps.

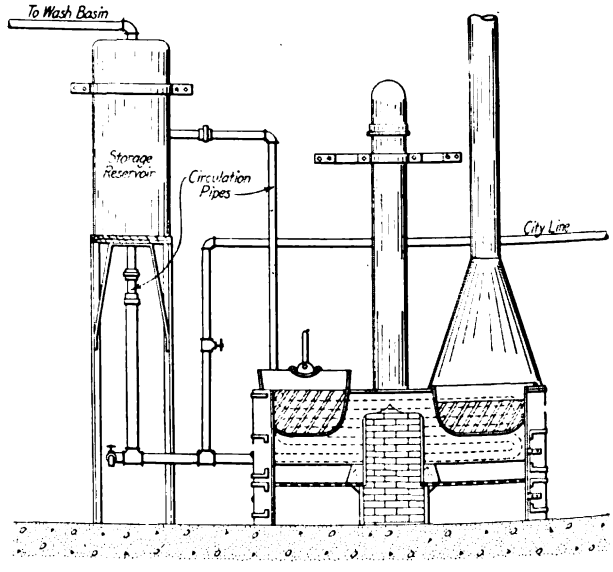
In addition to the safety features a rear sander cut-off valve is provided to prevent waste of sand on the rear sander in emergency applications. This is automatically taken care of by the brake valve in normal operation, but there must be some provision to cut off the supply of air to the rear sander when an emergency application is made. Hence, a valve is interposed between the emergency valve and the sander, and is so installed in connection with the brake valve that it is closed when the brake valve handle is removed and open when the handle is in position on the rotary valve key. Hence the rear sander is cut out and only the sander on the operative end of the car is effective. Door controller cut-off valves are also provided to permit automatic opening of the front door when an emergency application is initiated, either by the brake valve or the emergency valve, but to permit unlatching only of the rear door.

Babbitting Furnace Heats Water

BY R. H. PARSONS
Electrical Foreman

An economical method of obtaining hot water is always possible in shops where babbitting furnaces are used. It can be provided by installing coils of pipe within or around these babbitting furnaces as shown in the illustration herewith.

In the plan illustrated the coils were connected to a large cylinder formerly used as a car air reservoir, and taps were made to the city water line and to the wash basin. The space between the furnaces and the wall was utilized for the heating coils. If it had been desired to pipe the water to distant points in the building, an additional cylinder or reservoir could have been installed near the wash basin and connected to the heating coils in the same manner as the original one.



BABBITTING FURNACE UTILIZED FOR HEATING WATER
Heating Coil Is Between Back Wall of Furnace and Wall of Room

thus overcoming the necessity of drawing off a quantity of cold water each time before the hot water begins to run.

To keep up this equipment no extra fuel nor attendants are necessary, and hot water is available all the time.

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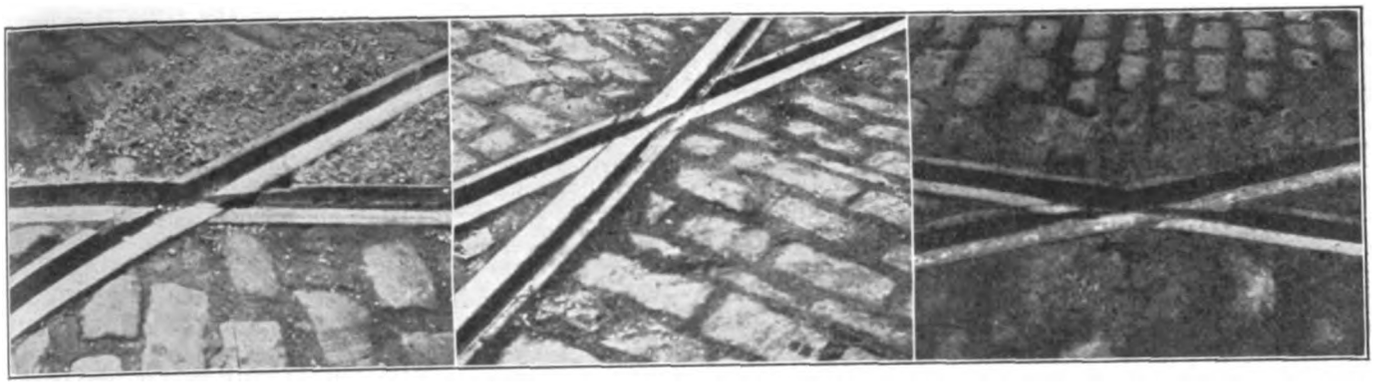


FIGS. 1, 2 AND 3—FROGS THAT HAVE BEEN IN SERVICE FROM TWO TO THREE YEARS AND ARE SUBJECT TO A TRAFFIC OF FROM 145,000 TO 411,000 CARS PER YEAR

Home-Made Frogs

Scrap Iron and Joint Plates Converted into New Frogs by Arc-Welding

BY C. BENHAM, JR.
Assistant Engineer New York State Railways, Rochester Lines

Frequently unforeseen failures of special work occur in pieces which must be replaced on the shortest possible notice, making it impossible to resort to the usual course of ordering the piece from a special work manufacturer. Large properties that make a regular practice of manufacturing their own special work can readily take care of such emergencies but lines not so equipped are left to their own devices.

Before arc welding came into use, a number of frogs were made by this company by bolting rails together and riveting the bottom flanges to a base plate on the same general plan as they are now made with the welder. These have worn remarkably well, the oldest one in the track at present having been placed in the summer of 1911. This frog has been subject to a traffic averaging 146,500 cars per year, but will soon have to be replaced. The frogs made with the welder are much more rigid than the bolted frogs, as there is no possibility of any nuts or rivets working loose. They also have a flange bearing through the center, and it is expected that these will wear a much longer time than the old type.

In making these frogs, the rail receiving the greatest traffic is not cut except at the head and guard to conform with the head and groove of the other rail. If the curved rail receives the lightest traffic it is first bent and then cut to fit. Standard joint plates bent to conform with the angle of the frog are used to fasten the rails together. Pipe separators are used to maintain the correct spread and the whole is bolted together and checked with the measurements, taken in the field, on the frog to be replaced. The base of the rail is then spot welded to the base plate at a number of points and the frog checked again before proceeding with the heavy welding. If the heavy welding is proceeded with immediately, there is great danger of the base plate buckling and drawing the whole frog out of shape. The plates at the center are welded top and bottom to the rail, the welding at the bottom being heavy enough to weld the plate, bottom flange of the rail and the base plate all together.

The grooves are filled in with the welder at the point and about 8 in. along each arm to form a flange bearing and then ground down to a smooth running surface. A hard grade of steel is used to form the flange bearing, soft iron being used in welding the plates and rail together. This flange bearing is one of the most important points, since it is on this that the smooth riding and wearing quality of the frog depends. This feature can best be seen in Figs. 5, 6 and 7. The

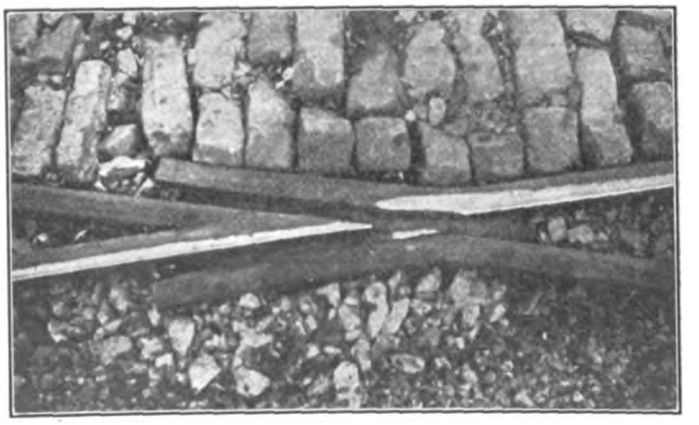


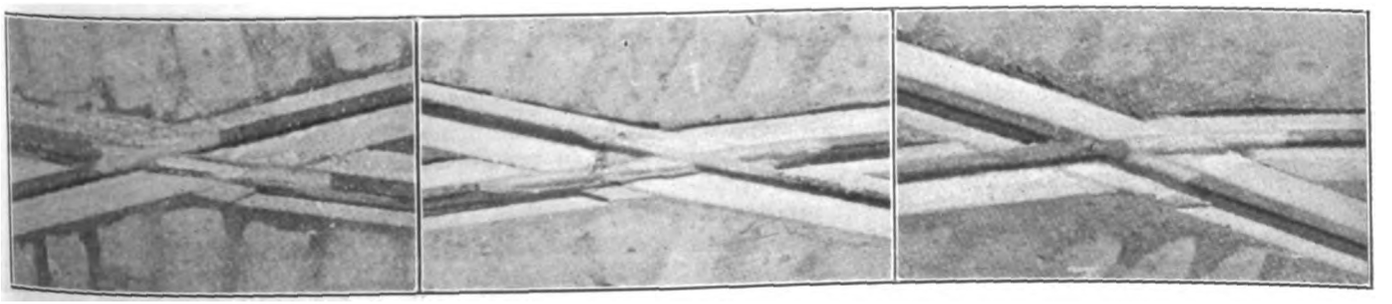
FIG. 4—FROG PLACED AT LAKE STREET AND DRIVING PARK

bolts are pulled up as tight as possible and the nuts welded so that there is no possibility of their working loose.

In the accompanying illustrations, Fig. 1 shows a frog at State and Central Streets placed in December, 1914. This piece is subject to a traffic averaging 41,100 cars per year. There was no flange bearing on this frog and it has worked loose. The fine material is buckwheat stone placed over temporary paving repairs.

The frog in Fig. 2 at State and Lyell Streets, was placed in June, 1914. A traffic of 146,500 cars per year passes over this frog.

The frog in Fig. 3, which was installed in the same



FIGS. 5, 6 AND 7—INSTALLATION OF FROGS SUBJECT TO A TRAFFIC OF MORE THAN 200,000 CARS PER YEAR

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COST OF MATERIAL AND LABOR FOR MAKING A FROG

½-ton scrap rail and joint plates, at $13	$4.30	
Scrap base plate	3.00	
40-lb. welding iron, at 5¼c.	2.10	
10-lb. welding steel, at 15¼c.	1.50	
Bolts	.60	
Total material		$11.50
Blacksmith foreman, 24 hours, at 40c.	$9.60	
3 helpers, 72 hours, at 30c.	21.60	
Total labor		$31.20
Grand total		$42.70

layout in October, 1913, is slightly loose, having no flange bearing.

The frog in Fig. 4 at Lake and Driving Park is made of 70 lb. A.S.C.E. rail and was laid in July, 1916. A traffic of 11,500 cars per year passes over this frog.

The frog in Fig. 5 at North and Central Streets was placed in May, 1916, and is subjected to a traffic of 227,500 cars per year.

The frogs in Figs. 6 and 7 at Clinton and Central

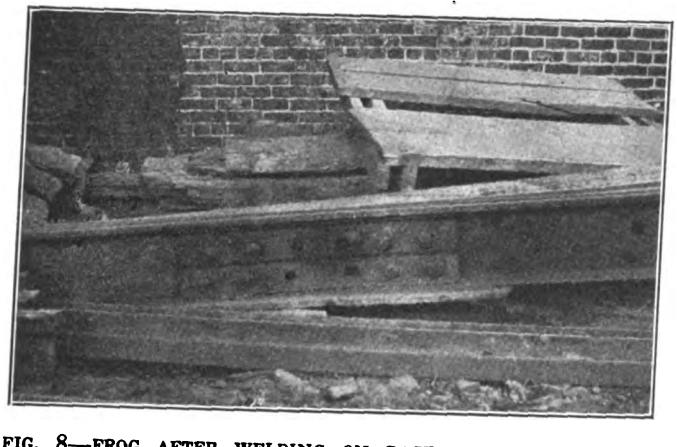


FIG. 8—FROG AFTER WELDING ON BASE PLATE BUT BEFORE WELDING JOINT PLATES

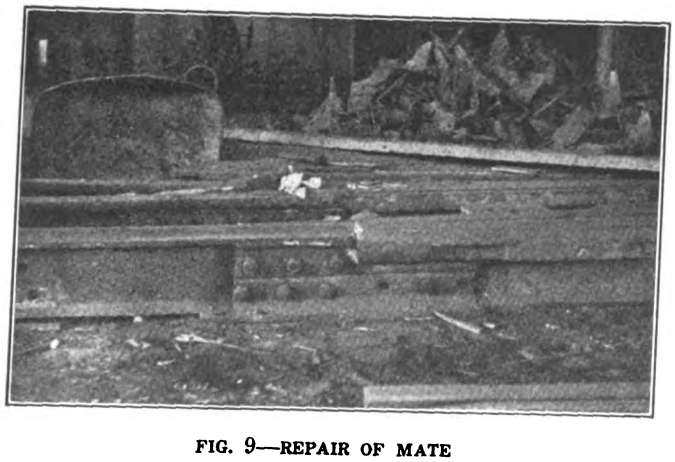


FIG. 9—REPAIR OF MATE

Streets were installed in November, 1915. A traffic of 211,500 cars per year passes over these frogs.

Some of these frogs have been laid too recently to show much wear, but a close inspection showed that they were absolutely solid and were wearing very evenly, having a good flange bearing.

Fig. 8 shows a frog after being fitted together with base plate welded to the rails but before the plates at the center were welded.

Another example in the repair of special work is shown in Fig. 9, showing a mate that has been repaired by joining a piece of rail on the single end. The ball of the rail at this end had broken off, although otherwise the piece was in fair condition. The single end was cut off close to the casting, an old joint plate cut to fit the casting and the new rail and welded to each, and a base plate welded across the joint similar to the base plates on the bottom flanges.

The rail for these frogs is usually taken from pieces of odds and ends that have no more value than scrap except for this purpose; the plates at the center are usually standard joint plates taken from the scrap pile, and the base plate is bought from a local scrap iron dealer at a little over scrap prices, so that the cost is unusually low, as shown in the accompanying table.

This, of course, does not include cost of electricity used in welding or any overhead charge.

Providing for Closer Gear Centers in Motor Design

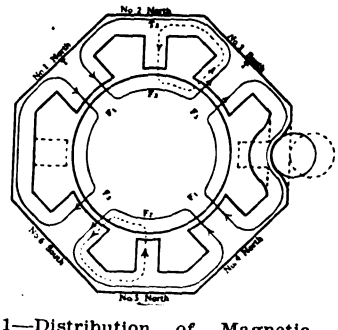
The Author Shows Some of the Conditions Imposed on the Designer by Changes in Car Design

BY F. W. MC CLOSKEY
Railway Engineering Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

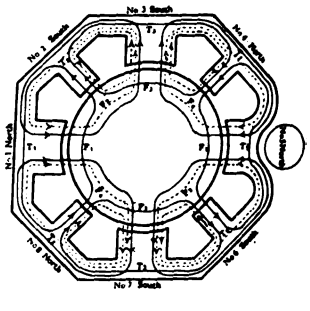
Certain features of the design of the modern street car motor depend directly on the design of the car. Size of wheels, length of wheel base, position of brake rods, etc., are frequently the deciding factors in the selection of armature diameter or type of field windings. Other important design features of the motor may also be affected.

MOTORS FOR SURFACE CITY CARS

The use of small wheels has introduced new problems in motor construction, one of the first being to overcome the handicap of shorter gear center distance.



1—Distribution of Magnetic Flux in a Four-Pole Motor Having Two Commutating Poles



2—Distribution of Magnetic Flux in a Motor Having Four Main and Four Commutating Poles

One way of doing this is to omit the commutating pole located on the axle side of the motor and proportion the remaining commutating poles so that they will produce the same effect with regard to commutation as would be obtained ordinarily with the full number of poles.

In city service where economy of power requires that the accelerating current be as low as possible, it is desirable in most cases to use the maximum gear reduction possible; that is, it is desirable to use as small a pinion as is consistent with the required strength under the teeth and as large a gear as will permit proper clearance beneath the gear case. A reduction in wheel diameter requires a corresponding decrease in the diameter and number of teeth of the gear to maintain sufficient clearance beneath the gear case. Using a minimum sized pinion, as before, to maintain maximum reduction, this decrease of gear diameter results in the shortening of the gear center distance, which means bringing the center of the armature closer to the center of the axle. This, in turn, results in a restriction of space in the axle region and a difficulty in obtaining room for the field winding. Omitting the commutating pole on the axle side permits the armature to be brought nearer the axle. If, however, only one pole is omitted an unbalanced magnetic pull results, which in most cases can be obviated best by omitting the opposite pole as well.

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In a machine having four commutating poles and four exciting poles, about 70 per cent of the ampere-turns on the commutating poles serve simply to neutralize the magnetomotive force of the armature. The remaining 30 per cent are for the purpose of producing sufficient field in the commutating zone to neutralize the sparking voltage in the short-circuited coils. Therefore, in omitting, say, two of the commutating poles, it is necessary only to add to the remaining poles the magnetising turns, or about 30 per cent of the turns of the poles omitted. In actual practice it is necessary to add a little more than 30 per cent and also somewhat to lengthen the commutating poles axially to take care of saturation, etc., but a considerable net saving in copper and iron is secured.

Efficient designs, using half as many commutating poles as main poles may be worked out for motor sizes up to about 50 hp. Above this size the commutating poles are apt to become bulky. This design, besides saving in space, has an advantage in reduced weight, copper loss and less likelihood of grounds, because of their being fewer coils to ground.

It is usual to think of the action of the commutating poles as being independent of the main poles. This is true only in the case of machines having the same number of commutating poles as main poles, and when the windings on the latter are symmetrical; that is, when each pole has the same number of turns. The flux distribution in a four-pole motor having two commutating poles is diagrammatically represented in Fig. 1. It is of interest to note the distribution of flux in different portions of the frame, as compared with that of a non-commutating pole machine. It is obvious that between poles 3 and 4 the flux will be the same. Between poles 2 and 3 the total flux carried by the frame is greater than on non-commutating machines by one-half of the commutating pole flux. Between poles 1 and 2 it is less by one-half of the commutating pole flux. It therefore follows that the frame may be made of smaller sections between poles 3 and 4 than between poles 1 and 2, or poles 2 and 3. The latter two sections will, however, be made the same because with reversal of direction of rotation, the conditions between poles 1 and 2 will be the same as shown between poles 2 and 3 in the diagram.

Motors for Elevated and Subway Cars

In the design of railway motors of about 150 hp. and up, such as are used in elevated and suburban service, as a rule the motor space is not as restricted as in the case of surface cars. However, cases occasionally arise where the gear center distance must be made shorter than normally would be required.

The conditions here involved are different from those in the smaller motors for surface cars, in that it is customary to have a main pole at the axle instead of a commutating pole. One advantage of this is that the brushes and brush holders are more readily accessible, inspection being made usually from underneath the car instead of through a trap in the floor of the car, as is the case generally with street cars. The location of the main pole at the axle requires that the brush holders be rotated on the 45-deg. line, bringing them nearer the axle, where they are more readily inspected.

Shortening the gear center distance results in a reduction of the space for the main field windings at the axle side. This condition may be overcome by proportioning the exciting coil at the axle side with as many turns as the restricted space will permit, and designing the top and bottom coils with a greater number of turns, such that the sum of the ampere-turns on the side and top coils will be sufficient to produce the required flux. The coil on the other side of the motor opposite the axle should, of course, have the same number of turns as that on the axle side.

In the above method of winding, the design of the commutating poles is somewhat influenced by the number of coils on the main field poles. With the same number of coils on all main poles the design of the commutating poles would be practically independent of that of the exciting coils.

The distribution of flux in the several magnetic circuits is shown in Fig. 2. From the diagram the following deductions are obvious: First, the flux in main poles 3 and 7 exceeds that in main poles 1 and 5 by an amount equal to twice the flux induced in each of the commutating poles by the unbalanced magnetomotive force due to $T_3 - T_1$ turns on poles 3 and 7. Second, the flux in commutating pole 2 is weakened and that in commutating pole 4 is strengthened by the flux induced in them by $T_3 - T_1$. These two statements are equivalent to saying that the magnetic unbalance is proportional to the difference in the number of turns on the main poles. For, if the unbalancing of the main field turns is carried so far as to make the flux induced in pole 2 by the ampere-turns $T_3 - T_1$ equal or exceed that induced in this pole by T_2, the flux in commutating poles 2 and 6 will be completely neutralized or even reversed.

These statements are all based on the assumption of unsaturated magnetic circuits. When the magnetic circuits are partly saturated, the difference between the fluxes in poles 1 and 3 and also in poles 2 and 4 will be reduced. In other words, the weakening of poles 2 and 6 is greater than the strengthening of poles 4 and 8, with a result of weakened commutating flux. This can be compensated for by additional turns on the commutating poles or by more liberal designs in other respects.

Copper-Clad Steel Wire

The Method of Manufacturing This Bi-metallic Wire Is Described and Test Data Are Given

The Page Woven Wire Fence Company of Monessen, Pa., has secured the exclusive right to draw and sell "Aristos Copperweld" copper-clad steel wire, which is made from rods manufactured by the Copper Clad Steel Company, Pittsburgh, Pa.

"Copperweld" copper-clad steel is manufactured by taking a steel bar about 4 in. in diameter by about 30 in. long, pickling, cleaning and covering with a specially prepared flux. This bar is then placed into a mold which is 5⅛ in. in diameter by about 30 in. long. The bar and mold are then placed in a furnace and allowed to remain there until the desired temperature is obtained, when copper heated to a temperature of 1980 deg. is poured over the steel bar, filling the space between the bar and the mold. This forms a "copperweld" bar, which is 5⅛ in. in diameter by about 30 in. long. This bar is then reheated, hot rolled and drawn into wire.

This wire has an absolute weld between the copper and steel, without voids. It is of such a nature that torsions, twists, strains, hammering, etc., will not cause the copper covering to be separated from the steel center or core. Even changes of temperature from extreme heat to a sudden plunge in cold water have no effect, it is declared, on the weld. The material is, furthermore, proof against external corrosion to the same extent that copper is, and as the weld is said to be perfect no moisture can enter between the two metals—hence electrolysis can never take place.

After the wire is drawn it is given the most severe tests for bending qualities, breaking strength, torsion, elongation and conductivity.

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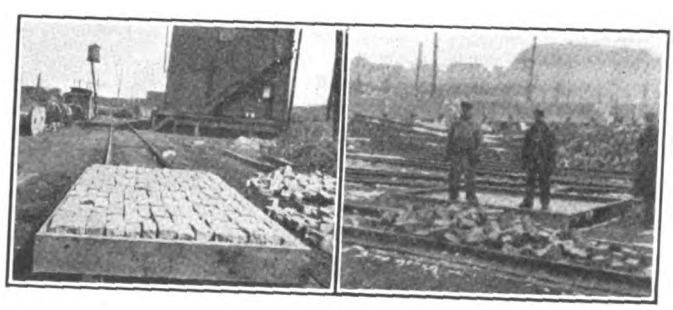
According to the claims of the maker, the wire has a tensile strength about 60 per cent greater than hard-drawn copper wire of the same size, and will stand approximately 126 per cent more strain than copper wire before reaching its elastic limit. The wire also weighs approximately from 7 per cent to 10 per cent less than copper wire of the same diameter and length, and is therefore not only cheaper in first cost but, on account of its greater strength, cheaper in maintenance. The wire is furnished in two grades of conductivity, namely, 40 per cent and 30 per cent, and also in a mechanical grade. Under special arrangements higher grades of conductivity can also be made. The material is manufactured in sizes of from 4/0 to 17 B & S gage. Smaller sizes can also be furnished under special arrangements. The material can also be furnished in weatherproof insulation and in rubber-covered twisted-pair forms.

This wire can be used to advantage on electric railways for trolley wire, signal wire, telephone wire, dead soft annealed tie wire, ground rods, and suspension strands. It is also used for automatic block signals, telephone systems, bond wires, series arc circuits, and transmission lines by railroads and power companies.

Measuring Granite Block Yardage

The large quantity of granite block used for paving in the electric railway track allowance has introduced the question of the most economical way of measuring the yardage furnished by the granite block manufacturers as a basis for payment. In the issue of the ELECTRIC RAILWAY JOURNAL for May 20 Charles H. Clark, engineer maintenance of way, Cleveland (Ohio) Railway, described the results he had obtained by measuring the yardage of granite blocks by weight instead of by count. The substitution of this method for that employing a standard yardage frame has been so successful that this company has now adopted the weight



GRANITE BLOCKS SET IN STANDARD FRAME, AND BEING WEIGHED ON TRACK SCALE

method as standard. Whenever a car of granite block is unloaded every tenth block or every twenty-fifth block is thrown in a separate pile, and when the unloading is completed this pile of block is placed upon a track scale and weighed. A view of the granite block in the process of being weighed is shown.

Where a track scale or a scale of sufficient capacity is not available, the standard frame is quite generally used. Prior to the adoption of the weighing method of measuring granite block yardage, the Cleveland Railway used a standard frame of 8 sq. yd. capacity. This frame was 6 ft. x 12 ft. in size and built of 3-in. plank. A view of this standard frame filled with granite block is illustrated. As in the case where blocks are weighed, every tenth to every twenty-fifth block is thrown in a separate pile as the car is unloaded and the average number of blocks per square yard, as determined after all these blocks cast aside have been set in the frame, represent the number of square yards the company pays for.

Improved Paint Gun Applicable to Railway Work

Portability, Lightness and Adjustability Are Qualities for Which the Designers Aimed in This Equipment

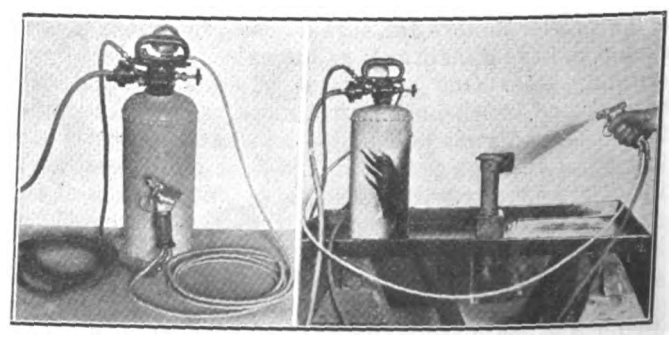
A large proportion of the railway equipment which requires painting is either so inaccessible or so irregular in shape that it is difficult to use the ordinary paint brush. The paint gun has, therefore, found an important field here, and even for use on large and exposed surfaces the speed and quality of the work done by the paint gun have made it a practical and popular tool. The Spray Engineering Company, Boston, Mass., has just placed on the market a portable paint gun having several special features which are said to simplify the operation, at the same time giving improved results in the quality of the finish of the work.

PAINT GUN SHOWING DETAILS OF ADJUSTMENT

As shown in the accompanying illustrations, the outfit consists of the paint gun proper, connected by flexible hose to a portable unit which comprises the control head and pressure tank. The gun has two adjustments, a round cap at the nose which screws out and in, thus regulating the flow of paint, and a knurled stem at the rear which regulates the amount of air used. These two adjustments determine the proportion of the air paint for any class of work, while the control trigger regulates the rate at which this mixture is sprayed. The weight of the gun is a little more than a pound.

The control head comprises an air strainer, a tank pressure gage, and a reducing valve. The function of this valve is to make the tank pressure independent of the air supply pressure. In this way both the air and the paint can be supplied to the gun at constant pressure, adjusted to suit the material which is being used. The tank has a plug in the base by which it can be filled or emptied without disturbing the control head. The construction of the apparatus is rugged throughout and designed to stand hard usage.

While the word "paint" has been used in referring to the material to be sprayed, it is understood that the outfit can also be used with varnishes and lacquers of different thicknesses. Owing to the wide range of adjustment to suit the material being used, this paint gun is serviceable for many classes of work. The painting of car bodies, trucks, brake rigging, fenders and metal work which is hard to reach with a brush is an instance in which the paint gun could be used.



PORTABLE PAINT GUN; OPERATION OF SPRAYING A SMALL IRON CASTING

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LONDON LETTER

Edinburgh Considering Electric Haulage—Details of Services of London County Council Tramways in War Time —Miscellaneous Financial Reports

(From Our Regular Correspondent)

The annual conference of the Municipal Tramways Association will be held in London on Sept. 21 and 22 at the Surveyors' Institution. Following a meeting of the executive council, the conference will open on Thursday morning, when Peter Fisher, general manager of the Dundee Corporation Tramways will deliver his presidential address. This will be followed by a paper entitled "Some Notes on Passenger Transportation in Large Cities" by J. M. McElroy, general manager Manchester Corporation Tramways. In the afternoon a joint paper on "Utilization of Tramways for Goods Traffic" by G. W. Holford, general manager Salford Corporation Tramways, and W. Clough, general manager Bury Corporation Tramways, will be discussed. On Friday morning there will be another meeting of the executive council and also a meeting of the managers' section, after which the annual business meeting of the association will be held. It has been decided that no social functions shall take place, and therefore no arrangements have been made for the usual association dinner or excursion.

The Corporation of Edinburgh has asked for a report from tramway experts on the question of converting its whole tramway system to electric haulage at the termination of the present lease of the lines to the Edinburgh & District Tramways. The present method of traction, which is by cable, was adopted before the electric system was fully developed, and was favored because it did not disfigure the streets—particularly Princes Street—with poles and overhead wires. But traveling with it is slower than with electrically propelled cars in other cities, and there are frequent stoppages caused by faults in the cables, or mistakes made by the drivers in gripping or slipping the cables at the stopping places or at corners. The corporation hopes to be able to have the electric cars ready to start at midnight on June 30, 1919, when the lease of the present tramway company comes to an end. Its experts, however, have asked for further time to investigate the whole matter, which is, they state, very complex. It is understood that the committee of the corporation which is dealing with the subject will, in consequence, ask for an extension until September, when, it is hoped, the policy of the corporation may be agreed upon.

The Corporation of Bristol is seeking powers to extend, for a further period of one year from Oct. 31 next, the time during which it shall be entitled to exercise its option of purchasing the Bristol tramway undertaking. While many ratepayers who are opposed to purchase have not changed their views, they are not likely to embrace the opportunity offered to them of giving notice of opposition.

The general purposes committee of the Middlesbrough Town Council has appointed a sub-committee to consider the question of taking over the electric tramway system in the district. The powers of the local electric tramways company expire in 1918, and six months' notice of any intention to purchase must be given to the tramways company. Many things, it was said, might happen before 1918. There was the possible variation in the distribution of coal after the war, and the substitution of benzol and petrol. This might revolutionize the whole question of street traction, and was one of the many points that would have to be considered by the committee.

The London County Council tramcars are carrying more traffic at the present time than they have ever done before. A recent weekly return showed a record revenue of £52,300. Facilities for getting out beyond the crowded parts of the town by means of motor buses have recently been very greatly restricted, and the trams have in consequence benefited. Great success has attended the system of car trailers, which was greatly extended recently in order to save labor.

Details respecting some of the services rendered by the London County Council Tramways in connection with the war have been given in a report presented at a recent meeting of the council. Of the 11,500,000 passengers carried by the council's cars, only a small proportion represents pleasure traffic. The majority of the passengers use the tramcars for traveling to and from their work in connection with the industry and commerce of London, while tens of thousands use the cars to reach munition works in various parts of the areas served by the tramways system. Of the various passenger carrying services the council's tramways were alone in a position to expand the normal services to an extent at all commensurate with the rapidly growing needs of Woolwich. As an instance of the efforts made by the tramways undertaking to further the nation's interests in connection with the war, the changes in the Woolwich tramway services may be mentioned. In July, 1914, just before the outbreak of war the maximum number of the council's tramcars arriving at a certain point during the busiest half hour was forty-one. This number has now been increased to eighty-six, an addition of 110 per cent. The number of cars arriving at the same point each day before the war was 975, but the number is now 1,595, an increase of over 63 per cent. During the busiest hour to-day accommodation is provided for 13,688 people, as compared with 4094 before the war, an increase of 234 per cent. The accommodation provided by motor omnibuses in this district, compared with that provided before the war, shows only a slight increase.

The Woolwich district is not being served to the neglect of other parts of London in which the tramways operate. Other changes have been made enabling the tramways management to meet the altered requirements arising out of the war. The authority obtained to carry an excess number of passengers has proved of considerable assistance in meeting the needs of the arsenal workers. To meet the shortage of men it became necessary to employ women on work formerly done by men, more especially as conductors. To-day there are 1072 women conductors employed on the council's cars. With the same end in view, and to increase as far as practicable the accommodation required by the traveling public, the construction of trailer cars has been expedited as much as possible. Although, the report concludes, during the last two years the problem of meeting the requirements of the traveling public has been a difficult one, the needs of the country have been borne in mind; the services of officers and employees have been lent to the government for national work; from the beginning of the war men have been encouraged to join the forces of the Crown, and substantial allowances have been made to the men enlisting or to their dependents, involving a charge on the undertaking of more than £168,700. This sum will be increased to more than £260,000 by the end of the current financial year if the war continues until March 31, 1917.

The interim dividends of the Metropolitan District Railway, the City & South London Railway and the London Electric Railway were about what had been expected, and being only interims no figures to show how the companies have fared as regards revenue during the last period are available. As the last two railways stood to get a larger proportion of the common pool during the last six months, it was only reasonable to expect larger dividends. The City & South London Railway paid at the rate of 1.5 per cent on the ordinary capital, as compared to nil for the corresponding perior of last year, while the London Electric Railway has increased its rate of distribution from 1 to 1.5 per cent. A little disappointment was felt that the Metropolitan District Railway has not been able to increase its rate of dividend on the second preference stock beyond the 3 per cent paid at this time last year, but it is probable that an extra sum has had to go into the line, running, as it does, such a frequent service of trains.

The gross profit on the Wolverhampton tramways undertaking for the last year amounted to £24,893. On motor char-a-banc account a sum of £1,459 was realized, the two sums representing a gross profit of £26,353. A considerable amount of maintenance and renewal work held in abeyance was unavoidable, owing to the depleted labor market and the impossibility of obtaining delivery of certain materials. The mileage run during the year was 1,156,591, as compared to 1,181,309 in 1914-15, the operating cost amounting to 1.573d. per mile as compared to 1.463d. in the previous year. Passenger receipts amounted to £58,250 (an increase of nearly £4,000), and the passengers carried numbered 13,296,146. The motor char-a-bancs covered 119,865 miles.

A. C. S.

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NEWS OF ELECTRIC RAILWAYS

BAY STATE LOSES 6-CENT FARE CASE

Massachusetts Commission Will, However, Allow Increases on Rural Lines—Criticises Management of Company and Advises Use of Earnings Upon Property

Six-cent fares throughout the system of the Bay State Street Railway, Boston, Mass., were refused on Aug. 31 by the Massachusetts Public Service Commission in a decision which censured the company for mismanagement and urged that dividends be suspended until accumulated earnings should be sufficient to rehabilitate the property. While the company will not be allowed to increase fares in any of its fifteen principal districts, however, the commission suggested that it would give consideration to a request for fare increases in strictly rural sections. The commission virtually assured the company that a new schedule of rates for rural lines "within certain restrictions" would be approved by the commission without further hearing and become effective within thirty days of the time of filing. Thus the main issue of a 6-cent fare is closed in a case that has been pending since November, 1915.

Relative to the districts where the commission concludes that there should be no fare increase it said:

"There is no evidence before the commission which would justify it in permitting the regular unit of cash fare to be increased in the populous centers which are already carrying their fair share of the burden. We also have grave doubt whether an increase in the 5-cent unit in this thickly settled, short-haul territory where jitney competition is so feasible and so prevalent would be of material benefit to the company. It is not a policy which street railway companies generally in this country have thought it wise to adopt. Any increase in the unit cash fare must, therefore, upon the evidence, be disallowed in the present 5-cent zones within or from the centers of the following cities: Boston (including Hyde Park), Brockton, Chelsea, Everett, Fall River, Haverhill, Lawrence, Lowell, Lynn, Malden, Melrose, Quincy, Revere, Salem and Taunton.

"The other lines operated by the company, in general, form part of the interurban routes as distinguished from what may be called urban and suburban portions of the system and are located in less populous districts. If the company wishes to increase the prevailing fares upon these lines (interurban districts), it is just and reasonable in our judgment for it to do so. Certain restrictions upon the discretion of the management in this respect, however, should be indicated."

In regard to proposed zone changes, etc., the commission said:

"The company, in its schedule of proposed fares, has in certain cases provided for an increase of the unit cash fare beyond 6 cents, has introduced certain new fare zones and has made certain alterations in existing zones and transfer privileges. The commission is of the opinion that no changes of this character can be allowed at this time."

The commission, in its voluminous report of forty-eight printed pages on the case, criticised the management of the Bay State Street Railway for the manner of keeping accounts and for failure to provide adequately for depreciation, attributed the weakness of the Bay State system to the original error in judgment of the present owners, said that the property had been allowed to run down in a manner that could not be justified, and stated that "the company has failed to satisfy our minds that additional net income cannot be secured through more efficient management and operation."

Regarding dividends the commission added:

"In order to place the future earning power of the system upon a more stable basis the company must expect temporarily to suspend dividends upon its common stock and turn back earnings into the property. This may seem a drastic prescription, but the situation clearly calls for it."

BROOKLYN WAGES ARE INCREASED

Employees' Benefit Association Enthusiastically Approves New Plan of Departmental Trustees for Meeting With Management

The Brooklyn (N. Y.) Rapid Transit Company on Aug. 29 announced a general increase in the wages of its employees in the transportation department effective on Sept. 1. This action was taken by the directors of the various operating companies in recognition of the demonstration of loyalty which the employees gave during the recent attempts of outsiders to stir up dissatisfaction in connection with the New York strikes. The increases affect 9216 employees of all classes, from car cleaners to superintendents. The additional cost to the company will amount to about $650,000 a year.

The new rates for motormen range from 26 cents to 42.5 cents an hour. The minimum rate applies to beginners on the surface lines and the maximum to those in service more than ten years on the elevated and subway lines, the rates gradually increasing to the maximum according to the years of service. Inasmuch as an unusual percentage of the employees of the system have been in service for many years, a large proportion of the total will receive the maximum rates of pay. Elevated and subway motormen will continue to be chosen from those having good records on the surface lines. The present time allowances are also continued, whereby on the surface lines conductors and motormen working more than eight hours a day but less than ten are paid for ten hours' work, and on the elevated and subway lines motormen, conductors and guards working more than seven hours and less than ten receive ten hours' pay.

The following table presents a comparison of the old and new rates as they affect the men engaged in the operation of the cars:

SURFACE CONDUCTORS AND MOTORMEN

	Present Rates Per Hour (Cents)	New Rates Per Hour (Cents)
First year	25	26
Second year	25	27
Third year	26	28
Fourth year	27	29
Fifth year	27	30
Sixth year	28	31
Seventh year	28	32
Eighth year	28	32
Ninth year	28	32
Tenth year	28	32
Eleventh year	29	33
Twelfth year	29	33
Thirteenth year	29	33
Fourteenth year	29	33
Fifteenth year	29	33
After fifteen years	29	34

ELEVATED AND SUBWAY MOTORMEN

First year	30	34
Second year	32.5	35
Third year	32.5	36
Fourth year	32.5	38
Fifth year	32.5	39
Sixth year	35	40
Seventh year	35	42
Eighth, ninth and tenth years	37.5	42
After ten years	40	42.5

Conductors on elevated and subway lines who now receive from 23 cents to 25 cents an hour will be advanced from 26 cents to 28 cents an hour, depending upon the years of service, and guards who now receive from 20 cents to 23 cents an hour will receive from 22 cents to 25 cents an hour.

The company also announced on Aug. 29 that the members of the Employees' Benefit Association had ratified by a very large majority the proposed amendments to the constitution of that organization creating in each one of the large departments of the system a set of departmental trustees who would constitute a committee to voice any changes of conditions desired by the employees of such department. This plan, announced by President T. S. Williams on Aug. 17, as previously noted in the ELECTRIC RAILWAY JOURNAL, has been enthusiastically received by

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the employees. Up to Aug. 29 more than 94 per cent of the members of the association working in the transportation department and more than 86 per cent of the entire membership of the association in whatever department employed, had signed proxies to be voted for the plan of departmental trustees at the special meeting of the association on Sept. 28, when the amendments will be formally adopted.

The plan provides that in case any question arises in respect to any matter affecting working conditions or employment which the departmental trustees may consider worthy of attention, they will arrange for a hearing of the question at issue with the employee or employees affected and the head of the department or his authorized representative. At such hearing the employee or employees affected will have opportunity to discuss fully and in the presence of the departmental trustees the conditions to which exception is taken.

Following such hearing, the departmental trustees will confer with the head of the department or his authorized representative to see whether an agreement can be reached covering the question or questions at issue. In the event that no such agreement can be reached, then the departmental trustee or trustees and the head of the department will respectively prepare and sign statements of the facts and conclusions drawn therefrom, which will be submitted to the president of the Brooklyn Rapid Transit Company for final decision.

On Aug. 30 members of the Employees' Benefit Association in the surface transportation department, the elevated and subway transportation department, the mechanical department, the department of way and structures, the electrical department and the freight department held a special election for acting departmental trustees. According to the announced results, thirty-nine of such trustees were elected in the various departments out of 140 candidates nominated by their fellow-employees. The aggregate vote represented was more than 98 per cent of the employees entitled to vote in the different departments. Thus the men elected take office under the virtually unanimous indorsement of their fellow members in the association. The acting departmental trustees will take office immediately and upon the adoption of the pending amendments to the constitution and by-laws of the association will become officially the departmental trustees of the association to hold office until the next annual meeting.

The Employees' Benefit Association has more than 10,000 members, including fully 90 per cent of the men in transportation service. While the departmental trustees are elected by the members of the association, their good offices are available for any employee or employees on the system.

MR. WHITRIDGE RETURNS

Commission Charges Said to Be Baseless — Third Avenue Railway Cannot Pay Higher Wages

A meeting of the directors of the Third Avenue Railway, New York, N. Y., on Aug. 30 was attended by Frederick W. Whitridge, president of the company, who had returned from Scotland on Aug. 28. It was the first time Mr. Whitridge had met with the directors since the recent strikes were called on the company's lines. He received power from the board to take charge of the negotiations with the ex-strikers, which have been in the hands of Edward A. Maher, Sr., vice-president and general manager of the company, and after the meeting was over he issued a statement to the effect that he would meet representatives of the employees on Aug. 31 to consider with them the twenty-six requests for changes in rules and regulations. Continuing, he said in part:

"Some of these requests are, I think, superfluous, as the things have already been done. Some of the others may fairly be discussed, and a few the company will be obliged to reject. The request for an increase in wages the company will also be unable to meet. Since Jan. 1 of this year the wages have been increased about $250,000. I had every reason to suppose at the time of my last conference with the men in July that this was substantially satisfactory, and I hope to be able to induce the men to proceed without now asking for an unreasonable further increase, and thus avoid the delay and expense of arbitration. If the men are not willing to meet me upon these lines, I am, of course, prepared to undertake such an arbitration and to pay our share of the expense thereof.

"So far as the personal attacks on myself are concerned, which the Public Service Commission for the First District of New York has seen fit to make, I have only to say that those attacks were quite as improper and baseless as any of the others which have been made upon me by this body."

ANOTHER INTERBOROUGH WAGE INCREASE

New York Company Raises Pay of All Class of Workmen for Third Time in Eight Months—Individual Working Agreements for Men

The Interborough Rapid Transit Company, New York, N. Y., announced on Aug. 30 the third increase in the wages of its employees that has been made this year. The new increase, effective Sept. 3, will affect 12,000 employees and will amount to approximately $1,250,000 a year. This is in addition to annual increases amounting to $200,000 made on Jan. 1 and $300,000 made on Aug. 1 of this year. It thus makes a total annual increase of $1,750,000 in the company's payrolls during the last eight months. The working day has also been reduced from ten hours to nine.

The present increase applies to shop, powerhouse, transportation and other classes of workmen in the employ of the company. The new rates per day of nine hours for the most important divisions of the transportation group follow:

Conductors:	
First year	$2.80
Second year	2.90
After second year	3.00
Guards:	
First year	$2.40
Second year	2.50
Third year	2.60
After third year	2.70
Motormen:	
First year	$3.50
Second year	3.75
Third year	4.00
Fourth year	4.20
Fifth year	4.20
Sixth year	4.40
After tenth year	4.50

Overtime for conductors, guards and motormen to be paid actual time up to ten hours; over ten hours, time and one-half.

The new scale of wages has been circulated among the employees with a view of establishing a working day and a satisfactory wage rate that will cover a period of not to exceed two years or until such time as the city becomes interested in the financial results of the operation of the elevated roads and the subway. Separate working agreements have been distributed among the men in the various departments showing in detail the hours that constitute a day's work in all branches of the business and the pay per day that will be given to the men, together with provisions for extra time and overtime. The company has not used and does not propose to use any influence whatever over anyone in its employ as to whether he shall or shall not sign the individual working agreement. It is entirely voluntary on his part whether he does so or not, and there will be no discrimination or any act on the part of any officer of the company permitted because any men do not desire to sign.

This individual working agreement contains the following clauses:

"1. The Interborough Rapid Transit Company employs the undersigned for the wages and hours set forth on the annexed schedule in the subway, until the beginning of initial operation as defined in Subway Contract No. 3, or on the elevated, until the beginning of operation of any part of the railroads as defined in the Elevated Railroad Certificate and (provided the Public Service Commission shall approve when such operation shall begin) until Aug. 31, 1918.

"2. The undersigned agrees to work for the company in such positions as may be assigned to him from time to time (provided there shall be no reduction in position except for good cause) for such wages and hours for such periods.

"3. It is further agreed that if the company shall increase the wages or change the hours set forth on the schedule, the undersigned shall have the benefit of such increase or change notwithstanding this agreement to the contrary.

"4. If, after five years' service in any one class, for physical causes beyond the control of the undersigned, he shall be

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assigned to a lower position, he shall then receive at least the low rate wages on the schedule of the class from which he is transferred."

In regard to the above matters, Frank Hedley, general manager of the company, issued a statement on Aug. 30 which said in part:

"Large numbers of Interborough Rapid Transit Company employees have voluntarily come to the president's office and to my office and indicated their desires to have such a working agreement executed that they can be assured that their positions are safeguarded and that the traveling public of New York can be assured that the rapid transit lines controlled by the company will be protected against interference with the continuity of its service for at least a fixed period.

"A few days ago President Shonts received a communication signed by a number of this company's employees who asked for a conference. A conference was arranged for these men to meet to-day. At this conference the question was immediately raised as to whether the employees of the Interborough Rapid Transit Company have a legal and moral right to organize, and I said that I would be glad to hear the grievances or demands of the employees on the assumption that the principles which had been agreed upon in so far as the New York Railways was concerned would also apply to the Interborough Rapid Transit Company. The New York Railways agreement provides that committees of the men have a right to have their individual committeemen, if they desire represented also by spokesmen, appear before the officers of the company to present their cases and, further, that should disputes arise with the management which cannot be settled with the employees the questions in dispute shall be arbitrated, excepting, however, all matters relating to efficiency. Of course, the same procedure will be followed on the Interborough lines.

"The spokesman for the employees at this meeting, Mr. Fitzgerald, brought up the question of wages for several classes of employees, and at this point I handed to him a printed copy of the working agreement between individual employees and the Interborough Rapid Transit Company. This agreement was formulated in conference with the committees representing each of the departments of the road, which committees as a whole represent every department of the system, and these committees stated that they would recommend the terms of the agreement for execution by the individual employees. The agreement is therefore the result of collective bargaining with the chosen representatives of the employees. The unrest or excitement that has prevailed on the Interborough Rapid Transit Company more or less for the last two or three weeks led the management to decide that a change in the working hours of many of its employees and an increase in the rate of wage were the essential things, and while these agreements provide for such changes they do not close the door for our men to continue their negotiations with the management for other requests that they have made. In fact, I invited them to continue their negotiations with me and with their superior officers with the view of arriving at a determination of all discussed matters to the complete satisfaction of our employees and the company."

STRIKE FOLLOWS BANGOR WAGE INCREASE

E. C. Ryder, president Bangor Railway & Electric Company, Bangor, Me., on Aug. 23 refused to sign a contract with the local carmen's union which involved recognition of the union and submission of disagreements between the men and the company to a board of arbitration. President Ryder stated that this involved a division of authority to which the company could not assent under any conditions. This demand on the part of the union was made in the face of a recent general increase of 2 cents an hour in the wages of conductors, motormen and carhouse employees, as announced in the ELECTRIC RAILWAY JOURNAL of Aug. 26.

In accordance with votes taken at two meetings, the first on the evening of Aug. 25 and the second at an early hour on Aug. 26, a portion of the conductors and motormen of the company went on strike at 9 a. m. on Aug. 26. During the forenoon there was a limited service on the local lines. President Ryder stated that the company had kept absolute faith with the employees in not importing operatives while negotiations were on, and for that reason it found some difficulty in keeping up its schedule. It expected, however, to be in a position on Monday, Aug. 28, to run its cars on schedule time.

On Monday the company maintained partial service with a few loyal employees, a few veterans and some new men, but service was withdrawn at night. Since then the length and the amount of service have been gradually increased. Strikers making personal application for reinstatement up to 5 p. m. Wednesday were promised preference, and by Tuesday night five had returned. The company asserts that the strike is practically over as far as it is concerned.

STRAW VOTE ON DALLAS VALUATION

City Officials and Utility Representatives Agree to Submit Point of Valuation to People in Hope of Settling Franchise Controversy

The controversy between the city of Dallas, Tex., and traction and electric lighting interests over the valuation that is to be fixed in the new franchises will be referred to a straw vote of the public. This arrangement has been made under an agreement reached between the city officials and the representatives of the traction and lighting interests, J. F. Strickland and C. W. Hobson, who propose to head the new companies that are to take the street railway systems and the electric lighting plant out of the hands of present owners and operate them on a service at cost basis.

The model service at cost franchise approved by the voters of Dallas at an election held on April 4 has been held up by an election contest. This model franchise fixed a valuation of $7,100,000 for the traction and lighting properties exclusive of the Oak Cliff lines, which are controlled by Stone & Webster and are operated separately by the Northern Texas Traction Company. This was the valuation fixed by E. W. Bemis, utility expert, who made an investigation for the city. The utility interests maintained that their properties are worth $8,500,000 and outlined their position in a long statement issued to the people of Dallas and signed by Messrs. Strickland and Hobson, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 26.

Following the issuance of this statement, Mayor Henry D. Lindsley and City Commissioners A. C. Cason and Manning B. Shannon, representing the city, issued a statement outlining the city's position in the controversy. This statement, before being issued, was submitted to Messrs. Strickland and Hobson and approved by them as being a true and impartial account of the controversy and the efforts at settlement.

The big point in dispute is that of valuation. It was agreed that this point should be submitted to the voters of Dallas in a straw vote so that a preference might be expressed for the $7,100,000 or the $8,500,000 valuation. The traction interests will pay all costs of this vote, and the returns will be made to the city secretary and will be counted by an impartial board composed of one member of the staff of each newspaper published in Dallas.

The statement issued by Mayor Lindsley and the city commissioners is in part as follows:

"As to the question of valuation, the investigation of Mr. Bemis showed, to the satisfaction of a majority of the Board of Commissioners, that the entire electric light property and the entire street railway properties east of the Trinity River were worth approximately $6,600,000. To this sum there was added by the Board of Commissioners $500,000 to cover all equities of every character. Stone & Webster, prior to the election, offered to accept a valuation of $8 500,000, which is the exact figure Messrs. Strickland and Hobson are offering to accept as a valuation adjustment. There is, therefore, a difference between the valuation now claimed by the owners of these public utilities and the valuation actually placed on them by Mr. Bemis of nearly $2,000,000.

"It is to be remembered that there were no differences whatever between Mr. Bemis and the engineers of Stone & Webster with regard to actual quantities involved or to the unit value of these quantities. The only differences came in considering proper allowance for overhead, construction, financing, etc., expenses, and as to whether depreciation accrued should be deducted from the properties

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involved or not. Stone & Webster claimed 36 per cent for such overhead expense and Mr. Bemis claimed that 20 per cent was a reasonable allowance. Stone & Webster asserted that there should be no deduction for accrued depreciation. Mr. Bemis claimed that that which had in part ceased to exist should be deducted in measuring value.

"The negotiations which have led up to the final status outlined in the Strickland-Hobson statement and in the Mayor's statement, although extending over a long period, have not at all delayed the final consummation of these franchise matters. The suit which was brought to contest the April election has not been settled. This case will come up for trial before the three district judges of Dallas County on Sept. 1. If the decision of these judges is appealed from, the city expects a final judgment by the higher courts during the month of October of this year. The administration, of course, is in no way responsible for this litigation. It has done everything within its power and will continue to do everything within its power to win this suit and to make the verdict of the people, as expressed at the polls in April of this year, operative.

"Furthermore, it will be necessary, before any franchises become finally binding, that they be voted by the people of Dallas at a regular election. The next regular election is the first Tuesday in April, 1917. Any franchises passed by the Board of Commissioners at this time would be subject to a referendum vote by the people. Such referendum could be demanded by 500 qualified voters of Dallas. There is no question whatever—and all parties who are interested in the settlement of this matter agree as to this—that any adjustment of these franchises now, other than as distinctly voted on in April, 1916, would be subjected to a referendum vote. Such vote could only be legally held in April 1917.

"We would not be willing, under any circumstances, to submit the Strickland-Hobson plan to the people of Dallas, either for a 'straw vote' or at a regular election, until there has been reached a definite, written agreement with Messrs. Strickland and Hobson covering every detail of these franchises, and there would be exacted by us four bonds in the aggregate sum of $1,000,000, conditioned that the agreements relative to the expenditure of $2,000,000 within the city of Dallas within eighteen months should be faithfully carried out, and conditioned that the agreement to build the two interurbans should be carried out.

Plan of One Day Off in Ten Turned Down.—Employees of the Tri-City Railway Company, Davenport, Iowa, by a margin of five votes, have rejected a proposition to take one day off in every ten instead of every fifteen as is the present plan.

Wages of Gorge Men Increased.—The Niagara Gorge Railway, Niagara Falls, N. Y., has granted a voluntary increase in wages to some of its platform men who have been in the company's service for many years. Some of the increases to platform men are as much as 3 cents an hour. Other employees were granted increases up to $10 a month.

Aurora Line Negotiating New Labor Contract.—Practically all the questions involved in the negotiations for a new working agreement between the Aurora, Elgin & Chicago Railroad, Aurora, Ill., and its employees are being settled in conference. It is understood, however, that the question of wages will be submitted to arbitration after the other difficulties are settled. The old labor contract expired June 1, 1916.

Hearing on Change in Fiscal Year.—The Interstate Commerce Commission has set Nov. 13 for a hearing in regard to the change of the end of the fiscal year for common carriers by rail from June 30 to Dec. 31, and it has invited all interested parties to be present. At the meeting of the executive committee of the American Electric Railway Accountants' Association, held in Chicago on Feb. 3, a resolution was adopted favoring this change, in accordance with the suggestion of the American Railway Accounting Officers.

Political Posters Prohibited on Detroit Lines.—Political candidates have been informed through a recent issue of *Electric Railway Service*, the company publication of the Detroit (Mich.) United Railway, that they will save considerably in their printing bills if they will announce to their workers not to attempt to place cards, posters and the like on the property of the company. Instructions have been issued that political advertising matter must not be posted or distributed, and if posted unknown to officials of the company it will be torn down and destroyed as soon as discovered.

Demands of Birmingham Men Being Considered.—On Aug. 19 representatives of the newly organized employees of the Birmingham Railway, Light & Power Company, Birmingham, Ala., presented demands for a recognition of the union, a rearrangement of the present wage scale and a regulation of working hours. On Aug. 21 the announcement was made that the union had been recognized and that the whole incident was closed as far as public interest was concerned. It only remained to arrange the details of wages and hours.

Partial Payment Stock Plan Grows in Public Favor.—Sales of preferred stock of the Northern States Power Company to customers of that organization, made under the partial payment plan, are on the increase. During June and July stock at a par value of $31,000 was sold to 135 customer investors. This would indicate that the popularity of the partial payment plan is steadily growing. A detailed description of the plan followed by this and other properties of H. M. Byllesby & Company, Chicago, Ill., in selling securities to patrons was published in the ELECTRIC RAILWAY JOURNAL of Aug. 12.

Higher Wage Scale for Philadelphia.—The co-operative committee of the Philadelphia (Pa.) Rapid Transit Company at a meeting held on Aug. 23 in company with the management determined that the condition of the 22 per cent fund was such as to make possible an advance of 1 cent an hour to all of the conductors and motormen of the company. Effective on Sept. 1 the new hourly scale reads as follows: New men, 27 cents; after one year's service, 28 cents; after two years' service, 29 cents; after three years' service, 30 cents; after four years' service, 31 cents; after five years' service, 32 cents.

No Cause for Trouble at Toledo.—A committee of the Central Labor Union, Toledo, Ohio, reported to that body on Aug. 24 that, after making a thorough investigation, it had found no cause that would justify any radical action on the part of the union against the Toledo Railways & Light Company. The recent complaints, the report said, were made by four or five men. There may be some minor troubles, it continued, but these can all be handled in a satisfactory manner. A committee of the street car men will meet President Coates at an early date to consider some of these matters, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 26.

Harrisburg Strikers Secure Jitney Referendum.—The striking trolleymen of the Harrisburg (Pa.) Railways during the last week concentrated their energies on procuring signers for the referendum petition to repeal the present jitney ordinance and to pass a new one, cutting the bond from $2,000 to $1,000, and reducing the license fee from $50 to $10. That they were successful is shown in the fact that only 1751 signers were needed to compel action and 2800 names were on the referendum paper on Aug. 30. If the City Commission refuses to accept the provisions of the new jitney ordinance the people will be given the right to vote upon the ordinance at the November election.

Seventy-five Thousand Dollars of Business Lost by Strike.—Towns along the line of the Buffalo & Southern Railway, Buffalo, N. Y., assert that they have lost more than $75,000 in business since the strike on the company's property, which has been in effect since last May. The line has been very seriously crippled by law-breaking strikers and their sympathizers. Nathan A. Bundy, receiver, is making an effort to operate a few cars between the Buffalo city line and Gardenville, Hamburg, Orchard Park and Ebenezer. New York bondholders have been asked to come to Buffalo and investigate the situation. Governor Whitman has also been requested to appoint a commission to investigate the trouble.

Chattanooga Car Strike Ends.—The strike of some conductors and motormen of the Chattanooga Railway & Light Company, which led to violence compelling a suspension of

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night service during part of last week, was settled on Aug. 25 by the strikers agreeing to go back to work pending arbitration. The only points thus far granted by the company are the recognition of the union and the reinstatement of twenty-one discharged employees. While no difficulty is expected in reaching a final settlement, there are two items that may have to be put into the hands of arbitrators. These are the increase in wage scale and the closed-shop provision. Conferences are now being held, and if no agreement is reached arbitration will be used.

Remedy for Internal Fissures in Rails Discovered.—A. H. Smith, president New York Central Railroad, New York, N. Y., has announced that P. H. Dudley has discovered a positive cure for internal fissures in steel rails, a defect which has baffled engineers for a number of years. After experiments covering a considerable period of years, Mr. Dudley has concluded that such fissures are caused by imperfect processes of manufacture and not by excessive wheel loads. In order to eliminate these, new specifications governing the manufacturing process have been developed. In addition to the usual methods, these specifications require reheating of the finished product by a special method. In announcing this discovery President Smith stated that through the use of Mr. Dudley's specifications the actual breakage of rails in service has been reduced from one in 600 to one in 142,000.

Gap Between Cleveland and Pittsburgh Closed.—The last gap in the interurban lines connecting Cleveland, Ohio, and Pittsburgh, Pa., was closed on Aug. 24, when the Cleveland, Alliance & Mahoning Valley Railway opened service between Alliance and Warren, Ohio. A passenger may now make the trip by using the Northern Ohio Traction & Light line between Cleveland and Ravenna. At the latter place he would take a Cleveland, Alliance & Mahoning Valley Railway car for Warren, where he would change to the line of the Republic Railway & Light Company to reach Youngstown. Youngstown, New Castle and Pittsburgh are connected by interurban lines and the trip could be thus completed. Some years ago there was much talk of through service between Cleveland and Pittsburgh, but a small gap existed in the line that was never closed. The new line provides a different route from the one originally considered.

New Franchise Ordinance Passed in Henderson.—Henderson, Ky., has passed an ordinance providing for the sale of a street railway franchise. The railway system is now operated by the Evansville (Ind.) Railways under a franchise which will expire on Oct. 16. The new franchise provisions are unusually radical, and the Evansville company has stated that it does not plan to bid for the privilege of operating under it. Some of the features of the new measure are: Half-fares for school children while on their way to and from school; 3-cent fares for all passengers between 6 a. m. and 7 a. m. and between 6 p. m. and 7 p. m.; a fifteen-minute schedule for the first five years and a ten-minute schedule for the remaining fifteen years of the life of the franchise; four years for making all necessary repairs and overhauling the present tracks in the event the franchise is purchased by the present operator, and the changing of the present routeing in some respect.

Wage Increase Asked in Louisville.—The Louisville (Ky.) Railway has been waited on by a committee of employees, who asked that an increase in the scale of wages be considered by the company. The conference with President T. J. Minary was friendly. The employees said they realized that the company's earnings had fallen off in late years, but the cost of living had gone up and they urged that the matter of an increase be taken up if possible. As soon as the members of the executive committee return to the city, Mr. Minary said, the subject will be considered. The men are now being paid from 21 to 24 cents an hour. A woman stockholder wrote to one of the Louisville newspapers in regard to the proposal, asserting that the holders of common stock, many of whom depend on it for a living, should be given first consideration. The common stock, she said, is paying 4 per cent, no increase having been granted in years, while the men have been advanced several times of late. She added that if the street-car men are not satisfied the company should employ women, many of whom could be found to operate the lines.

Financial and Corporate

TRACTION COLLATERAL FOR BRITISH LOAN

The list of American securities which are to serve as part of the collateral for the loan of $250,000,000 to the British government has been made public by J. P. Morgan & Company. The total number of American securities, which are valued at $100,000,000, is 503, including 442 bonds and sixty-one stocks. The stocks are made up of thirty-six steam-railroad issues, five public-utility issues (including the Manhattan Railway), and twenty industrial issues. The bonds include 320 steam-railroad issues, ninety public-utility issues, and thirty-two miscellaneous issues, including industrial, municipal and other bonds. The ninety public-utility bond issues comprise forty-one electric railways and forty-nine other utilities. Included in the electric-railway list are the following issues:

American Power & Light 10-yr. 6s, 1921.
Brooklyn Rapid Transit secured 5 per cent notes, 1918.
1st & ref. M. 4s, 2002.
5s, 1945.
B'way & 7th Av. RR. 1st cons. M. 5s, 1943.
Chicago Railways 1st M. 5s, 1927.
Commonwealth Power, Ry. & Lt. conv. 6s, 1918.
Detroit United Rys. 1st cons. 4½s, 1932.
Duluth Street Ry. 1st M. 5s, 1930.
Eastern Power & Light Corp. conv. 5s, 1918.
Federal Light & Traction 1st lien s. f. 5s, 1942.
Georgia Light, Power & Rys. 1st lien 5s, 1941.
Georgia Ry. & Elec. 1st cons. 5s, 1932.
Interborough-Metropolitan coll. tr. 4½s, 1956.
Interborough Rapid Transit 1st 5s, 1966.
Kentucky Traction & Term. 1st & ref. 5s, 1951.
Louisville Ry. 1st cons. 5s, 1930.
Lynn & Boston Ry. 1st M. 5s, 1924.
Newport News & Hampton Ry., Gas & Electric 1st & ref. 5s, 1944.
New Orleans Ry. & Light gen. 4½s, 1935.
Manhattan Ry. cons. 4s, 1990.
Michigan United Rys. 1st ref. 5s, 1936, Series A.
1st ref. 5s, 1936, Series B.
New York Rys. 1st real estate ref. 4s, 1942.
New York, Westchester & Boston Ry. 1st M. 4½s, 1946.
Northwestern Elevated Ry. 1st 5s, 1949.
New York State Rys. 1st cons. 4½s, 1952, Series A.
Portland Ry., Light & Power 1st ref. 5s, 1942, Series A.
Portland Ry. 1st & ref. s. f. 5s, 1930.
Public Service Corp. of N. J. gen. M. 5s, 1959.
Puget Sound Traction, Light & Power 6s, 1919.
Rochester Railway M. 5s, 1930.
St. Louis, Springfield & Peoria RR. 1st and ref. 5s, 1939.
San Joaquin Light & Power Corp. 1st and ref. 6s, 1950.
Springfield Ry. & Light 1st lien s. f. 5s, 1926.
Third Avenue RR, 1st M. 5s, 1937.
Tri-City Railway & Light coll. tr. 1st lien 5s, 1923.
1st ref. 5s, 1930.
United Light & Railways 1st & ref. 5s, 1932.
Virginia Ry. & Power 1st & ref. 5s, 1934.
Washington Ry. & El. cons. 4s, 1951.

IDAHO CONSOLIDATION REPORTED

It is reported that the hydroelectric and steam-generating properties in southern and western Idaho, with their transmission and distributing systems and some allied electric railways which were financed about a year ago through the Northern Securities Corporation, have been consolidated under the name of the Idaho Power Company, with a capitalization of $17,000,000. The Electric Investment Corporation, which was organized to assist in the consolidation, will be dissolved. The Boise Valley Traction Company, organized to take over the electric railway lines, will remain in existence, but all its stock will be held by the new company.

The new company is organized under the laws of Maine, but twelve of its sixteen directors are residents of Idaho. Companies merged into the Idaho Power Company include the Idaho-Oregon Light & Power Company, the Idaho Railway, Light & Power Company, the Idaho Power & Light Company, the Great Shoshone & Twin Falls Water Power Company, the Southern Idaho Water Power Company, the Jerome Water Works Company, together with a number of properties controlled by these corporations. The new company will operate in every city and town in the great Snake River Valley, with the exception of the two supplied with government power.

F. F. Johnson, Boise, is president, and William T. Wallace, vice-president and general manager. George E. Claflin and D. F. McGee, New York, are also vice-presidents, with E. P. Summerson and A. E. Smith of the Electric Bond & Share Company assistant secretaries and assistant treasurers. G. M. Dahl, of the Electric Bond & Share organization, is a director and member of the executive committee.

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ANNUAL REPORTS

International Traction Company

The comparative income statement of the International Traction Company System, Buffalo, N. Y., for the years ended Dec. 31, 1914 and 1915, follows:

	1915		1914	
	Amount	Per Cent	Amount	Per Cent
Gross passenger earnings	$6,564,631	95.9	$6,492,212	96.0
Receipts from other sources	275,343	4.1	268,368	4.0
Total	$6,839,974	100.0	$6,760,580	100.0
Operating expenses	$3,480,543	50.9	$3,601,800	53.2
Taxes	425,484	6.2	423,632	6.3
Total	$3,906,027	57.1	$4,025,432	59.5
Net earnings from operation	$2,933,947	42.9	$2,735,148	40.5
Interest	$1,681,468	24.6	$1,645,400	24.3
Rentals	47,971	0.7	45,379	0.7
Sinking fund and amortization of debt, discount and expense	137,521	2.0	132,601	1.9
Total fixed charge	$1,866,960	27.3	$1,823,380	26.9
Balance for renewals, replacements and dividends	$1,066,986	15.6	$911,767	13.6
Renewals and replacements reserve	396,582	5.8	359,244	5.4
Surplus	$670,404	9.8	$552,523	8.2

The gross earnings of the system for 1915 showed an increase of $79,393 or 1.2 per cent as compared to 1914, while the operating expenses and taxes decreased $119,404 or 2.9 per cent, so that the net earnings from operation gained $198,798 or 7.2 per cent. All of the saving in expenses came in the operating group, taxes showing a slight increase. A considerable portion of the saving in operating expenses was caused by the modification of the contract under which the company receives electrical energy and which will be a continuing source of economy in operation.

The fixed charges for 1915 showed an increase of $43,579 or 2.4 per cent over those of the preceding year, this arising from interest accrued on additional bonds issued for improvements and the acquisition of additional property and also from higher rental and amortization charges. The balance remaining for renewals, replacements and dividends was $155,218 or 17.0 per cent greater than in 1914, while the amount set aside for the renewal and replacement reserve increased $37,338 or 10.4 per cent.

The lines of the system were not subjected to jitney competition during the last year, for only one jitney appeared in Buffalo. State and municipal authorities passed regulatory legislation which is a safeguard for the future against irresponsible competition from this source. The first two months' operation in 1916 showed a marked increase in gross receipts and the management looks forward to a prosperous year.

Lethbridge Municipal Railway

The commissioners' and auditors' reports of the City of Lethbridge, Alta., for the calendar year, 1915, contain the following data regarding the operations of the Lethbridge Municipal Railway during 1914 and 1915:

	1915	1914
Expenditures	$71,582	$83,255
Revenue	41,740	46,053
Deficit	$29,841	$37,202
Gross receipts	$41,020	$45,333
Operating expenses	38,199	48,810
Operating ratio (per cent)	93	108
Net earnings (exclusive of interest, sinking fund, insurance and taxes)	$2,821	.....
Net loss (exclusive of interest, sinking fund, insurance and taxes)	.....	$3,477
Passengers carried	844,307	1,054,848
Average daily receipts	$112	$124
Transfers	49,938	184,481
Car miles	294,164	357,938
Revenue per car mile (cents)	14.19	12.87
Total cost per car mile (cents)	24.33	23.26
Passengers per car mile	2.87	2.95
Average fare per passenger (cents)	4.77	4.22

The auditors state in their report that the result of the operation of the street railway for 1915 was a net deficit revenue of $29,841, which was provided for, as in recent years, by taxation. In spite of a diminished revenue this result is said to be a considerable improvement over that in 1914. This is largely attributable to reduced operating charges resulting from the change to the one-man system of cars put into effect in the latter part of that year. It was found necessary during the year, owing to the increased cost of electrical power, to increase the charges to this department for that service from 2 to 2.75 cents per kilowatt-hour, which meant an added charge of $4,054 for power.

Philadelphia & Western Railway

The gross revenues of the Philadelphia & Western Railway, Upper Darby, Pa., for the year ended June 30, 1916, totaled $491,488, an increase of $68,681 over those of the preceding year. Most of this increase came in passenger revenues, which gained $60,491, although freight revenues in rising $879 to a total of $1,882 showed a high percentage gain. The operating expenses at $234,818 showed an increase of $24,778, this increase being well distributed among the various operating groups. The operating ratio decreased 1.9 per cent during the year to 47.78 per cent. The maintenance items aggregated 18.5 per cent of the gross revenues and 40 per cent of the operating expenses. The operating income of $256,669 for the year showed a gain of $43,902. Taxes increased $8,700 to a total of $18,000, but other deductions from income decreased so that the net income for the year, amounting to $106,319, showed an increase of $40,893. During the year the company carried 3,370,468 passengers, an increase of 438,775, and ran 1,376,691 car miles, an increase of 100,984. The earnings per passenger car mile amounted to 33.5 cents, an increase of 2.1 cents, and the expenses per revenue car mile were 16.75 cents, an increase of 0.55 cent. There was expended for additions and betterments during the year $14,432.

Glasgow Corporation Tramways

The working of the Glasgow Corporation Tramways for the year ended May 31, 1916, resulted in an ordinary income of £1,157,336. The working expenses, including payments to dependents of employees at war, totaled £773,442, leaving a net revenue of £383,894. The ordinary income of the preceding year was £1,076,877 and the working expenses £735,897, the net revenue of £340,890 for the last fiscal year thus showing a substantial improvement over the preceding. After adding interest on investments the income of £465,097 was applied to the payment of interest, sinking funds, income tax, parliamentary expenses and depreciation, the total amount so used being £421,549. The net income of £43,548 was paid over to the common good.

The gross revenue for the last fiscal year showed an increase of £95,834, and the average traffic revenue per car mile increased from 10.61d. to 11.049d. The working expenses, excluding expenditures incurred on account of the war, showed an increase of £8,833. The allowances paid to dependents engaged at the front was £68,550 for the year. During the year £62,175 was expended on the upkeep of the tramway track in ordinary repairs. In addition to this, £68,681 was set aside out of the year's revenue to meet the cost covering renewals of track, this sum being calculated at the rate of £350 per mile of single track. The total cost of ordinary repairs to the power plant and sundry machinery during the year was £6,678, and £23,045 was charged against revenue to cover depreciation.

During the last fiscal year, with 650.65 cars in average use on a fourteen-hour day as compared to 628.20 in the preceding year, the car mileage amounted to 24,063,309 car miles as compared to 24,214,460 car miles in 1915. The passenger traffic increased from 336,260,758 in the preceding year to 363 371,464 in the last fiscal year, and the receipts from £1,070,694 to £1,149,264, so that the average traffic revenue per car mile showed a gain from 10.61d. to 11.05d. The percentage of the working expenses to traffic receipts in the last fiscal year was 60.3 per cent as compared to 63.9 per cent in the preceding year. The average total revenue per car mile was 11.127d. in 1916 and 10.674d. in 1915, and the average fare paid per passenger was 0.761d. and 0.764d. respectively. The number of passengers per car mile increased from 13.887 in 1915 to 14.516 in 1916, while the number of passengers per mile of single track rose from 1,697,243 to 1,827,757. The amount expended on capital account during the last fiscal year was £83,448.

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NORTHERN OHIO CONTROL SOLD

1000 Shareholders to Profit Through Sale of Stock at Par to Eastern Interests

E. W. Moore, vice-president Northern Ohio Traction & Light Company, Akron, Ohio announced on Aug. 25 that his own interests and those of Henry A. Everett had been sold to E. W. Clark & Company, Philadelphia, and Hodenpyl, Hardy & Company, New York, contingent upon their obtaining 95 per cent of the common stock now outstanding. These men own more than 30 per cent of this stock. In all there are about 1000 stockholders, and their average holdings are ninety shares each. The agreement is that the price shall be par, or $100 per share. Following is the statement issued by Mr. Moore at that time:

"A contract has been entered into between the holders of the Northern Ohio Traction & Light Company common stock aggregating a majority for the sale of the stock with the understanding that all holders of common stock may participate on exactly the same price and terms. The price is par, and the dividends payable on Sept. 15 will go to present holders. The sale is contingent upon 95 per cent of all the stock coming in.

"Notices are being mailed to-day requesting deposit of the stock with the Citizens' Savings & Trust Company as trustee. The bank will issue participating certificates. The terms are $3 a share, to be paid on notice by the trustee that 95 per cent of the stock is on deposit; $47 a share payable thirty days later, and the remaining $50 a share to be paid on or before one year later at 6 per cent interest payable quarterly. The trust company certificates will have all of the stock so purchased as security. They will be in negotiable form and usable in place of the stock. Possession of the property will not be turned over to the buyers until a full 50 per cent has been paid."

The buyers have expressed the intention of carrying out all the betterments and extensions that have been planned by the present owners. The $4,000,000 of forty-year 5 per cent bonds recently sold to N. W. Halsey & Company will be distributed by the National City Bank of New York. While the plans of the buyers, outside of the extensions and betterments, have not been made known, it is believed that there will be no material change in the management. As yet no announcement has been made as to whether or not the purchased company will become a subsidiary of the Commonwealth Power, Railway & Light Company, but this is quite possible.

Lancaster & Southern Street Railway, Millersville, Pa.—Henry A. Hitner's Sons Co., Philadelphia, Pa., which recently purchased at public auction the property of the Lancaster & Southern Street Railway, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 26, states that plans are on foot for the reorganization of the railway.

Lincoln Railway & Heating Company, Lincoln, Ill.—The Lincoln Water & Light Company has taken a sixty-day option on the property of the Lincoln Railway & Heating Company, with the result that the former may provide a continuance of street-car service if certain franchise stipulations are granted by the city. A part of this plan is that the Chautauqua extension, heretofore operated as a separate property, be consolidated with the Lincoln Railway & Heating Company, and that adequate service, with a 5 instead of a 10-cent fare, be made to and from the Chautauqua grounds. It is said that the owners of the Chautauqua extension are willing to donate their line if first-class service be granted to the assembly grounds. It will be remembered that the Illinois Public Utilities Commission gave the Lincoln Railway & Heating Company the right to discontinue business provided the City Council of Lincoln would concur in the suspension of street-railway service. It is believed that the new plan will provide for uninterrupted service.

New York (N. Y.) Railways.—The interest on the New York Railways 5 per cent adjustment bonds for the six months ended June 30, as declared by the directors, is $19.81 per $1,000 bond, as compared to $13.70 for the corresponding period of last year. Judge A. N. Hand in the United States District Court on Aug. 25 filed an order granting the petition of the Farmers' Loan & Trust Company in the old Metropolitan Street Railway litigation and directing that the offer of the New York Railways providing for the settlement of a distributive rate of $350 for each of 121 refunding bonds with two coupons attached, dated April 1 and Oct. 1, 1908, amounting to $42,350 less $5,309 for compensation of the trustee and various disbursements, shall be accepted. It is provided in the order that $16,483,000 of the refunding bonds in the possession of the New York Railways shall be submitted to the Farmers' Loan & Trust Company and stamped as paid.

Ohio Traction Company, Cincinnati, Ohio.—The $200,000 of 6 per cent notes of the Ohio Traction Company due on Sept. 1 will be paid off at maturity at the office of the Pennsylvania Company for Insurances on Lives & Granting Annuities, Philadelphia, Pa.

Toledo Traction, Light & Power Company, Toledo, Ohio.—Henry L. Doherty & Company has announced that the executive committee of the Cities Service Company will recommend to the board of directors that the privilege of depositing Toledo Traction, Light & Power Company stocks for exchange for Cities Service Company securities, which expires on Sept. 1, be extended until Sept. 15.

DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	June,	'16	$26,656	*$15,862	$10,794	$5,266	$5,528
1 "	"	'15	24,589	*14,071	10,518	5,561	4,957
12 "	"	'16	304,420	*169,739	134,681	65,606	69,075
12 "	"	'15	265,298	*168,278	97,020	67,041	29,979

JACKSONVILLE (FLA.) TRACTION COMPANY

1m.,	June,	'16	$50,081	*$33,705	$16,376	$15,419	$957
1 "	"	'15	50,516	*35,921	14,595	14,593	2
12 "	"	'16	615,181	*420,015	195,166	179,273	15,893
12 "	"	'15	645,282	*447,568	197,714	166,043	31,671

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m.,	June,	'16	$72,030	*$43,039	$28,991	$16,094	$12,897
1 "	"	'15	67,446	*40,379	27,067	16,011	11,056
12 "	"	'16	763,749	*502,356	261,393	192,253	69,140
12 "	"	'15	703,897	*459,876	244,021	187,543	56,473

NORTHERN TEXAS ELECTRIC COMPANY, FT. WORTH, TEX.

1m.,	June,	'16	$149,460	*$97,610	$51,850	$28,692	$23,158
1 "	"	'15	134,483	*89,537	44,946	27,588	17,358
12 "	"	'16	1,831,954	*1,117,769	714,185	339,682	374,503
12 "	"	'15	1,819,725	*1,057,471	762,254	324,459	437,795

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m.,	June,	'16	$24,201	*$22,917	$1,284	$7,132	†$5,848
1 "	"	'15	21,769	*13,835	7,934	7,500	434
12 "	"	'16	301,486	*191,154	110,332	88,440	21,892
12 "	"	'15	292,512	*186,459	106,053	91,775	14,278

PENSACOLA (FLA.) ELECTRIC COMPANY

1m.,	June,	'16	$24,320	*$13,407	$10,913	$7,712	$3,201
1 "	"	'15	21,510	*11,745	9,765	7,136	2,629
12 "	"	'16	277,248	*153,976	123,272	88,722	34,550
12 "	"	'15	248,544	*153,340	95,204	86,988	8,216

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY.

1m.,	July,	'16	$2,214,928	$1,221,475	$993,453	$815,267	$178,186
1 "	"	'15	1,939,905	1,095,694	844,211	816,596	27,615

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m.,	July,	'16	$326,707	*$196,867	$129,840	$72,305	‡$57,768
1 "	"	'15	250,907	*$143,990	106,917	57,620	‡49,459
7 "	"	'16	2,260,626	*1,340,305	920,321	483,394	‡438,796
7 "	"	'15	1,707,826	*1,060,293	647,533	389,923	‡258,537

SAVANNAH (GA.) ELECTRIC COMPANY

1m.,	June,	'16	$68,110	*$46,860	$21,250	$23,368	†$2,118
1 "	"	'15	63,749	*41,847	21,902	22,971	†1,069
12 "	"	'16	789,536	*531,538	257,999	279,644	†21,645
12 "	"	'15	813,074	*526,557	286,517	277,344	†9,173

TAMPA (FLA.) ELECTRIC COMPANY

1m.,	June,	'16	$73,379	*$42,418	$30,961	$4,396	$26,565
1 "	"	'15	77,003	*41,898	35,105	4,378	30,727
12 "	"	'16	975,227	*519,656	455,571	52,255	403,316
12 "	"	'15	986,799	*507,367	479,432	52,836	426,596

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m.,	July,	'16	$880,859	$520,157	$360,702	$145,046	$215,656
1 "	"	'15	793,496	497,120	296,376	144,650	151,726
7 "	"	'16	5,890,274	3,662,780	2,227,494	998,433	1,229,061
7 "	"	'15	5,398,033	3,532,136	1,865,897	986,133	879,764

*Includes taxes. †Deficit. ‡Includes non-operating income.

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Traffic and Transportation

TENTATIVE STANDARDS FOR WASHINGTON

Public Utilities Commission of District of Columbia Will Consider Adoption on Sept. 6

The Public Utilities Commission of the District of Columbia has issued tentative regulations regarding standards of electric railway service in the district, with the announcement that the formal public hearing for the purpose of considering their adoption will be resumed on Sept. 6. The tentative provisions are as follows:

"Non-rush traffic is hereby defined as that existing from 9:15 a. m. to 3:45 p. m. and from 6:30 p. m. to 10:45 p. m. on mid-week days, and from 9:15 a. m. to 12 noon, and from 6:30 p. m. to 10:45 p. m. on Saturdays. Rush traffic is hereby defined as that existing from 6:30 a. m. to 9:15 a. m. on mid-week days and Saturdays, and from 3:45 p. m. to 6:30 p. m. on mid-week days. Mid-week days are hereby defined as Monday to Friday, inclusive, legal holidays excepted.

"The standard for non-rush traffic shall be on the average 100 seats per eighty passengers carried during a period of one hour, the hour period to be measured commencing on the hour and on the quarter hour points of the hour. The standard for rush traffic shall be on the average 7 sq. ft. of available standing floor area per passenger carried above the number for which seats are furnished during a period of one-half hour, the half hour period to be measured commencing on the hour and on the quarter hour points of the hour. (Accompanying tables indicate the seating capacity and the available standing floor area of the passenger cars now being operated in the District of Columbia.)

"The following traffic is specifically excepted from the application of the standards set: Traffic during all periods of week days not included above and all traffic during Sundays and legal holidays. During these periods and days excepted, the commission will require reasonably adequate and satisfactory service.

"Street railways shall operate all passenger cars in the District of Columbia in accordance with schedules on file with the commission. This shall not be construed to prevent additional cars from being placed in service for special demands. Schedules shall be filed with the commission not later than the date on which they are to become effective. However, schedules reducing any service during periods of week days not included above and on Sundays shall not be filed unless accompanied by the results of observations made on two consecutive days of similar character and covering the same period of days as covered by the reduction in service, and shall not become effective until approved in writing by the commission.

"Observations to determine whether service rendered complies with the standards shall be made only at specified observation points. A compliance observation at any of these observation points shall be the average of the results of observations made on three consecutive days (omitting periods and days specifically exempted from these standards), during identical hour periods, in the case of non-rush traffic, and during identical half-hour periods, in the case of rush traffic.

"Each street railway operating in the District of Columbia shall make compliance observations as provided in the preceding section at observation points, during periods, and in directions specified, once during January, once during April, once during July and once during October of each year, and shall submit the results to the commission on prescribed forms not later than the tenth day of the month following.

"In addition to these periodic compliance observations required, each street railway shall make such observations as will keep it in touch with the demand for service in the District of Columbia and also shall make and submit results of such observations as the commission may direct in writing from time to time. The Bureau of Transit and Equipment Inspection will make such observations from time to time as may be advisable.

"When it comes to the knowledge of the commission through compliance observations made either by a street railway or by the Bureau of Transit and Equipment Inspection that the service furnished at certain observation points is below the standards, the commission may serve on the street railways involved a non-compliance notice, submitting a copy of the results of such observations. Within seven days after the receipt of such notice, the street railway shall file with the commission a schedule which provides for service complying with the standards when compared with the results of the observations submitted, which schedule shall then become effective immediately.

"If, in case a non-compliance notice is based on the commission's observations, the street railway submits, within the seven-day period noted, compliance observations differing materially, in the opinion of the commission, from the commission's observations, joint observations shall be made by representatives of the commission and the street railway and the results of such joint observations shall then be substituted for those determined by the previous observations in question. If such joint observations are authorized by the commission such authorization shall act as a stay of the non-compliance notice so far as it refers to the period and line in question.

"The commission recognizes the fact that frequency of service is also an element of reasonably satisfactory service. The commission may, therefore, require a change in any schedule in which the frequency of service is found to be not reasonably satisfactory."

SAN FRANCISCO JITNEY ORDINANCE UPHELD

Court Refuses Permanent Injunction Against Market Street Operation—Test Case Fails

Superior Judge Crothers, in a decision rendered on Aug. 23, upheld the validity of the ordinance barring jitney buses from Market Street, San Francisco, from Sixth to Fremont, between the hours of 10:30 a. m. and 4 p. m. This ordinance was noted in the ELECTRIC RAILWAY JOURNAL of July 29 and Aug. 12.

Judge Crothers' decision dissolved the temporary injunction previously issued restraining police regulation, and refused a permanent injunction. It was based primarily upon two grounds, the first being that the Supreme Court of California recently held in the case of Sullivan vs. the San Francisco Gas & Electric Company (148 Cal. 368) that "an injunction should not be issued to enjoin the enforcement of an invalid law where the enforcement does not deprive the plaintiff of property rights, but merely interferes with plaintiff's business." The other reason for the decision was cited as follows: "The right of the governing body (Board of Supervisors) to enact legislation for the reasonable regulation of traffic on city streets is not open to question, and is not questioned by the authorities cited by counsel for plaintiffs. The right of the city to regulate and control the jitney bus traffic has been presented to the highest courts in many states, and although the statutes and ordinances involved have provided almost every conceivable form of restriction, they have in every instance been held to be valid and enforceable." Judge Crothers added: "The right of the legislative body to regulate jitney bus traffic upon the public streets is a matter which, under the decisions cited above, rests in the judgment and discretion of that body, and the courts have no authority to interfere unless it is conclusively apparent that the restriction is purely arbitrary and not in the interest of traffic along or across the street, or for some other reasonable, lawful purpose."

The ordinance went into immediate effect, and on Aug. 24, to provide a test case, a member of the Jitney Bus Operators' Union violated the law and was arrested. On Aug. 25 counsel for the union made application for a writ of habeas corpus from Judge Cabaniss of the superior court, the application being based on the contention that the permit to operate is a franchise and that a franchise under the charter does not become effective until sixty days after it is granted. This application was denied by Judge Cabaniss without argument from the prosecution. The petition was

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then taken to the Supreme Court, where Judges Angellotti, Sloss, Lawlor and Melvin, sitting in consultation, denied the writ without rendering an opinion. This establishes the legality of the ordinance.

WHO USES THE STREETS?

Seattle Check Shows Passenger Automobiles Are 67 per Cent of Traffic—Street Cars Only 14 per Cent

Recently the City Superintendent of Public Utilities of Seattle, Wash., ordered a check of traffic on Second Avenue. The check was made from 7 a. m. to 7 p. m., and consisted of a count of all vehicles passing a point between University and Union Streets. The results of the count, as announced in the Aug. 24 issue of *The Electrogram*, the company publication of the Puget Sound Traction, Light & Power Company, follow:

	Northbound	Southbound	Total
Passenger autos	2,494	2,698	5,192
Commercial autos, trucks, etc.	562	460	1,022
Teams	249	210	459
Street cars	539	532	1,071
Total for all vehicles	3,844	3,900	7,744

This information gives a good idea of who uses the streets and to what extent. Passenger automobiles, including private machines, taxicabs and jitneys, far outnumber all other vehicles put together. They total 67 per cent of the traffic. Street cars represent about 14 per cent of the traffic. Auto trucks and delivery wagons comprise 13 per cent. Teams represent about 6 per cent. These figures for Second Avenue are said to be probably a reasonable basis for estimating the proportions of street use in other portions of the city. In any event, they represent the downtown traffic.

Of all this traffic, the street cars, comprising but 14 per cent of the whole, are the only street users which pay special taxes for the use of the streets. The street cars pay for paving that portion of the streets between their tracks and a strip on each side. No other form of traffic pays for any portion of the paving.

The street car company pays one-half of the salary of the city's traffic officers at busy corners. Yet only 14 per cent of the traffic which these men regulate is street car traffic, and the other 86 per cent pays no part of the officers' salaries. A large portion of the automobile traffic, which forms 67 per cent of the street users, is jitney bus traffic. These users of the streets pay no portion of paving cost, no portion of traffic officers' salaries. They make free use of the streets for profit.

SACRAMENTO JITNEYS HARD HIT

With the possible exception of a few cars, Sacramento, Cal., is without a jitney service, all operators having withdrawn on Aug. 12, when Superior Judge Malcolm C. Glenn dissolved the injunction against the city ordinance regulating the operation of jitneys. Immediately upon the dissolution of the injunction, which had been in effect since July 21, 1915, 170 members of the Jitney Association declared that they would withdraw their cars from the streets. About eighteen private operators also expressed their decision to cease work rather than to take a chance of running afoul of the new ordinance.

The present jitney ordinance, which provides for an annual license of $40, a bond of $10,000, a fixed route and a fare not higher than 5 cents, was adopted last year by the City Commission. Before it went into effect the Jitney Association, through its secretary, A. P. Michaelson, asked that an injunction be issued. Judge Glenn issued the injunction and City Attorney Yell immediately appealed to the Supreme Court. This court just recently handed down an opinion which opened the way for Mr. Yell to ask for the dissolution of the injunction.

The jitney operators, however, have not given up the fight. Unless the City Commission agrees to make certain modifications in the new jitney ordinance, the Jitney Association has decided to invoke the initiative and submit a new ordinance to the people of Sacramento.

The Sacramento *Star* has made the following editorial comment on the situation:

"A greater burden is now upon the street railway company. The people have become accustomed to handy service and rapid transit. If the street railway can, in a large measure, meet the public demand the jitney soon will be forgotten.

"If the jitney men wish to come back they must form a reliable association and be ready to submit to regulation. That the drastic ordinance now in effect can be modified is generally believed. But the jitney men have lost an opportunity and it is unlikely they will regain the prestige they once had.

"So we must fall back on the street railway and ask its officers to meet the public demand. The company has shown a fine spirit in the last year. If this is maintained we predict good relations between the corporation and the people."

MUTUAL INSURANCE FOR JITNEYS

New Orleans Operators Complete Arrangements for the Formation of Bonding and Insurance Company

Jitney interests in New Orleans, La., have completed plans for the formation of the Automobile Mutual Liability Indemnity Association, a mutual society to insure against loss or damage any automobile engaged in the jitney business and to protect members from loss by legal liability or damage to property resulting from a collision in which a jitney automobile figures.

Operation of the proposed corporation is to begin as soon as $25,000 of premiums has been paid in. A sum in excess of $25,000 already has been subscribed by members of the association, and, allowing for some subscriptions which may not materialize, organizers of the mutual indemnity society are confident that the $25,000 required by the State law will be on deposit in a New Orleans bank in a short time.

It is said that assurances have been received from the city authorities that bonds given by such an organization as the one proposed will be accepted from jitney owners. The bond required for operation of a jitney under the city ordinance is $5,000.

The terms of members will be three years, with the privilege of renewal. Any member may be expelled for cause on five days' notice, and in such case the unexpired proportion of assessments for the year will be returned. In case of any claim against the company in excess of the surplus fund, extra assessments will be made against members. Each member will possess one vote without regard for the amount of stock in the company he has subscribed for.

Raising the $25,000 capital necessary to incorporate the association has involved the mortgaging of many cars that will be used as jitneys. Members of the jitney association not only pledged as large sums in cash as each felt he could afford, but in addition all will offer mortgages to make up the securities needed. Of the $25,000 required only $10,000 must be cash. The rest may be negotiable paper.

Kansas City Adopts Loading Signs.—The Kansas City (Mo.) Railways has arranged for painting arrows on the pavement at loading points at downtown intersections, to show the exact spot at which passengers may board.

Atlantic City Regulates Jitneys.—Atlantic City on Aug. 24 assumed complete supervision over jitney buses. The ordinance regulating their use outlines routes and fares and other matters. Violations of the ordinance are punishable by fines up to $100 or imprisonment for ninety days. The route along the principal thoroughfares covers about 3 miles, and automobiles must continue to the end. Five-cent fares are to prevail, except that 10 cents may be charged from midnight until 5 a. m.

New Bathing Beaches Help Railway Traffic.—The construction of municipal bathing beaches along the shore of Lake Erie near the Buffalo, N. Y., city line has greatly increased Saturday and Sunday traffic over the line of the Buffalo & Lake Erie Traction Company between Buffalo and near-by towns on the lake shore. Estimates by company officials place the total number in bathing on Sundays at more than 75,000, a large percentage of whom use the company's lines to reach the municipal beaches. All available cars have been pressed into service, and the company has leased a number of interurban cars from the International Railway to use during the rush hours.

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Jitney Overloading Prohibited in El Paso.—The City Council of El Paso, Tex., has passed an ordinance prohibiting overloading of automobiles used in the jitney service here. During the street-car strike the jitneys were inclined to haul as many people as could find room in the cars, and this condition led to the drastic law that has been passed. Under the new law jitney drivers are allowed to carry only the regular carrying capacity of their cars; that is, a five-passenger automobile is allowed to haul but four passengers. Sitting on the doors or standing in the cars or on the running boards is prohibited. Jitney men assert that the law will put them out of business.

Proposed Franchise for Portland Jitneys.—Commissioner Daly of the department of public utilities has completed his revision of the proposed franchise for the operation of jitneys over what is known as the Hawthorne Avenue route sought by the Union Motor Bus Company, and will present it to the Council for consideration at the next meeting. This franchise when approved by the Council will serve as a model for other franchises for the operation of jitneys. The franchise provides for a five-minute headway between 7.30 a. m. and midnight on week-days and a fifteen-minute headway between 9 a. m. and midnight on Sundays, a license fee of $6 a quarter, a 5-cent fare and a monthly inspection of machines.

State Official Praises Louisville Safety Work.—Those in charge of the safety work of the Louisville (Ky.) Railway were highly pleased with the compliment paid the work by Robert T. Caldwell, chairman of the State workmen's compensation board, which recently began work. Mr. Caldwell, in a recent address before the Louisville Rotary Club, emphasized the accident-prevention phases of compensation systems, and said that the co-operation of manufacturers would go a long way in the direction of preventing injuries to their workmen. In this connection he used as an illustration the efforts of the Louisville Railway and its men in co-operating with the public to reduce accidents, and said that the work accomplished by the company was marvelous.

Seattle Council to Consider Jitney Regulation.—Initial steps for the regulation of jitney buses in Seattle were taken by the City Council recently when a committee of three members was appointed by President A. F. Haas to submit a report and such ordinances as it deemed necessary. The committee was named after the Council had gone into session as a committee of a whole to discuss the report submitted by the assembly of improvement and civic clubs, prepared by A. V. Bouillon, Edgar J. Wright, J. A. Paine and other club representatives. A letter from the Puget Sound Traction, Light & Power Company asking the Council to take some steps to regulate jitney competition was submitted by A. L. Kempster, manager of the company. Accompanying the communication was a huge stack of printed petitions containing 41,751 signatures. An affidavit certifying to that number was made by Mr. Kempster's chief clerk. These petitions were mentioned in the ELECTRIC RAILWAY JOURNAL of Aug. 26.

Official Report on South Cambria Accident.—John P. Dohoney, investigator of accidents of the Public Service Commission of Pennsylvania, on Aug. 26 presented to the commission a comprehensive report on the head-on collision which occurred on the Southern Cambria Railway on Aug. 12, in which twenty-six people were killed and a score injured. According to Mr. Dohoney, the death of the two motormen prevented the obtaining of more definite information as to the causes of the disaster, but it seemed that the air brakes failed and the hand brakes were broken in trying to stop one of the cars. The investigation made, it was said, had developed the fact that the daily mechanical inspection of the cars was not thorough. Mr. Dohoney therefore recommended that the commission instruct the company to see that the brakes were inspected daily and also frequently tested during the day. Chairman Ainey of the commission stated that the commission would direct the bureau of engineering to make a careful examination of the tracks, grades, safety devices, etc., in use and the condition of the cars and property of the company with a view to determining what further orders or recommendations should be made to provide maximum safety.

Personal Mention

George A. Smith has been appointed assistant general freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, with office at Cedar Rapids, Iowa.

C. N. Stannard, secretary of the Denver Gas & Electric Light Company, Denver, Col., was recently appointed to the committee on traction matters of the Denver Civic Association.

J. W. Atkins has recently been made engineer of power station of the Savannah (Ga.) Electric Company, being transferred to Savannah from the Blackstone Valley Gas & Electric Company of Pawtucket, R. I.

Joseph A. West, formerly chief engineer of the Ogden (Utah) Rapid Transit Company and the Ogden, Logan & Idaho Railway, has been appointed chief engineer of the Sumpter Valley Railroad of Oregon.

R. T. Guernsey has been appointed traveling freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, with office at Cedar Rapids, Iowa. The position of commercial agent at Cedar Rapids has been abolished.

Ernest Gonzenbach, who recently resigned as general manager of the Empire United Railways, Syracuse, N. Y., has been elected vice-president of the Allen Seed Company of Sheboygan, Wis., and has moved to that city, which was formerly his residence.

P. J. Kealy, president Kansas City (Mo.) Railways and colonel of the Third Regiment M. N. G., after a month's leave of absence has returned to his regiment at the border. Colonel Kealy was rejected temporarily by the federal army authorities on account of physical examination, but will now be re-examined.

Alfred F. Townsend has been appointed local manager of the Stone & Webster properties in Beaumont and Port Arthur, Tex. Mr. Townsend has been associated with Stone & Webster for the last fifteen years and identified during that period with the public service utilities at Lowell, Mass.; Ponce, Porto Rico; Sydney, Nova Scotia, and with the Glace Bay Railway. For the last seven years he has been manager of the Woonsocket (R. I.) Electric Machine & Power Company.

W. B. Voth, recently chief engineer and purchasing agent of the Empire United Railways, N. Y., is a native of Milwaukee, Wis., and a graduate in the electrical engineering course of the University of Wisconsin in 1897. After several years in the construction and operation of hydroelectric properties in Wisconsin, he was appointed resident engineer in Sheboygan in 1904 for the building of a steam power station, the reconstruction of the commercial and street lighting system and the building of a single-track interurban railway. After the completion of this work he remained to operate the line as general superintendent. About two years ago he became chief engineer and purchasing agent of the Empire United Railways.

John F. Vaughan has been retained by the banking house of Estabrook & Company, Boston, Mass., as consulting engineer in connection with the redevelopment of a 20,000-kw. hydroelectric plant at the Canadian Sault, and has opened an office at 185 Devonshire Street, Boston, for the practice of consulting engineering. Mr. Vaughan has been employed for about fifteen years by the Stone & Webster Engineering Corporation and has been active in connection with power transmission and hydraulic problems, having served as chairman of the hydraulic section of the National Electric Light Association prime movers committee. He was engaged in steam railroad electrification work with the late N. H. Heft before joining the staff of Stone & Webster, taking part in the initial engineering associated with the Nantasket Beach line and other pioneer third-rail work. He is the inventor of the Vaughan hydraulic flow meter.

Walter Alexander has been appointed chairman of the Wisconsin Railroad Commission to succeed Halford Erick-

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son, who resigned from that position in May. Mr. Alexander has been a member of the commission since February, 1915, previous to which he was for thirteen years assistant district master mechanic and district master mechanic of the Chicago, Milwaukee & St. Paul Railway. He was born in Glasgow, Scotland, in 1872, and was brought to this country in 1873. He served an apprenticeship as a machinist and draftsman with the Chicago, Milwaukee & St. Paul Railway, later being employed as a fireman on the same road. He entered the University of Wisconsin in 1893, and graduated from the course in mechanical engineering in 1897. For three years he was an instructor in engineering at the University of Wisconsin, one year at Armour Institute and one at the University of Missouri. He then returned to railway work as assistant district master mechanic of the Chicago, Milwaukee & St. Paul at Minneapolis, Minn. Two years later he was transferred to Milwaukee, Wis., to a similar position, and later was promoted to district master mechanic at that point.

Britton I. Budd, of the governing committee of the Chicago (Ill.) Elevated Railways, and president of the elevated railroads controlled by that company, has been elected president of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., the successor to the reorganized Chicago & Milwaukee Electric Railroad. Mr. Budd thus adds to his responsibilities as operating head of 184 miles of elevated railway, more than 160 miles of high-speed suburban and interurban railway. Mr. Budd was born at San Francisco, Cal., on Sept. 7, 1871. He was educated in the public schools of Chicago and at the Shattuck School, Faribault, Minn. He entered railroading in the engineering corps of an Ohio railroad, and was with the Intramural Railroad at the World's Fair, Chicago. In 1894 Mr. Budd entered the service of the Metropolitan West Side Elevated Railway, Chicago, as a clerk in the storekeeper's office, and was storekeeper for five years. In 1899 he was made purchasing agent, a position he held until April, 1907, when he was appointed general manager. In February, 1910, Mr. Budd was elected president of the Metropolitan West Side Elevated Railway, and in 1911 became operating head of all the elevated railways in Chicago.

Samuel Insull, president of the Commonwealth Edison Company, Chicago, Ill., has been made chairman of the board of directors of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., the successor to the reorganized Chicago & Milwaukee Electric Railroad. Mr. Insull is one of the foremost men in the public-utility field in the United States. He was born in London, England, in 1859. In February, 1881, he became private secretary to Thomas A. Edison, of whose business affairs he had full charge for many years. When the various Edison manufacturing concerns, with the Edison Electric Light Company, were consolidated into the Edison General Electric Company, Mr. Insull became second vice-president in charge of manufacturing and selling, and when the company was consolidated in 1892 with the Thomson-Houston Company as the General Electric Company he became second vice-president of the latter company. Mr. Insull, besides the interests already noted, is connected with the Middle West Utilities Company as president, the Chicago Elevated Railways as trustee, the Chicago & Oak Park Elevated Railroad as receiver, the Metropolitan West Side Elevated Railway as chairman of the board, the Northwestern Elevated Railroad as chairman of the board, the South Side Elevated Railroad as chairman of the board, the Sterling, Dixon & Eastern Electric Railway as president, the West Penn Traction & Water Power Company as president, the West Penn Traction Company as president, the West Penn Railways as president, the Twin States Gas & Electric Company as president, the Wheeling Traction Company as president, and the People's Gas, Light & Coke Company (Chicago) as chairman of the board.

OBITUARY

Walter Chur, president and general manager of the American Railway Supply Company, New York, died on Aug. 29 at his home in East Orange, N. J., from heart disease.

James A. Leslie, for the last twelve years superintendent of the Fourth Street Division of the United Railways of St. Louis, died on Aug. 18. He is survived by a widow and seven children.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Northwestern Connecting Railway, Meadville, Pa.—Chartered in the interests of the Northwestern Pennsylvania Railway, to construct a line between Silverling's Corners and Cambridge, Pa., 3½ miles. Incorporators: Charles M. Hatch, vice-president and general manager, and A. A. Culbertson treasurer, Northwestern Pennsylvania Railway, Erie.

FRANCHISES

Mill Valley, Cal.—The Superior Court of Contra Costa County has declared the franchise of the Marin County Electric Railway in Mill Valley forfeited owing to the failure of the company to construct the line. [May 6, '16.]

Bridgeport, Conn.—The appeal of the Connecticut Company relative to the abandonment and removal of its tracks on East Washington Avenue, from Main Street to Noble Avenue, has been denied by the Public Utilities Commission of Connecticut. The petition was also refused by the mayor and Common Council of Bridgeport.

Henderson, Ky.—An ordinance has been placed by the Council of Henderson providing for the sale of a street railway franchise. The railway system is now operated by the Evansville (Ind.) Railways under a franchise which will expire on Oct. 16. The new franchise provisions are unusually radical and the company has stated that it does not plan to bid for the privilege of operating under it. Further reference to the franchise is made on page 416.

Methuen, Mass.—The Bay State Street Railway has received a franchise from the Council to relocate its track on Lowell Road.

Newark, N. J.—The Public Service Railway has asked the Board of Works for a fifty-year franchise to construct a double-track line on Roseville Avenue, from Orange Street to Bloomfield Avenue.

Dunkirk, N. Y.—Claiming it has been operating the Dunkirk belt line at an annual loss of $17,000, officials of the Buffalo & Lake Erie Traction Company appeared before the City Council of Dunkirk and urged approval of its application to abandon this service and take up the track. Decision was reserved.

Cincinnati, Ohio.—The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad is seeking a renewal of its twenty-five year franchise. The company proposes to float a $1,000,000 bond issue with which to build a 6½-mile extension into Cincinnati when the rapid transit terminal is completed if the renewal is granted.

TRACK AND ROADWAY

Visalia Electric Railroad, Exeter, Cal.—A contract has been awarded by this company to Robert Sherrer Company, San Francisco, for grading 20 miles of line. Work has been begun at Strathmore on the new extension of the Visalia Electric Railway, and the line will be built immediately into the El Mirador country. The next move of the company will probably be the branch into Lindsay, the plans for the routeing of which the company is now working out. Work has already been begun on the Santa Fé branch southward. The present terminus of that line is in Lindsay, although the orchards to the south are being penetrated by crews of workmen and the trees in the line of the route are being uprooted.

Municipal Railway of San Francisco, San Francisco, Cal.—A contract has been awarded to the United States Steel Products Company, San Francisco, under contract No. 86, for furnishing and delivering rails and rail joints for the Twin Peaks Tunnel line.

Bridgeport & Danbury Electric Railway, Danbury, Conn.—It is reported that several capitalists are going over the

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proposed route of this company's line to Danbury, with a view to constructing the road and investing in the proposition. The cost of building the line is estimated at $400,000.

Atlanta & Anderson Electric Railway, Atlanta, Ga.—The enactment of the interurban act by the General Assembly makes possible the construction at an early date of the Atlanta & Anderson Electric Railway, to extend from Atlanta through northeast Georgia and connecting at Anderson, S. C., with the interurban line of the Piedmont-Northern Railway. A charter for the new railway company will soon be applied for. J. L. Murphy, Atlanta, is interested. [July 22, '16.]

Pocatello Traction & Interurban Company, Pocatello, Idaho.—W. K. Palmer, of the W. K. Palmer Engineers Company, Kansas City, is going over the proposed route of the Pocatello Traction & Interurban Company, preparatory to making preliminary and location surveys. The purpose of the company is to develop a project for building a heavy electric traction line for freight and passenger business. The proposed line will connect with the present line of the Ogden, Logan & Idaho Railway at Preston, Idaho, and extend north through Downey, Pocatello, Idaho Falls, Ashton and Yellowstone, Mont., with a possible connection north to the Northern Pacific Railroad in Montana. The line will be from 200 to 250 miles in length, as nearly as can be determined at the present time. It will include single track of standard heavy construction and catenary overhead. All trains will be operated by electric locomotives, with power from one of the present established systems in operation in that vicinity. The project is entirely independent of any of the present railroad systems, and will make freight its first consideration. [July 15, '16.]

Union Traction Company of Indiana, Anderson, Ind.—This company is installing new rails in the curve at the corner of Thirteenth and Meredian Streets, Anderson. The construction of new track on South Meredian Street will be begun soon.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—The necessary right-of-way has been acquired by this company for the double-tracking of its line from the Indianapolis city limits to the motor speedway, 1 mile.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.—It is reported that this company is considering the construction of an extension to Evanston.

United Railways & Electric Company, Baltimore, Md.—This company has completed and placed in operation its extension of the St. Paul Street line to Guilford, 1 mile.

Berkshire Street Railway, Pittsfield, Mass.—About $25,000 will be spent by this company in improvements in Pittsfield during this summer. New tracks are being laid in Tyler Street and West Street.

Detroit (Mich.) United Railway.—Work preliminary to the construction of this company's new line on Hamilton Boulevard in Highland Park from the city limits to the Six Mile Road, for which permission was recently voted by the electors of the village, was begun last week. The line will be double-tracked and constructed in the center of an ornamental parkway to be created by the village. Work will begin within two weeks on the construction of a double-track extension of the West Warren line from its present terminus to the city limits. It is expected that the line connecting Victor Avenue with Forest Avenue East will be in operation within thirty days. Starting from the easterly terminus of the new line, the cars will run west to Gratiot Avenue, there taking the Gratiot tracks to Mount Elliott Avenue, following this line to Harper Avenue, where they turn west over the tracks of the Grand Belt route along Milwaukee Avenue as far as Chene Street and Jos. Campau Avenue, then going north on this line to the Davison Road, where they will turn west over the tracks now being constructed to Oakland Avenue and then north on Oakland Avenue to Victor Avenue to the big Ford Motor Company's plant. The entire line will be double-tracked except that portion of Jos. Campau Avenue between Caniff Road and Davison Road.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The contract for the installation of tracks on the Broadway-Fourth Avenue system in Manhattan and Brooklyn, from Fifty-ninth Street, Manhattan, to a connection with the Flatbush Avenue extension of the Interborough Rapid Transit Company, has been awarded to T. H. Reynolds Contracting Company, New York, at $288,400. The work includes the installation of about 25 miles of single track, the city furnishing rails and most other materials, the contractor furnishing labor, concreting materials, and a small amount of cast-iron pipe. Bids will be received by the Public Service Commission for the First District of New York until Sept. 13 for the construction of Section No. 1-B of Route No. 12 in Brooklyn.

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received by the Public Service Commission for the First District of New York until Sept. 8 for the supply of four portions of special work for use in the construction of the Pelham branch of the subway. Bids will also be received by the commission until Sept. 8 for the installation of tracks for the Seventh Avenue branch of the Seventh Avenue-Lexington Avenue line in Manhattan and Brooklyn.

Piedmont & Northern Railway, Charlotte, N. C.—This company will construct an 8-span, deck-plate girder bridge, 700 ft. long and 55 ft. above normal water, across the Catawba River, at Mt. Holly, to replace the structure recently destroyed by flood. The contract for steel work has been awarded the Virginia Bridge & Iron Company, Roanoke, Va., and the contract for masonry to Thomas Sheahan, Hagerstown, Md. The cost of the structure is estimated at $125,000.

***Bartlesville, Okla.**—The W. K. Palmer Engineers Company of Kansas City is now engaged in making location surveys and preparing plans and specifications for an electric interurban railway to connect Bartlesville with Nowata, Welch or Blue Jacket and Miami. The line will be about 70 miles long, and will consist of standard heavy construction, with catenary overhead, and will carry both freight and passengers. The road will probably generate its own power. All arrangements for capital have been made. D. F. Mason and F. M. Overless, Bartlesville, are interested.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—A party of four capitalists from Philadelphia, who will furnish the capital for the construction of the Oklahoma & Interstate Railway, were recently expected to arrive in Kansas City to go over the lines of the northern division of the line. This part of the system has already been located by the W. K. Palmer Engineers Company, Kansas City. It is expected that arrangements will be made to go forward with the construction at once John R. Rose, Oklahoma City, president. [April 29, '16.]

London, Ont.—Surveys are being made by engineers of the Ontario Hydro-Electric Power Commission for an electric railway from London to Owen Sound, 175 miles, and they will prepare estimates of the cost as soon as possible.

London & Port Stanley Railway, London, Ont.—Announcement has been made by the London Railway Commission, operating the London & Port Stanley Railway on Lake Erie, of certain improvements, including a grain elevator to cost $100,000, a new tea house, and a public bathing house containing one thousand rooms; also about 12 miles of double tracking.

Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.—Work has been begun on this company's proposed line from Womelsdorf to Myerstown, and it is expected that the line will be placed in operation within a year. Leroy R. Valentine, Womelsdorf, president. [Aug. 5, '16.]

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—This company has awarded to the J. G. White Engineering Corporation, New York, a contract for the consulting engineering in connection with the design and erection of a concrete dam 600 ft. long and 45 ft. high, on the Broad River, near Gaston Shoals, approximately 30 miles from Spartanburg. This dam will be in connection with the company's hydroelectric development at Gaston Shoals.

Marlin-Temple Interurban Company, Marlin, Tex.—In connection with its proposed electric railway from Marlin to Temple, this company will construct three bridges. S. D. Hanna, Temple, chief engineer. [Aug. 19, '16.]

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San Antonio (Tex.) Traction Company.—This company is acquiring additional land and is building siding and extra tracks at and leading to all depots in San Antonio, to provide facilities for handling the crowds to and from the depots and the business section of the city.

Wisconsin Interurban System, Madison, Wis.—This company has awarded a contract to John T. Adams, Columbus, Ohio, for grading on the section of its interurban line from Madison to Stoughton. J. E. Jones, Madison, president and general manager. [May 27, '16.]

SHOPS AND BUILDINGS

Southern Pacific Company, San Francisco, Cal.—This company has awarded a contract to Lindgren Company, San Francisco, for the construction of a ten-story office building at San Francisco. It is stated that the structure will cost about $2,000,000.

Arkansas Valley Interurban Railway, Wichita, Kan.—It is reported that this company plans the construction of a new carhouse.

Michigan Railway, Kalamazoo, Mich.—This company contemplates the construction of a 7-story terminal station at Grand Rapids. The building will have a large waiting room, and cars will enter the terminal over eighteen tracks.

Cleveland & Youngstown Railroad, Cleveland, Ohio.—It is reported that this company, which proposes to construct a line between Cleveland and Youngstown, contemplates the construction of a freight terminal and warehouse at Broadway and Orange Avenue. The structure will be 150 ft. x 400 ft., six stories high, and will be of reinforced concrete, brick and steel. The cost is estimated at $1,000,000. W. J. Watson & Company, Leader News Building, Cleveland, are the architects and engineers. W. E. Pease, Cleveland, engineer for the company.

POWER HOUSES AND SUBSTATIONS

Bangor Railway & Electric Company, Bangor, Me.—A new substation will be erected by the Bangor Railway & Electric Company at East Corinth, to be used for the extension of the company's lighting and power service in the vicinity.

Bay State Street Railway, Boston, Mass.—It is reported that this company contemplates the construction of an extension to its generating station at Quincy Point, making the station twice its present size. It is stated that five turbines will be installed of the same capacity as those now operated. The cost of the addition to the building is estimated at about $70,000.

Iron River, Stambaugh & Crystal Falls Street Railway, Iron River, Mich.—A report from this company states that it will purchase a 300-kw. rotary converter.

Beaver Valley Traction Company, New Brighton, Pa.—The powerhouses of this company at Junction Park and Economy will be abandoned. Power will be generated from Brunots Island. Three substations will be built by the company and transformers installed.

Nashville Railway & Light Company, Nashville, Tenn.—This company has installed a 2000-kw. motor-generator set at its central station, consisting of a 2800-kva., 2300-volt, three-phase synchronous motor, direct-connected and unit-mounted with a 200-kw., 600-volt generator and 150-kw., 250-volt exciter. This replaces two 500-kw. and one 1000-kw. rotary converters. The motor-generator set is connected to the station buses, and can be driven either by the local steam units or by energy from the Tennessee Power Company's Ocoee hydroelectric plant. The new equipment is designed to take care of a 50 per cent overload, so that the peak load of the railway traffic may be cared for without surplus installation, on the basis of a fairly average load. A 500-kw. motor-generator substation has also been installed to improve service on the West Nashville lines, which were formerly operated by power from a 7-mile transmission line. As a result considerably faster schedules have been arranged. This motor is also synchronous. The high-tension line is operated at 13,200 volts, 60 cycles, three-phase and the motor is rated at 700 kva., with a 500-kw. generator and 11.5-kw. exciter, unit-mounted. The set is capable of running continuously for twenty-four hours and of running two hours on 50 per cent overload.

Manufactures and Supplies

WESTERN AND NORTHERN CEDAR SHIPMENTS ABOVE AVERAGE

Pole Line Construction Less Than Indicated Early in Year, Due to High Cost and Delayed Deliveries of Fittings

It now appears that the transmission line construction during 1916 will total less than for several past years. High prices for line wire and pole fittings and the slow deliveries of these essentials have, in turn, caused a reduction in pole shipments for this purpose. However, the Western Red Cedar and the Northern White Cedar Associations report that for the first six months of 1916 the demand for cedar poles has been better than that of an average half-year.

In many respects the conditions surrounding the marketing of Northern and Western Cedar during the first half of the year were similar. At the beginning of the year indications were numerous that 1916 was to see a strong demand for poles. Producers and distributors received many inquiries for prices and estimates on expected pole requirements. Evidence was plenty that pole line construction which had been held back since the European war started would be pushed to completion during 1916. Indications pointed to a boom demand.

As time went by, however, it became evident that slow delivery of other materials used in pole lines were delaying some of this construction. This particularly affected the larger undertakings, such as long-distance projects.

This is the situation as it exists to-day. The companies operating in both the Northern and Western cedar-producing sections have felt the car shortage to some extent, but the cedar companies generally have been able to make quite satisfactory deliveries. Shipments of Western red cedar have frequently traveled across the country from Idaho and Washington in quick time.

Both Northern and Western cedar producers report a steadily widening market for cedar poles. Cedar is being shipped more and more into territory hitherto controlled by local woods. The use of Western red cedar poles is said to be increasing in outlying districts of large cities where beauty of pole line is demanded. Electrical construction, in cities particularly, is demanding a straight, sturdy, symmetrical pole of light weight that will carry a heavy load. That Northern white cedar meets this requirement satisfactorily is shown by its increased use for such purposes by large companies operating in big cities.

The cedar companies report collections as satisfactory, and the production of western and northern cedar is said to be normal.

RAPID INCREASE IN EXPORTS OF SUPPLIES

Value of Railway Materials and Equipment Exported Shows Increase of More Than 100 Per Cent Since 1914

According to figures compiled by the Bureau of Foreign and Domestic Commerce, railway materials and equipment valued at $75,000,000 were exported from the United States in the last fiscal year. The exports of this class have more than doubled since 1914.

The material shipped to Russia, France and Spain, practically new foreign markets for this equipment, accounts for a large proportion of the increase. Figures for June exports, given below, show that Russia received over 67 per cent of the freight cars exported, France received over 68 per cent of the steel rails and Spain received 37 per cent of the steam locomotives.

Until very recently Canada and Cuba have been the foremost foreign markets for our freight cars; Cuba, Canada and Brazil the largest markets for exported locomotives, and Canada, Australia, Japan, Brazil, Argentina and Cuba the leading markets for our steel rails. At present we are sending unusual quantities of freight cars and other supplies to Russia chiefly via her Pacific frontier, and, of course, consignments are going also to France and Spain as well as to

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our established markets in Cuba, Canada and Central America. The following figures for June exports indicate the present important markets for railway supplies; the total exports of freights cars for the month was valued at $1,613,000 of which $1,086,000 worth went to Russia. Steel rails to the value of $1,730,000 were sold abroad during the month, the exports to France alone amounting to $1,188,000. Of the $721,000 worth of steam locomotives sold abroad, $272,000 went to Spain.

The quantities of railway material exported during the fiscal year ended June, 1916, as compared with the fiscal year 1914, are shown in the following table:

Classes of Railway Material Exported	Fiscal Year 1916	Fiscal Year 1914
Railway cars	$26,660,000	$11,178,000
Rails for railways	17,687,000	10,259,000
Locomotives, steam	12,666,000	3,692,000
Locomotives, electric	455,000	437,000
Engine parts (all kinds)	7,274,000	3,357,000
Switches and other track materials	5,262,000	2,534,000
Ties	2,435,000	2,565,000
Railroad spikes	1,399,000	346,000
Car wheels	742,000	414,000
Telegraph instruments	149,000	137,000
	$74,729,000	$34,919,000

NOVEL AND SUCCESSFUL EMPLOYMENT METHOD

Newspaper Advertisement for Labor in Cleveland Brings Satisfactory Results

Selling a job to a worker is a new way to get good, earnest applicants for shop jobs in these times of scarce labor. The Lincoln Electric Company, Cleveland, needs men and does not feel that it should be called upon to bid for men against concerns that offer only temporary jobs at munitions manufacture, so it is successfully gathering into its organization good, earnest workers by advertising salesmanship. Space 4 in. high and two columns wide is used in the local papers. Portraits of workers are shown with descriptive titles about their service, as for example, "Age twenty-three, worked two years, now making $25 a week with bigger pay ahead."

The text of the advertisement reads as follows:

"Learn the electrical business.

"This week we will give twelve young men (eighteen years or over) a chance to learn the electrical business in our plant.

"We will teach them a line of work so that they can always get good positions elsewhere. We guarantee steady work here to good men.

"Good pay while learning.

"In two months' time a bright boy can be earning high wages. Pay according to work done. Should be able to speak, read and write English and must be quick with hands. Manual training school or shop training will help, but not necessary.

"Only twelve chances open. Come to general office and ask for Mr. Meeks.

"The Lincoln Heater Company, East Thirty-eighth Street and Kelley Avenue."

These advertisements inserted frequently have brought good young men to the plant, those who have their future in view and are desirous of getting into work where they can grow, rather than disregard the future for immediate salary. It is pointed out that this is a simple method which any electric railway might follow if it desired to increase its forces.

EUROPEAN LUMBER MARKETS TO BE INVESTIGATED

At a conference held in Chicago on Aug. 21 the Government, through the Bureau of Foreign and Domestic Commerce, Department of Commerce, and the lumber manufacturers of the United States decided to co-operate in sending abroad a corps of experts to study the condition of European lumber markets with a view to a great expansion of the field of the American producer. As a result of this conference the immediate passage of the Webb bill now pending in Congress will be urged. The passage of this bill will remove any question of the legality of the organization of foreign sales agencies to secure and distribute orders for American goods to be sent to foreign countries.

Detailed reports of conditions abroad show that Belgium, France, England, Scotland, Italy and Spain have exhausted their supply of lumber. Russia has great supplies of standing timber, chiefly Baltic pine, but owing to its lower quality it is not suited to the demand. Conditions in Germany have not been estimated. In order to secure the great volume of foreign lumber business when the rebuilding of these nations commences at the end of the war the American lumber industry must go after the trade systematically, with an advance knowledge of the needs of the various nations. It is hoped that the investigators and agents can be on their way abroad by Nov. 1.

CAR COUPLERS IN DEMAND

The market for car couplers seems to be increasing faster than the number of cars ordered would indicate. Boston has placed a large order with the Ohio Brass Company for Tomlinson radial couplers. This calls for 200 surface car coupler equipments, including the air coupling attachments, and eighty-four heavy type coupler equipments for the elevated division. Moreover, 400 fifteen-point electric train-line couplers have been ordered for multiple-unit service in the East Boston Tunnel. This is sufficient equipment for 100 cars. The Toledo Railways & Light Company has ordered 120 coupler equipments to include air and five-point electric connections.

Coupler orders from interurban roads are frequent but of course do not call for such large quantities as the city road orders. Interurban type couplers totaling nearly 1000 in number have been sold by the Ohio Brass Company so far this year. The interurbans seem to be running more two-car trains than before and according to the opinion of the coupler manufacturers multiple-unit and trailer service in the cities also is on the increase.

PRICE OF ZINC MAKES COST OF EXTRUDED BRASS TROLLEY EARS PROHIBITIVE

The jump in the price of zinc of more than 240 per cent since 1914 has forced such an increase in the price of extruded brass trolley ears that some roads which, from the service standpoint, greatly favor the extruded ear have found it necessary on the score of lower first cost to return to the use of cast bronze ears. The yellow brass from which extruded ears are made contains about 40 per cent zinc, while ordinary bronze ears are cast from a mixture containing about 5½ per cent zinc and about the same amount of tin. The increase in the price of tin has been around 40 per cent, and copper about 125 per cent, while zinc has shown an increase as high as 245 per cent. Thus, with the much larger content of zinc and its great increase in cost to the overhead manufacturer, he has been forced to price extruded brass ears so high that their exceptional service qualities are overweighed by the lower first cost of cast bronze ears.

ROLLING STOCK

Ithaca (N. Y.) Traction Corporation has ordered one snow sweeper from The J. G. Brill Company.

Waterville, Fairfield & Oakland Railway, Waterville, Me., is reported to have purchased two cars.

Boston (Mass.) Elevated Railway has ordered from the Laconia Car Company 100 sets of arch bar trucks for center-entrance surface motor cars.

Northern Ohio Light & Traction Company, Akron, Ohio, is in the market for fifteen all-steel, interurban passenger motor and trail cars similar to those ordered early in the year from the Jewett Car Company.

Ogden, Logan & Idaho Railway, Ogden, Utah, has ordered three new all-steel interurban motor cars from the American Car Company. These cars will be equipped with four 115-hp. motors and will have an overall length of 65 ft. Delivery is expected about Sept. 15.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, has ordered one 50-ft. observation parlor trail car, two 42-ft. 2-in., center-entrance, interurban cars of steel side-girder construction, and one 42-ft. 6-in., double-truck

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city car body from the McGuire-Cummings Manufacturing Company, Chicago, Ill.

Gary & Interurban Railroad, Gary, Ind., noted in the ELECTRIC RAILWAY JOURNAL of Aug. 12 as contemplating the purchase of ten or twenty cars, is having specifications prepared for six motor cars which will be approximately 42 ft. long, 8 ft. 4 in. wide, center-entrance type, double-end operation, double trucks and four motors. Specifications are also being prepared for fourteen trail cars which will be approximately 43 ft. long, center-entrance type and double-end operation.

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received an order from the New York, New Haven & Hartford Railroad for a large number of trolley-wire splicers.

Arc Welding Machine Company, New York, N. Y., will have an exhibit at the New York Electrical Exposition featuring electric welding of iron and steel. A special type of self-regulating generator will be used.

McQuay-Norris Manufacturing Company, St. Louis, Mo., has recently added three mechanical engineers to its sales force in the field. Herbert H. Cummings will be located in Chicago, Russell B. Pratt in Milwaukee and Fred L. Stevenson in Detroit.

Johnson Fare Box Company, Chicago, Ill., through its general Eastern agent, the U. S. Metal & Manufacturing Company, has received an order for sixty fare boxes from the Public Service Railway, Newark, N. J., and an order for twenty-five from the International Railway, Buffalo, N. Y.

Holden & White, Chicago, Ill., have received an order from the Milwaukee Northern Railway for fifteen Wasson air-retrieving trolley bases. The Fort Dodge, Des Moines & Southern Railroad has ordered four of these bases for use on new cars being built by the McGuire-Cummings Manufacturing Company.

Railway Improvement Company, New York, N. Y., has received an order from the General Electric Company for seventeen C. & S. coasting recorders for the Melbourne, Brunswick & Coburg Tramways Trust. This company has also received an order from the Capital Traction Company for 100 No. 3 sanitary strap covers.

Peter Smith Heater Company, Detroit, Mich., reports that it has recently received the following orders: Two type 3-C hot water heaters, St. Joseph Valley Railway, five No. 2-P for the Chicago & West Towns Railway, and twenty of the same type for the Michigan Railway. Also twenty-five No. 3-P for the Madison Railways.

Frank J. Engel and Herman P. Hevenor have formed a co-partnership for carrying on an engineering and contracting business under the firm name of Engel & Hevenor, with offices at 220 Broadway, New York. Mr. Engel was recently with the Boston & Albany Railroad and Mr. Hevenor with the New York, New Haven & Hartford Railroad and previous to that with the Brooklyn Rapid Transit Company.

Roller-Smith Company, New York, N. Y., announces that the O. H. Davidson Equipment Company, Ideal Building, Denver, Col., will handle Roller-Smith apparatus in Colorado, Wyoming, New Mexico and parts of the state of Montana, Idaho, Arizona, Texas and South Dakota. The O. H. Davidson Equipment Company, having specialized in the sale of apparatus, is well equipped to handle the Roller-Smith Company's various lines of instruments, meters and circuit breakers.

Safety Car Devices Company, St. Louis, Mo., reports that it has received orders for fifty light-weight air brake equipments for one-man cars, although the majority of these have not yet been installed. The installation of eight sets of equipment for the City Light & Traction Company, Sedalia, Mo., has recently been completed. This company will have complete double-end equipment which operates the door as well as the brakes from the motorman's brake valve handle on exhibition at the electric railway convention at Atlantic City.

ADVERTISING LITERATURE

American Electrical Works, Phillipsdale, R. I., has issued a new price-list, dated Aug. 23.

Pelton Water Wheel Company, San Francisco, Cal., has issued bulletin No. 9, describing and illustrating the Pelton-Doble centrifugal pump.

Cutler-Hammer Clutch Company, Milwaukee, Wis., has issued Bulletin 12 describing and illustrating its high-duty lifting magnets, circular type.

Crouse-Hinds Company, Syracuse, N. Y., has issued bulletin No. 1000-E describing, illustrating and giving the prices of its various types of condulets.

Peter Witt, Cleveland, Ohio, is distributing an illustrated circular entitled "The Car Rider's Car," which describes in detail the construction and advantages of the front-entrance, center-exit, pay-enter, pay-leave car.

Portland Cement Association, Chicago, Ill., has issued a booklet on "Concrete Swimming and Wading Pools and How to Build Them," and another entitled "Concrete Sewers." Copies of these publications may be had upon request.

American Steel Foundries, Chicago, Ill., has issued a booklet entitled "Making Davis Wheels." It shows in a brief pictorial way how the Davis steel wheel is made, and emphasizes the precautions used in the manufacture of a high-grade steel casting.

S. K. F. Ball Bearing Company, Hartford, Conn., has issued a booklet entitled "Better Electric Motors." Numerous illustrations show various applications of S. K. F. bearings. This company is also distributing a pamphlet which contains testimonial letters from sixteen electrical engineers located in various parts of the United States.

William B. Scaife & Sons Company, Pittsburgh, Pa., has issued a catalog entitled "Water Purification for All Purposes," which illustrates the various types of water-softening-and-purifying apparatus manufactured by it, and discusses water purification as applied to various industrial uses. A large number of illustrations show installations of water-purifying equipments.

Imperial Brass Manufacturing Company, Chicago, Ill., has issued a handbook on welding and cutting, the text of which is free from technical language. As stated in the preface, the purpose of this booklet is "to give an elementary knowledge of the apparatus, its use and how to properly keep it in good working condition." This book is given free to all purchasers of Imperial equipment and is sold to others at $1 per copy.

Smith-Ward Brake Company, New York, N. Y., has recently issued four illustrated pamphlets, one on the application of S. W. B. automatic slack adjusters for M. C. B. trucks, one for maximum traction trucks with brake beams, one for clasp-brake trucks, and one for trucks equipped with brake beams of the class of Brill 27-E., Standard 0-50 and Taylor S. B. This company has also issued a pamphlet on the new brake-lever strut it has recently placed on the market.

Peter Smith Heater Company, Detroit, Mich., has just issued its first electric gravity heater catalog, containing thirty-six pages of descriptive matter and illustrations of this product which has recently been added to the other heater equipment manufactured by this company. A number of large orders for the Peter Smith electric gravity heaters have already been filled, and all these heaters are being sold under a guarantee against defects in material and workmanship. The catalog describes in detail the heater elements and the various types of standard electric gravity heaters, which include the truss-plank type, double and single coil panel heaters, cross-seat heaters containing double and single coils, single-coil and four-coil cab heaters, four-coil platform heaters, switches and fuses. Copies of this catalog may be had upon request.

Company Sells 2000 Tons of Old Rails.—The Louisville (Ky.) Railway chose a timely occasion to dispose of its accumulation of old rails, selling about 2000 tons of this material last week at $15 a ton and enriching the treasury of the company to the extent of $30,000. The company has been holding its rails against a rise in the market, having decided to do so about four years ago, when the price for scrap was low. During this time the rails have been stored at various points about the city.

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Electric Railway Journal

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EVILS OF UNION DOMINATION

We are publishing this week an interview with a prominent railway manager upon the evils of union domination. The interview was obtained before the crisis in the New York labor situation was reached, but the present New York strike affords an excellent example of the excesses to which labor goes after its unionization. Carried away by the seeming success which followed their efforts to establish a union on the surface lines about a month ago, the same labor leaders atempted to annex the elevated and subway lines of the Interborough Rapid Transit Company and to dictate what kind of a contract that company should and should not make with its employees. We are glad that the company has accepted the challenge thus presented. It realizes that it is paying its men liberal wages and under the individual form of contract is offering them continuous employment with better working hours for the next two years. The company also realizes that the great majority of its employees are satisfied with their rates of pay and working conditions and do not desire to be molested by labor agitators. Under these conditions the duty of the company to itself, to its loyal employees and to the public was plain. This duty was performed when it declared "Hands Off!"

THE NEW YORK STRIKE

Less than five weeks ago a similar agitation on the surface lines belonging to the New York Railways was settled by the intervention of the Mayor and the chairman of the Public Service Commission for the First District. Under the agreement then reached all points of difference were to be submitted to arbitration, but this fact has not prevented the men of the New York Railways from declaring a strike a few hours after the one on the Interborough was called. If the union leaders had any grievances against the New York Railways Company about individual contracts or the discharge of employees, they should certainly have requested arbitration as required under the agreement. Is it any wonder that the managers of the Interborough company are unwilling to submit themselves and their properties to the perils of such domination? In view of the condemnation throughout the country of the unconditional surrender exacted by the Brotherhoods at Washington last Sunday, we believe that the people of New York will support the transportation companies in their attempt to control their own properties. It may mean some inconvenience for a few days, but this inconvenience will be well worth its cost. Surrender now would mean surrender in the future to every demand, no matter how unreasonable, which might be made. New York City has a financial interest—or will have as soon as the new subways are completed—in the profits of the Interborough company. Its citizens, therefore, have a greater concern in the result than that of mere spectators. They are part owners in the enterprise and closely concerned with any changes in conducting the business likely to affect adversely the financial position of the company. We believe they will support it in its efforts to operate its property without outside dictation.

ASSISTANCE FROM THE BUSINESS MEN

The business men of a community in past years have usually been keenly interested in the primary development of a local utility, but too often with the first signs of paying operation they have become indifferent to the further success of the enterprise. Such an ostrich-like attitude in regard to utility progress, however, is now becoming less frequent, and numerous examples are not wanting to show how business interests are actively co-operating with public service corporations in the solution of problems affecting the maintenance of successful operation. For instance, this week we are noting elsewhere a charter amendment which has been drafted by the Chamber of Commerce, Oakland, Cal., in an effort to help solve the financial and operating difficulties of the San Francisco-Oakland Terminal Railways. On still another page there is an announcement that the Chamber of Commerce of the United States is soon to hold a nation-wide referendum on the federal regulation of railroads. While it will undoubtedly be some time before business interests at large will seriously consider all the deeper questions of utility operation like regulation, business men in particular communities are coming more thoroughly to understand the simple points of their relationship with local utilities and to cultivate a broadness of vision that enables them more fairly to judge utility practices and utility needs. The commercial men of a community are the ones best able to understand the business problems and pitfalls that may confront public service corporations. They are also peculiarly the ones among the citizens to realize the important part which an electric railway plays in the business prosperity of every town. Hence, every effort should be made by electric railway companies to merit the support of this class of citizen and legitimately to secure it.

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TEACHING "SAFETY FIRST" THROUGH PLAY

As an intensive development of school safety work along sound educational lines, the Tacoma "school safety scout" plan described this week by T. N. Henry has much to commend it to the serious consideration of electric railway officials. Safety work in schools is not new, of course, but the Tacoma system is unusual in that it gives so much recognition to the educational significance of "play." Believing that safety lectures and illustrations are soon forgotten by a majority of school children unless there is some follow-up scheme to induce activity on the part of the children themselves, Mr. Henry has inaugurated a system similar to that of the boy scouts but emphasizing the point of safety. In so doing he has simply followed the fundamental pedagogical principles that play gives to children a pleasurable feeling which is educational and that the best way to reach both the intellect and the emotions of children is through fostering their play instinct. The safety-scout plan may seem too complex in its play features to appeal to the younger school children, as it is a step beyond the individual play and later the social play to which they are accustomed. Nevertheless, it gives full opportunities for the two more advanced types of recreative activity, competitive play and team play, which through the years of adolescence inculcate the various principles of right conduct between individuals. In general, therefore, the safety-scout plan is one into which all the children will gradually grow, and it is worthy of emulation as a well-thought-out combination of educational theory and utility safety work.

THE BAY STATE FARE DECISION

The decision of the Massachusetts Public Service Commission in the Bay State Street Railway fare case, abstracted elsewhere in this issue, is naturally disappointing in the light of the board's finding in the Middlesex & Boston proceeding some two years ago. In the latter instance, it appeared that a new lease of life had been granted to struggling companies endeavoring to pay a fair return upon their investments in the face of the shrinking purchasing power of the 5-cent fare unit. The findings of the board in the subsequent Blue Hill and New Bedford & Onset cases seemed the logical outcome of the Middlesex & Boston decision, and it was the common opinion in New England street railway circles that the demonstrated needs of the Bay State company would meet the same kind of encouragement. Consequently the refusal of the commission to permit the Bay State to try out its basic 6-cent fare schedule comes as a heavy blow to the company.

Looking below the superficial aspects of the finding, it is clear that the board is not wholly without sympathy for the company's position and that it has no desire permanently to withhold a return from the investor in this property, although the drastic prescription of turning back dividends into the system to improve its physical condition is written for the company's immediate observance. The problem of the company now is to obtain the additional revenue of $588,816 to which the commission rules it is entitled. Perhaps the most interesting feature of the decision is its discussion of remedies for the company's present financial and physical situation. The commission has a large faith in the possibilities of increasing net revenue through various improvements in operation and by better co-operation on the part of the public than the company has hitherto enjoyed. Experience must show whether the commission's hopes can be realized. Doubtless some of them can be, if the board will back up the company in its endeavors to improve its service along lines demanding public support for realization. These include such matters as the sweeping reduction of pole stops, improved traffic regulation by local police departments, the abandonment of petty, provincial, obstructive policies in respect to the location of loops and other trackage, and active co-operation in all cases affecting the speed of cars. Other sources of increased net revenue in which the commission believes are the gradual elimination of open cars, the investment in new shops, the retirement of old rolling stock, the rehabilitation of present cars, the lengthening of headway on interurban lines and on over-served lines generally, the use of fare boxes, one-man cars and trailers, the development of electric freight service on the lines north of Boston, intensive traffic promotion on interurban lines, admission charges to parks, the installation of additional feeder capacity, the reduction of taxation burdens, especially in connection with paving, improvements in general organization and increase of fares on the rural lines.

The commission can assist the company materially in securing the larger co-operation of the public along the above lines. The financial value of such co-operation cannot easily be estimated, but it is certainly considerable. According to the evidence at the hearings, the company questions the feasibility of many of the foregoing remedies from the standpoint of producing adequate additional revenue, but if the public does its share, it may be that a substantial increase in net can be realized. The board will entertain an increase in the fare unit from 5 to 6 cents on the rural lines, but emphatically refuses to permit any increase in the cities, where the traffic would naturally yield larger gains. The fears of the commission that jitney competition would thrive in the face of a slight increase in the city fare hardly seem a basic ground for refusing the company the right to try out the program.

Whatever may be the reader's opinion of the decision and its reasoning, there is no question that it throws an exceedingly heavy burden upon the company, and that the future of this property depends in no small degree upon the willingness of the public to co-operate with the management in a large-minded way. And if the remedies proposed by the commission fail after a year's trial, the way is fortunately open for a further consideration of the company's problems and their possible or impossible solution by the 5-cent fare unit.

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POWER TRACK TOOLS SUPPLANTING LABOR

The scarcity and the increasingly higher prices which must be paid for ordinary track labor have compelled electric railway way departments to substitute power tools wherever they prove economical and will displace labor. In fact, the track labor situation has become so critical during the present construction season that it is only because of these power track tools that any considerable amount of rehabilitation and extension has been undertaken by many companies. In the handling and delivering of track material in the store yards the quantity must be exceedingly small when a company does not find it economical to employ a crane car or stationary derrick for loading and unloading. For this work the self-propelled crane or derrick car is the more popular because the ease with which it can be moved from one point to another greatly increases its usefulness.

In construction and rehabilitation work, the concrete mixing machine has almost entirely replaced the old method of hand mixing, as by it a gang of a half dozen men can mix and place more concrete in a work day than was formerly possible by a gang of four or five times that size. This tendency toward the substitution of machines for hand labor in track work is conspicuous also in trench excavation. A great many of the electric railway properties do this work either with a steam or electric shovels of their own or with one supplied by a contractor. In connection with the removal of the excavated material, as well as the delivery of sand, gravel, crushed stone, brick, cement and such material to the work, dump cars and other special utility equipment are being used almost exclusively. There was a time when most companies utilized for this service the ordinary 6-cu. yd. or 8-cu. yd. side-dump cars usually employed in heavy excavation and embankment work on steam and electric railroads built on a private right-of-way. This type of car, however, is being rapidly replaced by equipment especially designed for the loading and delivery of material on a public street.

While the center-dump car is being used to some extent, the side-dump type is more popular, and the one which will place the material on the pavement outside of the track trench has been found to be the most economical. Perhaps the latest substitution of a power tool for hand labor has been afforded by the pneumatic and magnetic ballast tampers. Experience has demonstrated that with one of these tools one man will do practically the work of six men with shovels or tamping bars. The electric railway offers a particularly attractive field for this equipment because power is available at any point on the line.

In summing up this evolution which is taking place in track tools, it may be said broadly that labor conditions have forced the change, and that the economy and independence resulting from these tools have made them an absolute necessity when the way department desires to accomplish its usual construction season's program. An excellent illustration of the principles outlined above is furnished in the leading article this week.

CREDITABLE AND DISCREDITABLE ENERGY LOSSES

There has been of late a great deal of discussion in the technical press and before gatherings of railway men on the subject of reducing energy losses in car operation. The attention given to the subject shows that those responsible are determined to reduce energy consumption if this can be done without causing proportional increased expenses elsewhere. In considering the subject, it must be borne in mind that in one sense all energy put into a car is lost. Some of this loss is, however, commercially inevitable and, therefore, necessary. Such loss may well be called a creditable one, for it is creditable to permit a waste which could not be economically prevented. Those who have followed the development of the steam engine will recall that there was at one time a tendency to use a great many frills for the purpose of reducing steam consumption per horsepower-hour developed. Steam jacketing of cylinders, high degrees of superheat, excessive expansion of steam, etc., were sometimes used without regard to the fact that these might cause more expense than they would save. A well-known engineer once reversed the saying "The best is good enough" to "good enough is best," with the remark that some electric railways and other properties have been built with sole regard to technical perfection, thereby impairing their values as investments. The same reasoning will apply to car operation, in which it is always possible to reduce energy consumption below the economic limit. It is our belief that a great deal of energy is being discreditably wasted in electric car operation, but also that savings should be made strictly on an economic basis.

Without attempting a complete roster of these two kinds of losses, between which there is not a hard and fast line drawn, a few may be mentioned by way of illustration. A discreditable energy loss is one involved in carrying around useless dead weight in car body, trucks and equipment. Another is that which is due to the use of equipment not adapted to the work it is called upon to perform. Energy wasted at the brakeshoes due to running too long with power on comes in the same category. On the other hand, all brakeshoe loss is not discreditable, because cars must be brought to rest more quickly than their own friction will bring them. Some rheostatic losses are also necessary, because at starting the motor resistance and counter emf. are not enough to limit the current to the value necessary to produce the desired rate of acceleration. There must always, of course, be some friction in the best lubricated bearings and against the air through which the cars move.

Our purpose in directing attention to this division of losses is twofold. In the first place, it emphasizes the difficulty of comparing energy consumptions per car-mile or even per ton-mile under different operating conditions. It also indicates the importance of having on every railway property one or more men who are qualified and willing to make a special study of the economics of energy consumption in the cars on that property.

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Methods of Handling Track Work in Kansas City

The Construction and Maintenance Methods Employed by the Kansas City Railways Company to Keep Down Costs, and a Centralized System of Distributing Hand and Machine Tools Which Has Greatly Increased Efficiency Are Described.

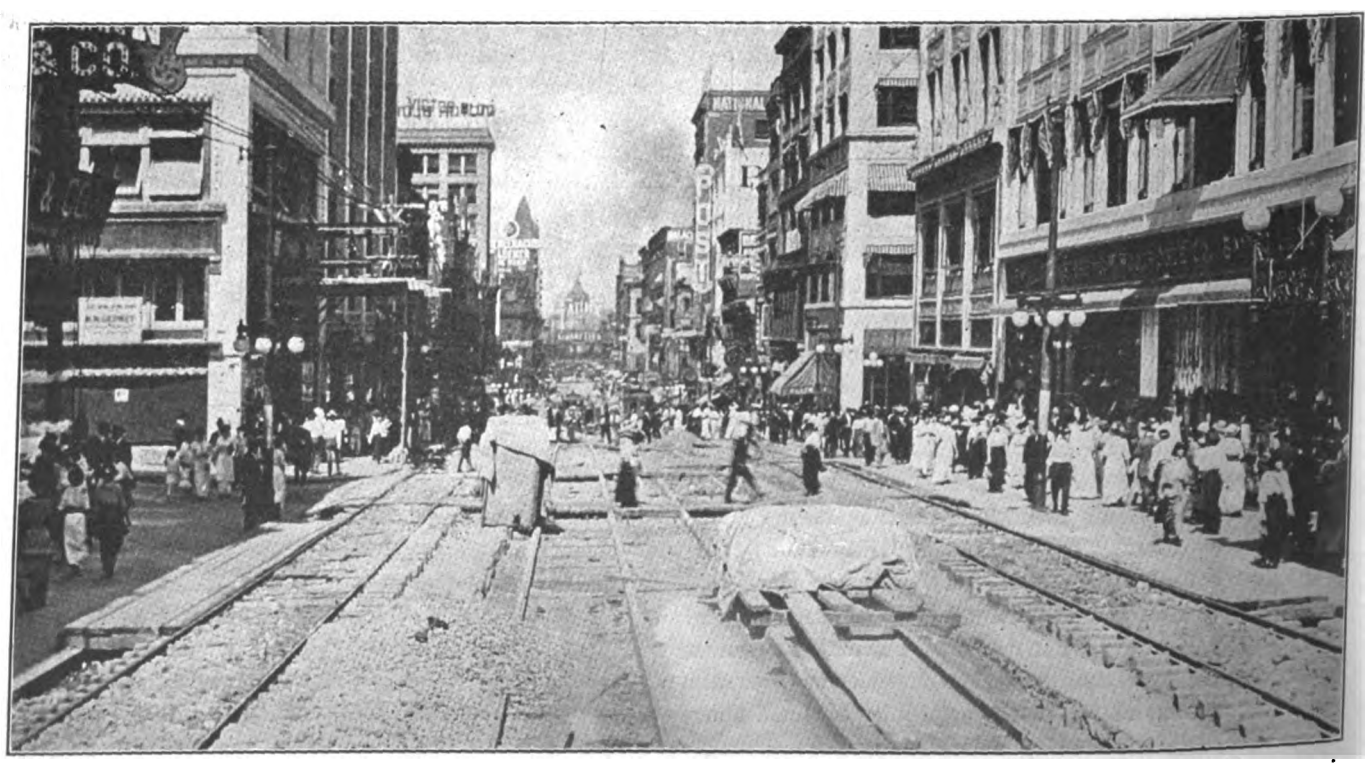
KANSAS CITY TRACK CONSTRUCTION—VIEW OF TRACK READY FOR PAVING

MAINTENANCE methods which make certain prompt attention to all necessary track repairs, the elimination of lost motion in handling track materials, and a tool system which insures a full quota in first-class condition on all jobs, epitomizes the outstanding features of the methods employed by the roadway department of the Kansas City (Mo.) Railway. These results are obtained by an organization composed of the superintendent of way and structures, A. E. Harvey, to whom five roadmasters, a supervisor of tools, a supervisor of work trains and an office clerical and engineering force report. The territories assigned to the roadmasters are largely divided on a basis of convenience in handling. One roadmaster is assigned to the business district in Kansas City and four to the territory in the outlying districts.

ORGANIZATION METHODS

Each roadmaster is responsible for all construction and repair work in his district and has reporting to him a general foreman and an assistant foreman in charge of large construction jobs, and a number of foremen in charge of the small repair gangs. In addition to these a staff of switch cleaners and emergency men report to the roadmasters. The emergency men ordinarily engage in light repair work and are required to report to the office of superintendent of roadway every hour. The purpose of this is to keep the office in touch with their movements so that they may be sent promptly to take care of any emergency repairs. During the night these emergency men are subject to the call and orders of the train dispatcher.

One of the clerks in the office is detailed to receive all reports requiring emergency repairs. As a rule these reports originate in the operating department, hence notices of emergency track trouble are received from that department. All cases of trouble are noted in the trouble record book in red ink and an emergency man is promptly dispatched to remedy the difficulty. An entry in red ink indicates the time that the report of



KANSAS CITY TRACK CONSTRUCTION—VIEW OF BUSINESS STREET ABANDONED FOR TRACK WORK

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trouble was received, and as soon as the difficulty has been remedied the emergency man reports it to the general office, where a record in blue ink shows the time the job is cleared.

Roadmasters Meet Twice Daily

In order that the superintendent of roadway may be advised of the progress of the work over the entire system, the roadmasters from the various districts meet at the general office at the noon hour and in the evening of each day. At this time they are advised of all the emergency trouble in their districts, and they in turn make all requests, on proper forms, for work that must be performed by other departments. For instance, all taps to the city fire hydrants for necessary construction or maintenance work are requested at this time, and requisitions are made on the proper city authorities. Jobs requiring bonding are also reported and requisitions made on the electrical department to have this work done.

In case sections of track under operation are to be taken out of service temporarily, the roadmaster files a request at the general office, in the morning prior to the night when track is to be abandoned. The superintendent's chief clerk then arranges with the train dispatcher for rerouting or detouring the cars which will be affected, and also notifies the roadmaster that all arrangements have been made. Following this verbal arrangement, the chief clerk writes a form letter to the operating department confirming the understanding. A copy of this letter is also given to the roadmaster and all others concerned in the change.

Ordering and Delivering Materials

All requisitions for construction work originate in the office of the superintendent of roadway and are based on the estimates made for each job. These requisitions are sent to the storehouse, where they are held on open file and the material is drawn subject to the will of the roadmasters. At noon each day the roadmasters make known their material requirements for the following day on proper forms, and these are immediately written on an order form and sent to the storehouse. On receipt of these orders the storekeeper sets the material aside and it is loaded for delivery at night or the following day. In connection with the delivery of material, the supervisor of work trains has full charge of all the work trains and is authorized to deliver any material requested by a roadmaster when a requisition has been made to cover it. The supervisor of work trains arranges for their loading and dispatches them to various points on the system. Experience has demonstrated that this is a very efficient way of handling company material.

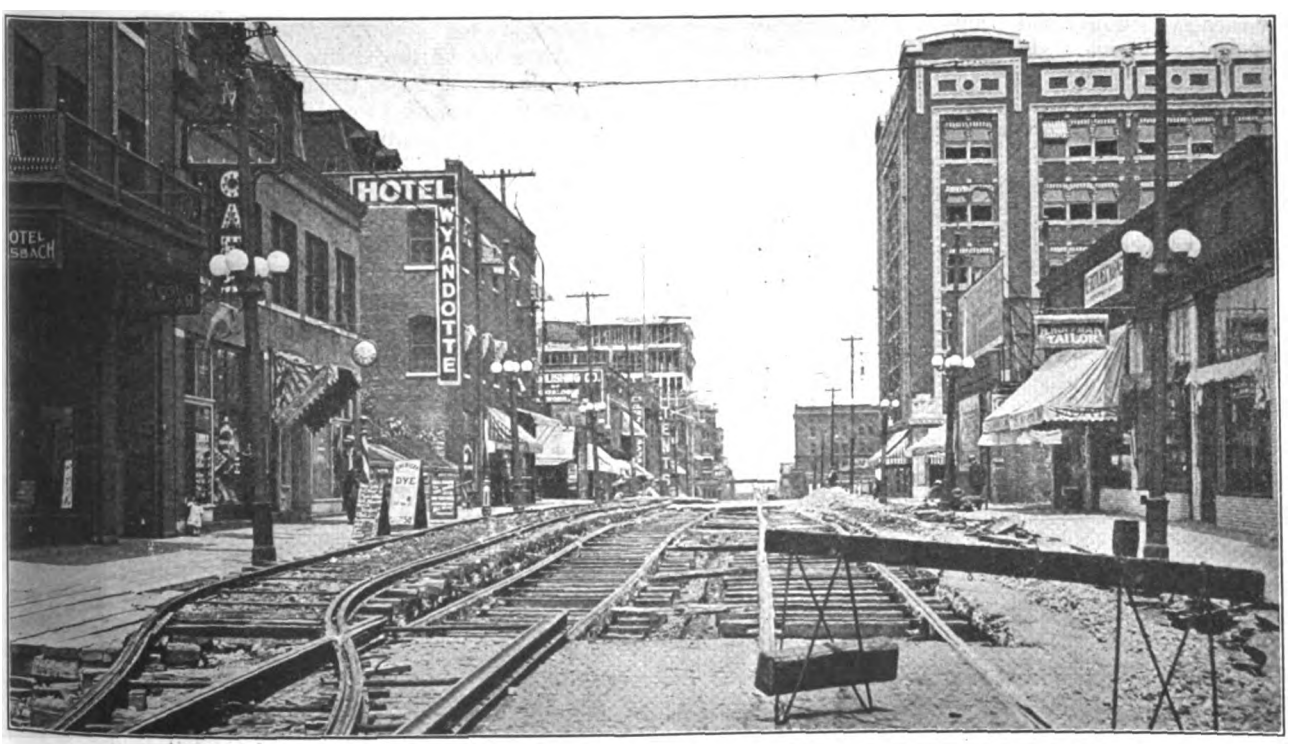
A great deal of duplication in mileage of work trains is avoided by organizing the transportation work in this way, instead of assigning one or two work trains to each roadmaster as may be required. The supervisor of work trains can consolidate the work in such a way that one train may answer the purposes of two or three different roadmasters on some particular trip. It also tends to develop efficiency, for if a train is assigned to a roadmaster regularly, there is a tendency for him to make work for it during slack periods in order to retain it. The method used has reduced the cost of work train service very materially, the average costs being as follows:

Asphalt, per square yard of paving	2.3 cents
Sand, per yard-mile	0.95 cent
Granite block, per yard-mile	0.16 cent
Cement, per barrel-mile	0.21 cent
Paving brick, per thousand per mile	2.04 cents

The cost of handling rail, including loading and unloading, is considerably more than for the other commodities and amounts to about 1.53 cents per ton-mile. All of these figures include the cost of the return trip.

Handling Material in Limited Store Yards

As the track-material storeyards are limited in capacity, more than 75 per cent of the carload shipments to the track department are transferred directly from the steam railroad cars to those of the street railway. This saves one handling of the material, but necessitates much closer figuring upon the requirements and working closer to a program than some railways find to be practicable. By careful attention to the progress of the work, however, this plan operates very



KANSAS CITY TRACK CONSTRUCTION—TEMPORARY TRACKS ON ABANDONED STREET

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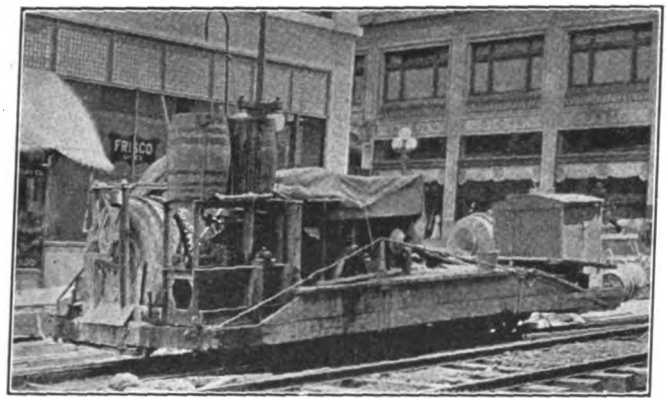


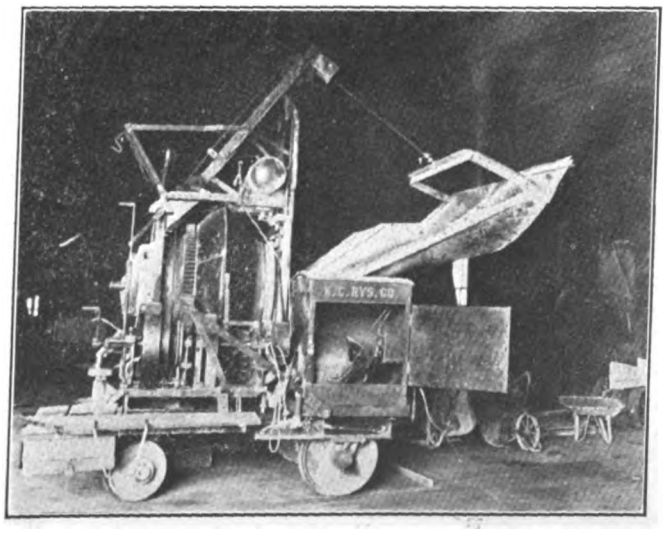
KANSAS CITY TRACK CONSTRUCTION—ONE OF THE OLD STYLE CONCRETE MIXERS

nicely. No serious delays have occurred due to failure to secure material, and it is very seldom that any demurrage accrues on the cars.

There are two principal storage yards, one for all special work used in making repairs and extensions, and the general storeyard where all classes of track materials are stored. In addition to these the company has an asphalt plant situated at another point on the system, and frequently bulk material such as sand and granite block is received at this point. To facilitate handling the latter, a stiff-leg derrick equipped with a clamshell bucket and a triple-drum electric hoist has been installed. While there is some storage space for sand beside this derrick, most of it is transferred direct from the steam railroad cars to those of the company. In connection with the asphalt mixing plant it is of interest to note that it includes ten pans having a daily capacity of 525 sq. yd. All usable asphalt removed from the street is delivered to this plant, where it is panned and delivered again to the street. The average cost of asphalt surface in place is 76.7 cents per square yard.

The track department rolling stock includes three 18-yd. Koppel dump cars, one 20-yd. side dump car, one crane car, two flat utility motor cars, one tool and supply car, one flat car for transferring equipment, two asphalt dump cars, six 6-yd. side-dump cars, three 6-yd. center-dump cars, five flat cars and one Knox tractor with a steel dump body, having a capacity for 9 cu. yd. of material and a stake body which is used in transferring track tools and equipment. The latter is an auxiliary piece of equipment used in emergencies.

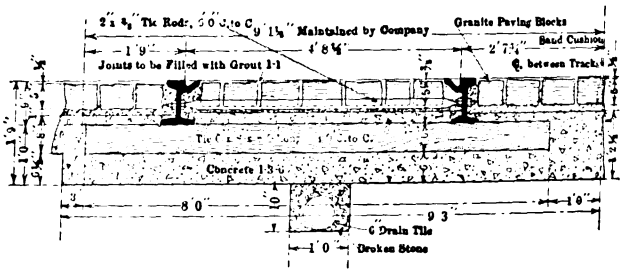
It is also of interest to note that the Kansas City Railways Company operates its own stone quarry which produces from 75 cu. yd. to 200 cu. yd. of crushed stone per day for use as ballast or as concrete aggregate. The stripping taken from this quarry is used as a filling material at points where it is needed on the system.



KANSAS CITY TRACK CONSTRUCTION—SELF-PROPELLED BATCH CONCRETE MIXER

CITY HELPS TO HASTEN TRACK CONSTRUCTION

As a general proposition the railway company has been aided by the city authorities in hastening construction jobs. Temporary tracks laid on the street surface with portable cross-overs are permitted, and in some instances the entire street has been given over to the railway company in order to complete the reconstruction work in the least time possible. On two occasions, the busiest retail streets in the downtown district of Kansas City were vacated for this purpose, and the time required to do the work was reduced about one-half. In order to obtain this concession the representatives of the railway company called on the various business interests which would be inconvenienced by a partial vacation of the street during track reconstruction, and outlined to them the advantages of giving over the entire



KANSAS CITY TRACK CONSTRUCTION—CROSS-SECTION OF STANDARD 141-LB. GIRDER GROOVED RAIL TRACK

street. These interests appreciated the value of having the construction work out of the way in the shortest time possible and granted the necessary permission. The dispatch with which these jobs were handled and the careful consideration of the rights and wishes of the merchants during the progress of the work, have made other arrangements of this kind possible in both heavy and light traffic districts.

OFFICE RECORD SYSTEM

An atlas of the entire system of trackage, drawn to a scale of 200 ft. to the inch, on individual sheets 18 in. x 30 in. in size, provides a permanent office record of any and all repair or reconstruction jobs of any size. This atlas is kept up to date and the work for each month in the year is shown in separate colors. This, together with a detailed typed record, makes an excellent account of the department's work for any month in the year, or for the year as a whole. By a system of daily reports, these records for the month's work are all ready for use by about the fifth day of the following month. The quarry foreman, the granite cutter foreman, the welders, rail grinders, asphalt plant foreman and the asphalt layers all have printed record sheets which are very easily prepared and facilitate the work of compilation and calculating cost data.

All accidents, which occur on the work, are immediately reported by telephone to the chief clerk, where instructions are issued for the proper care of the injured employee. This gives an immediate record of the accident and in almost every instance the injured party can be attended by the company's physicians. To facilitate the handling of all departmental matters, all incoming and outgoing reports, mail, etc., pass over the desk of the chief clerk.

A directory of most of the regular employees of the

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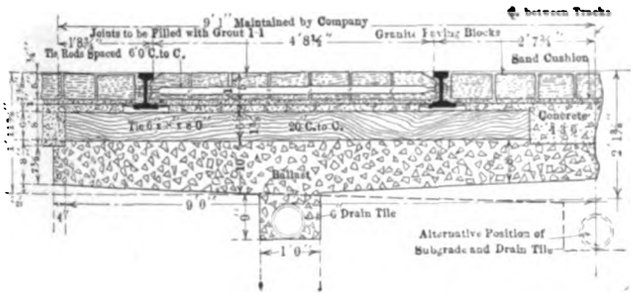
department is also kept, giving addresses and nearest telephones so that individual employees can be quickly located in case of accident. In this way any roadmaster, special foreman, or track foreman can be located within a few minutes. The division carhouse operating department offices assist in this by transmitting messages by motormen.

All requisitions on the storekeeper for material are made by the assistant engineers who also prepare the detailed estimates used when authority to do construction or rehabilitation work is requested. By a daily check received from the storekeeper, the superintendent's office is able to keep a fairly close record on what material is actually delivered on the various jobs. Roadmasters also report daily any material transferred to other jobs than the one for which it was ordered.

HANDLING TRACK TOOLS

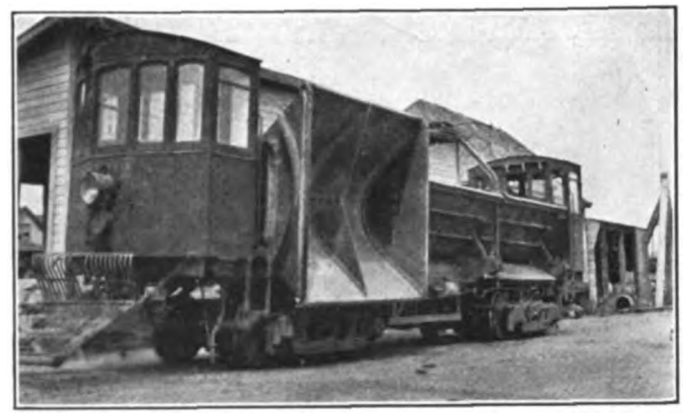
As a rule the quantity and condition of track tools and equipment is everybody's business, but this is not so in the track department of the Kansas City Railways. On this company's system the entire tool problem is centralized under the supervisor of tools and equipment. Whenever a construction job is scheduled to start, the supervisor is notified and he makes it his business to see that the tools are not only supplied, but that they are in first-class condition.



KANSAS CITY TRACK CONSTRUCTION—CROSS-SECTION OF STANDARD 7-IN. PLAIN GIRDER RAIL TRACK ON BALLAST

Too often mechanical tools have been condemned because they have been put in the hands of men incompetent to understand their use or care for them. The manufacturers are, to a considerable extent, to blame for this as they encourage corporations to use such tools by telling what can be accomplished with them by unskilled labor. A power tool of any kind, by slight misuse, may be damaged and put out of service. If there is no one on the job who understands it, and generally neither the foreman nor the roadmaster is able to repair it, the tool is laid aside and the work progresses as best it may with hand tools. At a convenient time, possibly as early as the following day, the tool is sent to the repair shop, where, after considerable delay the repairs are made by a mechanic who may be entirely ignorant of the action of the tool in actual service. In due time the tool again appears on the street, to be put out of commission more quickly than it was repaired. Such has been the history of many tools ever since they were first put on the market.

Under the organization that exists on the Kansas City Railways, all special tools as well as the repairs of the simplest hand tools, are placed under the direction of a man who is familiar with their uses, and with their operation and repairs. Where the tools are requisitioned by a roadmaster, they are sent, together with operators who have full charge of them, and who report only to the roadmaster or foreman. It is the duty of these men to operate the tools, see that they are always in proper working order and that they are returned to the tool house in good condition. Frequently,



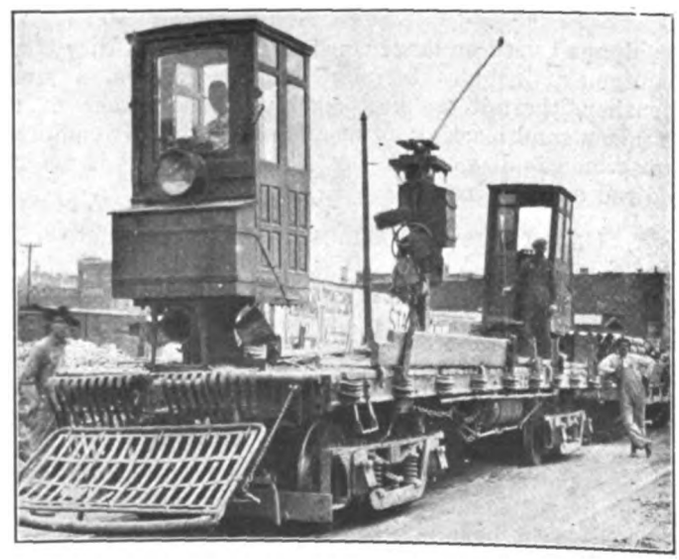
KANSAS CITY TRACK CONSTRUCTION—STEEL SIDE DUMP MOTOR CAR

under this arrangement, slight derangements are corrected immediately on the street, because the operator understands the machine and can locate the trouble. If the trouble is too complicated, a telephone call to the tool house will bring such further help as may be required. In this way the maximum service is obtained from all special tools, which include such equipment as concrete mixers, rail grinders, power drills, arc welders, thermit welders, stone crushers and asphalt kettles.

TOOL REPAIR FORCE

One of the railway company's old carhouses has been remodeled for a tool repair department and storeroom. In this repair department two blacksmiths and two helpers are employed regularly. Two repairmen and twenty-six others, including the operators of the power tools, make up the remainder of the force. The repair department is equipped with a small machine shop containing drills, grinders and a small lathe, and a wood shop with a circular saw, a sander, a band saw, and a mortising machine. A small plumbing and tin shop and a paint shop complete the tool repair facilities. In addition to the work on tools, all repars to the wagons belonging to the company are made at this point. While this force is kept busy during the construction season repairing tools, the work does not cease during the winter months, but all tools are carefully put in first-class condition and painted a bright red as a distinguishing mark.

All tools are issued upon orders from the roadmaster and are charged out in a tool record. As fast as tools wear out or break they are turned in at the tool car



KANSAS CITY TRACK CONSTRUCTION—UTILITY MOTOR CAR AND TRAIN

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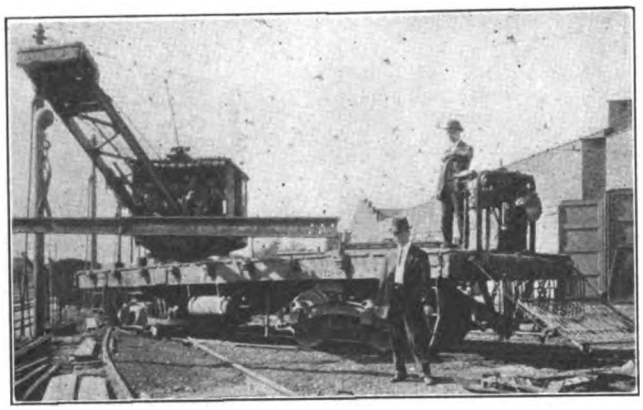


KANSAS CITY TRACK CONSTRUCTION—ELECTRIC CRANE FOR HANDLING SPECIAL WORK

which returns bad-order tools to the storeroom and delivers new tools to the various jobs over the system. In the hand-tool department one or two men are continuously engaged in making repairs, and, as mentioned before, repairs to all power track tools are made by the operators assisted by the department blacksmiths and machinists.

ADVANTAGES OF TOOL SYSTEM

This method of handling tools through a centralized tool storeroom and a tool supply car, minimizes clerical work and insures the prompt delivery of tools to all jobs. Moreover, under this system there is no occasion for a man working with a defective tool which may either reduce his efficiency or injure him. As a matter of fact the elimination of all injuries due to defective tools has alone justified this system of handling them.

Included in the power equipment there are several small continuous mixers which have been found very satisfactory for small concrete jobs. A motor-driven batch mixer mounted on car wheels is the standard equipment used on large construction jobs. Other track equipment includes tar and asphalt heaters, a stone crusher, thermit welding outfits, ratchet jacks of all kinds, a sand blasting outfit and a portable air compressor which is dismounted for shop use when it is not required on the street.

UNIT COSTS OF VARIOUS TRACK OPERATIONS

Unit costs of various roadway operations are always of interest, particularly when sufficient information is given to analyze the basis of calculations. For the guidance of the engineers making estimates on track repairs and construction jobs, the superintendent of roadway has compiled unit cost figures for practically every operation and all of the more common classes of track repairs. Practically all of the granite nose block is cut by the company, and the average cost for cutting 20,000 blocks, including the cost of sharpening the tools, is 2.9 cents per block. Old granite block is redressed at an average cost of 2.25 cents per block. This is the average for cutting 230,700 blocks for five months.

The average cost of work train service has been found to be approximately 15.3 cents per mile for hauling heavy material, and the average mileage per day in this service is approximately 56 miles. The cost of handling light supplies on work trains is approximately 12.7 cents per mile, and these trains will average about 89 miles per day. These costs include crew wages and all other items properly chargeable to work train operation.

COST OF DELIVERING RAIL

The cost of hauling rail, including the loading and unloading charge, has been found to average as follows:

Labor loading	33 cents
Power loading	4 cents
Crew time	92 cents
Power unloading	4 cents
Labor unloading	33 cents
Total	$1.66
Cost of delivery per ton	17 cents
Cost per mile hauled, inclusive of loading and unloading for the round trip	1.53 cents per ton
Derrick car capacity loading	10 tons
Three men loading 10 tons material in thirty minutes, rate per man, per hour	22 cents

COST OF LOADING TRACK MATERIALS

The unit cost of loading various materials has also been calculated on the basis of a gang of twelve men receiving 17 cents per hour and one foreman receiving 20 cents per hour.

Item	Time	One Motor Load
Granite blocks	20 minutes	2,400 blocks
Cement	35 minutes	300 sacks or 75 bbl.
Pavers	30 minutes	7,500 blocks
Sand	30 minutes	21 yd.
Rock from cars	1 hour 30 minutes	21 yd.

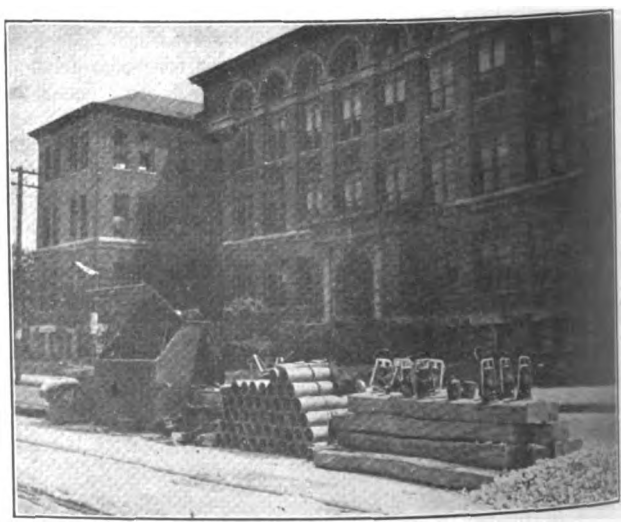
Item	Unit	Cost
Granite blocks	1 sq. yd.	$0.0078
Cement	1 bbl.	.0174
Pavers, brick	1 sq. yd.	.0090
Sand	1 cu. yd.	.0533
Rock from cars	1 cu. yd.	.1600

UNIT COSTS OF TRACK CONSTRUCTION

The following is the summary of the unit costs on ten different jobs of track reconstruction:

SUMMARY OF UNIT COSTS ON VARIOUS JOBS

Location	Length	Rail	Ballast	Paving	Track Material	Track Labor	Track Total	Paving Material	Paving Labor	Paving Total	Grand Total
Hardesty, Seventh to Independent	669 ft. D.T.	106 lb.	Crush Rock	Asphalt	$1.61	$2.59	$4.20	$3.21	$ .93	$4.14	$8.34
Main Street, Ninth to Twelfth	1,182 ft. D.T.	106 lb.	Concrete	Granite	1.74	3.89	5.63	2.92	.46	3.38	9.01
Delaware, Fifth to Ninth	1,528 ft. S.T.	106 lb.	Concrete	Granite	.75	1.95	2.70	2.21	.76	2.97	5.67
Southwestern Boulevard, State to Rosedale	8,779 ft. D.T.	106 lb.	Concrete	Granite	1.52	1.55	3.07	2.98	1.15	4.13	7.20
Walnut, Thirteenth to Eighteenth	2,315 ft. D.T.	106 lb.	Concrete	Granite	1.45	3.46	4.91	5.68	1.35	7.03	11.94
Wyandotte, Ninth to Twelfth	1,020 ft. D.T.	106 lb.	Concrete	Granite	2.45	4.49	6.94	5.02	1.41	6.43	13.37
Walnut, Seventh to Twelfth	1,880 ft. D.T.	141 lb.	Concrete	Wood Block	3.05	5.73	8.78	5.29	1.60	6.89	15.67
Holmes, Twenty-second to Thirty-first	5,569 ft. D.T.	91 lb.	Concrete	Granite	2.61	3.55	6.16	5.99	1.22	7.21	13.37
Twelfth Street, Liberty to Wyoming	480 ft. D.T.	91 lb.	Concrete	Granite	7.56	4.44	12.00	5.66	1.19	6.85	18.85
Washington, Eleventh to Thirteenth	654 ft. D.T.	91 lb.	Concrete	Granite	4.46	6.19	6.65	5.18	.61	5.79	12.43



KANSAS CITY TRACK CONSTRUCTION—MATERIALS AND TOOLS READY FOR A REPAIR JOB

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It is rather difficult to arrive at any average unit cost for track maintenance work because there are so many variables which affect the results. However, the unit costs for twenty typical cases of track repairs made in Kansas City are as follows:

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Twenty-fourth Street and Southwest Boulevard	Material..	$4.78	$0.54	
	Labor.....	1.21	.71	
	Total...	$5.99	$1.25	$7.24

This 394 lineal feet of track work consisted of the renewal of a 9-in. rail tie-constructed double-track branch-off. The new work was 100-lb. rail, tie-constructed track with 282-sq. yd. granite paving, and the job was done by a gang of about twelve men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Eighth Street—Troost to Woodland	Material..	$0.36	$0.64	
	Labor.....	1.88	.54	
	Total...	$2.24	$1.18	$3.42

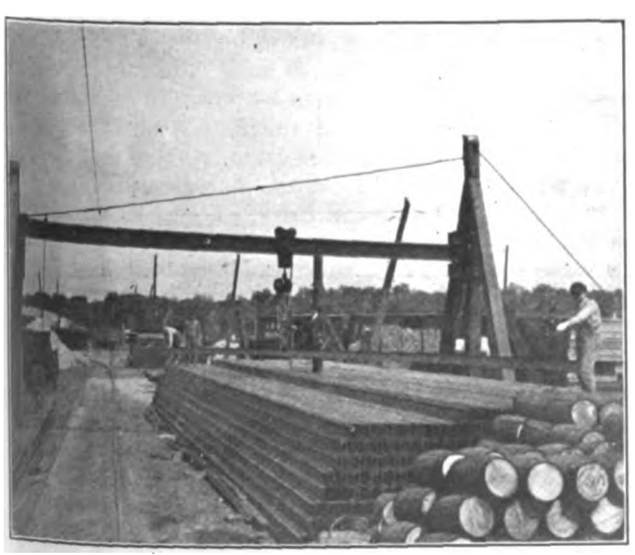
This 1171 lineal feet of track was 106-lb. rail laid on beam construction with conduit and an asphalt paving. The reconstructed track contained 106-lb. rail on tie construction with 1750 sq. yd. of asphalt paving and a 6-in. drain tile under each track. The work was done in stretches of from 50 ft. to 200 ft. by a gang of about forty men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Independence—Woodland to Chestnut	Material..	$0.33	$0.28	
	Labor.....	2.41	.24	
	Total...	$2.74	$0.52	$3.26

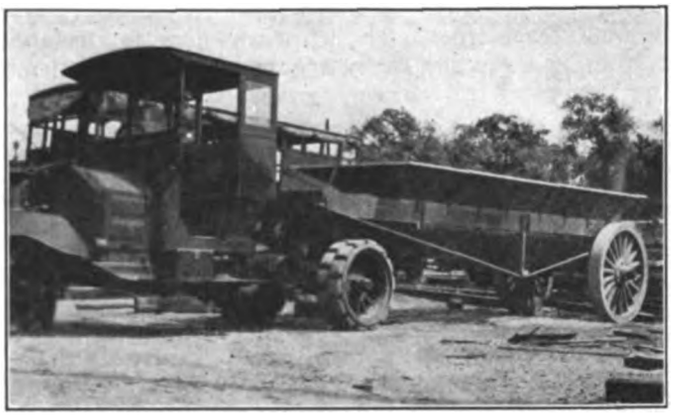
This 7100 lineal feet of track was 109-lb. rail laid on beam construction, with conduit, cast welded joints and asphalt paving. The new track is 109-lb. rail laid on tie construction with a 6-in. drain tile under each track and 7100 sq. yd. of asphaltic macadam pavement on a 6-in. concrete base. The paving costs show only the costs of the concrete base, the wearing surface being laid by contract. The work was continuous, being done by a gang of about seventy-five men, and a temporary third track was used during construction.

		Cost Per Lineal Foot of Single Track		
			Paving	Total
Fifth Street—Grand to Lydia	Material		$0.77	
	Labor		.46	
	Total		$1.23	$1.23

Only 2363 sq. yd. of wearing surface was renewed, and about 50 per cent of the brick was new.



KANSAS CITY TRACK CONSTRUCTION—STOCK YARD RAIL-HANDLING EQUIPMENT



KANSAS CITY TRACK CONSTRUCTION—TRACTOR WITH STEEL DUMP BODY

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Fifth Street—Washington to Oakland	Material..	$0.57	$0.50	
	Labor.....	1.14	.58	
	Total...	$1.71	$1.08	$2.79

This 282 lineal feet of track was and is 106-lb. rail laid on tie construction with 282 sq. yd, of brick paving. The work was done in stretches of about 20 ft. by gangs of about twelve men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Twelfth Street and Walnut Street	Material.	$10.36	$0.88	
	Labor....	2.55	1.36	
	Total..	$12.91	$2.24	$15.15

This 198 lineal feet of track was 9-in. rail laid on beam construction in a double track crossing with a 100-lb. flange bearing crossing on tie construction tile drained, with 135 sq. yd. of granite paving. The work was done by day and night gangs of about twelve men each.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Fifteenth Street—Brighton to Colorado	Material..	$0.36	$0.86	
	Labor.....	1.37	.40	
	Total...	$1.73	$1.26	$2.99

This 1037 lineal feet of track was 84-lb. rail laid on tie construction and a wood block paving. The reconstructed track is 84-lb. rail laid on tie construction with 1388 sq. yd. asphalt paving and a 6-in. drain tile between tracks. The work was continuous and was done by a gang of about ten men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Eighteenth Street—Main to Jackson Avenue	Material..	$0.61	$1.16	
	Labor.....	1.64	.59	
	Total...	$2.25	$1.75	$4.00

This 4218 lineal feet of track was 106-lb. rail, laid on 70 per cent beam 30-per cent tie construction, with both brick and asphalt paving. The reconstructed track is 106-lb. rail, laid on tie construction, with 6459 sq. yd. of paving, 30 per cent of which is brick and 70 per cent asphalt. A 6-in. drain tile is also provided. This work was done in lengths of from 15 ft. to 300 ft. by gangs of about twenty men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Ninth Street—Bales to Cleveland	Material..	$0.71	$0.77	
	Labor.....	1.65	.20	
	Total...	$2.36	$0.97	$3.33

This 523 lineal feet of track was 106-lb. rail, laid on beam construction with conduit and asphalt paving. The reconstructed track is 106-lb. rail, laid on tie construction with 1362 sq. yd. of asphalt paving and a 6-in. drain

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tile under each track. The work was done in stretches of from 50 ft. to 200 ft. by a gang of about ten men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Twelfth Street—McGee to Wyandotte	Material..	....	$0.52	
	Labor.....	....	.57	
	Total...	....	$1.09	$1.09

The wearing surface only was renewed, and 1036 sq. yd. of old sandstone was replaced by granite block.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Woodland Avenue—Thirtieth to Forty-third	Material..	$0.40	$0.85	
	Labor.....	1.20	.31	
	Total...	$1.60	$1.16	$2.76

This 3847 lineal feet of track was and is 106 lb. rail, laid on tie construction with 5347 sq. yd. of paving. The work was continuous and was done by a gang of about twenty men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Central Avenue—Sixth to Seventeenth	Material..	$0.52	$0.85	
	Labor.....	1.32	.27	
	Total...	$1.84	$1.12	$2.96

This 1907 lineal feet of track was 106-lb. rail laid on beam construction, with conduit and asphalt paving. The reconstructed portion is 106-lb. rail, laid on tie construction with 3906 sq. yd. of asphalt paving and a 6-in. drain tile under each track. The work was done in stretches of about 100 ft. by gangs of about twelve men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Thirty-first Street—Main to Indiana	Material..	$0.87	$1.21	
	Labor.....	2.19	.42	
	Total...	$3.06	$1.63	$4.69

This 2734 lineal feet of track was 106-lb. rail, laid on beam construction with asphalt paving, but without conduit. The reconstructed track is 106-lb. rail on tie construction, with 3759 sq. yd. of asphalt paving, and a 6-in. drain tile. The work was done in lengths of from 15 ft. to 150 ft., by gangs of about fifteen men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Independence—Walnut to Highland	Material..	$0.68	$0.76	
	Labor.....	1.64	.40	
	Total...	$2.32	$1.16	$3.48

This 1389 lineal feet of track was 106-lb. rail, laid on beam construction, with asphalt paving, but without conduit. The reconstructed track is 106-lb. rail, laid on tie construction with 2162 sq. yd. of asphalt paving and a 6-in. drain tile between tracks. The work was done in stretches of about 50 ft. by gangs of about fifteen men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Main Street—Thirty-third to Westport	Material..	$0.40	$0.95	
	Labor.....	1.21	.46	
	Total...	$1.61	$1.41	$3.02

This 8569 lineal feet of track was and is 80-lb. rail, laid on tie construction with 8818 sq. yd, of asphalt paving. The track was excavated to the bottom of the ties, the battered ends of the rails cut off, new joints applied, and the track resurfaced and paved. The work was continuous and was done by gangs of about thirty men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Walnut Street—Seventh to Eighth Street	Material..	$1.30	$0.82	
	Labor.....	2.62	.32	
	Total...	$3.92	$1.14	$5.06

This 115 lineal feet of track was 141-lb. rail, laid on beam construction, with conduit and asphalt paving. The reconstructed portion is 141-lb. rail, laid on tie construction with 123 sq. yd. of asphalt paving and a 6-in. drain tile under the track. The work was continuous and was done by a gang of twenty men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Grand Avenue—Seventh to Eighth Street	Material..	$0.88	$0.35	
	Labor.....	1.84	.78	
	Total...	$2.72	$1.13	$3.85

This 498 lineal feet of track was 106-lb. rail, laid on beam construction, with conduit and asphalt paving. The reconstructed portion is 106-lb. rail laid on tie construction with 498 sq. yd. of granite paving and a 6-in. drain tile under each track. Considerable old granite was used, on which there was no charge. The work was continuous and was done by a gang of twenty men.

		Cost Per Lineal Foot of Single Track		
		Track	Paving	Total
Troost Avenue—Eighteenth to Thirty-seventh	Material..	$0.65	$0.99	
	Labor.....	2.02	.44	
	Total...	$2.67	$1.43	$4.10

This 6407 lineal feet of track was 106-lb. rail, laid on 50 per cent beam and 50 per cent tie construction, with an asphalt paving. The reconstructed portion is 106-lb. rail, laid on tie construction, with 10,822 sq. yd. of asphalt paving and a 6-in. drain tile under each track. The work was continuous in stretches of from 50 ft. to 300 ft. and was done by twenty men.

Referendum on Federal Regulation

The Philadelphia joint committee on the reasonable regulation of railroads has been notified by Elliot H. Goodwin, general secretary of the Chamber of Commerce of the United States, that the directorate of that body, at its next meeting, will act on the request of the joint committee, made through the Philadelphia Bourse, for an early referendum to determine the attitude of the commercial organizations of the country toward unqualified federal regulation of railroads. Recognizing the impracticability of a referendum on a specific program, the joint committee asks only for a vote on the general principles of the "Philadelphia plan," which was submitted by the Bourse last February and has been circulated throughout the nation by the joint committee. Previous reference to this plan was made in the ELECTRIC RAILWAY JOURNAL of April 29, 1916, page 816.

In a statement issued on Aug. 30 the Philadelphia Bourse contended that any reform program should include, along with centralized regulation and an enlargement of the federal regulatory body, delegation to that body of power to regulate wages and the settlement of wage disputes. "To conceive properly constructive railroad regulation," the Bourse said, "the rate-regulating power should be accompanied by power to regulate questions of expenditures and the requirement that wage disputes be submitted to the same tribunal that controls rates, so that, when necessary, increases in wages may be covered by advances in rates. To expect proper regulation when, in addition to being hampered by conflicting state jurisdictions, the regulatory body has no control over expenditures, is inconsistent and illogical."

The government of Argentina has authorized the Buenos Ayres Western Railway to construct in its own shops, with the assistance of the Great Southern Railway, the coaches required for the company's electric service between the states of Once and Moreno. The Western Railway had originally contracted for these coaches in Germany, but the war naturally involved the cancellation of this contract. British firms were then approached, but had to decline the business owing to pressure of war orders.

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Training School for Safety Scouts*

How to Supplement Safety Lectures in Schools with an Organization Tending to Induce Safety Work on Part of Children Themselves—Results in Tacoma, Wash., Surpass Expectations

By T. N. HENRY

Lecturer on Safety Tacoma Railway & Power Company, Tacoma, Wash., and Puget Sound Traction, Light & Power Company, Seattle, Wash.

THE subject of safety work in schools may be studied with profit in connection with the details of any particular system or plan which with a reasonably fair trial has shown fairly satisfactory results. For this reason I will here confine my attention to the origin, material, devices, working plans and some of the results of the "School Safety Scouts," under which name safety work has been conducted by me in the schools of Tacoma and Seattle during the last year.

The work in Seattle for the Puget Sound Traction, Light & Power Company has been limited thus far to lectures and the distribution of so-called safety-scout literature, while in Tacoma, under promotion by the Tacoma Railway & Power Company, the plan has been fully developed by perfecting, in each of the ward schools, the organization of a pupil safety committee, which is the chief instrument for carrying on the work. The plan having thus been carried further in the Tacoma schools than in those of Seattle, I shall limit this paper largely to a discussion of the work in the Tacoma schools:

*Abstract of paper delivered before convention of Pacific Claim Agents' Association, in Tacoma, Wash., on Aug. 9-11.

WHY THE PLAN WAS INTRODUCED

We had been giving safety lectures in the Tacoma schools which were well received by both pupils and teachers, and which, through the schools, aroused sufficient public interest to create a demand for the lectures on the part of parent-teacher associations and other organizations. We became convinced, however, that the safety lecture, while very necessary as a part of any system of work in this field, should not be the sole reliance for lasting results in safety work with school children. Being necessarily limited to very brief references to a few phases of the question—little more than a mere introduction of the subject—the school safety lecture alone is not an instrument with which to achieve that percentage of efficiency which is in keeping with the standard striven for in modern business.

Thus, since the mere words, illustrations and figures of a single lecture before a school would be soon for-

HOW CAN YOU TELL A GOOD "SAFETY SCOUT"?

IN SCHOOL

1. He KEEPS TO THE RIGHT on walks, in halls, going up and down stairs.
2. He goes up and down stairs ONE STEP AT A TIME.
3. He LOOKS where he runs.
4. He doesn't bully the little fellows.
5. He sees that the little chaps have a fair chance on the playground and that they don't get hurt.

OUT OF SCHOOL

6. He does not play on streets where street cars run.
7. He LOOKS BOTH WAYS in crossing streets and railroad tracks.
8. He LOOKS SHARP for automobiles, wagons and motor cycles when alighting from a street car.
9. He does not loiter around railroad stations or cars.
10. He does not walk on railroad bridges or tracks.
11. He makes the car stop before he gets off or on—the car can wait; but he steps lively.
12. He peeks 'round to see what's coming on the other side (or the other track) when crossing behind a street car. When carrying an umbrella, he peeks 'round that, too.
13. He doesn't hitch on or steal rides on street cars, automobiles or wagons.
14. He never uses his roller skates, his skatemobile or his coaster near street car tracks or where many automobiles run.
15. He does not jump off moving trains, cars or engines, and does not crawl over, under or between cars.
16. He says: "I have no right to take a chance of getting hurt; some one else may have to take the consequences."
17. He looks out for automobiles turning corners.
18. He looks where he goes and keeps to the right.
19. He looks and listens for DANGER SIGNALS and HEEDS them.
20. He says: "Any wire may be a 'live wire.' Don't touch it."
21. He keeps his eyes on a scratched match till he's sure the spark is dead.
22. He never leaves a camp fire till he's dead sure it's out.
23. He doesn't THROW STONES. He knows it's a DANGEROUS and USELESS habit.
24. He tries to do at least one Good Turn for Safety every day.
25. He PLAYS SAFE, as much for the other fellow's sake as for his own.
26. He thinks "Safety First"—not part of the time, but all the time.
27. His motto is: "Better Be Safe Than Sorry."
28. He has the SAFETY HABIT.

NOTE—Many of the best Safety Scouts are Girls.

SCHOOL SAFETY SCOUTS—BASIC RULES USED IN TACOMA

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gotten by a large majority of the children, and since nothing of a concrete nature other than a limited amount of admonitory printed matter was being left in the schools to keep the subject before the minds of the pupils, we believed that to prevent the larger portion of the work from being wholly wasted the initial lecture should be supplemented with something as a "follow-up" that should tend to induce activity on the part of the child himself. This concrete something should be so designed as to appeal to the child's imagination, to furnish scope for his enthusiasm and to supply material upon which to expend his overflowing energies. The child is the true idealist, and the humane side of the safety movement, when presented to him on his own level, makes a strong appeal to the best that is in him, and leads him to act accordingly.

Views to this end were submitted to the company, and authority was granted for the introduction of a plan to supplement the lecture work. The result was the school safety scout system. This plan of organization, formulated by the writer with many valuable suggestions and much helpful advice from H. G. Winsor, superintendent department of accident investigation Tacoma Railway & Power Company, was submitted to City Superintendent W. F. Geiger of the Tacoma schools for his approval early last October. After some changes suggested by him had been made for the purpose of better adjustment to local conditions, the plan was introduced in the schools the latter part of that month. Its distinctive feature—a feature we have so far regarded as unique in school safety work—is that it places the work almost wholly in the hands of the school children themselves and combines safety education and work with a simple and easily administered form of pupil government. The lectures after the introduction of the safety scout plan, while still serving the general purpose of a beginning in safety instruction, became the occasions for the introduction and explanation of the new pupil organization in a way that immediately caught the attention and aroused the interest of a large percentage of the pupils and gave an impetus to the more essential matter of getting them to act for themselves.

Safety Scout Rules Are Basis of Plan

The basis and chief feature of the school safety scout plan is a poster known as "Safety Scout Rules," shown in the accompanying illustration. This poster is headed with the question: "How Can You Tell a Good Safety Scout?" The answer, constituting the body of the poster, is a series of twenty-eight statements as to the conduct of the "good" safety scout in relation to practices, conditions and situations involving danger to human life and limb. The chief end toward which these so-called rules are designed to lead the child is the formation of the safety habit. "Get the safety habit" is one of the principal slogans of the school safety scouts.

In connection with the lectures in the schools we have had the cordial co-operation of the school principals and teachers, and by reason of this have had no difficulty in securing such grouping of the children as has generally given us an audience whose ability to comprehend has been not far from uniform. That is to say, each group addressed was usually made up of not more than three contiguous grades, more often of two only, and in some of the largest schools the ideal condition of one grade has been presented, thus giving the lecturer an opportunity to adapt the talks to the age and comprehension of almost every one of the group.

As a feature of every lecture, whether given before a class of kindergarteners or to a high school group, a rehearsal in concert of various safety slogans suggested by the safety scout rules was given in true class yell style with the lecturer acting as yell leader. "Get the safety habit," "Better be safe than sorry," "Be careful all the time, everywhere—use your eyes and ears," "Look both ways," "Stop, look, listen," "Any wire may be a live wire—don't touch it," are some of the slogans or safety scout yells which have echoed through every ward school in Tacoma during the last school year and through a large number of those of Seattle.

Our safety scout organization for an individual school, as carried out in the schools of Tacoma, is composed of a safety committee consisting of two pupils, one boy and one girl, from each room, plus a safety scout master, to be appointed by the principal from one or the other of the highest two grades in the building. This provides a committee of from eleven to twenty-seven members, depending upon the number of rooms in the school. The work of this committee, consisting of recruiting, conducting examinations, checking on conduct of would-be safety scouts, inspection, patroling, etc., is carried on by sub-committees, the results of whose work are made matters of record by the secretary of the general committee under the direction of the safety scout master and the advice of the school principal. The complete rules and regulations governing the formation and activities of the safety scouts and their committees are contained in a folder formulated by the author of this paper. This folder is signed by Mr. Winsor for the Tacoma Railway & Power Company and is approved by the superintendent of schools.

Prizes Awarded for Individual Excellence

In formulating the plan it was deemed essential that a number of awards for excellence in safety work be provided. These awards are of two general classes: (1) Those designed for individual pupils, and (2) those intended for classes, grades or rooms and for schools.

The awards for individuals are:

1. The safety scout button of white and green enamel with gold letters and bands, a white cross on a green ground encircled by a white enamel band bearing the words "Safety Scout" in gold letters, and

2. The official council or safety scout commission. This latter is issued by the Tacoma branch of the National Safety Council, signed by its president and secretary and, in approval, by the city superintendent of schools.

The safety scout button was designed by a Tacoma school boy in response to the offer of a cash prize by Mr. Winsor through the city superintendent of schools. The offer resulted in a large number of designs being submitted by both grammar grade and high school pupils. This, occurring as it did in the early stages of the work, served the important purpose of arousing interest and of giving to the movement a local coloring and significance highly gratifying to the children.

The official safety scout commission was also designed as a part of the local plan. As will be noted from the accompanying illustration, it is addressed to the recipient in the second person in order to obtain a more personal touch.

To win the safety scout button, and thus achieve full rank as a safety scout, it is necessary for the pupil (1) to memorize paragraphs 6 to 25 inclusive of the safety scout rules poster; (2) to recite these without error before the pupil sub-committee on examination, and (3) under the eyes of committee-member inspectors, to show excellence in living up to all safety scout rules for a period of at least two months. At all times it is sought to impress on the mind of the aspirant to this honor that the button worn by a safety scout is an

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expression of his school's confidence in him and its certificate to the public that the wearer can be depended on to observe safety rules, not only for his own sake but for that of others.

The official safety scout commission is awarded to each of the two pupils in each room throughout the schools who are adjudged by their own organization to have made the best record in the observance of safety scout rules and in reporting to the safety scout master on dangerous practices and conditions. A special attraction is given to this commission by reason of the fact that it confers upon the winner the privilege of being the guest of the Tacoma Railway & Power Company at the annual safety scout picnic.

COUNCIL SAFETY SCOUT
COMMISSION

To....., Safety Scout, ...

School, Tacoma, Washington:

GREETING:—Whereas, you have been officially adjudged to have shown

THE HIGHEST DEGREE OF EXCELLENCE

in personally living up to "Safety Scout Rules" and in watchfulness for and reporting upon dangerous practices and conditions,

Now, Therefore,

THE NATIONAL SAFETY COUNCIL
Local No. 23, Tacoma, Washington

By its President and Secretary, as an expression of its confidence in you and of its approval of your conduct, hereby commissions you as a

COUNCIL SAFETY SCOUT

to aid this Council in its work of promoting safety and to do all things consistent with its plan of attaining such end, and it pledges you the advice and co-operation of its members in all matters relating to ways and means of preventing accidents.

.....
President.

.....
Secretary.

Approved by

.....
Superintendent Tacoma Schools

SCHOOL SAFETY SCOUTS—OFFICIAL SAFETY SCOUT COMMISSION ISSUED FOR BEST RECORDS

AWARDS FOR GROUP ACHIEVEMENTS

The awards provided for groups and for schools are as follows: 1. A safety pennant for each room wherein at least three pupils win the safety scout button. 2. A standard silk or bunting United Sates flag for the school in which the largest percentage of pupils win the safety scout button. Basing this award on the percentage of pupils successfully passing the tests gives the smallest school an equal chance with the largest.

To each room of each school's primary department, covering the first three grades or years, a safety pennant was presented this year regardless of the number of pupils therein winning buttons. As a result of this the children in 112 primary rooms participated in an equal number of little ceremonials involving the presentation of the pennant on behalf of the company and its acceptance by the teacher. The presentation of the pennants to rooms or classes entitled to them by reason of success in winning the required number of buttons was also made the occasion of a similar brief ceremony with the safety lecturer representing the company in presentation and the teacher speaking for the school in acceptance. Eighty-one rooms won safety pennants under this provision.

The school winning the flag did so with a record of 36 per cent of its pupils becoming winners of the safety scout button. The presentation and acceptance of this flag was made an occasion of interest in all the schools of the city by reason of the fact that the safety scout masters from other schools had places on the platform with their various school pennants and colors as invited guests of the winning school. A large number of patrons and friends of the school were present, and addresses were made on behalf of the schools, the parent-teacher association and the company, whose representative made the presentation address. This ceremony being held at a time (June 15) when the flag, patriotism and "Americanism" were ever-present topics of public speech and print, the event was made the occasion for emphasizing a number of the duties of good citizenship, among which all the speakers included that of aiding the safety movement by becoming good safety scouts and inducing others to do so.

THE CULMINATING EVENT OF THE YEAR—THE PICNIC

One thousand three hundred forty-seven pupils achieved full safety scout honors by meeting successfully the tests provided by the rules for winning the safety scout button. Three hundred and twelve of these, representing all of the twenty-one schools organized, were adjudged by the various safety committees to have qualified for the official safety scout commission. These, in company with a number of teachers from their respective schools, participated as guests of the company in what the pupils came to regard as the grand culminating even of the safety scout year, the first annual excursion and picnic of the Tacoma school safety scouts.

This excursion and picnic was given on Saturday, June 10, one week before the closing of the schools for the summer vacation, that date being chosen in preference to one after the beginning of vacation, for the reason that in the latter case many of the teachers would be out of the city.

For the purpose of the picnic free transportation was provided for the commission scouts and the accompanying teachers, this being delivered to the principals of the various schools previous to the date of the excursion. A common meeting point was designated at which the picnickers were to take the special cars provided for the occasion, and the happy 312 boys and girls, the flower of Tacoma's little army of soldiers of the common good, with a representation of the teaching corps from each school, indicated on that June morning that they regard punctuality as a safety rule.

The place of outing was the company's beautiful and spacious park at Spannaway Lake, the terminus of one of its suburban lines. A substantial luncheon with an abundance of ice cream and lemonade was served free by the company's extemporized commissary department, and an elaborate program of amusements and sports was provided. This latter was under the direction of the supervisor of physical training and hygiene of the city schools, assisted by a number of school principals and high school students.

An impressive feature of the day's program was the public presentation of each safety scout commission by a member of the city board of education. These were done up after the fashion of school diplomas and tied with green ribbon, and it is certain that no members of a school's graduating class ever received their diplo-

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mas with more apparent pride and gratification than did these safety scouts.

ORGANIZING THE SAFETY SCOUT LEAGUE

After the organizations in the several schools had been well established and large numbers of the children had become familiar with and interested in the plan and scope of the work, a safety scout masters' convention was held in the school administration building. At this "The Tacoma School Safety Scout League" was organized by the adoption of a constitution and by-laws providing for the usual list of officers and among other things for a membership of five (chiefly ex-officio) from each school and an ex-officio advisory council consisting of (1) the city superintendent of schools, (2) the commissioner of public safety of the city of Tacoma, (3) the president of the Tacoma Chamber of Commerce, (4) the secretary of the Tacoma branch of the National Safety Council, (5) the president of the Tacoma Labor Council, (6) the president of the Tacoma Automobile Club, (7) the supervisor of physical training and hygiene of the Tacoma schools, and (8) the safety lecturer of the Tacoma Railway & Power Company.

A part of the paragraph setting forth the objects of this central organization reads as follows: "(2) To exchange ideas and information relative to methods of carrying on the work of our school safety committees;

"(4) To unite all the girls and boys of the Tacoma schools for the purpose of interesting all citizens in safety scout rules;

"(5) To seek the advice and counsel of other organizations and persons interested in safety work."

Thus the safety organizations in the various schools of the city provided themselves with a clearing house for ideas pertaining to their particular line of work corresponding in its relationship and functions to the National Safety Council in its relation to the safety organizations of the mills, factories and transportation companies of the country at large.

RESULTS HAVE SURPASSED EXPECTATIONS

It is gratifying to be able to state as a general observation that this company's campaign during the last year in school safety work under the plan herein described has surpassed all expectations in what it deems good results. It has not only enlisted the active and enthusiastic interest of a larger percentage of the school children than was expected, but it has induced a keen interest in safety measures on the part of the many parents who heretofore have given the subject practically no thought, and it has attracted the favorable attention of the public generally.

A very potent element in the work of interesting the public in the movement has, of course, been the support of the newspapers in the way of news reports of these activities in the schools. The 15,000 school children of Tacoma, however, carrying their safety slogans into every home in the city, and in thousands of cases constituting themselves the advisers and protectors of other members of the family, afforded a means of effective publicity not second even to the newspapers. Moreover, an indispensable element of success in the safety work was the co-operation of the school officials and teachers. This we had in both Tacoma and Seattle. In Tacoma Superintendent Geiger was found to be deeply and actively interested in all manner of safety measures and in the movement generally. He gave a ready hearing to our initial proposal, invited the presentation and discussion of the plan before meetings of his ward school principals, and subsequently through official bulletins lent approval and encouragement to the work by urging principals and teachers to co-operate with us. The principals and teachers, with a cordiality showing their right appreciation of the great humane problem involved, gave in full measure the needed support.

PRINCIPALS TESTIFY TO VALUE OF PLAN

At the close of the year's work I addressed a letter to the principal of each of the twenty-one schools organized, asking for an estimate of the work and its influence upon the pupils. The replies need no comment to make it clear that the safety scout movement has become a potent factor in the work of solving the safety problem of Tacoma.

The principal of one of the largest schools, a man of long and successful educational experience, says:

"The influence upon the habits of pupils has been noticeable in many ways. Pupils do not take chances as they did before. One boy discovered a live wire on one of the city light poles and promptly reported it. Other boys have reported broken sidewalks in various parts of the district. Both boys and girls report promptly reckless driving by automobiles, frequently giving the number of the machine. The influence on the school as a whole has been marked. Formerly larger boys often promoted 'fights' among the little fellows. Now every scout feels that he is a special officer to prevent such. The parents whose children attend the school are pleased with the movement, and in many cases give active co-operation. Your plan of organization is a good one, and can be adapted to fit the conditions peculiar to any school."

The head of another large school says:

"In a general way it has set the reckless child to thinking more of his acts in their relationship to the school as a whole and to the rights of others."

Another states:

"Our safety scout organization has been a live, helpful agency in this school. To a large extent this body has helped in inspiring a wholesome respect for safety first ideals."

A principal whose school shows a record of two rooms in which every pupil qualified for a safety scout button and a total of 142 button winners for the school, states:

"Pupils have been more careful, not only at school but on the streets and elsewhere. They have been on the lookout for dangerous places, hanging wires, defective sidewalks, etc."

A lady principal, referring to conditions in her school after the work had been well started, remarks:

"A spirit of caution seemed to spread through the school. Teachers and principal began to realize that the responsibility of seeing that dangerous practices were avoided was being shared by a large number of the pupils."

The fact that this plan of organization, or any similar plan, offers itself to the teacher as an instrument for working out incidentally problems of discipline and arouses in the child an interest that is in harmony with the teacher's aims in this connection, will win for it the active support of the earnest teacher who becomes familiar with its workings.

There are now 1347 boys and girls in the city of Tacoma, ranging in age from ten to seventeen years, each proudly wearing the badge of a safety scout. Here are 1347 missionaries for the cause of safety; 1347 potential citizens with childhood's idealism unspoiled enlisted with abundant enthusiasm to spread the gospel of caution and carefulness. We are confident that the work has been well worth the doing and that the seed sown in so propitious a soil will produce a harvest in ample compensation for the effort and expense put forth in the work of opening the field and the labor of sowing.

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Cast in "Care Cure," a Musical Comedy, Presented by Milwaukee Electric Railway & Light Company Employees

Co-operative Activities of Railway Employees

Bert Hall, Welfare Secretary of The Milwaukee Electric Railway & Light Company, Describes Welfare Work of Public Utilities in General and That of the Milwaukee Company in Particular

IT is an indisputable fact that any co-operative activity which promotes the health, happiness and well-being of a large number of persons living in a community will react upon that community in a beneficial way. That electric railways are alive to the value of mutual benefit and welfare associations is shown by the number of such associations that have been formed within the last few years. Among the most successful of these has been the Employees' Mutual Benefit Association, organized four years ago among the employees of the Milwaukee Electric Railway & Light Company and associated companies.

In a paper delivered before the local company section of the American Electric Railway Association on May 25, 1916, Bert Hall, welfare secretary of the company and chairman of the section committee on co-operative activities, explained the plan and scope of the above-mentioned work. He also gave the results of certain investigations conducted by his committee into the operation of welfare work elsewhere. In preparing his paper Mr. Hall had assumed that what the employees desired was a discussion of those co-operative activities embraced in the general term "welfare," and which are designed not only to promote the welfare of employees, but also that of all others concerned in a great business enterprise.

The Local Association

The Employees' Mutual Benefit Association of The Milwaukee Electric Railway & Light Company was organized in 1912 primarily for the purpose of creating, managing and distributing a fund to provide free medical assistance for members incapacitated for work by sickness or accident when not within and subject to the provisions of the workmen's compensation act. The association has become a most efficient machine for conserving the health of those who work for the company and for caring for their dependents whenever disease or accident necessitates medical or surgical care. Its greatest field of usefulness has not been the payment of sick benefit or death claims, but rather the conservation of the health of its members. Through the opening of doctors' offices at the places of employment, it has been possible to reduce the amount of time lost on account of sickness by fully one-third, making a total annual saving of more than 10,000 work days annually.

What Other Companies Are Doing

During an investigation made by the committee of which Mr. Hall was chairman it was found that seventy-nine of the leading street railway and electric light companies of the United States conduct welfare work, which provides either life insurance or sickness and accident insurance, or both, through various agencies. Seventy-one companies do this through employees' mutual benefit associations which will be described later, five have additional benefits similar to those provided by the association of The Milwaukee Electric Railway & Light Company, in the form of insurance. Certain other companies provide life insurance policies for employees, the company paying the entire premium for a blanket policy covering all of its employees, in which case insurance ceases with employment by the company.

These mutual benefit associations group themselves naturally into four distinct classes, as follows:

Associations in which the members pay a certain

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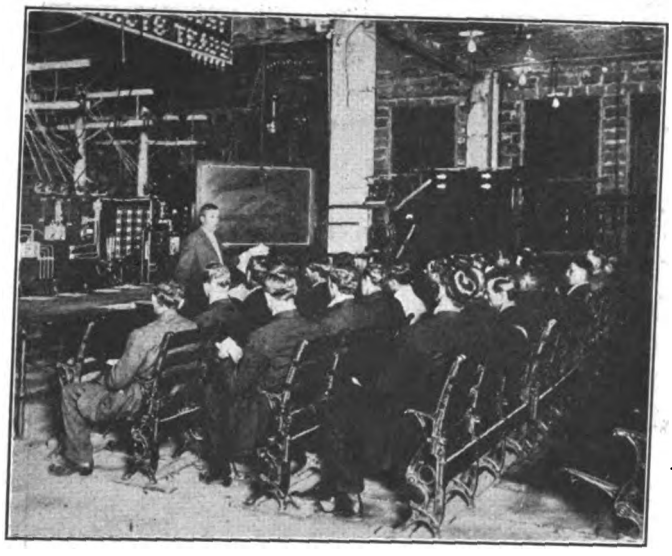


SCHOOL FOR LINEMEN, MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

amount of dues and to which the company contributes to some extent.

Associations in which the membership is divided into classes according to salaries received. In a typical case of this kind the dues range from 30 cents to 90 cents per month, the benefits from $7 to $12.50 per week, and the death benefit from $300 to $600.

Associations to the funds of which the individual members contribute nothing, the entire expense of sick benefits and death benefits being borne by the employing company.

Associations maintained entirely by employees, and to which the employing company contributes nothing in the way of money, but may contribute to rental of quarters and some clerical help.

By far the largest number of the associations maintained by electric railways or electric railway employees belong to the first class. Only one of the large companies of the country operates under the second type of association, and two large corporations operate under the third form. The fourth form, that in which the association is maintained and operated by the employees, seems to be the least popular, as the employees appear not to have sufficient confidence in this type of organization to warrant them in joining it. In one large company having an association of this type only 30 per cent of the employees are members of the mutual benefit association.

As welfare of this kind has been conducted by some of the companies for the past fifteen years, and as from reports it is plain that no standardization of practices has been reached, it would seem that a committee on employees' welfare of the national association might well take up this matter, sifting out from the various types of associations those which seem to have produced the best results, and recommending more uniform adherence to the best practice.

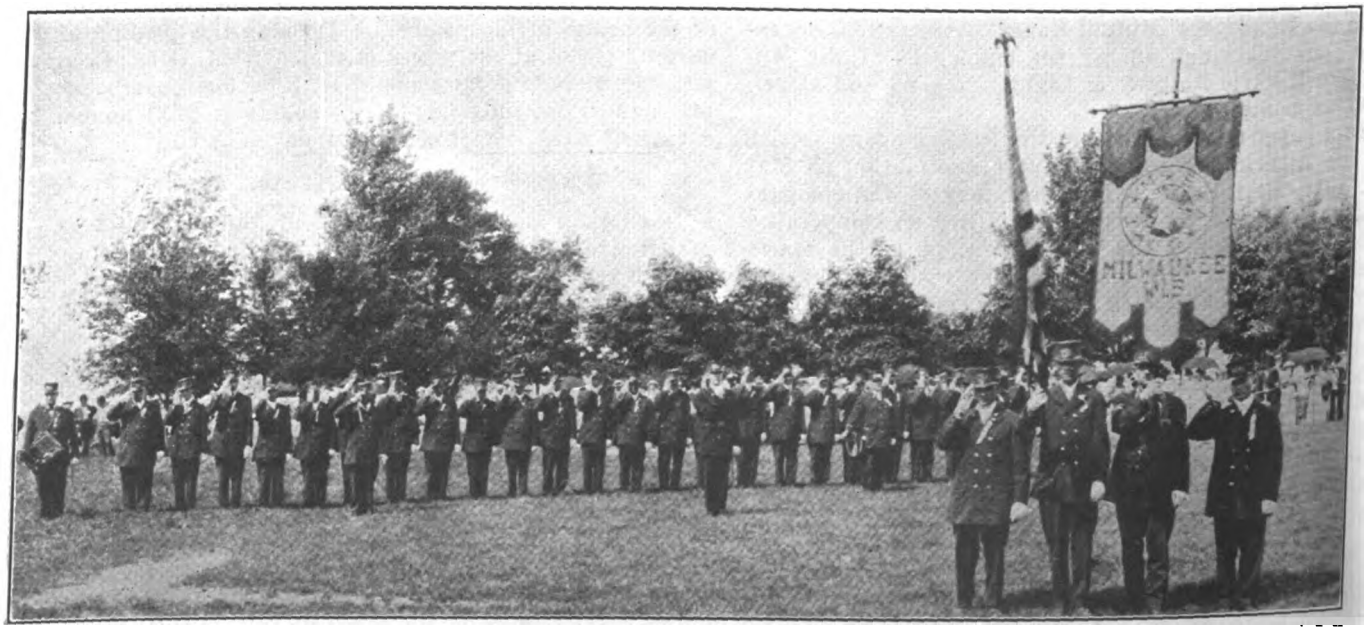
WOMEN'S RELIEF WORK

Apparently not more than four or five companies employ visiting nurses to assist in caring for those who are sick, nor are there many associations which have well-organized visiting committees, whose duty it is to give assistance to those who are sick or injured, in addition to the relief afforded by the medical department.

In the work of caring for those who are sick, the women's auxiliary of the Milwaukee association has proved extremely helpful. It was organized during the past year, and has been of great assistance in those cases where the regular benefit provided by the association does not completely meet the requirements of the case. It provides for the household duties and the taking care of small children in cases where the mother of a family has been sick for a long time, where the finances of the family will not permit of the hiring of help, and where there is no relative who can step in to perform these duties. Through this agency a number of poor families have been provided with Christmas cheer, and it has also been very helpful in providing social recreation.

EDUCATIONAL AND RECREATIONAL WORK OF THE LOCAL ASSOCIATION

Among the educational features of the association's work a branch of the public library has been established in the Public Service Building; company sections of the American Electric Railway Association and the National Electric Light Association have been organized, and regular departmental schools have been founded. The annual report shows that the total attendance at the departmental educational classes during the year 1915 was 15,529 persons. During the past year the educational and social auxiliary of the association has played an important part in giving to employees an opportunity to hear lectures on timely topics of high educational



DRILL TEAM EMPLOYEES' MUTUAL BENEFIT ASSOCIATION, MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

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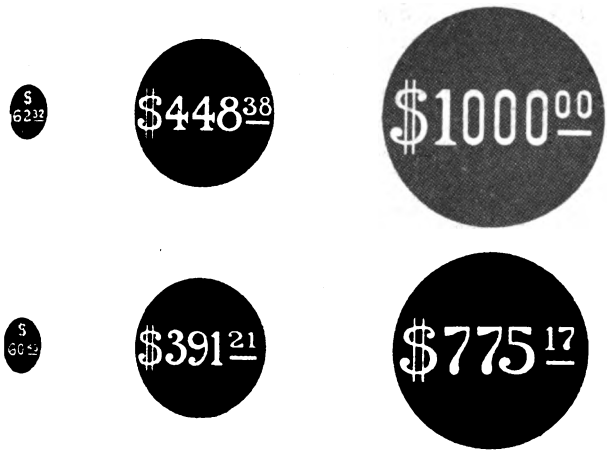
value. These included travel talks on Mexico and on the great cities of Germany, the experiences of an ambulance driver during the European war, and lectures on South America and the American Indians.

That wholesome recreation is considered important by the officers of the Milwaukee association is evident from the wide field covered by its recreational activities. During the winter months these take the form of dances and musical and dramatic entertainments, pool playing, indoor baseball and bowling. These activities are in charge of committees of the benefit association, which have done their work exceedingly well, and all of the various events have been well attended.



THRIFT DIAGRAM USED IN MILWAUKEE WELFARE WORK

Shows results of laying aside $5 per month; upper figures in building and loan association, lower ones in savings bank at 3 per cent interest, after one year and half and full maturity of shares respectively

PROVIDENT FUNDS

Very few companies were found to be doing any systematic work to promote thrift among employees. The employees' mutual savings, building and other associations of the Milwaukee company stand out as conspicuous examples of this kind of co-operative work. The opportunity which they give to a thrifty family to lay aside something for a rainy day, and the readiness with which the employees of the company have taken stock stamp this as one of the most beneficial of the several forms of the company's work. Four or five other electric railway companies have arranged to loan money to employees temporarily in need due to sickness or death in their families. The general custom is to charge interest on the money loaned.

The Milwaukee Electric Railway & Light Company has made provision for such emergencies, but makes no interest charge. Since the benefit association has extended its scope to provide medical attention for the wives and dependent children of its members the necessity for making such loans has been greatly reduced. Since Jan. 1, 1916, the association medical staff has made 2852 calls on dependents, and has performed fifty surgical operations which would otherwise have cost employees $4,561.

The value of such work as this as a provision for circumventing the notorious loan shark is very evident. Such a fund, however, needs to be administered with great care because there are sure to be some in a large body of workers who will attempt to take improper advantage of it and to ask for loans for very frivolous reasons. The Milwaukee Electric Railway & Light Company carefully scrutinizes all applications for loans, making a thorough investigation as to the necessity in each case, to insure the fund against unnecessary drains and preserve it intact for the benefit of those who are deserving and are in real need of assistance. Otherwise it would be easy to convert such a fund into a menace rather than into a help to the employees.

PENSIONS

The section committee found only six railway companies which provide pensions for employees who have become incapacitated for work through age, sickness or accident. The rules governing the granting of pensions by these companies fix the age of retirement at about sixty-five years, and the duration of service at from twenty to twenty-five years. The minimum retiring age appears to be sixty years, and the duration of service fifteen years, these being the limits set by The Milwaukee Electric Railway & Light Company. In this regard the company is in advance not only of other street railway and electric lighting companies, but also of the several departments of the city government of Milwaukee. The city pension system involves liberal contributions from the wages of policemen, firemen and school teachers, and much longer periods of service.

THRIFT DIAGRAM USED IN MILWAUKEE WELFARE WORK

Shows possible financial history of employee between 21 and 60 years of age; initial capital $120

WORK OF THE SECRETARY OF THE ASSOCIATION

Considerable general welfare work is performed through the office of the secretary of the benefit association of the Milwaukee company. During the first three months of 1916 there were 863 calls made at the secretary's office by persons who needed help in solving their problems, and he made ninety-eight calls outside of the office for the purpose of giving such help. The calls made outside of the office in cases of sickness and death, and in making investigations relative to troubles of employees, numbered 1018, which added to the other outside calls mentioned made a total of 1881, an average of about twenty-one calls per day. The demands on the secretary's time have increased to such an extent that it has become important for all departments to cooperate closely with him to eliminate useless calls, for example, by prompt reporting of recovery from sickness or accident and of the removal of patients to the hospital.

In conclusion, Mr. Hall summarizes the ideals of welfare work about as follows: The very best that industrial life owes to any individual under ideal conditions is steady employment from which he may earn a living for himself and for his family at work which is congenial to himself and useful to the rest of the world; an opportunity to rise to higher and higher places of responsibility commensurate with his ability and industry; an income sufficient to admit of his laying up of a fair part, large enough to care for him in sickness or old age, and provision that his work shall be wholesomely interspersed with periods of rest and recreation.

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Six-Cent Fare Disallowed for Bay State

Massachusetts Public Service Commission Sanctions Higher Rates for Country Lines of Bay State Street Railway but Retains Existing 5-Cent Fare for Principal Cities—Tells How to Secure More Revenue Through Increased Efficiency and Larger Co-operation on Part of Public

ON Aug. 31 the Massachusetts Public Service Commission handed down a decision, which is abstracted below, ordering the Bay State Street Railway, Boston, Mass., to cancel the proposed schedule of increased fares which has been before the board since Sept. 7, 1915. A preliminary notice of this decision was published in the ELECTRIC RAILWAY JOURNAL of Sept. 2. In brief, the changes proposed by the company were: (1) A general increase in the unit cash fare upon all lines from 5 cents to 6 cents; (2) an increase in certain local fares from 5 cents to 8 cents; (3) the sale of nine tickets for 50 cents, each ticket good for a single cash fare in certain city districts; (4) the modification of certain existing fare zones; (5) the modification of certain transfer privileges, and (6) the withdrawal of all existing reduced-fare tickets other than half-fare tickets required by law for school-children. The company estimated, on the basis of its operations in the fiscal year 1914, that these changes would yield an increase of nearly $1,250,000 or about 14.5 per cent in passenger revenue. This estimate assumed traffic losses on the various lines, due to the increased fares, ranging from 5 to 20 per cent and a 60 per cent use of tickets in the city districts.

On June 30, 1914, the company operated 951 miles of single track and owned 897 miles in Massachusetts. The total area served was 1528.6 square miles and the average population per square mile 873.8. The system furnishes a composite of city and country service. The company is the successor of sixty-three street railways which have been consolidated. Practically all the common stock is held by the Massachusetts Electric Companies, an unincorporated association, but a relatively small amount of preferred stock outstanding is held by the public.

FRANCHISE CANNOT RESTRICT FARES

In many instances the locations in public ways which the Bay State company now holds were originally granted to predecessor companies on condition that the fare charged for any ride within certain limits should not exceed 5 cents. In the Middlesex & Boston case (2 Rep. P.S.C. 105) the commission ruled that such conditions are not valid as against the rate-making power vested in the board by the public service act. This has recently been affirmed by the Supreme Court of Massachusetts in Board of Survey of Arlington vs. Bay State Street Railway, decided June 21, 1916. The legal right of the commission to permit a fare increase, notwithstanding the terms of local franchise grants, is thus clearly established. The commission holds that even in the cases of Lowell and Fall River, whereby certain fare limitations were established by direct legislative enactment, the board's power to act is not affected.

REVENUE NEEDED FOR A 7 PER CENT RETURN

The company claimed that it is justly entitled to a fare increase because its revenues are insufficient to pay operating expenses and taxes, provide for depreciation and yield a reasonable return upon the investment. The total investment claimed by the company was $42,987,405 (including $1,424,097 working capital). The company urged that it needed $1,578,648 additional yearly revenue to pay a 7 per cent return upon the above investment and meet operating expenses and fixed charges, the total revenue for 1914 (fiscal year) being but $9,092,077. The total revenue needed was made up of the following items: Variable expenses, $5,993,505; taxes, $604,957; depreciation in addition to present maintenance charges, $1,063,145; interest on investment, $3,009,118; total, $10,670,725.

The decision reviews at length the inventory of Sloan, Huddle, Feustel & Freeman, consulting engineers for the company, which established $41,563,308 as the total original cost of the property on Nov. 1, 1914. The addition of working capital to this gave the total investment of $42,987,405. The total outstanding capitalization of the company in 1914 was $49,431,500, composed of common stock, $21,035,900; preferred stock, $2,748,600; funded debt, $23,747,000, and unfunded debt, $1,900,000. The difference between the engineers' estimate of the investment and the total capitalization is $6,444,095. The capitalization in part represented discount on bonds amounting to $1,251,010 and replacements in suspense amounting to about $750,000. Premiums amounting to $1,414,680 were paid in at various times on new stock issues.

COMMISSION CRITICIZES THE INVENTORY

In the opinion of the commission, the method of determining original cost used by the company experts creates an impression of accuracy which is not wholly warranted. Ties, ballast, building foundations and other items are in whole or in part buried in the ground. Nor can the amount of street grading when the track was originally laid be determined with accuracy by present inspection. Information in regard to these matters the engineers were forced to obtain from the imperfect records of the company, supplemented by statements of its officers. The same difficulty was experienced in determining property ages, and even less accuracy was possible in the case of unit prices in earlier years. The difficulty was enhanced by the fact that the promoters of many of the original roads were at the same time their builders, doing the work under contracts which were largely a matter of form. Without disparaging the work of the engineers, the commission holds that it calls not infrequently for the drawing of general conclusions from fragmentary evidence.

Much difficulty was experienced in checking the unit prices which were used. The results of the investigation, however, tended on the whole to check the unit prices used, although they showed the somewhat speculative character of many of the prices and the meagerness of the data upon which it was at times necessary to base conclusions. The chief engineer of the commission, H. W. Hayes, estimated a net reduction of about $600,000 in the total estimate of original cost. No criticism is intended by the commission of the work of the engineers, for it is doubtful if more satisfactory evidence could be obtained. So far as the evidence relates to prices for labor and materials within the last

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ten years, the records are fairly complete, and the company has, the board feels, in general sustained the burden of proof. On the facts before the commission, the same must be said of all the prices of land, cars, car and power station equipment. The data in regard to buildings and paving, also, are detailed, and have not been challenged by the remonstrants. The best judgment of the commission is that the company's engineers did not attach sufficient weight to the low labor and material costs prevailing in the nineties, or to the imperfect and cheap character of street railway construction during that period.

Overhead Charges Held to Be Excessive

Of the total investment value of $41,563,308 estimated by the company's engineers, $4,721,674 covers overhead charges. These average 12.74 per cent of the direct property cost and are assigned by the company as follows: Engineering and superintendence, 3.68 per cent; interest during construction, 2.23 per cent; taxes during construction, 0.12 per cent; insurance during construction, 0.48 per cent; organization and legal expenses, 3 per cent, and contingencies, 3.23 per cent.

The commission points out that the above percentages are based not upon records, but upon judgment. A considerable number of these costs were incurred during the construction of the constituent companies and were outstanding capital obligations at the time of the consolidations. As a test of overhead expenses in earlier construction, the commission's accountants selected at random from the board's files thirty appraisals or estimates submitted in capitalization cases from 1890 to 1900. In these appraisals no overhead charges were noted save engineering and superintendence in the cases of roadbed, track and overhead system. These amounted on the average to 2.19 per cent of the total cost of these property items.

The commission realizes that much overhead expense in the past and even recently has not been segregated in the records, but it believes that the company has failed to sustain the burden of proof in this matter and that its estimate considerably exceeds the reality. The present Bay State system has grown slowly and a large portion of its cost represents additions and improvements to already existing property, a fact which has tended to lessen interest during construction. Much of the engineering and superintendence, especially in the past, has probably been supplied by officers whose salaries were charged to operation, and this is no doubt true of other overhead expense. The item of contingencies the commission believes has been considerably overestimated. In this case, therefore, the commission finds that 8 per cent is a liberal allowance for overhead charges. Assuming that the engineers of the company overestimated the direct cost of the property by $600,000, the total estimate for overhead expense on this 8 per cent basis is $2,899,330, instead of $4,721,674.

Working Capital and Revised Original Cost

The company allowed $1,424,097 for working capital, defined as cash on hand and money invested in stores and supplies, the figure used being based on the average of these items during the past five years. The remonstrants urged that no such amount is needed or should be allowed as a part of the investment, emphasizing the point that the company collects its income more frequently than it pays its bills. The commission points out that in 1909 its predecessor, the Massachusetts Railroad Commission, authorized the Boston & Northern and Old Colony companies (now the Bay State) to issue securities to supply $1,141,375 working capital, and therefore sets this standard for the present case.

Making the above revisions, the commission has set the fair original cost of the existing tangible property in Massachusetts, including working capital, at $40,282,340. The commission figures that $39,104,340 represents the amount which must be used as the basis of fixing passenger fares in Massachusetts, after taking out $600,000 on unit prices; $1,822,343 on overhead charges; $282,722 on working capital; $293,000 on unused property and $885,000 on property leased to the Boston Elevated Railway.

Claims for Intangible Values

No evidence was introduced by the company to substantiate its claim of intangible property, but claims were made for reward for promoters' services, the cost of securing money and the cost of the development of the plant. The first claim is that a certain amount of over-capitalization was necessary in order adequately to reward promoters and that initiative for the future will be destroyed unless capital allowance for such services in the past is taken into account. Such evidence as the commission has in regard to "water" in the Bay State capitalization indicates that it was injected largely during the process of electrifying roads which had long since passed the promoters' stage. In the main, the promoters of the newer enterprises seem to have sought their reward in the shape of construction contracts, and it is probable that they also reaped additional profit from enhancement of land values. There is no evidence, the commission states, in the records of capitalization cases in the past that issues of securities were either allowed or sought to have commissions for bankers.

Regarding development charges, the commission concedes that a reasonable opportunity should be given to spread the loss over the earnings of succeeding years, but such a policy cannot be continued indefinitely. Electrification took place over twenty years ago and the process of consolidation more than ten years ago. No doubt much property was abandoned in the process of electrification, but the amount has been exaggerated. In the absence, at least, of tangible evidence in regard to the amount, character and time of abandonment of property, the commission is of the opinion that no allowance for such property should be made.

Indirectly, a claim for land appreciation was made even prior to the filing of the brief of the company, the appreciation amounting to $648,502. Later, at the request of the board, the cost figures were substituted. Car riders, however, cannot be expected to pay higher fares because land has increased in value, nor ought they to pay lower fares if it should decrease. Even if the doctrine of present worth were accepted, the figure to be used in rate-making would clearly be present worth for street railway purposes, and in this case no evidence has been submitted that the land has increased in value for such purposes.

The remonstrants claimed that the original cost estimate includes all the existing property, whereas a substantial portion was paid for out of income and therefore not invested by either stockholders or creditors. Under the looser methods of bookkeeping which have prevailed in the past, capital expenditures could be concealed by including them in operating expenses with the maintenance charges. In the sixteen years in which the Massachusetts Electric Companies have controlled the Bay State system, however, the evidence points to no such padding of the maintenance accounts. The tendency has been to capitalize expenditures wherever possible and to distribute the maximum possible dividends.

The commission does not feel that the theory

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of the remonstrants can be applied to the Bay State company, in view of the history of the property.

DEPRECIATION AND DIVIDENDS

The commission rules that in determining the revenues to which the company is entitled, allowance should be made for an amount equal to a fair return upon all the capital honestly and prudently invested, without deducting accrued depreciation. Upon the basis of the Feustel figures the property had depreciated 31.1 per cent, representing about $12,000,000, but the company claimed that insufficient earnings have been received to enable it to make proper provision for depreciation. In making the above ruling, however, the commission states that it must not be understood as deciding that the company can, if it earns the amount to which it is entitled, properly pay dividends before the depreciation and other deficits from past operation are made good. In the Blue Hill case (3 P.S.C. Rep. 75) no dividends whatever had been paid by the company, and no deduction was made for depreciation in estimating the fair basis of return.

A more difficult question arises in the case of a company which has paid dividends and which has neglected to provide adequately for depreciation. It is doubtless true, the commission feels, that it would not now be regarded as sound business practice for a public utility to pay any dividend whatever at the expense of adequate provision for depreciation, but in dealing with the past transactions of street railways it would in many cases work injustice if the rule were inflexibly applied that a company which has failed to make adequate provision for depreciation ought to have paid no dividends whatever. The average dividend paid by the Bay State and its predecessors from 1862 to 1900 was 4.07 per cent. Even if the amount of excessive capitalization is eliminated and the return is figured on the actual legitimate investment, the dividends paid by the company in the past average less than a fair return upon the money actually put into the property.

During the time when these dividends were being paid no attempt whatever was made, the commission states, to provide for future depreciation by creating a reserve until the regulations of the Interstate Commerce Commission, two years ago, made it necessary to set aside something for depreciation on rolling stock. President Sullivan testified that he realized when he took up the management of the system in 1899 that in future years the amounts necessary for renewals would increase sharply, but he and his associates considered it sound policy to make renewals when necessary and relied upon the future increase of revenue to cover all contingencies.

The Bay State system is made up of a large number of city, suburban and interurban lines, some of which were nearly forty years old at the time of consolidation. There may have seemed at the time some justification for the view that the property had reached a condition where the renewal requirements of successive years would not vary greatly in amount, or at any rate, would not increase more rapidly than the growth of traffic. Under the circumstances, the Bay State company should not be criticized too severely for adopting a policy which was in conformity with the prevailing standards. The dividends paid have not been large, and under the Massachusetts laws a company which is not paying dividends finds it difficult to finance its needs. Nevertheless, the commission holds that the company should cease paying dividends on its common stock until current repairs and renewals have been completed, with the replacement of obsolete equipment. While this ruling may seem harsh to stockholders who have at best received only a moderate return, the board is convince that it is not only in the general public interest but i the interest of the investors that a larger portion o the earnings shall be put back into the property.

In determining the depreciation provision the engi neers of the company first eliminated all property, such as land, which does not require eventual replacement All overhead charges were considered depreciable except those for organization and taxes during construction. The board concludes that half the annual depreciation allowance should be estimated on the straight-line basis and half on the sinking fund basis, instead of on the all straight-line plan, as figured by the company. The commission finds that $1,044,374 may be properly allowed for depreciation annually.

DISCUSSION OF FAIR RETURN

The company claims that it is justly entitled to a return of 7 per cent upon the full amount of capital found by the commission to have been honestly and prudently invested. Past experience with Massachusetts public utilities give little ground for the claim that the above return is essential to attract capital. Stock of fairly capitalized and well-managed properties, even including street railways, has frequently been issued, taking premiums into consideration, upon better than a 6 per cent basis. The commission states that the company is asking not only for a 7 per cent return but for funds sufficient to make provision for depreciation such as no other street railway in Massachusetts has ever hitherto made. The provision for depreciation which is allowed and the fair rate of return must be considered together, the board holds, and so concludes that a 6 per cent return should be ample.

Assuming a charge of 4.7 per cent for money borrowed, this will leave 7.3 per cent for the portion of the investment represented by capital stock. In fixing this rate the commission emphasizes the point that it must not be understood as declaring that a street railway which finds it possible to declare dividends in excess of 7 per cent may reasonably be required to reduce its charges. Each case must be judged upon its own merits. Due consideration in the present case has been given to the fact that the company's dividend policy has lost it the right to claim an enhanced return which it might have had if a more conservative program had been followed.

MAKING UP THE EARNINGS DEFICIENCY

Making the various corrections and deductions specified by the board, it appears that the net earnings applicable to dividends amount to $1,757,444, or about 4.5 per cent, on the amount of investment to be used as the basis of reasonable rates. The deficiency below the 6 per cent return found to be reasonable is $588,816. Yet in view of the provisions of the statutes under which the Bay State consolidations were effected, in view of the circumstances leading up to them, and in view of the little community of interest between certain parts of the system, it would, in the judgment of the board, be an injustice to the many populous communities which the company serves to regard its system wholly as a unit for rate-making purposes. This does not mean that every line should be required to pay its own way. It may be conceded that the communities in which the company earns the major part of its divisible income must expect in some measure to bear the burden of tributary lines which cannot support themselves. This, however, does not mean that the full burden of carrying the "speculative" properties in sparsely settled territory, which were made a part of the system sometimes hastily and with the assumption that econo-

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mies would necessarily follow from consolidation, must be borne by the better-paying communities.

At the request of the remonstrants, the territory served was divided into fifteen districts regarded in general as having some community of interest, and the company's engineers regrouped their figures showing the estimated surplus or deficit from operation on the ninety-five operating "routes" as submitted in the company's evidence. The regrouping was then refigured by the commission, using the amount fixed by the board as the present basis for passenger fares and the corresponding depreciation allowance. With the exception of the Gloucester, Newburyport and New Bedford districts, all showed a surplus on the investment ranging from 0.38 per cent to 8.35 per cent.

SIX-CENT FARE IS UNPOPULAR

The results of fare increases from 5 to 6 cents on Massachusetts street railways have been disappointing, in the opinion of the board. The 6-cent fare unit is admittedly awkward and unpopular. Conditions in parts of the Bay State territory seem peculiarly unfavorable to the increase. General Manager Goff testified that under the proposed schedule fares between some points, especially in the Boston metropolitan district, would in some cases exceed even the steam railroad single fares, and would generally be about double the commutation rates. Further, the centers of larger population are in general mill and factory cities, with comparatively short average haul. In such localities walking is a form of competition not to be ignored. So far as the board is advised, no attempt has been made elsewhere to increase the 5-cent unit, in cities at least, although in many cases it has been reduced by ticket concessions. The tendency in other parts of the country, in the main, is clearly to meet the new difficulties by inviting additional traffic through faster, better or generally more attractive service, or by decreasing expense through improved operating methods. Encouraging progress has been made in recent years in both directions.

HOW TO SECURE GREATER EFFICIENCY OF OPERATION

The decision reviews various points discussed in the report of Bion J. Arnold to the board upon possible increases in the operating efficiency of the Bay State company. The commission concludes that the moderate increases in speed recommended can be effected, and suggests that the general problem of speed increase be given higher executive attention and specialized skill. Reduction of service in short-haul urban territory is doubtful wisdom, but the board holds that this can be done effectively on some of the longer interurban lines where the traffic is light, especially at certain seasons of the year. The later rolling stock is praised by the commission, but emphasis is laid upon the need of repairing, cleaning and painting the older cars. The decision points out that the Bay State company has 984 open cars in use out of a total of 1996 cars in service, and points out that while the open car has been popular in the East, it is an expensive luxury. It involves a duplicate investment, greatly increased maintenance expense, increased accident hazard, loss of fares and hardship to employees. The semi-convertible car can be made nearly as attractive to riders, and is far more economical. The gradual retirement of open cars is recommended.

The commission also points out that with the new equipment fare boxes could also be used, and states that it is significant that almost alone of the great systems of the country the company has not at present a single prepayment car. (Exception should be made of the latest type of semi-convertible car designed by the company, which furnished the basic design for 200 new cars lately ordered.—Eds.) The change in equipment would also facilitate the introduction of trailers, which at present are not used at all, although the use of double-headers is frequent. The economy of properly designed trailers, even though they require the construction of additional loop tracks, is now well established. Regarding one-man cars, the company is of the opinion that these can be used on certain routes. The company cannot be held responsible for any failure to use one-man cars up to the present, as the commission has previously regarded this practice with disfavor. The board states that it is willing to give this matter renewed consideration without prejudice, in view of possible recent improvements in this type of car and methods of control.

The commission favors the installation of additional feeders. It is also inclined to believe that some substantial saving in general expense can be attained through methods of organization. The commission is convinced that the interurban lines are in but a rudimentary stage of development at present, and that they hold forth the possibility of largely increased traffic, provided they can in some way be made to furnish more expeditious and more convenient service. The prospects are also more hopeful than ever for the development of trolley freight service along broader lines. The company has in mind the extension of this service into the territory north of Boston, where the population is larger, the freight service of the railroads subject to many delays, and where much market-gardening exists. Through charging admission to parks and through the sale of unused real estate, the company may possibly increase its resources. The commission feels that new shops and other improvements could be capitalized on a paying basis.

CO-OPERATION OF THE PUBLIC

The economies which have been suggested, however, cannot be carried into effect without the co-operation of the public. Excessive taxation in connection with paving requirements is a serious burden to the Bay State company. In securing new locations involved in the laying of double track, reduction of curves, etc., the company has continually been obliged to negotiate with the local authorities and finally to agree to perform work upon the streets which the statutes do not require or even contemplate.

The decision points out that it is natural that municipal governments, anxious to keep down the local tax rate by which they are so largely judged, should seek to unload upon the street railway all possible expense, but that such a policy, in the long run, reacts upon the public served. Any burden or tax imposed upon the company the car riders ultimately must pay. Further, the burden is not measured wholly by the cost of the physical work which the company is finally required to do, for the continual dickering over such matters consumes a large amount of time and adds materially to the cost of management. The cost of the paving alone for which the Bay State company has paid since 1898 and which it has been expected to maintain, is estimated at more than $2,000,000. In a report to the 1916 Legislature, the commission strongly urged that the present system should be changed by eliminating, in effect, the present "commutation tax," by placing all paving work squarely in the hands of the municipalities, and by requiring the street railways to meet only the reasonable cost of any such work done within their track locations. The companies ought not to be required to pay the present "commutation tax" and at the same time to do the work for which this tax was supposed to be a substitute.

The elimination of many of the present indicated stops and the decreasing of headway on overserved lines

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are also strongly advised by the commission as further means of increasing revenue. Better traffic regulation through police co-operation is also considered advisable. The commission states that in the past small concessions have been withheld by the public, when these ought, in the larger interest, to have been granted, and petty restrictions have been unwisely imposed. The commission now believes that if the company makes any serious and comprehensive attempt to improve operating conditions, it will not find the public lacking in co-operation.

RURAL FARES MAY BE INCREASED

The commission states that the weakness of the Bay State situation arises from original error of judgment in the too hasty combination, on an equal basis, of all sorts and conditions of companies without any adequate consideration of the fact that some of the older properties had suffered in capitalization and in physical condition from the operations of certain predatory syndicates, and that many of the newer properties were manifestly speculative in their nature and constructed in territory where the hope of any early return was exceedingly small. Coupled with and accentuating this error was the inflation of the shares of the holding company used in bringing about the combination. From this initial handicap the system and its managers have continually been suffering and they have faced a difficult and oppressive situation in which they have not been wholly free agents. As President Sullivan has stated the property has never at any time been in a "normal" condition.

If the company and the public will each do its share toward the relief of present conditions, however, the prospects for the future cannot be considered unfavorable. The public can reasonably be expected to make contribution in the form of some increase in fares. The proposed new schedule cannot be allowed, as the commission finds no evidence which would justify it in permitting the regular unit of cash fare to be increased in the populous centers which are already carrying their fair share of the burden. The board also has grave doubt whether an increase in the 5-cent unit in this thickly-settled, short-haul territory where jitney competition is so feasible and so prevalent would be of material benefit to the company. Any increase in the unit cash fare is therefore disallowed in the present 5-cent zones within or from the centers of the following cities: Boston (including Hyde Park), Brockton, Chelsea, Everett, Fall River, Haverhill, Lawrence, Lowell, Lynn, Malden, Melrose, Quincy, Revere (town), Salem and Taunton. These are roughly the districts in which the company had proposed to sell nine tickets for 50 cents. The 5-cent zones radiating from these centers include, in whole, or in part, adjoining municipalities, such as Beverly, Peabody, Saugus and Swanpscott.

The other lines of the company, in general, form part of the interurban routes and are located in the less populous districts. If the company wishes to increase the prevailing fares on these lines, it is just and reasonable, in the board's opinion, for it to do so. In its schedule the company had in certain cases provided for increases beyond a 6-cent fare unit, had introduced certain new fare zones and altered existing transfer privileges. The commission has not been able, from the evidence submitted by the company, and for lack of time, to deal with such changes in the present proceeding.

For the reason mentioned and because such fare increases would in any event yield a small increase of revenue and might cause serious hardships to certain small groups of riders the board is of the opinion that no changes of this character can be allowed at this time. The company is, however, authorized to file a new schedule, to become effective within thirty days after filing, of rates, which schedule, upon approval by the commission and proper notice, will be allowed to become effective without further hearing. With respect to reduced fare tickets, the commission doubts its authority to require the company to put into effect or continue concessions over the regular rates. After one year under the new schedule the commission will be prepared to consider further revision of rates if this is proved to be necessary.

COMMUNICATION

Public Relations Outline Commended

FORD, BACON & DAVIS, ENGINEERS
NEW YORK, Sept. 6, 1916.

To the Editors:

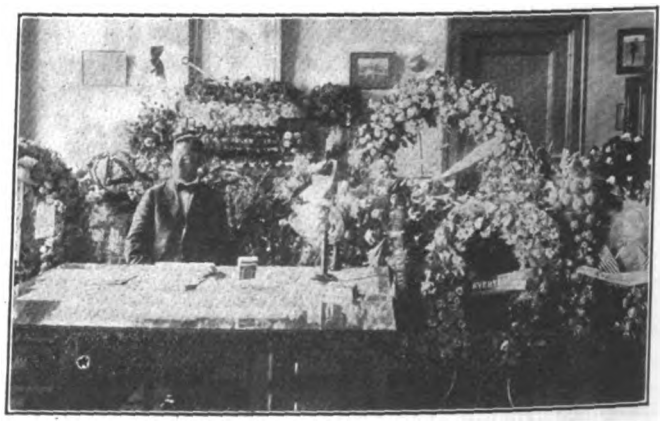
I have read with much interest the outline of important methods of improvement of public relations, which is published in this week's issue of the ELECTRIC RAILWAY JOURNAL, and I want to congratulate you not only upon its completeness and value but also upon the crisp form of presentation.

This schematic plan of presenting the subject is one that carries an appeal to the human understanding, both by its brevity and its logical form. This outline will form a very valuable supplement to the code of principles prepared by the public relations committee of the American Electric Railway Association several years ago.

FRANK R. FORD.

Floral Tribute to Superintendent Bolen

A FEW days ago nineteen social clubs composed of trainmen on several parts of the system of the Public Service Railway of New Jersey recognized the completion of thirteen years of service with the company by General Superintendent N. W. Bolen in a remarkable manner. The recognition took the form of a floral shower, comprising trolley cars, large horseshoes, bouquets and other set pieces. Accompanying the floral pieces were signed testimonials tendered by a number of the social clubs extending best wishes for the continued leadership of Mr. Bolen. The accompanying halftone shows some of the contributions. One of his associates describes the occasion thus: "It certainly was a great day for 'Boss Bolen' on the Public Service system.



MR. BOLEN SURROUNDED BY FLORAL TRIBUTES

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Another Strike Hits New York

Indications Are, However, That Strike Is Broken—Interborough Subway and Elevated Lines, the Primary Objective, Are Operating Normally—Individual Working Agreements the Main Cause of Trouble

THE long-threatened rapid transit strike has at last occurred in New York, but unless unforeseen developments arise the residents of the city will not be seriously inconvenienced. On Wednesday night, Sept. 6, about 2000 disgruntled union employees of the Interborough Rapid Transit Company voted to strike because the company refused to cancel individual working agreements with more than two-thirds of its employees, and at the same time employees of the New York Railways, the surface lines controlled by the same management, walked out for reasons much in dispute. According to the latest reports, the surface line service is disrupted but steadily improving, while the subway and elevated services are operating in excess of the normal amount through the loyalty of more than 9000 of the 11,000 employees. Unless the labor interests succeed in calling out all other surface lines in Manhattan, the Bronx, Queens and Richmond, and the Brooklyn Rapid Transit Company as well, the strike seems certain to fizzle out in short order.

THE ISSUE

As Stated by the Company

"There is just one issue involved in the proposed threat to tie up the street railways of New York:

"Shall the Interborough Company be compelled to cancel and annul contracts, creating improved conditions of employment, voluntarily entered into between the company and more than 8,000 of its employees?"

Fundamentally the whole cause of the present situation seems to be the individual contracts which the Interborough company has secured through the voluntary act of most of its employees, and which the New York Railways is now distributing among its men. The former contract was published last week, and the latter, differing only in its time limit, appears elsewhere in this issue. The way in which the New York Railways has been drawn into the rapid transit dispute, in spite of the elaborate arbitration clauses of the agreement reached on Aug. 7 in settlement of the earlier strike on these surface lines, is quite complicated. The union men allege that they were given to understand that the policy of this settlement, covering the right to organize, treatment with committees and arbitration of disputed points, would be followed out in the case of the Interborough lines as well as the New York Railways, but that when they wished to arbitrate the fairness or unfairness of the individual working agreements and the question as to whether the methods used in obtaining them were a breach of the settlement plan, the Interborough general manager, Frank Hedley, refused. Consequently, when they learned that the New York Railways was contemplating the issuance of similar working agreements for its men, they did not pursue the stipulated course and ask Mr. Hedley as general manager of the surface lines to arbitrate the contract question, but voted to follow the Interborough men in striking.

The Interborough officials, on the other hand, deny the existence of any agreement comparable to the New York Railways settlement, and aver that they could not arbitrate all the Interborough contracts that had been already voluntarily signed through the exercise of a constitutional right, especially when the Interborough unionists voted to strike in an effort to coerce the company into cancelling the contracts. Moreover, the company says, in going out on strike the New York Railways men deliberately violated the settlement plan of Aug. 7, and this is no longer operative.

WORKING AGREEMENT AND CONFERENCE OF AUG. 30

The dispute between the Interborough Rapid Transit Company and its union employees began to assume a critical form on Thursday, Aug. 30, when at a conference regarding union demands Mr. Hedley introduced a printed copy of the working agreement that for several days had been circulated among the individual employees. This working agreement, as stated in the ELECTRIC RAILWAY JOURNAL of Sept. 2, was formulated in conference with the committees representing each of the departments of the road, and these committee said that they would recommend the terms of the agreement for execution by the individual employees. Although these agreements, carrying with them $1,250,000 in increased wages, concessions in working hours and stable conditions for about two years, were being voluntarily signed by more than two-thirds of the 11,000 Interborough employees, the minority union interests immediately asserted that they constituted an attack on the right of collective bargaining and their circulation must be stopped.

Moreover, at this conference the question was immediately raised as to whether the employees of the Interborough Rapid Transit Company had a legal and a moral right to organize. In regard to the attitude taken by the company representatives, Mr. Hedley after the conference issued a statement in part as follows:

"I said that I would be glad to hear the grievances or demands of the employees on the assumption that the principles which had been agreed upon in so far as the New York Railways was concerned would also apply to the Interborough Rapid Transit Company. The New York Railways agreement provides that committees of the men have a right to have their individual committeemen, if they desire represented also by spokesmen, appear before the officers of the company to present their cases and, further, that should disputes arise with the management which cannot be settled with the employees, the questions in dispute shall be arbitrated, excepting, however, all matters relating to efficiency. Of course, the same procedure will be followed on the Interborough lines."

STRIKE ORDER VOTED BY INTERBOROUGH UNIONISTS

To such an extent did the individual working agreements stir up the union leaders that a strike meeting of

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Interborough unionists, numbering, it was asserted, about 3000, was held on Friday night, Sept. 1. The men then voted that an ultimatum should be presented to the company on Tuesday, Sept. 5, the date set for the next conference. The resolutions passed demanded forthwith the return and cancellation of all such individual working agreements as had been signed, and stated that "in the event of the failure of the company to return and cancel said contracts and upon their refusal to do so, we authorize, empower and instruct our officers and executive board to take such steps as they may see and deem fit and proper; and, if in their judgment they deem it expedient and advisable, to call forthwith a suspension of all work on the lines of the Interborough Rapid Transit Company."

It was directed, moreover, "that a copy of this resolution be delivered to Division 722 of the Amalgamated Association of Street and Electric Railway Employees of America, the members of which division are employees of the New York Railways, which is owned, operated and controlled by the officials, board of directors and management which owns, operates and controls the Interborough Rapid Transit Company, with the request that they co-operate with us to obtain our just and proper rights."

INTERBOROUGH REFUSES TO CANCEL CONTRACTS

In advance of the conference scheduled for Sept. 5, Theodore P. Shonts, president of the Interborough Rapid Transit Company, announced that the company would not annul the individual working agreements with the vast majority of its men. In a statement issued on the evening of Labor Day, Sept. 4, Mr. Shonts said that his position as president of the company was that these contracts were entered into voluntarily by the men and officers of the company, that they were binding upon both parties, that they could not be abrogated by either without the consent of the other, and that in making the same, both parties were exercising the right of liberty to contract guaranteed by the Constitution. It was, therefore, obviously impossible to comply with the demands of the minority represented by the officers of the union. He emphasized the fact that there was nothing involved in the controversy except the right of the employees of the Interborough to form their own brotherhood and the right of the company and the members of the brotherhood to enter into contracts respecting rates of pay and hours of labor.

The position of the company was further set forth in large advertisements sent to the newspapers on the evening of Sept. 4, summarizing the recent negotiations between the company and its employees. Along with other things it was explained therein that conferences between the company and the committee of employees selected under its own brotherhood plan took place before any other committee, union or otherwise, had presented any requests whatsoever. In order that there should be no mistake, and that the company might know definitely that the new schedules were satisfactory to the men, a contract was prepared for submission to each man individually. No man was asked to sign by any one selected by the company, or by any man with authority over others. Submission of agreements to the individual men was handled entirely by elected representatives of an overwhelming majority of the men, and they had up to that time been signed by more than 8000 of the employees.

Mr. Shonts also gave out a letter that had just been sent by Mr. Hedley with his approval to Mayor Mitchel, asking that in the event of the threatened strike materializing, the company be given immediate police protection. A copy of this letter had been forwarded to Governor Whitman, "in order that if a strike with all its disorder should come and the police be found inadequate to cope with the situation, and we ask the militia be sent, the authorities could not say they had not been informed of the seriousness of the car situation."

WARNING NOTICES ISSUED TO EMPLOYEES

At this same time notices were sent out to Interborough employees explaining why the company would not annul the working agreements as demanded by the union and warning them that all those who either encouraged or participated in a strike or interfered with the freedom of their fellow-employees or with the peaceful and continuous operation of the road, would not be entitled to the benefits secured by the contracts or to those accruing under the rules of the company from seniority of service, and that all employees who absented themselves from duty because of a strike order would be dropped from the company's service, and if re-employed at a later date would be taken into the service as new men.

WORKING AGREEMENT

1. *The New York Railways employs the undersigned for the wages and hours set forth on the annexed schedule from Sept. 3, 1916, to Aug. 31, 1918.*

2. *The undersigned agrees to work for the company in such positions as may be assigned to him from time to time (provided there shall be no reduction in position except for good cause) for such wages and hours for such periods.*

3. *It is further agreed that if the company shall increase the wages or change the hours set forth on the schedule, the undersigned shall have the benefit of such increase or change notwithstanding this agreement to the contrary.*

4. *If, after five years' service in any one class, for physical causes beyond the control of the undersigned, he shall be assigned to a lower position, he shall then receive at least the low rate wages on the schedule of the class from which he is transferred.*

Dated New York City, 1916.

NEW YORK RAILWAYS,
By FRANK HEDLEY
Vice-President and General Manager

.....
Employee
Pass No......

NEW YORK RAILWAYS INDIVIDUAL SERVICE CONTRACT

In view of the co-operative aid that the union strike resolutions had asked of New York Railways employees, a similar notice was sent to these, admonishing them that they were bound by the formal settlement of Aug. 7 and that any sympathetic strike would be a breach of that agreement with the company. They were notified that any strike activity or any absences on account of a strike order, or otherwise, would result in a discharge from the company's service. If re-employed at a later date, the discharged men would be taken back as new employees.

CONFERENCE ON SEPT. 5 FANS THE FLAME

The scheduled conference on Tuesday, Sept. 5, between Mr. Hedley and leaders of the union served only to show that the company intended to keep its word in refusing to annul the individual working agreements. Although the labor leaders had the power to call a strike at once, they did not take advantage of it but decided, after notifying Mayor Mitchel of the deadlock, to pass the responsibility for calling a strike back to the In-

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terborough union employees at a mass meeting on the evening of Sept. 6.

At the conference company officials stated that if the working agreements were thought to have been illegally obtained, their validity could be ascertained in court. The union leaders offered to arbitrate the question as to the fairness or unfairness of the working agreements and also the methods that were being used in getting the men to sign the same. To this the company would not agree.

The labor leaders then offered to submit the whole matter to the Public Service Commission and the company also refused that, claiming that the commission had no jurisdiction in the matter. It was pointed out by the company that if the working agreements were to be tested, the act should take place before a tribunal where perjury could be punished. The company representatives were disinclined to discuss any points beyond the refusal to annul the agreements, inasmuch as it was reported that the labor leaders had threatened a general tie-up from the Bronx to Coney Island. Counsel for the union men, however, denied that they had made such a threat.

At the above-mentioned conference the question of the union demands for the New York Railways was also taken up, and the company representatives were asked whether they had proposed for the employees of this company any working agreement similar to that used for Interborough men. While insisting that nothing whatever had been done which by any chance could affect in any respect the settlement agreement of Aug. 7, company officials stated that a similar agreement had been discussed and drawn up, but that they had determined to withhold any distribution of such contracts for the present.

According to statements of the union leaders, however, the suggestion and discussion with reference to the advisability of getting all of the New York Railways employees under contract had taken place not only subsequent to Aug. 7, the date of the New York Railways settlement, but also after the conferences were begun between the officials of the company and the committee of employees and their spokesman in accordance with the settlement plan.

No Agreement Between Interborough and Its Men

After the conference Mr. Shonts issued a statement in part as follows:

"There is and has been no agreement between the Interborough Rapid Transit Company and the Mayor and Chairman Straus covering relations between the company and its employees. The only agreement between the Interborough and any of its employees is the individual 'working agreement' signed by the company and now more than 8500 of its men.

"With that agreement the Amalgamated Association has and has had nothing to do. It was the outgrowth of conferences between this company and representatives duly chosen by the vote of an overwhelming majority of the employees. It is these agreements which the union officers—representing but a small minority of the men—ask us to cancel. We have received no such requests from the men who did sign.

"The employees of the Interborough have formed a brotherhood of their own, and have manifested in a variety of ways their desire to deal with the company independently and to be free from the attempted invasions upon their work and freedom. The whole situation involves an effort by the outside union, of which but a minority of our men are members, to create an issue, whereby through strike, or threats of strike, the majority of our men shall be compelled against their will to join the outside union."

The Strike Finally Is Called

The first step in the impending strike finally was taken the evening of Sept. 6, when mass meetings of the union employees of the Interborough Rapid Transit Company, covering the subway and elevated lines in Manhattan and the Bronx, voted to quit service at about 9.30 p. m., and about 11 p. m. the unionized strength of the New York Railways, operating the "green-car" or one of the two big surface systems in Manhattan, followed suit. About midnight the surface lines suspended service for the night, but the rapid transit lines continued to operate with little delay.

On Thursday morning, Sept. 7, New York awoke to learn that what it has been fearing for weeks had come to pass—*i.e.*, a strike on the rapid transit lines or main arteries of travel in Manhattan and the Bronx. Yet only from the newspapers was this in general discernible, for through the support of more than 9000 of loyal employees and some of the 3000 emergency workers which it had gathered in its carhouses and at its terminals, the Interborough company was able to offer normal service. At the time of the strike the company had received 9264 signed working agreements, and only twenty employees thus represented failed to report in the morning for duty. Only three motormen on the whole rapid transit system struck.

On the New York Railways about 2500 of the 3300 men went out. From early morning, however, when service was resumed, operation gradually improved. At 7 a. m. the company had 70 cars in operation; at 8 a. m., 143 cars; at 9 a. m., 157 cars, and at 10 a. m., 179. This latter figure, which was maintained during the day, was 25 per cent of the normal service.

The board of directors of the New York Railways voted increases for the men who stuck by the company. A new scale, with individual contracts for two years, is being offered to these men. The increases voted amount to $350,000 a year. Up to 10 a. m. 409 of the surface car men had signed the individual contracts. Double pay until further notice was also announced by Mr. Hedley for both Interborough and New York Railways employees who remained loyal and signed the individual working agreements.

The subway and elevated lines were operated all night Thursday, but the surface-car traffic was halted at dusk until Friday morning. In the face of the great set-back, the union leaders declared they would hit at the Interborough through the power houses, but Interborough officials reported that every one of its power house employees had signed the individual contracts. In consequence, the company declared, it had no fear of a strike call among its power house employees.

Strike Seems to Be Fizzling Out

At the time that this paper went to press, it was evident that the rapid transit strike had failed, more than normal service being operated, and the only inconvenience suffered by the public is the partial suspension of service on the green-car lines. Union employees of the Third Avenue System and the Second Avenue Railroad, the other surface lines in Manhattan and the Bronx that were mixed up in the preceding strike, voted on Thursday night against joining the strike at this time.

The latest figures on the lines already affected by the strike show that a total of 1150 men have gone out on the subway and elevated lines, while 9977 employees have signed the individual working agreement. The 1150 strikers are recruited from the following classes

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of workers: On the elevated, four motormen, eight towermen, three switchmen, twenty-three station agents, 216 gatemen, 442 guards and one special officer; on the subway, three station agents, twenty-five gatemen, 240 guards and one escalator man. These figures total 976. The balance is made up of track hands, assistants in the car shops and other unskilled laborers.

As for the New York Railways, up to 9.30 a. m. Friday 1588 or almost half of the employees had signed the working agreements, giving increased wages for the next two years. No strikebreakers were being used on the surface lines, but the service was being steadily improved. At 7 a. m. Friday 136 green cars were in operation as compared to seventy the preceding day at the same hour, and at 9 a. m. the total was 234 as compared to 157 on the preceding day. Less than one-fourth of the 3000 strikebreakers whom the Interborough officials had ready for the strike had actually been used. The number actually called into service was between 600 and 700—mostly on the elevated roads and for unskilled positions such as gatemen and guards, inasmuch as the majority of the strikers had gone out there. A large number of former employees of the surface lines were using the opportunity to get back in its employ.

On Friday morning Mr. Shonts announced that the striking employees of the New York Railways would have until 1 p. m. Saturday to return to work without prejudice. The company, however, would reserve the right to reject the applications of any men who were known to have indulged in illegal acts during the strike. Moreover, no men taken back would be allowed to continue union affiliations.

Statements by Queens and Third Avenue Lines

The New York & Queens County Railway, which was included in the preceding surface strike, in a notice to the public dated Sept. 5 stated that neither it nor its employees had any concern in the Interborough dispute. It said that it was carrying out in good faith the method provided for settlement of its own controversies, to which it agreed with Mayor Mitchel and Chairman Straus of the Public Service Commission on Aug. 8, and would continue to do so. It wanted the public to accept its assurance that it did not propose to have its part of the street car service of the city tied up because of any demand of a labor union that another company shall grant its demands through a committee representing a small disaffected minority of its employees.

In a similar notice to its employees, the company reminded them that it was their duty to remain in continuous and peaceable performance of work. If as a matter of sympathy with any disaffected men of the force of any other company, or as a matter of obedience to the dictation of any union, any men should leave the service of the company, their places would be filled by others. First preference would be given to present employees who remained at work. They would be entitled to an advance of seniority rights and would hold such seniority during the continuance of their employment against any employee who should have left the service and might afterward for any reason be taken back into the employ. Employees not reporting for duty or not taking out runs assigned during any emergency would be considered out of the service.

The Third Avenue Railway stated on Sept. 7 that it was endeavoring to carry out in good faith the method provided for the settlement of any of its own controversies as agreed on Aug. 7, and it expected the employees to do the same. On Sept. 6 at a conference between the management and employees further consideration of a proposed agreement was had, and each of its twenty-six sections was fully discussed. As a result a number of them were agreed to, several were passed for further discussion and others, including those relating to the increase in wages, were also considered. It was concluded to arbitrate these questions.

Little Disorder in Early Stages of Strike

Up to Friday morning few signs of disorder were apparent along the affected lines. In some cases missiles were hurled at the elevated trains, and some employees were roughly intimidated, but in general the situation was quiet. Police Commissioner Woods ruled that pickets would not be permitted to ride on the front platforms of cars and attempt to recruit motormen. His reason for ruling against such action, Commissioner Woods said, was that the motorman's attention would be distracted and public safety endangered.

Throughout the city there were 5000 policemen on strike duty. There was one man to each of the surface cars; two to each of the elevated and subway trains being operated; two to each of the subway and elevated station platforms, and others guarding the power stations, sub-power stations, and car barns and terminals.

Commissioner Begins Investigation

On Thursday Chairman Straus of the Public Service Commission subpoenaed Mr. Shonts and Mr. Hedley, representing the railways, and W. B. Fitzgerald, organizer, and William Conway, local president, for the men. Hearings were held throughout the day in an effort to learn the issues involved in the strike and to fix the responsibility for the downfall of the New York Railways settlement underwritten by Chairman Straus on Aug. 7.

At this hearing Mr. Fitzgerald was asked why the strike on the New York Railways took place without any formal request for arbitration. He replied that he and his associates had offered to arbitrate the fairness or unfairness of the contracts on the Interborough system, but this had been declined by the company, and the fact that similar contracts had been prepared for the employees of the New York Railways Company caused the union to abandon its promise to arbitrate. The union had no signed agreement with the Interborough Company, but from previous interviews with Mr. Hedley the men understood that the same policy in regard to treating with the union which had been followed by the New York Railways would be followed also by the Interborough Company. Several statements by Mr. Hedley, taken from the stenographers' minutes of the meetings, were then read into the minutes. The gist of them was that in Mr. Hedley's opinion unless the directors who had molded the policy for the New York Railways Company were to reverse themselves, the Interborough would have to deal with the union.

Mr. Hedley, in his testimony, said that the Interborough had no signed agreement with the union as was the case with the New York Railways. Personally, he had not been in favor of the agreement of Aug. 7 made by the New York Railways. He believed the road could deal with its own employees more effectively than through "outside parties."

Mr. Shonts testified that the directors of the New York Railways on Sept. 6 had voted not to ask their employees to sign individual service contracts. This action was taken about two hours before Mr. Hedley and the union leaders had the conference that resulted in the strike. Asked why Mr. Hedley had not told the union leaders that the company did not intend to send out the service contracts, Mr. Shonts said Mr. Hedley had not heard when he went into the conference that the directors had taken this action, and did not learn of the decision until the next day, after the strike had begun and the working agreements were circulated.

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Evils of Union Domination

Views of a Prominent Manager on the Activities of the Electric Railway Labor Agitators

THE steam railroad labor crisis has brought the methods by which steam railroad employees enforce their demands prominently before the attention of people of this country. The question of union domination, however, is not confined to the steam railroads. Many electric railway companies have also had experience with it, and the seriousness of the situation is increasing rather than decreasing. During the past week the editors of this paper have had the opportunity of obtaining an expression of opinion from the manager of an important electric railway property on this general condition. The following is an abstract of his remarks:

How the Amalgamated Association Operates

"From my point of view many serious and vital problems confront the American Electric Railway Association, as representing the street and interurban railway properties throughout the country, but all of these problems pale into utter insignificance as compared to that of having their properties organized by the Amalgamated Association and dominated by that organization.

"The present plan seems to be for the Amalgamated Association to pick out properties individually, where from peculiar municipal conditions or a favorable feeling of the Mayor or public officials to the Amalgamated Association, organization is rendered possible and then use the whole resources of the Amalgamated Association, including all of its financial resources, to organize this property. On the part of the street railway companies, each company is permitted to fight out its own battles alone and unaided, except solely from the moral support and sympathy of the other properties, but this is not of any great material assistance to a struggling street railway property which is unable to bear the financial burden imposed upon it by loss in receipts and heavy expense in operation caused by strike conditions.

Railways Must Get Together

"Unless the street railway companies of the country realize the situation that they are facing and get together an organization for combating the tactics and methods followed by the Amalgamated Association and present a united front to the organization of their properties by the Amalgamated Association, I can personally see nothing but disaster ahead for a vast number of the weaker street railway properties throughout the country. The trustee of the mortgages of these properties and the financial interests connected with them usually require that a fund is to be set aside covering losses to the property that may accrue due to fire or tornado, but they make no provision against losses occurring through attacks of the Amalgamated Association, both in loss of receipts and destruction of property, which are vastly more serious at the time of a strike occurring and in their after effects than any losses due to fire or tornado or flood could possibly be.

"In my judgment, if a number of street railway properties in the country would get together and form a nucleus to start with and set aside a percentage of their gross receipts, say, running from 1 to 3 per cent, for a strike fund which would be handled by a committee to be selected, for example, by the American Electric Railway Association, covering funds to be expended for the defense and protection of the properties attacked by the Amalgamated Association, this would be of greater benefit to the street railway and interurban interests of the country than the solution of any other problem now confronting them, and unless the street railways interests of the country wake up to the true conditions of affairs and some plan of this kind is worked out by the American Electric Railway Association, or the larger financial interests of the country who have their money invested in street railway properties, I can see nothing but disaster ahead for them.

Situation on the Boston Elevated

"Take the Boston Elevated property to-day, as an example. If you will look over their last wage agreement you will find that in addition to covering the motormen and conductors, it includes between fifty-five and sixty departments of the company, exclusive as I have just stated of motormen and conductors, reaching even to 'stockroom clerks,' 'treasury department employees,' etc. In case of the disciplining or discharge of a man, or a number of men in any of these departments, regardless of what the nature of their offenses may be, if these men are sufficiently close to the Amalgamated Association and of enough importance to them, the union has simply to say that unless the men are reinstated and given whatever their demands may be, that the whole organization will be pulled out on a strike. This would place the railway company in a position where it could not operate its power stations, or substations, etc., and would leave it utterly helpless even to make any start toward the operation of its property. It is tied hand and foot by the Amalgamated Association, and the street railway property is run only through the sufferance of the Amalgamated Association and practically as it may dictate. I simply refer to the Boston Elevated as I happen to have just read a copy of their last articles of agreement, but there are any number of companies throughout the country which are in exactly the same condition as the Boston Elevated.

An Effective Defense Plan Is Needed

"It would seem from the recent developments in New York City, with the surface, the elevated and the subway lines, that the true character of the Amalgamated Association should be made plain to the street railway interests throughout the country and that this absolutely vital question should arouse sufficient interest among them to wake them up to a plan of defense which would effectually and forever put down the tyranny and oppression now exercised over any property which may have been forced into membership in the Amalgamated Association by methods of strike, rioting, bloodshed and destruction of property, and would cause the street railway companies throughout the country to join together and present a united front against the further wrecking and devastating of street railway properties by an outlaw organization such as the Amalgamated Association.

"When the Amalgamated Association goes into a city to organize the same, it is usually able to get together at least a small nucleus of discontented employees, sufficient to call a strike and make a disturbance. The Amalgamated Association then demands arbitration of its differences to prevent a tie-up of street railway traffic. This appeal usually strikes the uninformed public and newspapers as only fair. An arbitration agreement is then entered into, and this gives the Amalgamated the foothold among the employees of the company that it wants, and then, after getting the property fully organized, unless the Amalgamated gets what it wants, its slogan is 'arbitration be damned.'

"This policy of the unions is perhaps most forcibly evidenced by the attitude of the Brotherhoods in the recently threatened steam railroad strike. They were perfectly willing to arbitrate, but only after they had been granted the only real demand that they expected to gain."

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Some Recent Advances in

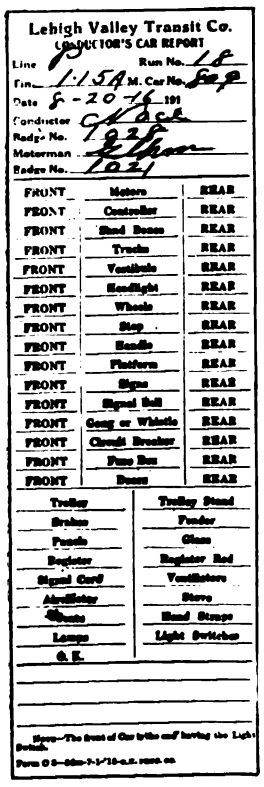
EQUIPMENT AND ITS MAINTENANCE

Testing Lamps and Fuses Saves Many Steps—Punching Reduces Work on Maintenance Reports—Use of Potential Relays Saves Fuses—Better Rail Steel a Panacea for Rail Corrugation—Graphics Simplify Line Calculations—Snow Scrapers and Water Heaters for the Coming Winter

Punches vs. Pencils for Daily Car-Shop Reports

BY HARRY BRANSON
Superintendent of Equipment Lehigh Valley Transit Company, Allentown, Pa.

The accompanying illustrations show the conductor's car report slip and the daily car maintenance report card which have been designed by the writer to facilitate the keeping of the car maintenance records of the company. The reports are similar in some respects to a conductor's transfer, the striking features being that the conductor's car report slip is punched by the conductor, who reports in this way any defects in his car, while on the daily car maintenance report card the workman records the work which he does on the car by punch marks instead of writing out a report.


Lehigh Valley Transit Co.
CONDUCTOR'S CAR REPORT
Line ... Run No. ...
Time ... M. Car No. ...
Date 5-20-16 191
Conductor ...
Badge No. ...
Motorman ...
Badge No. ...

FRONT		REAR
FRONT	Motors	REAR
FRONT	Controller	REAR
FRONT	Hand Brake	REAR
FRONT	Trucks	REAR
FRONT	Vestibule	REAR
FRONT	Headlight	REAR
FRONT	Wheels	REAR
FRONT	Step	REAR
FRONT	Handle	REAR
FRONT	Platform	REAR
FRONT	Signs	REAR
FRONT	Signal Bell	REAR
FRONT	Gong or Whistle	REAR
FRONT	Circuit Breaker	REAR
FRONT	Fuse Box	REAR
FRONT	Doors	REAR

Trolley	Trolley Stand
Brakes	Fender
Fenders	Glass
Registers	Register Rod
Signal Cord	Ventilators
Headlights	Stove
Gongs	Hand Straps
Lamps	Light Switches
G. E.	

Note—The front of Car is the end having the Light Switch.
Form C 5—20m-7-1/16-n.c. reprint on

CONDUCTOR'S CAR REPORT

It is often a difficult matter to get shop men to write. They are liable to slight a written report of their work by omitting some of the important facts or by not writing clearly, while if care is taken in making a written report considerable amount of time is used. The use of the daily car maintenance report card solves the difficulty.

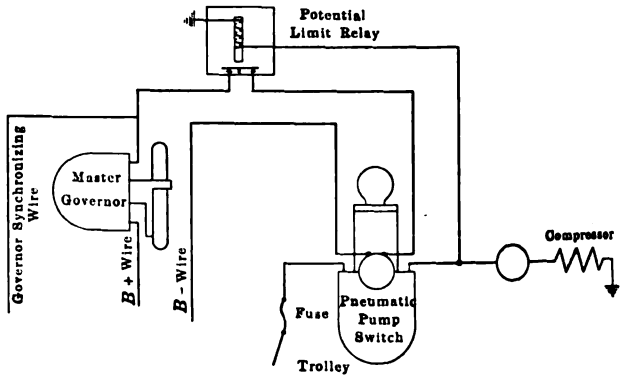
Each car is provided with a card holder, and in the morning before the car leaves the carhouse the previous day's card is removed and a new one put in its place. When the car is in the carhouse for inspection or repairs each workman, by means of his punch, records on the card the jobs which he has done. Each repairman and inspector has his own punch and each punch makes a perforation of different shape, so that a permanent record is made showing both the work done and the man who does it.

In the office the data on these cards are transferred by the clerks to the monthly record sheets and the cards are filed in an open rack, which has a compartment for the records of each car. If a car is overhauled a green tag is put over the end of the card. These tags are visible after the cards are filed, so that it is very easy to pick out the card giving the overhauling record. In the same way the painting of a car is shown by a red tag. The card shown in the illustration is for a car that has been overhauled.

Potential Relay Saves Fuses in Compressor Circuits

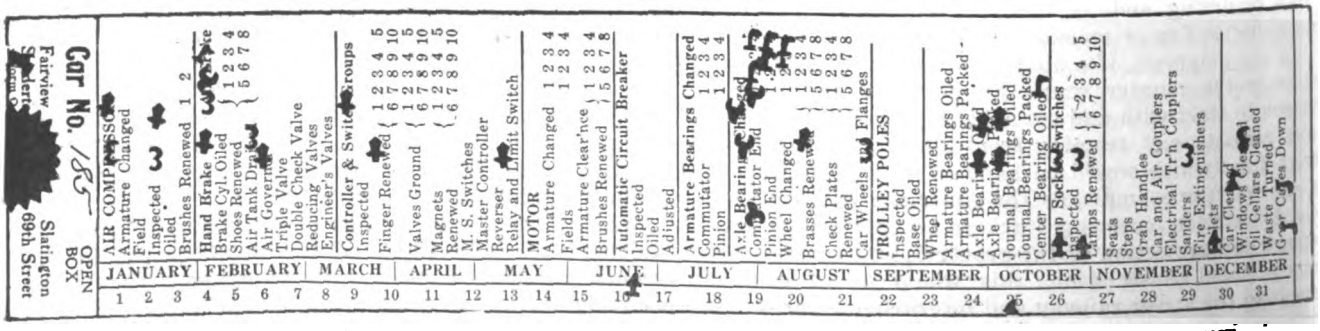
BY GEORGE H. BLECKWEDEL
Inspector Long Island Railroad, Morris Park, N. Y.

Considerable difficulty was formerly experienced on the multiple-unit cars of this railroad, due to the "blowing" of excessive numbers of fuses in the air compressor motor circuits. These are 30-amp., 600-volt fuses. This fuse blowing was objectionable, not only on account of the cost of the fuse, but train delays were caused due to the motormen having to replace blown fuses in order to keep up the air pressure.



WIRING DIAGRAM FOR POTENTIAL LIMIT RELAY FOR MOTOR-COMPRESSOR CIRCUIT

This matter was checked up carefully about four years ago and it was found that the fuses invariably blew on long feeders where the voltage was low. In making tests on these feeders it was learned that when a heavy load was applied, such as was caused by a four-



DAILY CAR MAINTENANCE REPORT CARD WHICH IS PUNCHED BY THE SHOP MEN TO RECORD THE WORK DONE

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car or five-car train taking power, the voltage sometimes dropped to one-half its normal value.

The releasing of this heavy load produced a voltage kick which was anywhere from one and a quarter times to twice normal voltage. If the compressors were running at the time they invariably flashed over, blowing the fuses.

In order to overcome this difficulty various plans were tried, such as the use of choke and resistance coils in series with the compressor motor circuit, but these afforded very little satisfaction. It was finally decided to build a relay that would operate at 725 volts and, on application of this potential, open the 14-volt magnet circuit which held the compressor pneumatic switch closed. Several of these were built and operated very well.

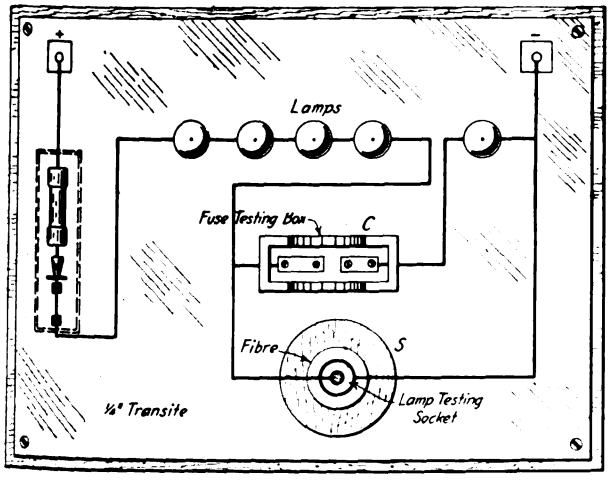
After one year's trial 100 more were installed, and after two years' service these have cut the consumption of fuses on the cars about 60 per cent. The wiring diagram on page 454 shows how the relays were connected in the circuit.

Combination Fuse and Lamp Test Board

Time Is Saved by Using This Testing Outfit in the Maintenance Storerooms

BY E. D. RANSOM, B.E.

Considerable time is wasted in maintenance work in separating good fuses and lamps from those which are burned out or otherwise defective. Many times a man will traverse a considerable distance between a storeroom and a car only to find that the lamp or fuse he has secured to replace the defective one is also defective. Where locking receptacles are used the time wasted in installing a defective lamp is still greater. To eliminate this waste of time the test board shown in the accompanying illustration has been installed near the door of each maintenance shop stockroom of a well-known railway system. All lamps and fuses can now be simply touched to the proper contacts as they are being taken out of the stockroom, thus making certain that the fuse or lamp is a good one.



COMBINATION FUSE AND LAMP TESTING BOARD

The test board consists of five lamps, a fuse test box, *C*, and a stripped socket, *S* for the lamp test. If a fuse is placed across contacts in the test box the lamps which form a standard five-light circuit will light if the fuse is a good one. The lamp to be tested is pushed in the stripped socket *S* and the lamps in this circuit will light if the lamp being tested is not defective.

The sides of the fuse test box are of maple, the wood being cut away to form arched gaps which permit a man's hand to go far enough into the box so that the fuse which he is holding can be touched to the copper contact blocks in the bottom. These contact blocks consist of two sections of scrap bar copper about 1 in. x ¼ in. in cross-section, laid in the bottom of the box, and flush with the surface. The bottom is made of transite, and the contact blocks are held in place by screws which do not go through the transite into the wood below. The gap between the contact blocks is arranged so that the smallest fuse will just bridge the gap while the over-all length of the contacts from end to end is arranged to take the largest fuse used.

The lamp test socket is made of an ordinary socket, the threads being pounded out leaving the sides smooth and slightly larger in diameter than the original threads.

In this way a lamp has merely to be pushed in to make contact. Lamps can be tested in this socket as fast as a man can pick them up and put them down again. Around the socket there is a large wooden rosette with a ring of fibre between it and the metal part of the socket. As this rosette extends beyond the top of the socket, it protects the workman against accidental contact.

The board proper on which the testing apparatus is mounted consists of a wooden base entirely covered with ¼-in. transite and equipped with a standard control switch and fuse protected by a box with a door.

In addition to trying out lamps and fuses for immediate use, all lamps received at the shops of this company are tested when delivered, as they can be tested as fast as they are unpacked. The test boards have proved to be very convenient and the time saved makes them well worth the small cost of construction and installation.

Long-Lived Poles

Some interesting facts on the life of poles have recently been obtained by the Lindsley Brothers Company, Minneapolis, Minn., dealers in Western and Northern cedar poles. The fact that this company was established in 1896 and began shipping Western red cedar poles into the Central States in 1899 affords it unequaled opportunity for making a study of this kind.

Some months ago the company wrote to a number of concerns to which it had furnished red cedar poles in these early days asking about their present condition. A company in St. Paul, Minn., reported that of a lot of poles set in 1899, 90 per cent are still in very good condition and should last at least five years longer before reinforcement is necessary. Another company in Fort Worth, Tex., reported that of the lot set in 1899 none had been removed on account of rotting. A company in Milwaukee made the same statement, and one in Louisville reported that of sixty poles set in 1901-1902 only two had been replaced and the others seemed good for ten years. Reports of very similar tenor, with the year in which the poles were set, were received from Minneapolis, 1900; Dallas, Tex., 1899; Menominee, Mich., 1899; Iron Mountain, Mich., 1899.

In addition to these investigations, which were conducted by mail, a special study was made by G. L. Lindsley, of the firm, of some poles shipped to Grand Rapids, Mich., in 1900. These poles were still standing, apparently in as good condition as when first set. On closer investigation, a little sap rot was found just below the ground line but not enough to weaken the pole in any way. Other red cedar poles which were set in 1900 in Detroit were also found by Mr. Lindsley to still be in good condition.

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Rail Wear and Corrugation

English Rail Expert Discusses the Curved Head Rail and Commends a New Process Steel for Tramway Rails

In the issue of the *Railway and Tramway World*, London, England, for Aug. 10, 1916, considerable space is devoted to a discussion of rail design, and rail wear and corrugation, based partly upon articles which have appeared in recent issues of the ELECTRIC RAILWAY JOURNAL. In one of the leading articles Robert B. Holt,

CROSS SECTIONS OF LEEDS 1910 CURVED HEAD RAIL AND WORN TIRE SHOWING INTIMATE CONTACT OF TREADS

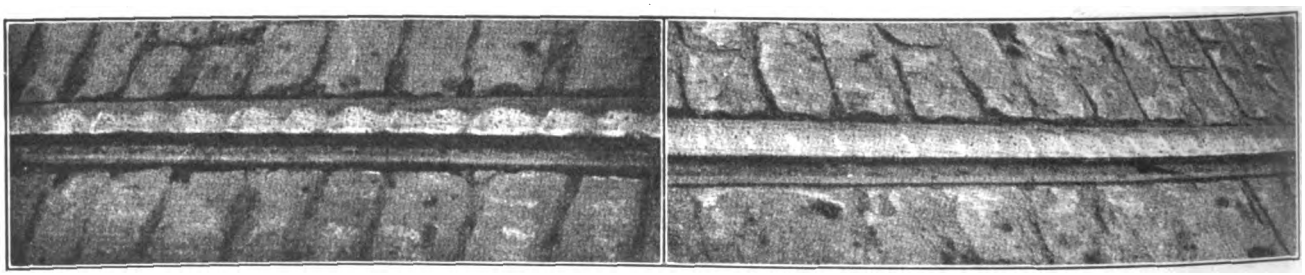
highways and permanent way engineer, Leeds, summarizes the progress which has been made in the last five years as exemplified particularly in the city of Leeds.

In articles published in the *Railway and Tramway World* in 1910, Mr. Holt had called attention to the inequalities in wear of rails and wheels due to defects in the design of both. He had noted that in service rails assume a convexity of about 12 in. radius, and he referred in these articles to the imperfect contact which existed between new rails with flat or inclined plane treads and worn wheels, and between partly worn rails and new tires. As a result of the poor contact there was detrusion of the metal in the rail head. To overcome the defects mentioned, Mr. Holt had designed a rail with a curved head of 12-in. radius which was put into operation in Leeds in 1910. This is shown in cross-section in an accompanying illustration, which shows a worn tire in contact with a new rail. The operation of this rail has been satisfactory. Although Mr. Holt favored a curved wheel tread contour no alteration had been made in the contour of the wheels in Leeds.

In the present article Mr. Holt states that many other British tramways have adopted convex rail heads, and that the British engineering standards committee is said to be contemplating alterations to its rail sections in this direction. He then quotes at length from an article by R. C. Cram appearing in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 25, 1915, page 1246. He agrees with Mr. Cram in concluding that imperfect contact causes detrusion of rail-head metal. However, the experience in Leeds has shown that Mr. Cram's conclusions as to corrugation do not hold, because in Leeds there has been no diminution in the tendency for rails to corrugate.

Quoting from an interim report of the Municipal Tramways Association committee on rail corrugation, he states that the investigations of this committee "show that the occurrence of corrugation is independent of the number of cars which have passed over the rails"; that "corrugation produced by one set of cars may be entirely removed by another set of cars running in place of the first, and may also be caused and removed by the same set of cars under apparently the same conditions"; that "corrugation appears on the rails independently of whether the wheels are being actively driven by the motors or not. The committee is of the opinion that the explanation of this may be the slip and skid taking place owing to the different diameters of the wheels, which difference largely results from the unequal wear produced by the relative difference in the speeds of the motors." The committee further states that "it considers that it has ample evidence that the force or forces responsible for the reaction which results in rail corrugation are external to the rail. It is realized, however, that while rails rolled to any known specification are affected to a certain degree by this reaction, some are not affected to the same extent as others. From evidence collected, coupled with experience of the members of the committee, it is of the opinion that steel for rails can be obtained which is more durable and less liable to the development of corrugation than the ordinary varieties of steel in use at present."

Mr. Holt next takes up an article by G. E. Pelissier appearing in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 30, 1911, page 528. He commends this article, but directs attention to Mr. Pelissier's contention that most corrugation can be eliminated by so designing the rail head, wheel tread and wheel flange, and by so laying the rails that the maximum intensity of pressure occurs near the center of the rail tread, and as far as possible from the gage line fillet. He also quotes Mr. Pelissier's recommendation that the elastic limit of the steel should be raised and the area of contact between rail and wheel increased. Although the Leeds rail and that designed by Mr. Cram fulfill Mr. Pelissier's requirements regarding contact, yet in the Leeds rail corrugation still occurs. Mr. Holt's conclusion is that attention to the composition and method of manufacturing steel offers the only practical way of dealing with corrugation.



CORRUGATION DEVELOPED ON LEEDS RAIL AFTER PASSAGE OF 523,350 CARS AND 300,000 CARS RESPECTIVELY

On the Leeds tramway during the past eight years Sandberg silicon steel rails have been used. Although immunity from corrugation has not been entirely secured, only a relatively slight amount of grinding has been necessary. During the past year, air-cooled steel of the same composition has been experimented with in Leeds. This cooling is a patented process which can be applied to any rail, and it is said to increase the life

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from 100 to 150 per cent. Tests made at Leeds showed about 6 per cent more tensile strength and 13 per cent less elongation for the new as compared with the ordinary Sandberg rail. So far no corrugation has developed with the new rails and superior wearing qualities have been shown.

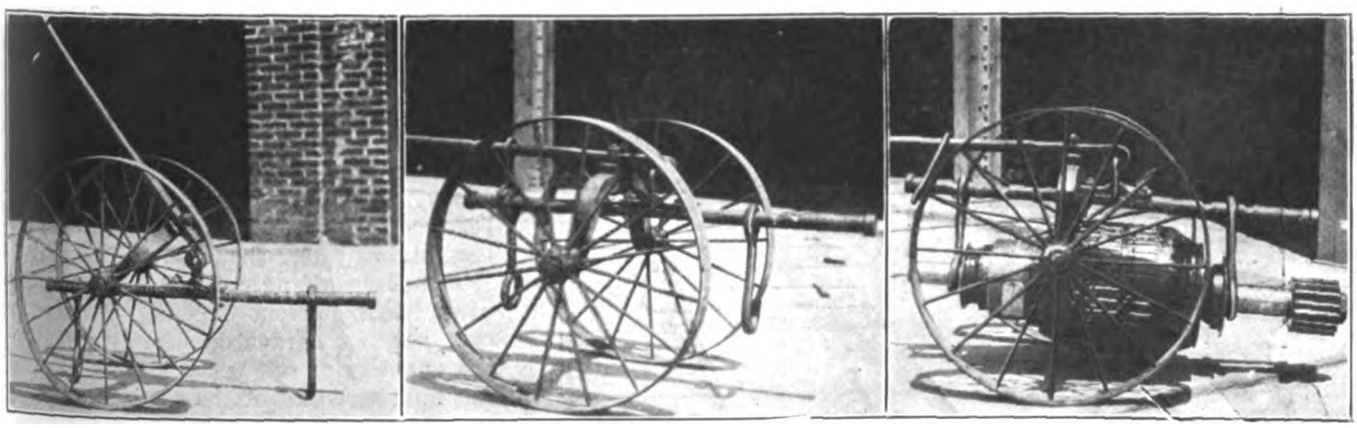
In the same issue of the *Tramway and Railway World*, and on the same general subject, is a comment upon the results secured with differential gear drive on the Huddersfield Corporation Tramways, the details of which were described in the issue of the ELECTRIC RAILWAY JOURNAL for July 3, 1915, page 26. By this plan the wheels are driven independently, so that there is no slippage on curves. This type of drive has been in use since October, 1914, and although there has been no reduction in tire wear or current consumption, rail corrugation has been eliminated.

Armature Buggy Constructed at Small Expense

A simple armature buggy has been designed and put in operation by E. G. Daniels, master mechanic Macon Railway & Light Company, Macon, Ga. The accompanying illustrations show the construction and operation of this device.

In using the buggy, the workman rolls it to the armature and lowers the carriage by raising the long handle. The eye-bar is slipped over one end of the armature shaft and the other end of the shaft is hooked to the carriage as shown. The carriage is then raised by lowering the handle, and when the latter is hooked in position the outfit is ready to be rolled to any part of the shop.

The buggy is of rugged construction and the cost to the company was small, as the wheels were the only parts that had to be purchased. A device of this kind is not only serviceable for handling armatures but may be used in handling many heavy pieces of equipment which can readily be attached to the carriage. The notches on the carriage make it possible to handle armatures of different lengths.



ARMATURE BUGGY USED IN THE SHOPS OF THE MACON, GEORGIA, RAILWAY & LIGHT COMPANY

Improved lighting, a reduction in lamp breakages and thefts, as well as in the amount of energy consumed, and a saving of 175 ft. of wire, were the results obtained by modernizing the lighting systems of the single-truck cars used on the lines of the Public Utilities Company, Evansville, Ind. Two lines of wire in the new plan were substituted for seven lines in the original lighting circuits. In the new scheme seven 56-watt lamps light the car body and vestibules, one lamp is in the headlight and the two other lamps are in the illuminated signs.

Finding Pole and Wire Loads

Handbooks on electric railway engineering supply many data and formulas for pole and wire load calculations, but most of the methods recommended for exact determinations include mathematical steps too far advanced for ready use by those whose engineering training has largely been obtained in the "school of hard knocks." In planning their work few line foremen resort to mathematical calculations which include algebra and trigonometry. A rule-of-thumb backed up by practical experience serves their purpose.

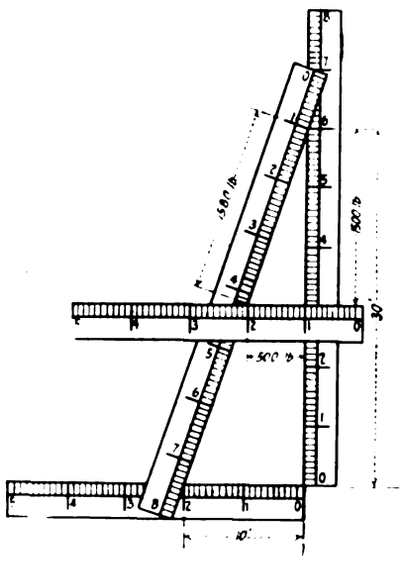


DIAGRAM SHOWING USE OF SCALES IN LINE CALCULATIONS

For those who frequently have to determine how poles should be loaded and guyed, and how wires and cables should be stressed, some very simple ways of figuring are set forth in a new booklet just issued by the Bates Expanded Steel Truss Company, Chicago, Ill. The methods give the results of the experience of A. S. Bates.

Mr. Bates gives a number of tables from which ordinary line problems can be solved readily. By means of problems he illustrates the use of the tables. He also gives a number of illustrations to show how the results of calculations based on the tables can be checked or the problems solved graphically by means of scales. The use of these can best be explained by an example.

In the accompanying figure are shown four scales arranged for a guy-wire problem. Assume that a horizontal pull of 500 lb. on a pole applied at a point 30 ft. above the ground is to be counteracted by means of a guy attached at the same point and entering the ground 10 ft. from the base of the pole. The problem is to determine the pull in the guy wire and from this the safe size of wire. Incidentally the vertical compression on the pole produced by the guy wire will be of interest.

For convenience the scales should be divided into inches and tenths of inches. Two of them are placed at right angles as shown for the purpose first of determining the angle of the guy. Five feet to the inch is selected as a convenient scale of length. A third scale is laid diagonally across the first two from point 6 (rep-

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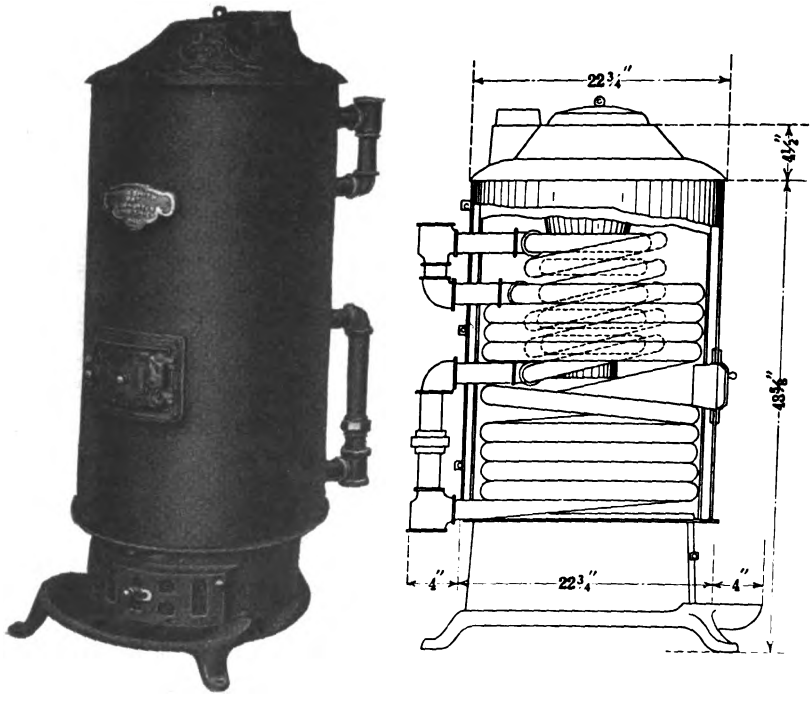
resenting 30 ft. height) on the vertical scale to point 2 (representing 10 ft. on the ground) on the horizontal scale.

Remembering now that the forces involved act along directions parallel to the three scales, the next step is to choose a scale for the forces. A scale of 500 lb. to the inch is convenient. A fourth scale is then laid across the vertical and inclined scales, in a horizontal direction, and is moved upward until they intercept on it just 1 in., which represents the horizontal pull on the pole. This completes a triangle of which the other sides, to scale, represent respectively the pull in the guy wire and the vertical force in the pole. From a table of wire strengths the proper size of guy wire can be selected.

Hot-Water Heater for Steel Interurban Cars

Coincident with the increase in the number of steel interurban cars has been the demand for a hot-water heater which would heat them comfortably when they were operating at high speeds during extremely low temperatures. To supply this demand the Peter Smith Heater Company, Detroit, Mich., has just put on the market a new hot-water heater quite similar to its No. 1-C type heater, which has been in successful operation on interurban cars for a number of years. Although the new heater has greater heating capacity than the 1-C type, this has been obtained without requiring much additional floor space. The new hot-water heater occupies a space 22¾ in. in diameter, which is 2¾ in. larger than that required for the 1-C type heater, and the height of the two heaters is the same. This new type hot-water heater for steel interurbans is shown in the accompanying illustrations.



VIEW OF HEATER AND CROSS SECTION SHOWING COIL ARRANGEMENT

Two features in the design of the new hot-water heater are to be found in the arrangement of the hot-water coils and the manner of connecting them in the heating system. Two sets of coils are mounted in the heater drum, the lower one of which is made of 1½-in. pipe and it serves as a fire pot, and the upper coils lie directly over the fire. The outer portion of this upper coil is made up of 1½-in. pipe, and the two inner coils are made up of 1¼-in. pipe. The magazine feed chamber passes down through the center of the upper coils, and it is of sufficient capacity to supply coal for a twelve-hour run. It will also be noted that the heater coils are interconnected on the outside of the heater casing, and that a 1½-in. air space is provided between the inner and outer casings to insulate the heater so that it may be installed close to the interior wood finish of a car.

In connection with the hot-water heater installation it has been found preferable to provide a double circulation system with a set of heater coils on each side of the car body. This reduces the hot water travel one-half in making a complete circuit of the heating-pipe system, and thus insures a more uniform temperature throughout the car body. Piping systems of this kind are just as readily arranged for center-entrance cars as for end-entrance cars. The heater may be installed at any convenient point in the car, and a piping system provided which will offer free water circulation, and, therefore, uniform heat distribution.

Concreting in Cold Weather

The Portland Cement Association has formulated the precautions necessary to insure best success with concrete work in cold weather, with the statement that while there are limitations to the practicability of doing concrete work in winter it can be done successfully by following a few simple rules. Some of the suggestions are in substance as follows:

During the first few days following the placing of concrete, alternate freezing and thawing at comparatively short intervals will damage it; therefore, it is necessary so to mix, place and protect the concrete that early hardening will be complete before the work is exposed to freezing temperatures.

Sand and pebbles or broken stone used must be free from frost or lumps of frozen material. If these materials contain frost or frozen lumps they should be thawed out before using. As cement forms but a relatively small bulk of the materials in any batch of concrete, it need not be heated, but mixing water should always be heated.

Although adding common salt to mixing water will prevent freezing of concrete that has not hardened, there is a limit to the quantity of salt which may be added if the final strength of the concrete is not to be affected. Salt simply lowers the freezing point of the mixing water; it does not supply what is most needed—heat and warmth. It delays, rather than hastens, the hardening of the concrete.

Sand and pebbles or broken stone and mixing water must be heated so that the concrete when placed shall have a temperature of from 75 to 80 deg. Fahr. Some sands, pebbles and varieties of broken stone are injured by too much heat. A temperature not exceeding 150 deg. will generally prove most satisfactory.

Concrete should be placed immediately after mixing so that none of the heat will be lost before placing in the forms. Metal forms and reinforcing should be warmed before the concrete is placed. Forms can be warmed by turning a jet of steam against them or by wetting with hot water. The concrete should be protected immediately after placing. Canvas covering, sheathing, housing in the work, or hay or straw properly applied will furnish the required protection for some work. In ad-

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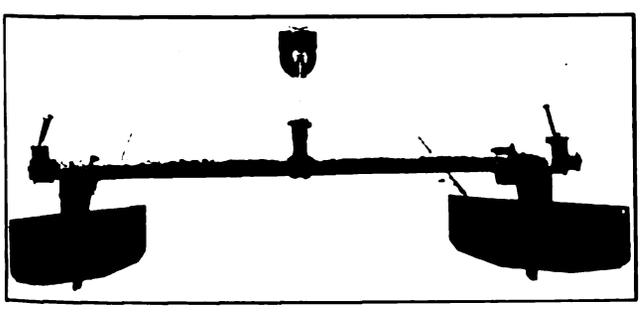
dition to those means, small oil or coke-burning stoves or salamanders may be used in inclosed structures. In severe, cold weather protection should be continued for at least five days. Temperatures which may not be low enough to freeze the concrete may, nevertheless, delay its hardening for a considerable time.

Frozen concrete sometimes very closely resembles concrete that has thoroughly hardened. When frozen concrete is struck with a hammer, it will often ring like properly hardened concrete. To determine whether concrete has hardened or is simply frozen one board may be removed from some section of a form, and hot water poured on the concrete, or the flame of a plumber's blow torch or a jet of steam under pressure may be turned against the concrete. If the concrete is frozen the heat will soften it by thawing the water contained in it. Although concrete which freezes before early hardening has been completed may not be permanently injured if after thawing out it is not again exposed to freezing until hardened, nevertheless protecting the concrete against the possibility of freezing is best.

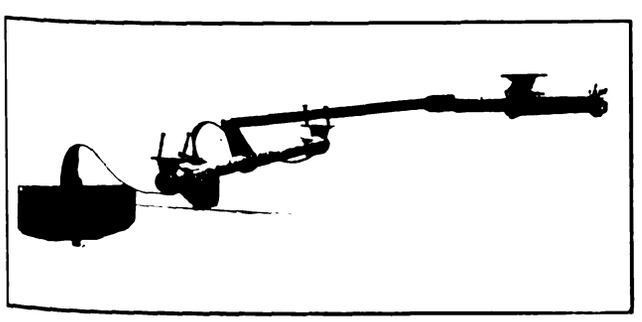
An Improved Snow Scraper

The Root Spring Scraper Company, Kalamazoo, Mich., has placed on the market a new snow scraper for use on low-level or other city cars. This scraper, which is shown in the illustrations herewith, consists of a shaft, an operating arm, and a spring scraper attachment for each rail. The design is such that the shaft



FRONT VIEW OF SCRAPER SHOWING ADJUSTABLE BLADE RESTING IN RAIL FLANGES

is as low as 10 in. to 12 in. from the top of the rail and can be attached to the car sills or platform arm directly or by means of brackets. The operating arm on the shaft is adjustable, so that it can be set to give any desired tension to the scraper flanges on the rail. Only one-half turn of the wheel, which is located in the cab

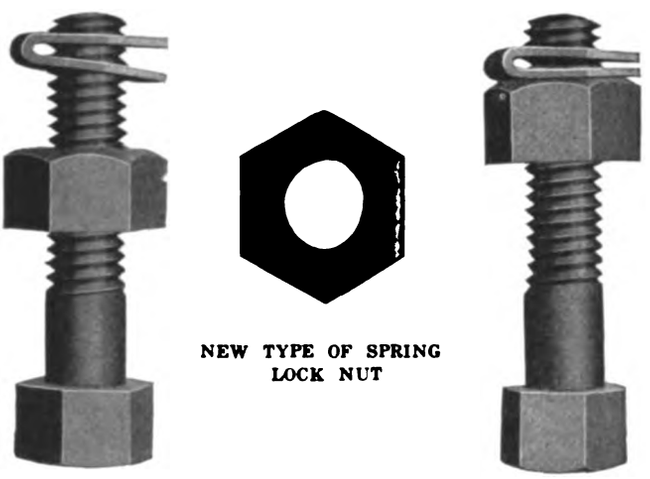


SIDE VIEW OF IMPROVED SCRAPER SHOWING OPERATING MECHANISM

of the car and attached to the operating arm, is necessary to lock the scraper to the rail with any pressure desired. The springs, which are attached to the scraper flanges, are so shaped that they will yield when going forward and will not turn under when the car is going backward. The blades of the scraper, which set into the flange of the rail, are adjustable and can be dropped or lowered as they gradually wear down. This scraper has a concentric locking device which automatically locks the blades of the scraper to the rail or in a carrying position. It can be operated by air, by wheel and staff, or by lever hand power.

A New Lock Nut

The Industrial Development Corporation, Chicago, Ill., is placing upon the market a form of spring lock nut which is said to have been proved effective by long continued tests. It consists of a punching of spring steel bent double, as shown in the accompanying illustrations, and tempered. The punching is so shaped



NEW TYPE OF SPRING LOCK NUT

that when bent to finished form the outline is that of a standard nut. Holes of diameter slightly larger than the bolt are punched to be somewhat offset when the lock nut is bent to form. When the lock nut is drawn into close contact with the main nut it binds in the bolt threads, but friction between the two nuts causes it to follow the main nut on the thread.

A Pipe Bender Made of Trolley Wheels

Three old trolley wheels mounted on lag screws driven into an 8-in. x 8-in. wooden building column serve as the device for bending fender rods and pipe in the shops of the Galesburg (Ill.) Railway Lighting & Power

PIPE-BENDING DEVICE

Company. The arrangement of these wheels is shown in the accompanying illustration. The picture also shows a pipe vise mounted on the same building column, where it is convenient for pipe work, which is practically all done at this point in the shop.

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NEWS OF ELECTRIC RAILWAYS

RESETTLEMENT PROPOSED IN OAKLAND

Chamber of Commerce Submits Charter Amendment to Aid Railway—Is Seeking Election by Initiative

The Chamber of Commerce, Oakland, Cal., as the result of an appeal by the San Francisco-Oakland Terminal Railways for help in solving its financial and operating difficulties, has drafted a charter amendment to be submitted, if possible, to the people for ratification at the coming November election. The City Council has failed to pass a resolution to place the amendment on the ballot, but an attempt is being made to do this by means of an initiative petition. Various items regarding the proposed reorganization of the San Francisco-Oakland Terminal Railways have previously been reported in these columns.

The proposed charter amendment provides for a resettlement franchise similar to the Kansas City and Chicago plans, but with alleged improvements. In brief, it provides for an appointment by the Mayor of an advisory board with seven members to co-operate with the City Council in drafting the franchise ordinance. This would be submitted to the people for ratification at the spring election in 1917. The franchise would be for an indeterminate period on condition that the city might buy out the system on six months' notice and might transfer its right to buy to a third person, firm or corporation.

The conduct of the traction affairs would be carried on by a joint board, one member representing the city and one the company, with an arbitrator to be called in if necessary. The net profits would be divided between the city and the company, the city to get not less than 55 per cent and the company to be allowed 6 per cent on its valuation and a proper amount for maintenance, operation, taxes, insurance and depreciation.

In the event of purchase by the city, the price would be the valuation of the property as fixed by the State Railroad Commission at the time of granting the franchise, plus the cost of all additions, extensions and betterments as authorized by the board of control and minus depreciation as fixed by the same board and also minus properties sold and abandoned. The city might assume the outstanding obligations of the company, subject to the State constitution, up to the valuation fixed by the State Railroad Commission, the bonds then to be secured by the city's credit or by a lien on a fixed percentage of the gross earnings.

The charter amendment, as first outlined, was intended to apply only to the affairs of the traction company, but as the special committee of eleven appointed by the Chamber of Commerce to unravel the tangle got further into its investigations, it was decided to broaden the amendment so as to permit any public utility to seek a resettlement franchise.

In addition to the principal provisions of the plan as outlined above the charter amendment provides that resettlement franchises shall be let to the highest bidder, 55 per cent of the net annual profits to be the minimum bid, and bids to be raised not less than one-half of 1 per cent. It is also provided that no other street railway or steam railroad shall use the tracks of the franchise grantee, except on express permission of the city.

In the final draft of the amendment the committee had the assistance of George K. Weeks, president San Francisco-Oakland Terminal Railways; W. I. Brobeck, its attorney, and C. A. Beardsley, counsel for the stock and bond holders. Mr. Weeks is reported to have said, after the amendment was whipped into shape for submission to the popular vote, that he considered the plan the best yet evolved in the United States for straightening out street-car difficulties.

Work was started, on Aug. 15, under the direction of the special committee of the Chamber of Commerce, to place the proposition upon the ballot for November. It was planned to obtain 15,000 names as soon as possible to file with the city authorities, asking the election. The names must be filed not later than Sept. 7. The decision of the committee to force the issue followed the refusal of the City Council to take up the plan.

NORFOLK FRANCHISE NEGOTIATIONS FAIL

The proposed new franchises to the Virginia Railway & Power Company in Norfolk have not been acted upon. The old City Council went out of existence Aug. 31. On Sept. 1 the company published in the daily papers a notice in regard to the withdrawal of tickets from the lines of the Norfolk Railway & Light Company. This was followed the next day with a statement of the reasons for the withdrawal. The contract referred to is a ten-year contract with the city covering gas and electric rates and the sale of tickets at stations. It expired on April 1, 1916.

The City Gas Company has filed new gas rates with the State Corporation Commission. The price runs from $1.10 down to 80 cents, with a discount of 10 cents per thousand, with additional discounts of 10 cents and 5 cents per thousand to very large consumers. The special committee appointed to make a report on gas rates failed to present its report before the old Council went out.

The advertisement which appeared in the papers on Sept. 1 is as follows:

"The contract between the Norfolk Railway & Light Company and the city of Norfolk, providing for the sale of tickets at certain stations in the city at a price of six tickets for 25 cents, good on cars of said company, having expired by limitation, the street car fares authorized by the franchise contracts under which the lines of said company are operated will be restored and the sale of such tickets at said stations will be discontinued after Sept. 10.

"No tickets sold after Sept. 10, 1916, except school tickets as hereinafter stated, will be accepted on the cars operated on the lines of the Norfolk Railway & Light Company except in that portion of the city of Norfolk which was formerly the town of Berkley wherein the franchise ordinances require the sale of tickets.

"While not required by the franchise, the company will continue until further notice the sale of school tickets under the same regulations as have heretofore existed.

"All unused tickets will be redeemed on presentation at the company's office in Plume Street in the city of Norfolk.

"As a result of this change there will be a straight 5-cent fare on all lines operated by the Virginia Railway & Power Company in Norfolk, except the line known as the Bay Shore line; the lines in Berkley, and the line between Norfolk and Berkley."

The statement of Sept. 2 by the company to the public was concluded as follows:

"The contract with the city providing for the sale of tickets at certain stations having expired, the company is now remanded to the terms of its original franchise ordinances prescribing its rights and obligations in operating upon the streets of the city, and since these ordinances authorize a charge of 5 cents per passenger and do not require the sale of tickets, the sale of such tickets will be discontinued from and after Sept. 10, and no tickets will be sold for use on the cars of the Norfolk Railway & Light Company other than the lines in what was formerly the town of Berkley, after that date.

"It is believed the public will realize the reasonableness of this action on the part of the company. Not only is the fare of 5 cents a reasonable, and in fact a low fare, as it has recently been declared to be by the Council in fixing the fare on the jitney bus, but as the company is required to live up strictly to the provisions of its contract in favor of the city and to discharge fully its obligations thereunder, it is reasonable that it should expect the benefits of such contract upon the faith of which the investment in the properties was made and the obligations of these contracts assumed."

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ELECTRIC RAILWAYS EXEMPTED

The act of Congress fixing the workday of railroad employees after Jan. 1, 1917, at eight hours specifically excludes the electric railways from its provisions. Section 1 of the act, which contains this exemption, is as follows:

"Sec. 1.—Beginning Jan. 1, 1917, eight hours shall, in contracts for labor and service, be deemed a day's work, and the measure or standard of a day's work for the purpose of reckoning the compensation of all employees who are now or may hereafter be employed by any common carrier by railroad, except railroads independently owned and operated, not exceeding 100 miles in length, electric street railroads, and electric interurban railroads, which are subject to the provisions of the act of Feb. 4, 1887, entitled 'An Act to Regulate Commerce,' as amended, and who are now or may hereafter be actually engaged in any capacity in the operation of trains used for the transportation of persons or property on railroads, except railroads independently owned or operated, not exceeding 100 miles in length, electric street railway, and electric interurban railroads from any State or Territory in the United States or the District of Columbia, to any other State or Territory of the United States or the District of Columbia, or from one place in a Territory to another place in the same Territory, or from any place in the United States to an adjacent foreign country, or from any place in the United States through a foreign country to any other place in the United States.

"Provided, That the above exceptions shall not apply to railroads though less than 100 miles in length whose principal business is leasing or furnishing terminal or transfer facilities to other railroads, or are themselves engaged in transfers of freight between railroads or between railroads and industrial plants."

PENNSYLVANIA JITNEYS MUST GET SERVICE PERMIT

The Public Service Commission of Pennsylvania, in opinions rendered on Sept. 6, held that Bryan Blythe and W. T. Alter, operating jitneys in the vicinity of Natrona, Allegheny County, must obtain certificates of public convenience from the commission. The decisions in the main follow the lines of those handed down in the Scranton cases decided by Judge Mongahan, Philadelphia, when a commissioner. The Allegheny Valley Street Railway was the complainant. In the case of Blythe, however, it is pointed out that he had made an application for a certificate and that when a hearing was held on a protest filed by the street railway he did not appear. The opinion says:

"The granting of certificates of public convenience authorizing individuals to engage in the business of a common carrier of passengers is of grave moment to the public. Not only the public's convenience, but their safety is involved. It seems proper that the commission should be informed of the character and fitness of such applicants and also as to their ability to perform the service which such certificates of public convenience would impose upon them."

The opinion contains an order that Blythe must stop operating until he obtains a certificate. A similar order is also made in the case of Alter.

EDITORIAL TRIBUTES TO MR. CHRISTY

The principal Akron papers said editorially of the late Will Christy, vice-president of the Northern Ohio Traction & Light Company, Akron, Ohio:

"Will Christy had not an enemy in the whole city which had been his home since boyhood, which speaks better than all else for the exemplary manner in which he had lived and for the strength of his character. He was always loyal and helpful to his friends, and when fortune favored his business endeavors the resulting wealth and influence that were his did not abate in the slightest degree the genuinely democratic nature of his impulses and associations."

"In the death of Will Christy, Akron loses a valuable citizen and the traction industry of the country one of its far-seeing leaders. Mr. Christy was a practical dreamer with the faculty of making his dreams come true. He saw Akron and his work in a big way—that was the secret of his success. He was still dreaming of big things for Akron when he was called from his busy desk. He was not content to work in his own field. He was interested in all industry, in finance, in Akron. His aid, unostentatious and unsolicited, has gone to many industries and many philanthropies."

JOINT ENGINEERING BOARD FORMED IN MINNESOTA

The engineers of Minnesota believe that through co-operation of various engineering societies they can be more useful to their communities, and are attempting to bring about closer co-operation through the formation of the Minnesota Joint Engineering Board. The constituent societies represented on the board are the Northwestern Association of the members of the American Society of Civil Engineers, the Minnesota Section of the American Society of Mechanical Engineers, the Minnesota Section of the American Institute of Electrical Engineers, the Minnesota Surveyors and Engineers Society, the Engineers Club of Minneapolis, and the Civil Engineers Society of St. Paul. It is hoped that through this central organization the activities of the engineers of the State may be more closely correlated and more accomplished for the public welfare. Geo. W. Rathjens of St. Paul is the secretary of the board.

CROSSTOWN RAPID TRANSIT LINE URGED FOR BROOKLYN

That a crosstown subway in Brooklyn reaching into Queens is indispensable to the proper development of those two boroughs is pointed out by Commissioner Travis H. Whitney and LeRoy T. Harkness, chief of rapid transit, of the Public Service Commission for the First District of New York, in a report to that body dealing with the third-tracking of the Fulton Street elevated line in Brooklyn and with the whole transit situation in the borough of Brooklyn. The report also recommends the institution of negotiations with the New York Municipal Railway Corporation looking toward the fixation of a price at which the existing elevated railroads in Brooklyn can be taken over by the city.

The report suggests a subway extension connecting with the Fourth Avenue line at Fulton Street and Ashland Place and extending under Fulton Street to a point near Cumberland Street, where a connection might be made with the Fulton Street elevated line. If the opportunity were made for such connection, it is pointed out, the existence of the present Fulton Street elevated tracks east of Cumberland Street will be obviated. The report also suggests that a line in Livingston Street, Brooklyn, be built with funds raised by assessment upon property benefited together with certain funds which it is proposed shall be provided by the city.

The crosstown line, it is pointed out in the report, will furnish a through route from Coney Island to Queens, uniting disjointed sections of both boroughs. It is suggested that the crosstown line be built with funds raised by assessment upon property benefited. No statement of the cost of this line, it is pointed out, can be made at this time. The report holds against the suggestion which has been made of abandoning the Nassau Street line in Manhattan immediately and turning the funds thereby released toward the construction of the crosstown line. Several other suggestions are made in the report, one being to the effect that investigation and consideration of the plans and scope of the proposed crosstown line improvement be made at once and that the preliminary steps toward laying out an area of assessment be undertaken. It is suggested that a committee of ten be named, five appointed by the New York Municipal Railway Corporation of Brooklyn and five by the Public Service Commission, to institute negotiations with the railway looking to the making of a valuation of the elevated railroads in Brooklyn. The report states that if this committee is appointed at once such rapid progress may be made that within a period of a few months it can be shown whether success or failure will attend the carrying out of the proposed plan.

The report also renews the recommendation made in a previous report by Commissioner Whitney and Mr. Harkness in which they disapproved a plan for the transfer of the elevated tracks from lower Fulton Street, Brooklyn, to Adams Street. The report points out that this project would cost a very large sum of money and would be hardly worth the expenditure.

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A PLEA FOR THE TROLLEY

Further evidence of increasing newspaper appreciation of electric-railway problems is shown in an editorial in the Wareham (Mass.) *Courier*. That paper recently said in part:

"These are hard times for the rural trolley companies. They are having difficulties in meeting the advanced expense of operation in face of the decreased revenue from travel. Trolley stocks are not attractive investments these days. For the situation that exists there is a reasonable explanation.

"There are companies which were wrecked from within, but there are other companies, honestly built, honestly financed and honestly operated, which are feeling the strain from an entirely different cause. They have seen the price of equipment doubled within the last few years. They have been forced to pay more for operating expenses, owing to the increased cost of living. They have seen their taxes increase enormously, and have had to meet the most exacting demands of the various commissions which regulate their operation. Regulation, while intended to safeguard the rights of the public, has gone to an extreme, and there is danger of their being regulated to death. They are forced to incur additional expense to meet the requirements of the numerous commissions which demand different systems of accounting to meet their varying whims. They are forced to maintain safety devices which, while they may be good, cost money.

"With all this, the reports of nearly all suburban roads show that their patronage is decreasing steadily. Every automobile that is put into service means fewer passengers for the trolley roads. From this source alone the decrease has been enormous. Jitneys, too, enter somewhat into the situation. Take it all in all, who would own stock in a trolley road?

"Yet trolley roads are a public necessity. They must continue to be operated even though the stockholders get no interest on their money. It is perfectly plain that something must be done about it. Honestly-operated roads must be supported. They must be relieved of some of their burdens if they are going to continue.

"Making corporations marks for extortion cannot go on forever. There must be a distinction made between the corporation which has been honest and decent and those that have robbed the public. The same regulations cannot be continued over both."

$351,206,584 INVESTED IN ELECTRIC RAILWAYS IN CALIFORNIA

According to information compiled by the California Electric Railway Association, there are twenty-seven street and interurban electric railways in California. They represent an investment of $351,206,584, operate 3037 miles of track, with 3348 passenger and 1598 freight cars, and handle about 2,000,000 passengers daily. These railways employ 17,405 persons, who have 50,210 persons dependent upon them for a living. They operate in ninety-one cities and through numerous districts outside of incorporated cities, serving approximately 2,100,000 people. In 1915 they carried 627 533,941 passengers. The gross receipts in 1915 were $34,147,671, of which $1,792,752 went to the State as taxes. Approximately 2000 motor vehicles commonly called "jitneys" are now operating in direct competition with the electric railways. Most of these vehicles run on the more profitable and short-haul routes. They charge the one-way or round-trip fare, but do not attempt to meet the low commutation rates of the interurban electric railways. Those competing with the 5-cent local lines do not run to the end of the car routes. Street cars carry passengers in the larger cities distances in excess of 10 miles, with transfers, for a nickel. The average trip of the 5-cent "jitney" does not exceed 5 miles. The statement of the association concludes as follows:

"The future of the electric railways in this State rests with the people. Are they going to permit this unsound condition to continue or will they insist on the enactment of laws that will place this new class of utility on a parity with the electric railway companies as to regulation and taxation?"

TERMS OF CHATTANOOGA LABOR SETTLEMENT

The agreement entered into between the Chattanooga Railway & Light Company, Chattanooga, Tenn., and its employees, under which the strike of trainmen was settled, will continue in force until Aug. 24, 1917. The company has agreed to employ only members of Division No. 715 of the Amalgamated Association, or those who, if eligible, become members within sixty days after entering the service of the company. The company agreed that when an employee is suspended or discharged the cause of such suspension be furnished the properly accredited officer of the association. Any employee found not guilty, after investigation, of the offense charged against him is to be restored to his former standing with pay for time lost. All men hired between Aug. 20 and the signing of the agreement were to be discharged. The maximum time for any regular scheduled run is not to exceed ten and one-half hours in any one day. The scale of wages is fixed as follows: First six months, 20 cents an hour; second six months, 22 cents an hour; second year, 24 cents an hour; third year, 26 cents an hour; fourth year, 28 cents an hour. Time and one-half is to be allowed for overtime both for platform men and in all other departments. The men on the extra list are guaranteed not less than five hours a day. The wages and conditions in the line department are as follows: Fifty-eight hours shall constitute a week's work with sixty hours' pay. Ten per cent increase in wages, time and one-half for overtime. Scale for apprentice, 17½ cents an hour for first six months; 25 cents raise a day every six months until three years elapse. Standard scale, 30 cents an hour; thirty-one minutes is to constitute an hour's pay. Emergency men are to receive straight time for first ten hours and time and one-half for overtime. Construction men, time and one-half for Sunday and all overtime. Arbitration is provided for as a means of adjusting all questions which arise and cannot be agreed to mutually.

WAREHOUSES PLANNED BY OWNERS OF CLEVELAND & YOUNGSTOWN RAILWAY

The Cleveland & Youngstown Terminal Company, headed by the Van Sweringen brothers, who are also the promoters of the Cleveland & Youngstown Railroad and principals in the ownership of the Nickel Plate Railroad, announced on Sept. 2 that plans had been completed for a series of warehouses that will have a capacity of 40,000,000 cu. ft. and cost between $10,000,000 and $15,000,000. These buildings are to be located along the right-of-way of the Cleveland & Youngstown Railroad between East Ninth and East Thirty-fourth Streets. The buildings are to be constructed of brick, concrete and steel and made fireproof. They will be built in groups from four to eight floors in height, depending upon the individual demand for space. The warehouses are being planned for both storage and distribution purposes. It is estimated that the buildings, as planned at present, will all be completed within five years. Further plans of the Van Sweringen interests include a union station and freight houses to be used by the interurban lines and a number of the steam roads. This building will extend from the south side of the Public Square to the line of warehouses as proposed. Some of the business places on the square are now being vacated in anticipation of the change. The old Forest City House, on the west side of the square, is also being razed to make room for the Hotel Cleveland, a twelve-story structure which is to be erected by the Van Sweringen interests in connection with the depot proposition.

THREE PROPOSED KENTUCKY ROADS MAY ENTER CINCINNATI

In a report to the Cincinnati Rapid Transit Commission on Sept. 1, Frank S. Krug, chief engineer, discussed the possibility of the entrance to the city of three proposed Kentucky lines, if the use of the Southern Railroad bridge can be secured and the companies are allowed to operate their cars over the rapid transit loop. All three of them would use the same track between Cincinnati and Walton, Ky. From that point south they are separate propositions. One is to be known as the Covington, Big Bone & Carrollton Railway. J. J. Weaver, Ludlow, Ky., is laying out the

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line. It will connect Ludlow, Walton, Big Bone, Worthington and Carrollton and may be extended to Madison, Ind. Its length would be 65 miles and it would serve a territory with a population of about 80,000 people. Another road, to be known as the Louisville, Lexington, Maysville & Cincinnati Electric Railway, 120 miles in length, is being promoted by J. C. Blackburn, Dry Ridge, Ky. The third would be 55 miles in length and would connect Ludlow, Falmouth, Cynthiana and Winchester. The three, it is said, would serve a population of 240,000 and would bring 500,000 people into Cincinnati annually. Mr. Krug has recommended a conference between the commission and the promoters of the roads.

Paris Cars Again Running.—The street cars of the Paris (Tex.) Transit Company are again operating, by means of power from the plant of the Texas Power & Light Company at Waco. The street cars had been out of commission since the big fire in Paris on March 21, which destroyed the local company's power station and carhouses.

Cincinnati Commission Has Right to Award Contracts.—Attorney Frederick L. Spiegel, counsel for the Rapid Transit Commission of Cincinnati, Ohio, has rendered an opinion to the effect that the commission is empowered to award all contracts according to law. The commission had asked an opinion on this matter before making contracts for test holes along the route of the rapid transit loop.

Sandpoint System Offered to City.—The directors of the Sandpoint & Interurban Railway, Sandpoint, Idaho, have submitted to the City Council a proposition to sell the entire system to the city. The directors asked the Council to submit the plan to the voters at an early election. The company planned to abandon the system and dispose of the equipment, but this move was protested and it was considered advisable to offer the people a chance to retain the system if the majority desired it.

Increase in Wages in Galveston.—Notices have been posted announcing increases in pay affecting 135 trainmen, conductors and motormen employed by the Galveston (Tex.) Electric Company. The increase amounts to nearly 10 per cent, being a flat increase of 2 cents an hour for all employees, regardless of seniority. Under the new scale of wages, which went into effect on Aug. 15, conductors and motormen entering the company's employ will receive 23 cents an hour, while those longest in the service will receive 28 cents an hour.

Another Boston Tunnel Section to Be Opened.—The Boston (Mass.) Elevated Railway will equip and operate the Summer Street section of the Dorchester tunnel within the next few months, providing rapid transit train service between Cambridge and the South Station via the Cambridge subway. As the result of a recent conference with the Boston Transit Commission, the Park Street-South Station section of the tunnel will probably be operated without a rental charge, pending the completion of the Dorchester tunnel to Andrew Square.

Bay State Employees Seek Wage Increase.—The agreement between the Bay State Street Railway, Boston, Mass., and its employees covering wages expires on Oct. 1. In a new agreement presented to the company the men ask for an increase in wages and changes in the present schedule of runs. The last demands of the union were made in October, 1914. Arbitrators were appointed who awarded the men an advance dating from Oct. 1, 1914, and an additional increase on Oct. 1, 1915. P. F. Sullivan, president of the company, has met the new demand of the union with a request that the carmen go back to the 1914 scale of pay, which was substantially lower than their present rate.

Question of a New Power Plant at Cleveland.—Street Railway Commissioner Fielder Sanders has engaged Fred Sargent of Sargent & Lundy, electrical engineers, Chicago Ill., to advise him as to the best course to follow in regard to the Cedar Avenue power plant of the Cleveland Railway, which is rapidly becoming useless. It is said that about $500,000 would be required to build a new plant and that the cost of abandoning the present plant and installing apparatus for the use of power from outside sources would entail a cost of $1,000,000. Light Commissioner W. E. Davis is urging the company to purchase energy from the municipal light plant, but additions costing $1,750,000 would have to be made to it in order to have the necessary capacity.

Nashville Men Get Higher Wages.—The Nashville Railway & Light Company, Nashville, Tenn., has announced a new wage scale. Under this the rate of pay of men who have been in the service of the company for six months and less than one year is increased from 19 to 20 cents an hour; one year to two years, 20 to 21 cents; two years to three years, 21 to 22 cents; three years to four years, 21 to 22 cents; four years to five years, 22 to 23 cents; five years to six years, 23 to 24 cents; and six years and more, 23 to 25 cents an hour. Employees who have served less than six months are not affected. This class will continue to receive 18 cents an hour. All men on the extra list, and assigned to extra runs, swings, and special cars, will receive pay for not less than three hours.

Changes in Southern Texas Traction Personnel.—Changes in the operating department of the Southern Texas Traction Company, Dallas, Tex., have been announced by Burr Martin, general manager, to become effective at once. Dan G. Fisher, who has been superintendent of transportation for the Corsicana division, has been transferred to the executive offices, reporting direct to J. F. Strickland, president, and assuming the position of assistant to the president. H. G. Floyd, superintendent of transportation of the Waco division, has become superintendent of transportation for both the Waco and Corsicana divisions and is now the ranking operating official for the Southern Traction Company, exclusive of the properties in Waco, where H. B. Foss will remain in charge of transportation for the terminal properties.

Conditions in Bangor Practically Normal.—Since Monday, Sept. 3, cars of the Bangor Railway & Electric Company, Bangor, Me., the employees of which went on strike on Aug. 26, have been operated on regular schedule on the suburban and interurban lines. The city schedule is being operated practically in full. Riding is about 80 per cent of normal. There has been very little violence. All of the new employees are residents of Bangor and Penobscot County. Thomas F. Shine and John H. Reardon are the organizers in charge for the Amalgamated. Parades and public meetings are held almost every night, but outside of a few friends the men who went out are receiving very little support. The strike situation as far as the company is concerned is a closed incident. A visitor to Bangor would hardly notice that there is a strike in force. The Municipal Court Judge fined an engineer of the Maine Central Railroad $100 and costs for interfering with the operation of cars, indicating clearly that effective means will be taken in dealing with offenders who interfere with the orderly conduct of the business of the company.

Labor Day Riot in El Paso.—As the Labor Day parade in El Paso, Tex., concluded many in the parade attacked three cars of the El Paso Electric Railway, the employees of which are on strike, on San Antonio Street, badly wrecking the cars and beating up the operatives. Later three more cars were attacked on Oregon Street by the mob. Police watched the mob for a time without attempting to interfere. Capt. H. Boyd Edwards of the Massachusetts guard hurriedly gathered up a hundred militiamen on the street and, arming them with rifles of the provost guard at the police station, helped the regular provost guard to restore order. Two companies of soldiers were put on duty in the city. Mayor Tom Lea declared he would dismiss the entire force if necessary to enforce order. He placed two men with sawed off shot guns on each street car. A mob later surrounded the Mayor on San Antonio Street in his auto, but armed troops and police came hurrying up and the crowd was dispersed.

Preparing for the Dallas Straw Vote.—C. W. Hobson, who with J. F. Strickland proposes to head the new companies that are to take the street railway systems and the electric light plant at Dallas, Tex., out of the hands of the present owners and operate them on a service at cost basis, is now in the East for the purpose of consummating a lease on the Oak Cliff Lines, owned by the Northern Texas Traction Company and controlled by Stone & Webster. An exact undertaking as to the terms upon which these lines

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can be leased and operated, since they cannot be purchased, will be given to the voters before the straw ballot is taken to fix the valuation in the controversy between the city and the traction and electric light interests. The taking of the vote, which was referred to at length in the ELECTRIC RAILWAY JOURNAL of Sept. 2, is being held up waiting for this detail. Just when the vote will be taken depends upon Mr. Hobson's return. No further conferences are probable before the election, as Mayor Lindsley expects to be out of the city until after the election is held.

Bids for Special Work Opened.—During the week ended Sept. 2 the Public Service Commission for the First District of New York opened bids for the supply of seven portions of special work for use in the construction of the new Culver line in Brooklyn, and set Sept. 18, 1916, as the date for the receipt of bids for the installation of tracks for a portion of the same line. The new Culver line in Brooklyn will be an elevated extension of the Fourth Avenue system, while the present Culver line is the surface extension of the Fifth Avenue elevated line. The special work order upon which bids were taken includes the purchase of frogs and switches and incidental materials, and the Ramapo Iron Works, New York, to which the award will probably go, was the low bidder at $29,859. The contract for track installation will cover the section beginning at a point in private property between Eighth and Ninth Avenues near Thirty-eighth Street and ending at or near Avenue X and Gravesend Avenue. The city will furnish practically all of the necessary materials to the contractor, whose principal item will be the furnishing of labor and a certain amount of hauling.

PROGRAMS OF ASSOCIATION MEETINGS

Colorado Electric Light, Power & Railway Association

The following tentative program has been arranged for the convention of the Colorado Electric Light, Power & Railway Association at Glenwood Springs on Sept. 21, 22, 23:

"The Electric Range Game," by H. L. Titus.

"The New Operating Rules," by F. J. Rankin.

"Uniform System of Reports and Local Reports," by W. L. Sterne.

"Tell the Public What You're Doing," by F. P. Weed.

"Selling Securities to Consumers," by W. F. Raber.

"Utility Regulations," by M. H. Aylesworth.

"How You Can Get More Lamps Into Use," by S. E. Doane.

"The Society for Electrical Development," by H. W. Alexander.

"Pertinent Remarks on Depreciation and Your Annual Report," by F. W. Herbert.

"Sensible Rates for Lighting, Cooking and Power," by L. P. Hammond.

The report of the special committee on depreciation will be presented by H. U. Wallace, vice-president and general manager of the Western Light & Power Company.

New England Street Railway Club

Those in charge of the outing of the New England Street Railway Club, which will take place at Springfield and Holyoke, Mass., on Sept. 21 and 22, report enthusiastic interest in the affair by members of the club. The local committee has been most energetic not only in preparing a most attractive program for the outing, but in making sure that no one will forget the date. A series of cards have been sent out at intervals with such injunctions as "Don't be a crab! Get away from your business, yourself, or your wife, if necessary, and have a good time by attending the outing of the New England Street Railway Club, Springfield and Holyoke, Sept. 21 and 22." The Holyoke Street Railway has also sent to the members of the club a folder descriptive of Mount Tom at whose summit is one of the most attractive hotels in New England. The program includes a luncheon on Friday at this hotel, which is reached by the lines of the Holyoke Street Railway. All in all, the outing this year promises to outdo even the most successful affairs of similar nature conducted by the club in the past, which is saying a great deal. The full program was published on page 373 of the issue of this paper for Aug. 26.

Financial and Corporate

ANNUAL REPORTS

Puget Sound Traction, Light & Power Company

The comparative income, profit and loss statement of the Puget Sound Traction, Light & Power Company, Seattle, Wash., for the calendar years 1914 and 1915 follows:

	1915 Amount	1915 Per Cent	1914 Amount	1914 Per Cent
Railway department	$4,855,839	64.3	$5,714,565	67.6
Light and power department	2,202,337	29.1	2,258,886	26.7
Gas department	54,531	0.7	53,325	0.6
Steam heat department	312,699	4.1	320,548	4.0
Other earnings	134,176	1.8	103,649	1.1
Total earnings	$7,559,582	100.0	$8,450,973	100.0
Operation	$3,144,738	41.6	$3,303,868	39.1
Maintenance	855,893	11.3	881,988	10.4
Taxes	754,132	10.0	821,151	9.7
Total operating expenses and taxes	$4,754,763	62.9	$5,007,008	59.2
Net earnings	$2,804,819	37.1	$3,443,965	40.8
Interest charges	1,878,779	24.8	1,860,824	22.0
	$926,040	12.3	$1,583,141	18.8
Bond sinking funds	301,205	4.1	258,032	3.1
	$624,835	8.2	$1,325,109	15.7
Dividends paid on preferred stock	615,463	8.1	820,618	9.7
Dividends paid on common stock	.....	...	556,736	6.6
	$9,372	0.1	*$52,245	0.6
Net direct charges to reserves and surplus	44,827	0.6	7,407	0.1
Surplus	*$35,455	0.5	*$59,652	0.7

*Deficit.

The total earnings for 1915 decreased $891,391 or 10.5 per cent. The railway department sustained a loss of $858,725 or 15 per cent, and the light and power department $56,549 or 2.5 per cent. These unsatisfactory results necessitated the postponement at the last two quarterly dividend dates of half the amount normally payable on the preferred stock.

The railway earnings contracted under jitney and autobus competition and the general business depression throughout the Puget Sound district. Jitneys appeared in January and increased rapidly until in February and March about 700 were in operation. The loss in gross earnings for a time exceeded $2,000 a day. Since then the number of jitneys gradually declined to about 450 at the close of the year. Light and power revenue was reduced by partial or entire suspension of many industries. Several cement plants were thus affected, and practically all sluicing and dredging work, an important factor in 1914, was discontinued. Reduction in commercial and residential light and power rates in the city of Seattle on April 1 also contributed to the loss.

By rigid economy, however, the expenses of "operation" were diminished $159,130 or 4.8 per cent, while maintenance expenses dropped $26,095 or 2.8 per cent, and taxes $67,018 or 8.1 per cent, so that the total expenses and taxes decreased $252,244 or 5 per cent. The net earnings, therefore, showed a loss of $639,146 or 12.7 per cent. This decrease, with rises in interest and sinking fund charges, was covered by the aforementioned partial postponement of preferred dividends and the suspension of the $556,736 of common dividends. Although, the annual report of the company states, present signs of improvement in general business may be of benefit to the utility, the prospects for a rapid recovery are not encouraging.

Expenditures on property, about one-fifth of which were for replacements, amounted to $1,493,184, as follows: track and paving, $736,405; transmission and distributing system, $378,051; power plant, $67,209; equipment, tools, real estate, steam heat system, gas plant and gas distributing system, $85,137; miscellaneous (principally riparian rights), $226,382. In the railway department expenditures were

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made for paving and regrading, amounting to approximately $500,000, and bridges and trestles along the interurban lines between Seattle and Tacoma were rebuilt. To reduce accidents twenty Seattle cable cars were converted into "pay on entering" type, and 368 anti-climbers were purchased for cars in Seattle.

Montreal Tramways

The income, profit and loss statement of the Montreal (Que.) Tramways for the year ended June 30, 1916, follows:

Gross earnings	$6,609,765
Operating expenses	3,707,053
Net earnings	$2,902,712
Deductions:	
City percentage on earnings	$418,083
Interest on bonds and loans	806,721
Interest on debenture stock	800,000
Taxes	93,600
Total	$2,118,405
Net income	$784,307
Dividends	323,871
Surplus for year	$460,435
Transfer to contingent renewal account	275,000
War tax (two years, 1915-1916)	74,013
Transfer to general surplus	$111,422

The gross earnings of the company increased $84,533 or 1.3 per cent during the last fiscal year as compared to the preceding. The increase came in the latter part of the year, thus indicating a tendency to an improvement in the business conditions of the city. The operating expenses of the company decreased $6,943 or 0.19 per cent, so that the net earnings increased $91,478 or 3.25 per cent. The operating ratio in 1916 was 56.08 per cent as compared to 56.92 per cent in 1915.

The sum of $583,894 was expended during the year on the maintenance of the company's property and charged to operating expenses. This, together with $313,576 charged to the contingent renewal account for special renewals, made a total expenditure of $897,470 during the year on the upkeep of the company's property. There was also expended, on capital account, the sum of $320,872. During the year there was redeemed and cancelled $163,233 of underlying bonds, making a total of $1,146,746.

Manila Electric Railroad & Lighting Corporation

The statement of income, profit and loss of the Manila Electric Railroad & Lighting Corporation, Manila, P. I., for the year ended Dec. 31, 1915, follows:

Gross earnings	$1,494,787
Operating expenses and taxes	762,958
Net earnings	$731,829
Interest on bonds	264,975
Surplus over fixed charges	$466,854
Reserves:	
For sinking fund	$41,500
For replacements and renewals	80,000
Total	$121,500
Surplus	$345,354
Dividends	300,000
Net surplus for the year	$45,354

The gross earnings for the year ended Dec. 31, 1915, showed a decrease from the previous year of $107,213, or 6.69 per cent. The operating expenses and taxes decreased $55,455.82 or 6.78 per cent, while the net earnings from operation dropped off $51,757.64 or 6.6 per cent. Interest charges during the year were $264,975 and sinking fund requirements were $41,500, leaving a surplus for the year of $425,354.

The directors maintained the annual appropriation for the replacement and renewal fund of $80,000, and deducting this from the year's surplus earnings there remained an available surplus for the year of $345,354. From this amount there were paid four dividends of 1½ per cent aggregating $300,000, leaving $45,354 over all disbursements and reserves. This was transferred to surplus account, making the total accumulated surplus to Dec. 31, 1915, $1,778,835. Against this amount was charged $55,000 to provide for a special reserve recommended by the company's auditors, leaving total accumulated surplus and reserves of $1,723,835. The total dividend payment of 6 per cent in 1915 compared with 7 per cent in 1912, 1913 and 1914, 5¼ per cent in 1911, 4 per cent in 1908, 1909 and 1910, and 3 per cent in 1906 and 1907.

In the railway department the earnings decreased $107,801, and the operating expenses increased $5,045. In the electrical department the earnings increased $22,139, and the operating expenses decreased $42,568. In the other departments, principally on account of the non-operation of trucks, the earnings decreased $21,550, and the operating expenses decreased $29,343. The company's taxes increased $11,409.

The uncertainty of the future political status of the Philippine Islands created during 1915 a widespread condition of unrest. This condition brought about the almost entire cessation of investment of capital in new enterprises or in already established businesses. Almost all the local industries and business houses followed a policy of retrenchment, causing decreased revenues to the insular and municipal treasuries, which in turn had to resort to the assessment of additional taxes. The government and municipalities also stopped to a great extent all improvements and new public works. The available shipping to and from Manila was so scarce that all lines of trade suffered, and freight rates rose so high as to be almost prohibitive. Now that the political situation has been clarified to a great extent, however, it is thought that business conditions will begin to improve.

OPERATING FIGURES FOR THREE ENGLISH CITIES

The annual report in connection with the South Shields Corporation Tramways states that the total revenue for the twelve months ended March 31, 1916, amounted to £41,826, an increase of £1,981 as compared with the previous year. Female laborers were first used in November to take the place of male conductors, and they have adapted themselves to the work splendidly. It has not been possible, however, to fill all the vacancies caused by the absence of motormen, and the service had had to be reduced at a time when an increased service was required. During the year the ratio of pay had been increased to nearly all the employees by 1 halfpenny an hour, and the standard rate is now one of the highest of any tramway system in the country. The total working expenses, including £1,932 paid to dependents of employees who had joined the forces, was £26,317. After meeting interest and sinking fund charges a net profit of £6,504 remained, as compared with £5,594 for the previous year.

In the annual report of the city engineer for Newcastle, it is stated that the length of tramway opened for service, measured as single track, is 66.5 miles. The maintenance of the permanent way has been £9,545, equivalent to £143 per mile of single track, or 0.40d. per car mile. In addition to ordinary maintenance, £1,580 was expended in renewals, equivalent to £24 per mile of single track, or 0.06d. per car mile, so that the total cost of the permanent way (exclusive of capital charges) was £11,125, equivalent to £167 per mile of single track or 0.46d. per car mile. A considerable length of the permanent way is in urgent need of renewal, but the great difficulty in obtaining a sufficient supply of labor has prevented the work from being undertaken. The major portion of the track has been in use for nearly fifteen years. Consequently, the fact that the present heavy service on a permanent way having many steep gradients is maintained at such a comparatively small cost, is satisfactory, but it is inevitable that the cost will be greatly increased as soon as opportunity will permit of renewals being carried out.

The receipts of the Southampton Corporation Tramways for the last year amounted to £79,828, as compared with £71,037 for the previous year, the highest figure up to that date. The passengers carried numbered 15,494,365, an increase of 2,228,651. The mileage run was 1,636,103, as compared to 1,703,032, a decrease of 66,929. The total receipts averaged 11.710d. per mile, as compared to 6.851d. A total of 135 members or 39 per cent of the permanent staff have enlisted, and more than sixty women are now regularly employed as conductors.

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REPORT FOR DISTRICT OF COLUMBIA

The annual report of the Public Utilities Commission of the District of Columbia for the calendar year 1915 states that during the year the commission authorized $512,200 in bonds and $10,360 in stock, there remaining pending at the end of the year applications for $922,614 of bonds and $33,940 of stock. The commission continued its valuation work, and it was estimated that the valuations of the larger utilities would be completed during the first half of 1916. The report of the commission contains miscellaneous operating figures for the individual utilities, some for electric railways being given in the accompanying table:

MISCELLANEOUS OPERATING STATISTICS FOR ELECTRIC RAILWAYS IN DISTRICT OF COLUMBIA FOR YEAR ENDED DEC. 31, 1915

	Total Revenue from Transportation			Total Operating Revenues			Total Operating Expenses			Average Fare	
Name	For Year	Per Car-mile (Cents)	Per Car-hour (Cents)	For Year	Per Car-mile (Cents)	Per Car-hour (Cents)	For Year	Per Car-mile (Cents)	Per Car-hour (Cents)	Per Revenue Passenger Carried	Per Passenger (Including Transfers)
Capital Traction Company	$2,191,935	0.28056	2.61481	$2,206,493	0.28242	2.63218	$1,152,283	0.14749	1.37459	$0.04296	$0.03214
Washington Railway & Electric Company	2,109,904	0.27174	2.27563	2,411,206	0.31055	2.60060	1,434,395	0.18474	1.54706	0.04310	0.03227
City & Suburban Railway	573,925	0.26250	2.31701	584,193	0.26720	2.35846	375,712	0.17184	1.51650	0.04247	0.03405
Georgetown & Tennallytown Railway	71,856	0.19868	2.16859	72,365	0.20009	2.18395	64,259	0.17768	1.93932	0.04286	0.02975
East Washington Heights Traction Railroad	7,944	0.15273	1.14551	7,944	0.15273	1.14551	5,169	0.09939	0.74543	0.04256	0.02142
Washington-Virginia Railway	490,794	0.27029	3.11817	498,541	0.27456	3.16739	238,761	0.13149	1.51693	0.08988	0.08988
Washington Interurban Railway	18,624	0.13230	1.27280	18,624	0.13230	1.27280	19,653	0.13960	1.34307	0.04082	0.04082
Washington & Maryland Railway	6,100	0.10069	0.65546	6,100	0.10069	0.65546	16,605	0.27409	1.78420	0.03110	0.01801
Washington & Old Dominion Railway*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

*The Washington & Old Dominion Railway operates trains by both steam and electricity.

American Public Utilities Company, Grand Rapids, Mich.—The gross sales of all subsidiaries of the American Public Utilities Company totaled for the year ended June 30, 1916, $3,309,586 as compared to $2,932,069 in the preceding year, an increase of 12.88 per cent. The gross earnings of the railway property in Eau Claire showed a gain of 8.08 per cent. The condition of the Jackson Light & Traction Company improved during the year. Competition from jitneys seems to have been almost entirely removed by municipal regulations requiring bonds and licenses.

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—A petition has been filed by the majority bondholders of the Birmingham, Ensley & Bessemer Railroad with the Alabama Public Service Commission asking for the consolidation of the system with the Birmingham Railway, Light & Power Company. Under an act passed by the last Legislature the consolidation of such public utilities is allowed, provided the consent of the Public Service Commission is obtained. That body has set Oct. 2 as the date at which the hearing will be conducted. The Birmingham, Ensley & Bessemer Railroad has been in receiver's hands for two years.

East Washington Heights Traction Railroad, Washington, D. C.—In an order dated Aug. 24 the Public Utilities Commission of the District of Columbia has set the reproduction cost of the East Washington Heights Traction Railroad at $34,978 as of Nov. 1, 1914. The reproduction cost, less depreciation, was fixed at $28,009. In addition to these values the commission found the following: Expended in the construction and equipment of the utility, as shown by the utility's records, $58,020; subscribed by stockholders, $14,800; proceeds of bonds sold, $16,000; and proceeds of notes issued, $27,220. The accrued depreciation, as shown by the utility's records, was nil, while the accrued depreciation as found by the commission totaled $6,969. In its order the commission annual rates of depreciation to be based on the reproduction cost new of property on hand on Nov. 1, 1914, and on the original cost of property subsequently acquired, of 2.86 per cent for way and structures, 3.87 per cent for equipment, and nil for land.

Hudson & Manhattan Railroad, New York, N. Y.—The board of directors of the Hudson & Manhattan Railroad at a meeting on Aug. 31 declared the interest earned on the adjustment income mortgage bonds for the six months ended June 30, 1916, at the usual rate of 2 per cent per annum, or $10 per $1,000 bond for the period. This interest is payable on Oct. 1, 1916, at the office of the company's fiscal agents, Harvey Fisk & Sons, New York City.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—Federal Judge Wilbur F. Booth has authorized C. P. Bratnober, receiver of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, to issue $100,000 of receiver's certificates to take care of obligations existing now or expected to arise. It is stated that the attorneys at the hearing said that the creditors had not come to a decision as to what should be done about the terminal agreement with the Electric Short Line. Action on that matter was postponed. Obligations to be met out of the certificates which the receiver will issue include $15,000 expected deficit within the next sixty days, $35,000 to close up right-of-way claims, $24,000 to pay overdue taxes with penalties and $2,500 in traffic balances to the other roads. It is stated that the road needs $1,500 a month to keep up its terminal contract and that a $15,000 instalment is due on its contract for terminal land bought of T. B. Walker. Action on these latter matters was delayed.

Northern Ohio Traction & Light Company, Akron, Ohio.—A special meeting of the stockholders of the Northern Ohio Traction & Light Company has been called for Oct. 2 to vote on increasing the authorized amount of 6 per cent preferred stock from $5,000,000 to $10,000,000, and common stock from $9,000,000 to $10,000,000. The increase in capitalization is to facilitate financing of the company by new interests which will be in control after Sept. 15. The arrangements for the sale of the property to E. W. Clark & Company, Philadelphia, and Hodenpyl, Hardy & Company, New York, were noted in the ELECTRIC RAILWAY JOURNAL of Sept. 2, page 418.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The gross revenues of the Oakland, Antioch & Eastern Railway for the twelve months ended June 30, 1916, totaled $629,928, as compared to $542,039 for the preceding year, an increase of $87,889 or 16.2 per cent. During these same periods the operating expenses at $425,402 and $412,989 showed an increase of only $12,413 or 3 per cent. The net earnings of $204,526 for the last year therefore showed a gain of $75,476 or about 58 per cent. The freight business of the company is showing special improvement, for the total gain of $14,813 in gross for the month of June, 1916, included $6,159 for freight, more than an 80 per cent gain over June, 1915.

Ohio Utilities Company, Columbus, Ohio.—The Ohio Utilities Company has applied to the Ohio Public Utilities Commission for authority to issue $750,000 of 6 per cent first mortgage bonds, $200,000 of preferred stock to pay not more than 7 per cent dividends, and $100,000 of common stock. The company has also requested permission to purchase the property of the Circleville Light & Power Company for $169,500, the Gallipolis Electric & Power Company for $91,600, the Delaware Electric Light, Heat & Power Company for $231,700, and the Chillicothe Electric Railroad, Light & Power Company for $480,000, or a total of $972,800. This would allow the company $27,200 for working capital and $50,000 for extensions and betterments. John P. Phillips, vice-president of the Chillicothe Electric Railroad, Light & Power Company, is president of the Ohio Utilities Company, which was recently organized with an authorized capital stock of $500,000. Attorney J. C. Martin is secretary of the company.

Omaha, Lincoln & Beatrice Interurban Railroad, Omaha, Neb.—The Omaha, Lincoln & Beatrice Interurban Railroad

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has applied to the Nebraska Railroad Commission for authority to issue $2,000,000 of common stock and $500,000 of preferred stock and $2,500,000 of bonds.

Pacific Electric Railway, Los Angeles, Cal.—The annual report of the Pacific Electric Railway for the year ended June 30, 1916, to the California Railroad Commission shows a deficit of $821,734 in the company's earnings. The total operating revenues for the year were $8,856,796, while the total railway operating expenses were $5,994,611, which left a net revenue from railway operations of $2,862,185. From this $515,556 was taken for taxes. Other income amounted to $37,301, making the gross income of the railway $2,383,929. From this $3,205,664 was deducted for interest on bonds and floating debt, bond discounts and rents, which caused a deficit in the company's earnings of $821,734. The jitney bus and other automobile passenger carrying traffic are blamed mostly for these results. The railway operates in fifty-four towns in southern California, and very large sums have to date been spent on improvements in the various places.

Philadelphia (Pa.) Rapid Transit Company.—The Philadelphia Stock Exchange has authorized the listing of $1,880,000 of additional extended voting trust certificates of the Philadelphia Rapid Transit Company, making a total of $18,847,500 of these outstanding.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—The St. Joseph Railway, Light, Heat & Power Company has applied to the Missouri Public Service Commission for permission to create a new bond issue of the authorized principal amount of $15,000,000, to secure first and refunding mortgage sinking fund 5 per cent thirty-year gold bonds, due in 1946. The company and its subsidiary, the St. Joseph & Savannah Interurban Railway, also have asked the commission for authority to execute a joint mortgage to secure the new bond issue. Under the terms of the proposed mortgage, provision is made for the delivery by the trustee to the company of $826,000 of bonds, $326,000 thereof to take the place of an equal amount of first mortgage bonds of the St. Joseph & Savannah Interurban Railway now outstanding, but which will be cancelled, and the mortgage securing the same discharged. The proposed new mortgage further provides for the setting aside of bonds to retire, by exchange or otherwise, the present closed first mortgage issue of the St. Joseph Railway, Light, Heat & Power Company of the principal amount of $5,000,000, which matures in 1937. The balance of the bonds will be held by the trustee to provide for future extensions and additions to the property. Simultaneously with the execution of the new mortgage, the properties of the St. Joseph & Savannah Interurban Railway, which include a 12-mile line between St. Joseph and Savannah, will be transferred to the St. Joseph Railway, Light, Heat & Power Company, subject to the new mortgage. The properties will thus be consolidated, with the proposed mortgage covering the interurban property as a first lien and the St. Joseph Railway, Light, Heat & Power Company properties as a second lien. A meeting of the stockholders of the company to pass upon the mortgage will be held on Sept. 28, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 26 page 376.

Sapulpa & Interurban Railway, Sapulpa, Okla.—The Sapulpa & Interurban Railway, which operates 5 miles of track from Sapulpa to Keifer, has been sold at public sale by the sheriff of Tulsa County to the Midland Valley Railroad. It is said that the Midland Valley Railroad, an operating steam road with main offices in Philadelphia, will build a connecting link between Keifer and Glenpool, a distance of 4 miles. The impending sale of the road was referred to in the ELECTRIC RAILWAY JOURNAL of Aug. 26, page 376.

United Light & Railways Company, Grand Rapids, Mich.—Announcement has been made that the United Light & Railways Company has declared a quarterly dividend of 1 per cent on its common stock and a regular quarterly dividend of 1½ per cent on its preferred stock, both payable on Oct. 2 to stock of record of Sept. 15. The United Light & Railways Company discontinued dividends at the rate of 1 per cent quarterly on its common stock in July, 1914. The declaration which has now been made marks the resumption of the common stock dividend at the regular 4 per cent a year rate.

DIVIDENDS DECLARED

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

California Railway & Power Company, San Francisco, Cal., quarterly, 1¾ per cent, prior preferred.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred.

El Paso (Tex.) Electric Company, quarterly, 2½ per cent, common.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., quarterly, 1¾ per cent, preferred.

Second & Third Streets Passenger Railway, Philadelphia, Pa., $3.

Third Avenue Railway, New York, N. Y., quarterly, 1 per cent.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	July,	'16	$72,642	*$39,318	$33,324	$17,632	$15,692
1 "	"	'15	68,146	*37,948	30,198	17,462	12,736
12 "	"	'16	805,386	*433,219	372,167	211,578	160,589
12 "	"	'15	780,845	*378,809	402,036	211,633	190,403

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m.,	July,	'16	$102,884	*$65,613	$37,271	$30,067	$7,204
1 "	"	'15	90,116	*63,458	26,658	30,337	†3,679
12 "	"	'16	1,195,120	*750,209	444,911	357,072	87,839
12 "	"	'15	1,039,521	*709,345	330,176	351,820	†21,644

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m.,	July,	'16	$287,226	*$173,447	$113,779	$42,862	$70,917
1 "	"	'15	239,594	*146,303	93,291	40,232	53,059
12 "	"	'16	3,354,689	*1,961,205	1,393,484	504,364	889,120
12 "	"	'15	3,057,558	*1,816,271	1,241,287	470,860	770,427

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m.,	July,	'16	$1,379,381	*$764,743	$614,638	$417,865	$196,773
1 "	"	'15	1,182,520	*654,686	527,834	365,166	162,668
12 "	"	'16	16,009,772	*8,542,235	7,467,537	4,885,185	2,582,352
12 "	"	'15	14,072,518	*7,565,138	6,507,380	4,327,623	2,179,757

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m.,	July,	'16	$264,023	*$159,786	$104,237	$69,423	$34,814
1 "	"	'15	262,080	*141,245	120,835	64,819	56,016
12 "	"	'16	2,761,786	*1,653,046	1,108,740	794,467	314,273
12 "	"	'15	2,555,338	*1,453,628	1,101,710	778,734	322,976

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m.,	July,	'16	$258,367	*$151,584	$106,783	$62,987	$43,796
1 "	"	'15	200,599	*122,023	78,576	63,645	14,931
12 "	"	'16	2,760,532	*1,642,212	1,118,320	751,943	366,377
12 "	"	'15	2,448,863	*1,452,450	996,413	758,115	238,298

GRAND RAPIDS (MICH.) RAILWAY

1m.,	July,	'16	$113,948	*$73,043	$40,905	$19,173	$21,732
1 "	"	'15	105,596	*72,022	33,574	13,933	19,641
12 "	"	'16	1,263,820	*835,117	428,703	171,907	256,796
12 "	"	'15	1,216,108	*833,416	382,692	163,523	219,169

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m.,	July,	'16	$83,759	*$51,196	$32,563	$15,214	$17,349
1 "	"	'15	75,376	*44,683	30,693	15,949	14,744
12 "	"	'16	772,132	*508,869	263,263	191,518	71,745
12 "	"	'15	706,709	*463,361	243,348	187,996	55,352

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m.,	July,	'16	$199,043	*$125,137	$73,906	$42,248	$31,658
1 "	"	'15	166,927	*109,847	57,080	42,896	14,184
12 "	"	'16	2,283,640	*1,409,218	874,422	514,590	359,832
12 "	"	'15	2,163,788	*1,281,341	882,447	493,588	388,859

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m.,	July,	'16	$481,143	$287,692	$193,451	$48,641	$144,810
1 "	"	'15	371,736	219,704	152,032	51,804	100,228
7 "	"	'16	2,860,642	1,720,266	1,140,376	355,006	785,370
7 "	"	'15	2,128,387	1,321,350	807,037	360,270	446,767

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	July,	'16	$448,219	*$255,256	$192,963	$181,780	$11,183
1 "	"	'15	467,946	*260,486	207,460	183,947	23,513
12 "	"	'16	5,437,240	*3,069,517	2,367,723	2,189,891	177,832
12 "	"	'15	5,694,808	*3,103,158	2,591,650	2,210,534	381,116

*Includes taxes. †Deficit.

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Traffic and Transportation

SAFETY CAMPAIGN STARTED IN KANSAS CITY

For the First Time the Work Will Be Carried Into the Public Schools

Plans have been completed by the Kansas City (Mo.) Railways, through the aid of the Board of Education, the Commercial Club and other industrial institutions, for a general safety campaign in Kansas City. For the first time the safety work will be carried on in the schools of the city. The Board of Education on July 6 authorized the company to place safety blotters, calendars and other literature in the schools under the direction of Superintendent I. I. Cammack.

A calendar will be placed in every school room and in other places throughout the city. More than 500,000 blotters will be distributed among the school children during the school year. Each child will receive one blotter each month. The blotters are in four colors. Each one carries a safety motto pertaining to the month issued, a small calendar for that month and the words, "Safety and Service," with the name of the company. The large calendars which will be displayed in the school rooms carry the designs that are on the blotters. These designs are grouped at the top with a motto under each design. In the center is the company slogan of "Safety and Service" in a circle with the name of the company worked about the slogan. The calendars start with the month of September, 1916, and end with August, 1917. They are printed in the same colors as the blotters and are on heavy cardboard.

The Board of Education also authorized the distribution of safety league buttons among the children. These buttons will carry the colors of the various schools and the name of each school with the words, "Safety League."

At the suggestion of Superintendent I. I. Cammack it was decided to introduce large bulletins into each room to carry on the educational campaign in connection with the hygienic work. Superintendent Cammack also suggested that motion picture films, showing the price of carelessness and the necessity for always being on the safe side, be exhibited in all the school rooms equipped for such moving pictures. This suggestion has been adopted by the company. In this connection lectures will be given. More than half of the school buildings in the city are equipped for motion picture shows. Additional literature for the pupils may be prepared as the months progress. All this will be done under the direction of Mr. Cammack.

W. S. Woodland, who has been one of the company's supervisors for several years, will be in charge of the company's work. He will be known as the railways safety director. Mr. Woodland will work under a general safety committee consisting of the superintendent of efficiency, the publicity agent and a member of the legal department. This committee will supervise the work in the schools, the other public work and aid in the direction of the safety work to be conducted among the employees of the company. The company is a member of the National Safety Council and arrangements have been made for organizing a Kansas City safety council. Membership in this council will embrace all the leading industrial concerns in Kansas City, Mo., and Kansas City, Kan.

The campaign will be taken up among vehicle drivers and owners. The first step in this direction will be the issuance of form letters to all drivers and owners urging them to do all they can to promote the general safety movement. This will be followed by placards to be placed in all stables and garages. In addition to this there will be talks by members of the council and others on the necessity for safety. This work will be carried on by the general safety committee. In the general public work there will be a new series of dash cards that are practically ready for issuance. Safety suggestions will also be carried on the backs of transfers and on the stationery of the Kansas City Railways.

PRELIMINARY STATEMENT ON SEATTLE JITNEY REGULATION

William Hickman Moore, chairman of a special committee appointed by the City Council to draft proposed jitney bus regulations in Seattle, Wash., states in his opinion the people of this city want the jitney as a transportation fixture, and for that reason the committee will exercise great care in formulating its report and submitting a proposed ordinance to the Council. Chairman Moore said:

"The problem of adequate transportation at reasonable rates to all sections of the city looms up large at this time, because of the complications the auto bus has injected. The settlement of the problem of adequate transportation should not be approached with the thought that the traction company is to be protected as a mere money-making machine operated for the benefit of its stockholders; that jitney owners are to be permitted to earn a living, unrestrained by regulations, or that the public shall finally own and operate all public utilities. The problem is one in which the home owner is interested. Should a zone system be brought about through reduced earnings of the traction company, many home-owners will be compelled to return to the congested districts to escape excessive transportation charges. Establishment of a zone system of fares would be a calamity for the small property owner, and it is imminent unless the transportation problem is settled with fairness to all. The street railway must be regarded as the backbone of a dependable transportation system, and competition which will arrest the development of that system would, without question, retard the development of the city and stifle its growth. Should the petition of the street railway to the Public Service Commission be granted, the city would be deprived of a 2-per cent revenue on the gross earnings of the company, which in 1914 amounted to $72,934 and in 1915 to $61,581. The smaller amount in 1915 is attributed by the company to jitney bus competition. The paving of an 18-ft. strip by the street railway has in many instances made possible the paving of the remaining portion of the street by the property owners, where the limit of assessment would otherwise have prohibited the improvement. If the petition of the company be granted by the Public Service Commission, this additional burden would fall upon the property owner. A release from payment of a portion of the cost of bridges would also fall upon the general taxation."

At this time the Puget Sound Traction, Light & Power Company is petitioning the Public Service Commission to be released from some of its franchise obligations considered by the company to be unreasonably burdensome.

EXPLAINING THE COMPANY'S SIDE

That a frank and courteous presentation of the company's side of a question by company officials to the public is a potent means of establishing better public relations, if not of settling the question itself, is well shown by the following excerpt from the Denver *Tramway Bulletin* for August:

"Golden has been demanding, through her newspapers and Council, that the fare to that city be cut one-half. Study of the question proved that a reduction could not be allowed, and on Friday evening, Aug. 4, General Manager Hild met with the Mayor and Council in a meeting open to the citizens of Golden to explain why a reduction could not be granted. His talk, which was illustrated by lantern slides, was based on such good common sense that the discussion which followed was pleasant and resulted in practically everyone assenting to Mr. Hild's statements.

"The Eighteenth Street Improvement Association met on Aug. 3 to demand greater service on Eighteenth Street. H. C. Kendall, traffic engineer, was present with figures which showed conclusively that there was not sufficient short-line travel during the day on Eighteenth Street to permit increased service at additional expense, and that in spite of the light traffic Eighteenth Street was being given several times as much service as other lines doing a similar business. The explanation of the company seemed to be reasonable and the consideration of Eighteenth Street's needs fair to most of the association members, in spite of a resolution adopted asking for increased service."

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CLEVELAND INTERURBAN TO START FREIGHT SERVICE ON OCT. 1

Plans of the Manufacturers and Wholesale Merchants' Board of the Cleveland Chamber of Commerce will have been at least partially consummated on Oct. 1, when the Cleveland, Southwestern & Columbus Railway inaugurates a freight service on its two southern divisions. An ordinance was passed by the Cleveland City Council some years ago providing for the operation of freight cars through the city after 10 o'clock in the evening, but this is the first road to take advantage of it. The ordinance was subjected to a referendum vote, but through this board a favorable result was secured. The service will include cities and towns with a combined population of more than 100,000. For the Bucyrus division there will be a daily through three-car train each way, one starting from each end of the division. A train, making the round trip, will furnish service on the Wooster division. Carl J. Laney, traffic manager of the road, will have charge of the freight service. The rates differ in some respect from the steam road rates. It is said that this service will result in the delivery of freight to most of the towns the road touches in a much shorter time than over steam roads from other places and that Cleveland will, therefore, profit much by it. A freight depot is being built beside the express depot of the Electric Package Company at East Ninth Street and Eagle Avenue, Cleveland.

Winston-Salem Considers Jitney Measure.—The aldermen of Winston-Salem, N. C., have decided not to eliminate the jitney from any street by ordinance, but to require that the routes and schedules to be maintained by each car be inserted in the application for franchise and that this be considered by the board in passing upon the license. The bond is placed at the minimum of $10,000 for four cars and under, and $500 for each additional car. The matter of license to be paid to the city has been discussed, but no definite conclusion was reached in that matter.

Decrease in Dallas Jitneys.—The semi-annual jitney licenses issued by the city of Dallas, Tex., have just expired and it is interesting to note that 425 of the 465 licenses have been renewed. This means a decrease of forty jitneys in Dallas during the last six months. Plans for the relief of traffic congestion in the business district are receiving consideration of the City Commissioners of Dallas. If adopted they will confine the operation of jitneys to streets on which there are no car lines. The regulations contemplated are similar to those put into effect in the city of San Francisco, Cal., and described previously in detail in the ELECTRIC RAILWAY JOURNAL.

Six-Cent Fare Allowed.—The Bristol & Norfolk Street Railway, Randolph, Mass., on Sept. 2, received notice from the Massachusetts Public Service Commission that the local passenger tariff filed some time ago providing a 6-cent fare had been allowed. Under the new schedule the fare of 6 cents will be charged from Holbrook station, in Randolph, to the corner of Turnpike and Page Streets, North Stoughton, and from that point to Washington Street, Stoughton, another 6 cents will be charged. A workingman's fare of 6 cents for the entire trip will be allowed by the company for two hours in the morning and two in the afternoon. School tickets in strips of ten will be sold for 30 cents. It was expected that the change in fare would go into effect on Sept. 10.

Changes in Children's Fares in Vancouver.—The franchise of the British Columbia Electric Railway, Vancouver, B. C., requires the company to carry two children under twelve years of age for one regular fare and to issue tickets to school children at a rate of ten for 25 cents. Under these regulations the company would be entitled to charge full fare for a single child not possessing school children's privileges. It has decided, however, to extend the privilege of school children's tickets at all times to any child five years of age and under twelve for whom half fare must now be paid. Two children of these ages may travel for 5 cents or for a green or red ticket. Children under five years may travel free. The franchise requires the company to carry only infants in arms free. School children over twelve may travel on school tickets between 8 a. m. and 5 p. m., except on Saturdays or Sundays.

Peculiar Succession of Accidents.—One street car was demolished, another was damaged, two automobiles were damaged and a wagon was smashed up as a result of a peculiar accident on Aug. 19 at Rittersville, on one of the lines of the Lehigh Valley Transit Company, Allentown, Pa. A truck driver, dazzled by an automobile headlight, first came into collision with an open street car. A short distance behind the open car came an interurban car, which ran into the wreck on account of the dust surrounding it and the lack of time to apply brakes. In the meantime, however, an automobile touring car and a two-horse wagon were over-anxious to get by the first pile-up, with the result that they were both caught in the second smash, which completely demolished the open street car. Several persons were hurt, but only the truck driver seriously. The fact that the open car contained no passengers prevented many fatal accidents.

Illinois System Preparing for State Fair.—The operating and traffic departments of the Illinois Traction System, Peoria, Ill., are making elaborate preparations for handling traffic to and from the State Fair at Springfield, Ill., on Sept. 15-23. This company is the largest transportation feeder to the big exposition, as it enters the city from three directions and handles annually thousands of State Fair visitors. Low rates have been named from all points effective on Sept. 15, with return limit Sept. 25. Special schedules have also been prepared, and regular trains will run in sections and with trailers attached as the traffic demands. As is customary, the company will maintain an information bureau on the State Fair grounds, where representatives of the State Board of Agriculture and the traction system will furnish information concerning all railway schedules and the fair itself. The company will give away a new souvenir in the shape of an up-to-date and complete railway map of the State.

Who's a "Jay"?—This is the explanation of a "jay," as contained in the August issue of *Safety*, the magazine of the Union Traction Company of Indiana: "A 'jay' walker, 'jay' driver, and 'jay' chauffeur is one who cuts across the street at all kinds of angles, at crossings, in the middle of the block, or any place else, thereby endangering all others in his class, as well as jeopardizing his own safety, and especially increasing his liability to car collisions. A 'jay' rider is a Union Traction employee, not excepting the official class or the semi-official class, who persists in doing things that the ordinary passenger is not expected to do, such as smoking and riding on the rear platform and steps; riding in the baggage room and talking to the motorman; shifting the material in the baggage room to increase his comfort; getting on and off at the front end, when the rear steps should be used; stalking through the car as an indication of ownership; seeking special favors from the car crew, via sending and receiving word through the dispatcher's office.

Newspaper Selling Stopped on Kansas City Cars.—To insure safety for newsboys, scores of whom have been injured jumping on or off cars, the Kansas City (Mo.) Railways at the suggestion of the Board of Public Welfare has decided to abolish the practice of permitting boys to sell papers on the cars. The actual work of securing the new order started with the welfare department of the company as a feature of its public safety work. The order has met with the hearty indorsement of the Kansas City *Star*, *Times* and *Post*. It is being enforced without difficulty or complaint. Three years ago the Metropolitan Street Railway issued an order to the same effect, but withdrew it after a few weeks of futile efforts at enforcement. Recently the Kansas City Railways prepared a statement indicating the cost of the newsboys to its stockholders. About $25,000 a year was chargeable to the freedom of newsboys on the cars. In one month thirty-two claims of newsboys were paid, ranging from $10 to $500. There were several death claims of $5,000 each in the last two or three years. While these claims were called newsboy claims, it was well known that many of the injured were not newsboys, but boys who had got hold of newspapers and were using them as the excuse for riding free.

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Personal Mention

T. L. Miller has been appointed vice-president and efficiency engineer of the Fort Wayne & Northern Indiana Traction Company, with headquarters at Fort Wayne, Ind.

Minot J. Hill, general manager of the Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., is now consulting manager for Martin & Company, Philadelphia, who financed the Salem & Pennsgrove Traction Company line.

A. B. Brown, who has been in the employ of the Texas Traction Company, Fort Worth, Tex., since the interurban railway between Sherman and Dallas was built, has been made assistant to M. J. Loftus, superintendent of transportation.

Harry D. Frueauff has resigned as treasurer and manager of the City Light & Traction Company, Sedalia, Mo., to become general manager of the Montgomery Light & Water Power Company, Montgomery, Ala. Both properties are controlled by the Doherty interests.

Louis A. Pease has been appointed division superintendent of the Western division of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to succeed C. Earl, deceased. Mr. Pease has been a conductor on this line since the present company acquired the property.

William Heener has succeeded A. L. Bowen as engineer of the power station of the Terre Haute, Indianapolis & Eastern Traction Company at Lebanon, Ind. Mr. Keener has also succeeded Mr. Bowen as chief engineer of the Indianapolis & Northwestern Traction Company.

Lawrence W. Jackson, who has been local auditor of the Alabama Power Company in Anniston for several years, has been appointed acting manager of the local operations to succeed A. L. Kenyon, resigned, who retires from the company on Oct. 1 to take a managerial position at Columbia.

Frederick S. Pratt, chairman of the board, and Thomas Nelson, Thomas N. Perkins and Stedman Buttrick, members of the executive committee of the board of directors of the Puget Sound Traction, Light & Power Company, have been in Seattle on a tour of inspection of the property.

Dan G. Fisher, who has been superintendent of transportation for the Corsicana division of the Southern Texas Traction Company, Dallas, Tex., has been transferred to the executive offices, reporting direct to J. F. Strickland, president, and assuming the position of assistant to the president.

C. F. Berry, who has been clerk of the Lewiston, Augusta & Waterville Street Railway, Portland, Me., has also been made treasurer of the company, to succeed Charles A. Pearson, Jr., Philadelphia. Mr. Berry is also treasurer and clerk of the Cumberland County Power & Light Company, Portland.

E. N. Strait, who for the last ten years has served in the engineering and statistical departments of the Wisconsin Railroad Commission as inspector and public utilities expert, has joined the organization of H. M. Byllesby & Company, Chicago, Ill., as assistant to Arthur S. Huey, vice-president in charge of operation.

William F. Pfennig, accountant for Stone & Webster, who has been connected with the Houston (Tex.) Electric Company for the last ten years, has been transferred to the Boston office of the company. Prior to his departure from Houston, Mr. Pfennig was a guest at a luncheon at the Rice Hotel, the host being David Daly, manager of the Houston Electric Company.

John P. Phillips, vice-president of the Chillicothe Electric Railroad, Light & Power Company, Chillicothe, Ohio, has been elected president of the Ohio Utilities Company, incorporated recently to consolidate the Circleville Light & Power Company, the Gallipolis Electric & Power Company, the Delaware Electric Light, Heat & Power Company, and the Chillicothe Electric Railroad, Light & Power Company, Chillicothe, Ohio.

Simon Bamberger, formerly president of the Salt Lake & Ogden Railroad, which operates between Salt Lake City and Ogden, Utah, a distance of 36 miles, is the Democratic nominee for Governor of the State of Utah. Mr. Bamberger was born in Darmstadt, Germany, in 1847. In 1915 he retired from the active management of his varied and extensive interests and has since then indulged in recreation and travel.

Horace E. Allen, formerly of the Toledo Railways & Light Company, Toledo, Ohio, has been appointed assistant general superintendent of the Michigan Railway, Jackson, Mich. Mr. Allen was graduated from the Massachusetts Institute of Technology. After completing his electrical engineering course he accepted a position with the Westinghouse Electric & Manufacturing Company, and in 1910 he became connected with the Toledo Railways & Light Company under J. F. Collins, then assistant general manager.

George A. Smith, who has been appointed assistant general freight and passenger agent of the Waterloo, Cedar Falls & Northern Railway, Cedar Rapids, Iowa, was connected for twenty-two years with the Chicago & Great Western Railroad as messenger, operator and local agent at several of that company's stations, for three years as traveling freight agent in the Pittsburgh territory and for two years as division freight and passenger agent at Chicago. He resigned from the latter position and engaged in the real estate business. Two years later he re-entered steam railroad work as traveling passenger agent for the Southern Pacific Company in the Pittsburgh territory. He resigned from the Southern Pacific Company to become connected with the Waterloo, Cedar Falls & Northern Railway.

J. B. Duvall has been appointed by President W. A. House of the United Railways & Electric Company, Baltimore, Md., as superintendent of the welfare department of the company. For many years the company has displayed a substantial interest in the welfare of its employees, aiding them in sickness and in time of distress and caring for those who have become incapacitated for work. The welfare work of the organization has heretofore been assigned by Mr. House to various committees of officials, but its growth finally made such demands upon their time that it was found necessary to put some one competent person in direct charge as the executive officer, and Mr. Duvall was selected for this post. He has been in the claim department of the company for many years and his long training and general efficiency are such as peculiarly to adapt him for the new position.

W. Stanley Woodland has been chosen safety director for the Kansas City (Mo.) Railways. Mr. Woodland will have charge of all the safety work to be done by the company. He will work under the direction of the general safety committee. Mr. Woodland was born in Crisfield, Md., on Nov. 12, 1886. He began his street railway career nine years ago at Key West, Fla., where he was employed by Stone & Webster in the power house department. He remained there for two years. In January, 1909, he resigned and went to Beaumont, Tex. At Beaumont he was engineer in a power house of the Beaumont Traction Company, later being promoted to chief engineer of the power house. He remained there until the close of the year, when he resigned to enter the transportation department of the Missouri & Kansas Interurban Railway Company as a trainman. Mr. Woodland remained in the employ of that company until April, 1910, when he went with the Kansas City Railways as night clerk at Twenty-ninth and Southwest Boulevard division. Later he was night clerk at the Ninth and Brighton division, then day clerk at Ninth and Brighton, then assistant supervisor at Ninth and Washington and assistant supervisor at Forty-eighth and Harrison. From the Forty-eighth and Harrison division Mr. Woodland was appointed supervisor at Twenty-ninth and Southwest Boulevard.

OBITUARY

James M. Denniston, for many years general traveling salesman of the American Steel & Wire Company, died at his residence in the Chicago Athletic Association on Aug. 29. Mr. Denniston was born in Pittsburgh in 1866. He was well known in wire circles in Pittsburgh and elsewhere in the West.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

*Pinellas West Coast Railway, St. Petersburg, Fla.—Incorporated to acquire franchises, build, lease, own and operate railroads or street railways. Capital stock, $10,000. Officers: H. C. Case, president; J. A. Mangold, vice-president, and C. E. Worrell, secretary and treasurer.

FRANCHISES

Mobile, Ala.—The Mobile Light & Railroad Company has received a franchise from the Council to construct an extension to its Dauphin Street line.

Batavia, Ill.—The Aurora, Elgin & Chicago Railway has asked the Council for a renewal of its franchise in Batavia.

Kansas City, Mo.—The Kansas City Railways has received a franchise from the Council to construct a single-track line on Twenty-fifth Street from Troost to Grand Avenues.

Nashville, Tenn.—The Nashville Traction Company has asked the Board of Commissioners for permission to remove its tracks on Fifth Avenue from Deaderick Street to Church Street.

TRACK AND ROADWAY

Los Angeles (Cal.) Railway.—The Los Angeles Railway and the City Engineer's Department will work out a program whereby 10 miles of work by the company will be finished before the rainy season, the most important being done first. This was decided on by the Board of Public Works when the company asked that it be allowed to reconstruct its tracks on Second Street between Spring Street and Broadway and on Figueroa Street between Seventh and Eleventh Streets before going ahead with work in other districts. Chief Engineer Bulpin of the Los Angeles Railway informed the Board that at present there are nearly 10 miles of track to be attended to in addition to 2 miles on Mesa Drive, just outside the city. He said the work was being pushed as rapidly as possible, and under the present schedule it was hoped to have it cleaned up before winter.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will construct an extension from La Habra to Anaheim, via Fullerton.

San Jose (Cal.) Railroads.—Work has been begun by this company reconstructing its tracks on Seventeenth Street from Santa Clara to Empire. The present 60-lb. Trilby rail will be replaced with 72-lb. T-rail.

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—This company expects soon to begin construction on its proposed electric railway to connect Jacksonville and St. Augustine. T. R. Osmond, St. Augustine, general manager. [June 12, '15.]

Atlanta & Anderson Electric Railway, Atlanta, Ga.—The Atlanta & Anderson Construction Company, Electric and Gas Building, Atlanta, has been organized preliminary to constructing the proposed electric railway from Atlanta to Anderson, S. C. J. L. Murphy, Atlanta, is interested. [Sept. 2, '16.]

Galesburg Railway, Lighting & Power Company, Galesburg, Ill.—Work has been begun by this company on the construction of an extension north of its Seminary Street line.

Kewanee & Eastern Electric Railway, Kewanee, Ill.—Preliminary surveys are being made of this company's proposed line from Kewanee to Henry. C. G. Lampman, Cedar Rapids, is interested. [May 13, '16.]

Chillicothe & Peoria Electric Railway, Peoria, Ill.—This company will probably receive a free entrance to the city of Peoria, if the decision of the streets committee of the Council is upheld. The committee regards the new interurban line merely a tenant of the Peoria Railway, as it will enter the city over tracks of the latter company. [Aug. 26, '16.]

Jacksonville Railway & Light Company, Peoria, Ill.—This company is repairing its tracks on South Main Street and the Vandalia Road.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company reports that within the next two months contracts will be placed for the construction of one block of track in Paxton to complete its line to its new station; also for switches and special work at Paxton.

St. Joseph Valley Railway, Elkhart, Ind.—It is reported that an extension will be built by this company early in 1917 to Toledo, Ohio.

Columbus, Greensburg & Richmond Railway, Indianapolis, Ind.—It is reported that the project to construct a line from Columbus to Richmond, via Greensburg and Connersville, has been submitted to a financing company. John A. Shafer, Indianapolis, consulting engineer. [April 8, '16.]

Bay State Street Railway, Boston, Mass.—Operation has been begun on the Highland Circuit line of the Bay State Street Railway. The extension forms a loop along Dock Avenue, Grant Street and Bay View Avenue, Lynn.

Boston (Mass.) Elevated Railway.—A general widening of the space between tracks and the laying of new rails in Brookline is planned by the Boston Elevated Railway during the coming year. Plans for the near future contemplate track changes on Washington Street from Park Street to Beacon Street; on Harvard Street from Coolidge Corner to the Allston line, and possibly from Boylston Street to Coolidge Corner. Work on Harvard Street is already under way, and will soon be started on the other sections where change is contemplated. The increased space between tracks when the work is completed will be 5 in., and the new rails will be of the heavy type of girder rail. The joints between rails will be electrically welded.

Iron River, Stambaugh & Crystal Falls Street Railway, Iron River, Mich.—This company, which operates a line from Iron River through Stambaugh and Palatka to Gaastra, reports that its line to New Caspian is partly finished and a line is projected to the James locations, 2 miles north of Iron River. Work on the company's main line to Crystal Falls which was begun in 1914 will be continued this year if it is possible to secure labor and the necessary material in time.

Public Service Railway, Newark, N. J.—It is reported that this company will construct tracks from the present terminus of its Cedar Lawn line at Market Street and the Wesel Road to the entrance of Cedar Lawn Cemetery.

Pennsgrove, N. J.—A committee composed of members of the Chambers of Commerce of Wilmington, Del., Pennsgrove, Woodstown, Elmer, Millville, Vineland and Atlantic City, N. J., is working on the project to build either a steam or electric line from Pennsgrove to Atlantic City, connecting all of the towns interested. It is estimated that a line taking in all of these points would cost $5,000,000. Another plan is to connect only Pennsgrove and Elmer with a trolley line, giving Wilmington and Pennsgrove direct connection with Atlantic City and the other South Jersey points, via the Pennsylvania and Jersey Central Railroads. These two railroads seem willing to co-operate in the project, providing connection is made to their lines. [July 8, '16.]

Salem & Pennsgrove Traction Company, Salem, N. J.—This company reports that 4 miles of its line between Salem and Pennsgrove is completed and in operation and the balance will be completed this fall. The line when completed will be 14 miles long. Carl N. Martin, Philadelphia, secretary. [March 11, '16.]

Public Service Railway, Trenton, N. J.—County Engineer Logan has ordered the Public Service Railway to raise its tracks 5 1/3 in., to conform with the road between Bordentown and Trenton.

Southern Public Utilities Company, Charlotte, N. C.—This company is improving its track in Winston-Salem.

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Goldsboro (N. C.) Electric Railway.—This company reports that it has just completed the construction of 1½ miles of new track.

Northern Ohio Traction & Light Company, Akron, Ohio.—It is reported that this company plans to construct a new bridge at Walnut Street, West Barberton.

Tulsa (Okla.) Interurban Railroad.—Promoters of the Tulsa Interurban Railroad, which is to afford an entrance into Tulsa for the Iron Mountain and the Missouri, Oklahoma & Gulf Railways, announce that preliminary work will begin in a few days. A route via Broken Arrow has been selected and grading will be rushed. H. D. Pattee, Tulsa, is interested. [July 15, '16.]

Guelph (Ont.) Radial Railway.—A report from this company states that it expects to construct 3000 ft. of track in 1917.

London (Ont.) Street Railway.—This company will construct an extension to its Hamilton Road line and will double track its Dundas Street line.

Sudbury-Copper Cliff Electric Railway, Sudbury, Ont.—It is reported that this company is contemplating the construction of two extensions, one from the Sudbury flour mill, the eastern terminus of the line, to the Murray nickel mine, about 4 miles; the other to start from the Sudbury flour mill to the Mond Nickel Company's plant at Coniston, about 19 miles. J. H. Mackey, Sudbury, president.

***Portland & West Coast Railroad & Navigation Company, Newport, Ore.**—It is reported that construction will soon be begun by this company on a proposed electric railway between Newport and Portland. Dr. A. J. Fawcett, Newport, is interested.

Portland Railway, Light & Power Company, Portland, Ore.—This company has decided to run no electric cars across the big interstate bridge over the Columbia River to Vancouver, Wash. E. Howard, engineer of the company, states there is no money in such an arrangement for the company, as it would cost at least $30,000 to build a line across the bridge to Vancouver. For that sum, the company claims, it can get enough big buses to care for the traffic.

Saskatoon (Sask.) Municipal Railway.—Proposals are under consideration by the City Council of Saskatoon for the construction of 1200 ft. of new double track on the provincial bridge at Twenty-fifth Street.

Knoxville Railway & Light Company, Knoxville, Tenn.—About $175,000 is being spent this year by the Knoxville Railway & Light Company on improvements to its system in Knoxville. The company is reconstructing its Magnolia Avenue line and is improving its double track on the Broadway Pike from the city limits to Arlington. The Sevierville line has been rebuilt from the county bridge to the end of the line, about 1 mile. Of this distance, 2330 ft. is double tracked.

Nashville & Eastern Electric Railway, Smithville, Tenn.—In an election held recently DeKalb County voted to issue $150,000 4 per cent, thirty-year bonds and subscribe that amount to the stock of the Nashville & Eastern Electric Railway. The line will extend from Nashville to Smithville, via Lebanon, Watertown, Alexandria and Liberty. A year ago DeKalb County voted $150,000 4 per cent bonds for the purpose of building an electric line from Lebanon to Smithville, but on account of technicalities the bonds were held void. Construction work will begin at once on the road as the survey has been made and most of the right-of-way has been secured. The road will connect with the Nashville, Chattanooga & St. Louis Railway at Lebanon, which, it is said, will be electrified from there to Nashville. The road is contracted to be finished by December, 1917. [Aug. 5, '16.]

Dallas Consolidated Street Railway, Dallas, Tex.—The City Commission of Dallas has granted an extension of time until Dec. 1 to the Dallas Consolidated Street Railway Company in which to begin track construction work ordered by the commission on Texas Street, between Swiss and Live Oak Streets, and on Colonial Avenue between Lenway and Romaine Streets.

Dallas Northwestern Traction Company, Dallas, Tex.—E. P. Turner, president, and S. G. Perkins, chief engineer, of the Dallas Northwestern Traction Company, have been over the route of the proposed interurban line from Dallas to Denton, conferring with business men of the cities and towns which this line will touch. The officials also have investigated the proposed extension of the line from Denton to Gainesville, and have made favorable report on the project, after conferring with business interests at Gainesville. This line now is practically assured. [June 1, '16.]

Galveston (Tex.) Electric Company.—This company reports that it expects to construct ½ mile of track with concrete foundation and various special work layouts.

Richmond, Rappahannock & Northern Railway, Richmond, Va.—It is reported that nearly all the money needed to insure the construction of this company's line from West Point to Urbanna, 17 miles, has been subscribed, and it is expected that construction will be begun at once. C. L. Ruffin, 514 American National Bank Building, Richmond, chief engineer. [Dec. 11, '15.]

Monongahela Valley Traction Company, Fairmont, W. Va.—Surveys have been completed by this company for the extension of its Weston line through Stealey Heights Street.

SHOPS AND BUILDINGS

United Railways & Electric Company, Baltimore, Md.—Plans have been filed by the United Railways & Electric Company for the construction of a one-story brick waiting station at Callow Avenue. The station proper will measure 20 ft. x 30 ft., while the shed will be 90 ft. x 30 ft.

Kansas City (Mo.) Railways.—This company has awarded a contract to E. L. Winn Construction Company, Kansas City, for the construction of a shelter house at Union Station. The structure will be 22 ft. x 60 ft., of cut stone with red tile roof. The floors will be of stone and brick. The cost is estimated at $4,000.

Goldsboro (N. C.) Electric Railway.—This company advises that contracts will be placed at once for the construction of an addition to its carhouse.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—A freight depot is being built by this company beside the express station of the Electric Package Company at East Ninth Street and Eagle Avenue, Cleveland.

Lake Erie & Northern Railway, Brantford, Ont.—The Brantford City Council has granted a permit for the erection of a brick station on Colburn Street, to be used jointly by the Lake Erie & Northern Railway and the Brantford & Hamilton Railway. The work of putting in the foundations is being done by Schultz Brothers, Ltd., Brantford. The cost of the station is estimated at $25,000.

Valley Railways, Lemoyne, Pa.—It is reported that this company will construct a new waiting station and office building at Second and Walnut Streets, Harrisburg.

Dallas, Tex.—The new $1,500,000 interurban terminal at Dallas was opened for service Sept. 1. It was built by the Dallas Terminal Association. Cars of the Northern Texas Traction Company, the Texas Traction Company, the Southern Traction Company and any other lines which may be built out of Dallas will use the new terminal.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—The hydroelectric plant of the Pacific Electric Railway at Upland was recently destroyed by fire, causing a loss of about $20,000.

Union Traction Company of Indiana, Anderson, Ind.—This company has ordered twenty complete quadruple equipments with No. 333-V motors and HL control from the Westinghouse Electric & Manufacturing Company to replace some of their high speed passenger equipments consisting of 50-C motors and type L hand control.

Des Moines (Iowa) City Railway.—This company is asking for bids for the reconstruction of its power station. The equipment will include one 1000-kw. and one 5000-kw. generator unit.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company reports that it has awarded a contract to the Edge Moor Iron Company, Edge Moor, Del., for one 500-hp. boiler, to be installed and ready for service by Nov. 1. An extension to the company's plant to take care of this new equipment is now under construction by the Armstrong Engineering Company, Taylorville, Ill.

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Manufactures and Supplies

SHEET METAL CULVERT TRADE SITUATION

Since the beginning of the European war the demand for sheet metal culverts has been rather less in amount than that in normal times. Prices have increased and decreased in accordance with the galvanized metal market, and the range of prices has varied from 5 to 15 per cent above the prices for corrugated culverts established in normal years. The selling conditions are thought to have been influenced not so much by the variations in culvert prices as by the generally slackened new construction work. Substantial quantities of metal culverts, however, were purchased for maintenance work. The low relative cost of this type of culvert is also responsible, probably in considerable part for the continued activity which has been experienced in the culvert market during the last year. These culverts are easier to transport and install than the materials used for the heavier types of drainage structures, and the increased prices that have been asked for cement, reinforcing steel and cast-iron pipe, together with the high cost of labor since July, 1914, have greatly improved competitive conditions so far as corrugated iron culvert sales are concerned.

The largest manufacturers of metal culverts state that the longer that installations of corrugated culverts are in service the clearer becomes the necessity for the use of high grade metal in them. The adaptability of corrugated culverts in heavier than standard gages for those situations where, on account of unstable foundations or other severe conditions it is difficult to maintain a permanent waterway, is likewise becoming more and more firmly established.

PRICES AND DELIVERIES FOR TWIN STEEL TIES

Prices of steel products have varied so greatly in the last few months that observations on the steel tie situation are now of interest. Steel ties for city track work have been installed by a large number of city properties and also on some interurban lines.

One manufacturer, the International Steel Tie Company, Cleveland, Ohio, states that its twin ties have been used for the construction of more than 450 miles of city track in paved streets.

The first installation of this type of tie was made in 1909 on the Altoona & Logan Valley Electric Railway at Altoona, Pa., the second was made by the Cleveland Railway in 1910, and the third was made early in 1911 by the Scioto Valley Traction Company at Circleville, Ohio. Since that time their use has spread. Now they are used by nearly 100 different electric railways located in all sections of the United States.

The cost of the steel itself is said to account for more than half the selling price of twin steel ties, the present price of which is $4.90 per tie. One tie, however, is sufficient for each 6 ft. of track. In times of normal steel prices these ties sold for $3.50 each, f. o. b. Cleveland. Then steel was about $1.10 and now it is $3 per 100 lb. The price of malleable iron rail clips, eight of which are required per tie, is 5 cents each. Thus the total price of ties and clips per mile of track is about $4,665. The manufacturers point out that a reduction in the quantity of excavation and concrete needed brings about a sufficient lessening in the total cost of the track foundation to enable these steel ties to compete with wood ties on the basis of first cost of paved track substructure, even at the present high cost of raw steel.

The manufacturer also states that his contracts with steel producers provide sufficient steel for the manufacture of about 300 000 more ties than are now on order and that deliveries can be made immediately in carload lots of 300 to 500 ties so that they may be used for fall construction work. Recent rush orders for Fargo, N. D., Tippecanoe City, Ohio, and Beaumont, Tex., were shipped within four days from receipt of order.

OUTDOOR TRANSFORMER AND SWITCHING STATIONS

Continued development of the sale of power direct from the transmission lines of interurban railways has greatly increased the sales of the manufacturers of outdoor transformer and open-air switching stations. The interurban lines of the North Central states have installed a great many open-air switching stations for tapping their high-tension railway transmission system so that local consumers, such as industrial plants and small municipalities, may be fed direct from the railway circuits. These open-air stations consist of towers carrying horn-gap switches that are operated from a lower level through the medium of connecting rods. One refinement in this general type of switch as produced by the Railway & Industrial Engineering Company of Pittsburgh is that of the automatic air-break switch equipped with overload trips and no-voltage release. A further refinement which has been lately supplied to some railways is that of remote electrical control for opening or closing the air-break switches. One use for switches so equipped is for sectionalizing branch lines.

This company is making three weeks' delivery on its standard type of outdoor substations and six weeks' delivery on special equipment. Some of the more recently designed special equipments include outdoor switching stations for handling 110,000-volt energy supplied to portable transformer stations of the Southern Power Company.

MOTOR TRUCK SALES ACTIVE

Reports from the manufacturers of motor trucks indicate that the sale of gasoline power wagons has been especially active this summer. The White Company of Cleveland, for example, cites the sale during six weeks of more than 100 motor trucks to be distributed among thirty-nine public service companies. This company has a department devoted to the design of special truck and body equipment suitable for electric railway operating and constructing uses, as well as for other public utility uses.

Examples of economy to be obtained from the use of motor trucks, particularly for line and emergency outfits, have prompted engineers carefully to study the possibilities in the electric railway field and to apply the trucks in many new and interesting ways. The results of these investigations are reflected in orders for specially designed motor equipment to meet individual requirements of different properties.

The types of gasoline motor equipment used by public service corporations include line repair trucks, emergency trucks, cable pulling power-winch trucks, power trucks, wrecking trucks, ash removal trucks equipped with power dumping bodies, delivery trucks, and in some instances electric railways use buses for providing branch feeder line passenger service.

Recent orders have been placed with the White Company for motor trucks to be delivered to the Public Service Corporation of New Jersey; the Panama Traction Company, a new organization at Jamestown, N. Y.; New York State Railways; Des Moines City Railway; Columbus, Delaware & Marion Railway; Charleston Consolidated Railway & Lighting Company; Yonkers Railroad Company; Republic Railway & Light Company, Youngstown, Ohio; Stone & Webster Management Association; Chicago Surface Lines; Georgia Railway & Power Company, and the Grand Rapids (Mich.) Railway.

SALES OF EXPANDED STEEL POLES

A new use for the expanded steel pole is reported by A. J. Bates of the Bates Expanded Steel Truss Company, Chicago. These steel trolley type poles are being employed for supporting outdoor high-tension switching and lightning arrester stations. The Central Maine Power Company has a large wire tower built of these poles and the Delta-Star Electric Company has purchased poles for five outdoor substations.

This type of pole has been on the market less than a year and consequently many of the orders received have called for poles for demonstration purposes. Repeat orders are

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now reported. The largest number of Bates poles so far sold to an electric railway went to Des Moines, where the Des Moines City Railway is completing the erection of more than 1100 expanded steel truss trolley poles. Other orders have been delivered to the Chicago, Ottawa & Peoria division of the Illinois Traction System, the Aurora, Elgin & Chicago Railroad, Chicago & Joliet Electric Railway, Hudson Valley Railway, Public Service Company of Oklahoma, Oklahoma City Railway, Intermountain Railway, Light & Power Company, Lamar, Col., and to a substantial number of central stations and transmission companies in various parts of the country. Several foreign orders have been delivered, and recently a repeat order was received from a property in Cuba. The manufacturing capacity of the plant has reached 300 poles a day; deliveries on standard trolley poles can be made at once, and 70-ft. combination poles can be shipped in ten days. The price of poles advanced somewhat in July, but the officers of the company state that their reserve of steel is such that they can now furnish steel poles at a price but little above the present price of raw steel.

WIRE AND CABLE ORDERS LARGE

Manufacturing conditions in the weatherproof wire and cable industry have improved greatly during the last few months. The Standard Underground Cable Company, for example, has five plants now all in full operation. Delivery on weatherproof trolley feeder cable and wire is normal at two months, but the manufacturers point out that such roads as may be planning for the installation of weatherproof feeders and cable in the early months of next year should consider ordering very shortly. The biggest buyers of cable are now placing contracts for exceptionally large amounts. They are placing orders far in advance, and this may embarrass the manufacturers in making normally prompt deliveries of smaller orders.

ROLLING STOCK

Goldsboro (N. C.) Electric Railway is in the market for two open cars and one closed car.

Jackson Railway & Light Company, Jackson, Tenn., is in the market for two one-man car bodies.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., has ordered two cars from the Southern Car Company.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, is in the market for ten additional cars for city service.

Charleston (W. Va.) Interurban Railroad is reported to have placed an order with the Cincinnati Car Company for two all-steel double-truck interurban cars.

North Jersey Rapid Transit Company, Hohokus, N. J., is reported to be contemplating the purchase of one-man light weight cars to replace present equipment.

Long Island Railroad, New York, N. Y., is inquiring for prices on forty-five trail cars for use on its electrified divisions and for fifteen coaches and ten baggage cars for steam operation.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., noted in the ELECTRIC RAILWAY JOURNAL of March 18 as considering the purchase of twenty-five all-steel double-truck cars, has ordered this equipment from the Cincinnati Car Company.

Wheeling (W. Va.) Traction Company is in the market for fourteen double-truck city cars. This new requirement is in addition to the eight 30-ft. body double-truck cars which have just been delivered by the Cincinnati Car Company. The latter cars are equipped with four Westinghouse motors and with Allis-Chalmers air-brake equipment.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., noted in the ELECTRIC RAILWAY JOURNAL of Aug. 12 as considering the purchase of additional equipment, is in the market for five interurban motor cars. This company has just received from the Westinghouse Electric & Manufacturing Company two new single-phase freight locomotives weighing 72 tons each.

TRADE NOTES

Miller Trolley Shoe Company, Boston, Mass., has received an order for forty-eight trolley shoes from the Lehigh Valley Transit Company.

Railway Improvement Company, New York, N. Y., has received an order for anti-climbers for the fifty cars recently ordered from The J. G. Brill Company by the Boston Elevated Railway.

Consolidated Car Fender Company, Providence, R. I., has received, through its general sales agent, Wendell & MacDuffie Company, an order from the Wheeling Traction Company for fifty H-B life guard equipments.

Page Woven Wire Fence Company, Monessen, Pa., has appointed W. T. Kyle as Eastern sales manager, with offices at 30 Church Street, New York. For some time Mr. Kyle has been connected with the Okonite Company in the sales department and previously was Eastern sales manager of the Duplex Metals Company.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received an order from the Jackson Light & Traction Company for two equipments of Westinghouse 515-X motors and five equipments of Westinghouse 512-Z motors; the first mentioned to be used in two new light-weight one-man cars now being built and the last to be used in replacing old-type motors.

Peter Smith Heater Company, Detroit, Mich., reports the recent receipt of the following orders for heaters of the forced-ventilation type: Wichita Railway & Light Company, seven; Kansas City, Kaw Valley & Western Railway, four; Ashtabula Rapid Transit Company, three. This company has also received an order from the St. Joseph Valley Traction Company for two hot-water car heaters.

National Tube Company, Pittsburgh, Pa., has announced that a new steel pipe mill will be built at once at Gary, Ind. The plant will be located near the works of the Indiana Steel Company and will make pipe from the ore to the finished product. It is pointed out that so far as electric railways are concerned this new plant will place the company in a much better position for the delivery of steel trolley poles and power plant steam piping.

Cleveland (Ohio) Fare Box Company has recently made the following sales of its locked fare boxes: Fifty for the Clement C. Smith Companies at Winona, Minn.; Green Bay, Wis., and Evanston, Ill.; 265 to the Pittsburgh Railways, sixty to the New York State Railways, fifteen to the Buffalo & Lake Erie Traction Company, and fifty to Detroit United Railway, to which company an order for eighty boxes has just been delivered. That the fare box business is particularly active is evident by the statement that the Cleveland Fare Box Company has now unfilled orders on its books for more locked boxes than it sold during the entire year of 1915.

ADVERTISING LITERATURE

Ohmer Fare Register Company, Dayton, Ohio, has issued a booklet on the Ohmer system, entitled "Power."

Searchlight Company, Chicago, Ill., has issued Catalog No. 12 on Searchlight welding and cutting equipments. This company is also distributing a circular illustrating its equipment and some of the work done by it.

White Company, Cleveland, Ohio, has circulated several new bulletins on the service now being rendered by White motor trucks in use in the electric railway industry and also in other divisions of the public utility fields. Illustrations in these bulletins show special types of bodies designed for line and track work. One bulletin is devoted to tower trucks for electric railway service.

The paint and varnish manufacturers report a considerable increase in electric railway business for 1916 as compared with former years. The Sherwin-Williams Company, Cleveland, Ohio, has done over 25 per cent more electric railway business during the year ending Aug. 31 than it did in the previous year. This company, due to war conditions, has built a dye manufacturing plant and is at present turning out daily a ton of red dye. The dye-making equipment is soon to be doubled in capacity.

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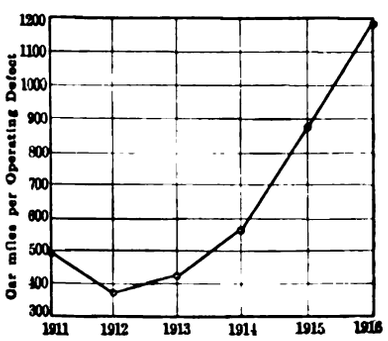
Complete Records Help to Offset the Rising Cost of Labor and Material

Rolling Stock Maintenance Cost Can Be Materially Reduced by a Record System, Which Accurately Checks Up the Work of the Employees as Well as the Performance of the Apparatus

By W. H. BOYCE
Superintendent Beaver Valley Traction Company, New Brighton, Pa.

IN the successful operation of any manufacturing concern detail reports are an absolute necessity. The same principle holds good in the proper maintenance of electric railway lines. Through the complete system of reports used in all departments of the Beaver Valley Traction Company, New Brighton, Pa., it is possible at any time to secure accurate and intelligible information as to the condition of the rolling stock and other equipment. Certain employees are held responsible for the making out of these reports and the rules governing them are strictly followed.

Our experience has proved that even in a property of this size, records of all kinds, and systems in all departments are profitable. One might think that on a road operating twenty-three to twenty-five regular cars



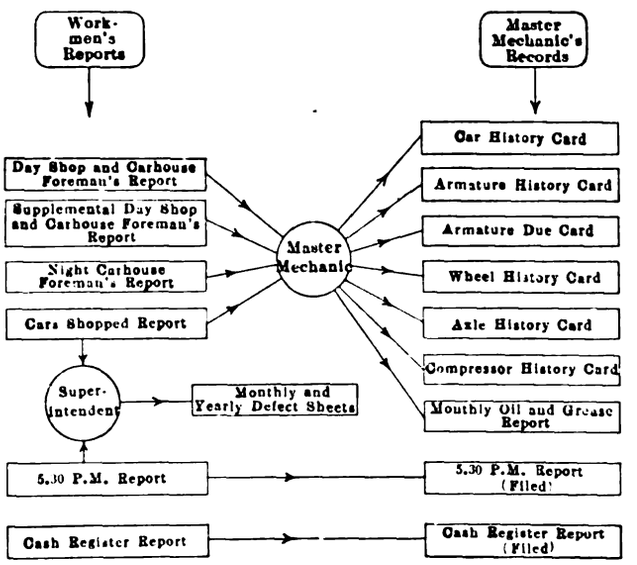
CURVE SHOWING CAR-MILES PER OPERATING DEFECT

there would not be much demand for the number of records which are kept relative to the rolling stock, but a glance at the curve showing car-miles per operating defect for the past six years will readily disprove this. With the rising cost of labor and materials the management of a property should at any time be able to determine from the records the comparative cost per 1000 car-miles of even as small a thing as a trolley wheel.

The illustration on the opposite page shows the forms on which our car maintenance records are kept and the diagram indicates how the data from the workmen's reports are transferred in the master mechanic's office to the several history cards. Copies of two of these reports also go to the superintendent's office where the monthly and yearly defect sheets are compiled. An outline of the work covered by each report follows:

The cash register report, Fig. 1, shows the car number and cash register reading of each car in the carhouse when the day carhouse inspector comes on duty and the same data for each car turned in from operation during the day. The report is begun by the day carhouse inspector and finished by the night inspector and is filed in the master mechanic's office. A separate cash register report of the cars turned into the carhouse at midnight is sent to the night cashier who checks it with the register closing statements on the conductor's reports.

The 5.30 p. m. report, Fig. 2, shows the number of cars in the carhouse at the time the report is made out, the number of cars not ready for service and the causes of their disability. One object of the report is to keep the day men on the job and reduce as far as possible the number of crippled cars which the day men leave for the night men to take care of. The report is made



METHOD OF KEEPING CAR MAINTENANCE RECORDS BEAVER VALLEY TRACTION COMPANY

in duplicate, one copy for the master mechanic and another for the superintendent.

The number of crippled cars turned in from service and the cause of the failure of each car are recorded on the report of cars shopped, Fig. 3. This is one of the most vital reports since it indicates the condition of the equipment by showing the failures and troubles of the cars in service. The superintendent receives a copy of this report and in his office the data are transferred to the monthly and yearly defect sheets. The master mechanic also receives a copy and transfers the data to the history cards.

The armatures, axles, etc., which are replaced during the day are recorded on the day shop and carhouse foreman's report, Fig. 4, which is filed in the master mechanic's office where the data are transferred to the history cards. Motor armatures are removed periodically on a mileage basis, 12,000 miles being allowed for a GE-54 armature, 15,000 miles for a GE-67, etc. For keeping a record to show when an armature should be removed the armature due cards, Fig. 5, are used, the information being taken from the day shop and carhouse

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foreman's report. In determining when an armature should be removed we allow about 170 miles per day which takes into account the fact that the cars are left in the carhouse periodically for cleaning.

The supplementary day shop and carhouse foreman's report, Fig. 6, covers the miscellaneous shop work which is noted on the form. The data from these reports are transferred to the respective car history, armature history or other cards. The inspection, oiling and cleaning which is done at night is recorded on the night carhouse foreman's report, Fig. 7, and transferred from there to the respective history cards. The master mechanic keeps account of all lubricant used and records it on the monthly oil report, Fig. 8. The history cards to which reference has already been made are shown in Figs. 9 to 13 inclusive. The data from the various workmen's reports, described above, are transferred to these cards which form a permanent record in the master mechanic's office. These history cards thus show the operating record of the apparatus and the amount of repairs that have been necessary.

SHOP PRACTICE

In connection with the record blanks which have just been described, a brief outline of some of our shop practices may be of interest. The Westinghouse-328 motors are inspected every 600 miles or every third night, and all other motors are inspected every night. The air gaps are gaged with a hack-saw blade with the teeth ground off, or with a 1/32-in. sheet of fiber cut in a long strip. The motors are examined for the usual defects and the brushes and holders are inspected. The armature bearings are oiled every night and the axle bearings every other night. The latter are removed if they show a diametrical wear of over ⅛ in. The steel wheels are removed when the limit of wear gage, ⅝ in. in width, will slip down over the flange of the wheel. In cases where the tread of the wheel is less than ⅝ in. from the radial limit of wear line the flange is allowed to wear down as small as ½ in.

Four single-truck and two double-truck cars are cleaned on the interior each day and two single and one double-truck car are scrubbed thoroughly each day, the windows and outside of the car being cleaned when the cars are scrubbed. At night car cleaners sprinkle the floors of all cars with a disinfectant and then sweep them thoroughly.

Once every month each car is inspected from the trolley wheel to the rail. This has been the means of finding many small defects and thus preventing delays and more costly repairs. At this time the journal boxes are oiled and repacked, and we have found more frequent attention unnecessary. The air compressors are also inspected and filled with oil once a month. The amount of oil used is recorded on the compressor history card, a glance at which at once shows if the consumption is irregular.

In the summer season the aluminum lightning arresters on the cars are inspected after each storm by pulling off the trolley wheel and letting it make contact again. A sharp, snappy spark indicates that the arrester is in proper working condition. Every two weeks the night carhouse foreman inspects all aluminum cell arresters to see that they are properly filled and that they are not heating.

Work has been commenced on a new narrow-gage railway to connect Motril and Ordiva, Spain. It is probable that when this railway is completed the tramway company at Granada will open a new tramway line between Granada and Ordiva, thus bringing the port of Motril within easy reach of Granada.

Signal Lights to Be Changed on the Pennsylvania System

White Lights for Proceed Signals to Be Replaced by Green Lights

WHITE lights are to be eliminated altogether as a signal indication on the entire Pennsylvania Railroad system, both east and west of Pittsburgh, Pa., as soon as the materials to make the necessary changes can be obtained. Green lights will replace white lights for "clear" or "proceed" signals while a bright distinctive yellow light visible at great distances will be used for a "caution" signal. A red light will continue to be a "stop" signal. The elimination of white from the signal color scheme has been rendered desirable by the increasing use of white lights of various kinds in buildings, driveways, roads and streets close or adjacent to the railroad's right-of-way.

This company, however, was unwilling to proceed with the change until a yellow glass could be obtained for the "caution" signal which would give a bright light at long distances. A light was desired which would not be liable to be mistaken for white, and thus be confused with other lights along the line of the railroad. Progress in the art of coloring glass, after years of experiments, has resulted in the production of such glass.

The adoption of the new signal system will mean the changing of hundreds of thousands of colored glasses and lanterns. This will require considerable time for completion, especially as slow deliveries are to be expected owing to industrial conditions resulting from the European war. Not only will alterations have to be made in all of the semaphore signals, but the following devices will also be affected: Marker lights on the rear of passenger and freight trains, switch lamps and targets, markers for track tanks, slow signs, resume speed signs, hand lamps at interlocking and block signal stations and lights displayed at crossing gates. Lights for the latter purposes will be red instead of green as at present.

This proposed signal system has been tried out on the extreme end of the New York division and has been found to work satisfactorily. It has also been adopted by branch lines of the Pennsylvania system so that desirable uniformity will be obtained. No change is to be made on those short portions of the system which are protected by "position light" signals in which the various indications are given by rows of electric lights showing against a black background in the various positions of the semaphore arms.

Louisville Railway's Interest in Factory Fund

The Louisville (Ky.) Railway Company will ultimately be one of the principal individual beneficiaries of the "million dollar factory fund" which Louisville succeeded in raising by a nine-day campaign which closed recently. The railway company, with a subscription of $25,000, was one of the largest subscribers, the only other similar subscription having been made by the Louisville Gas & Electric Company. Subscriptions announced at the close of the campaign were several thousand dollars over the million set out for, while there are still other additions to be made. Payments will be made in ten equal semi-annual installments, and the fund will constitute the capital of the Louisville Industrial Foundation, Inc., an adjunct of the Board of Trade. The organization of the corporation will begin at once, after which an industrial survey of the city will be made.

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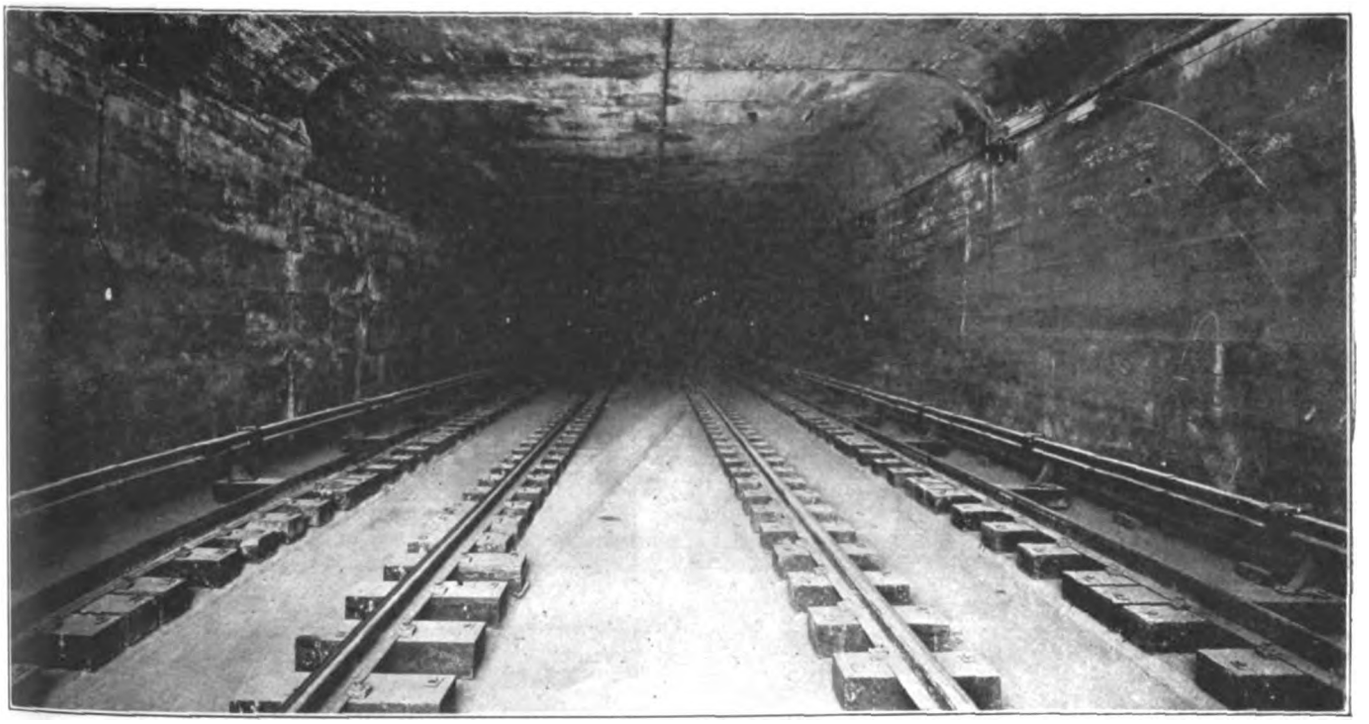
Unballasted Track Gives 50 Per Cent Lower Maintenance Cost

By WILLIAM S. TWINING
Director Department of City Transit, City of Philadelphia

The author of this article was chief engineer of the Rapid Transit System in Philadelphia at the time that the subway in that city was constructed, and it was under his direction that the novel method of track construction there adopted was employed. It is interesting to learn that during nearly ten years' of service very few renewals have been found to be necessary and that no defects have developed which would suggest any desirable changes in the methods of construction.



PHILADELPHIA SUBWAY TRACK—VIEW SHOWING FOUR-TRACK TUNNEL

At the time of the installation of the track in the Philadelphia (Pa.) subway in 1907 there was a great deal of interest manifested in the work owing to the fact that a new type of construction was installed. After nearly ten years of severe use this construction has given an excellent service record. Accordingly, the figures given below, showing the total yearly cost of this track construction as compared with the cost of ballasted track subjected to same service, are of value and interest.

The installation of track was described in the STREET RAILWAY JOURNAL in the issue of Feb. 16, 1907, and further details were given in the issue of May 4, 1907, but for the benefit of those unfamiliar with this type of roadbed a brief description follows:

The construction comprises two 12-in. 20½-lb. channels under each rail, the channels being spaced 15 in. back to back, with two 15-in. 33-lb. channels as permanent spacers. This steel work is assembled in the shop in 30-ft. lengths, then placed in position in the subway and accurately surfaced and aligned by attaching the rail thereto with temporary long ties spaced at intervals of about 15 ft. The channels are then embedded in concrete to the height shown on the accompanying illustrations. The concrete is brought to a true plane about ⅛ in. above the channel flanges to afford a bed for the ties. The ties are 6 in. x 10 in. x 2 ft. yellow pine, surfaced to precise thickness and placed on the concrete at intervals of 2 ft. They are anchored to the channels by ¾-in. x 8-in. bolts passing through the ties (head up), the holes for this purpose having been previously provided in the flanges of the channels. After the ties are in place the rails are accurately aligned and fastened to the ties by means of screw spikes and cast-iron clips. The rails used are 90-lb. A. S. C. E. Bessemer steel in 60-ft. lengths. The carbon content is about 0.55 per cent.

The first section of track was placed in operation in February, 1907, and has been in continuous use since that date, or about nine and one-half years. The same rail and construction throughout as originally placed is still in service with the exception of the rail on curves, and probably the rail on tangents will have a life of about a year and a half more. During this period approximately 3,500,000 cars have used the track, or a tonnage approximating 140,000,000.

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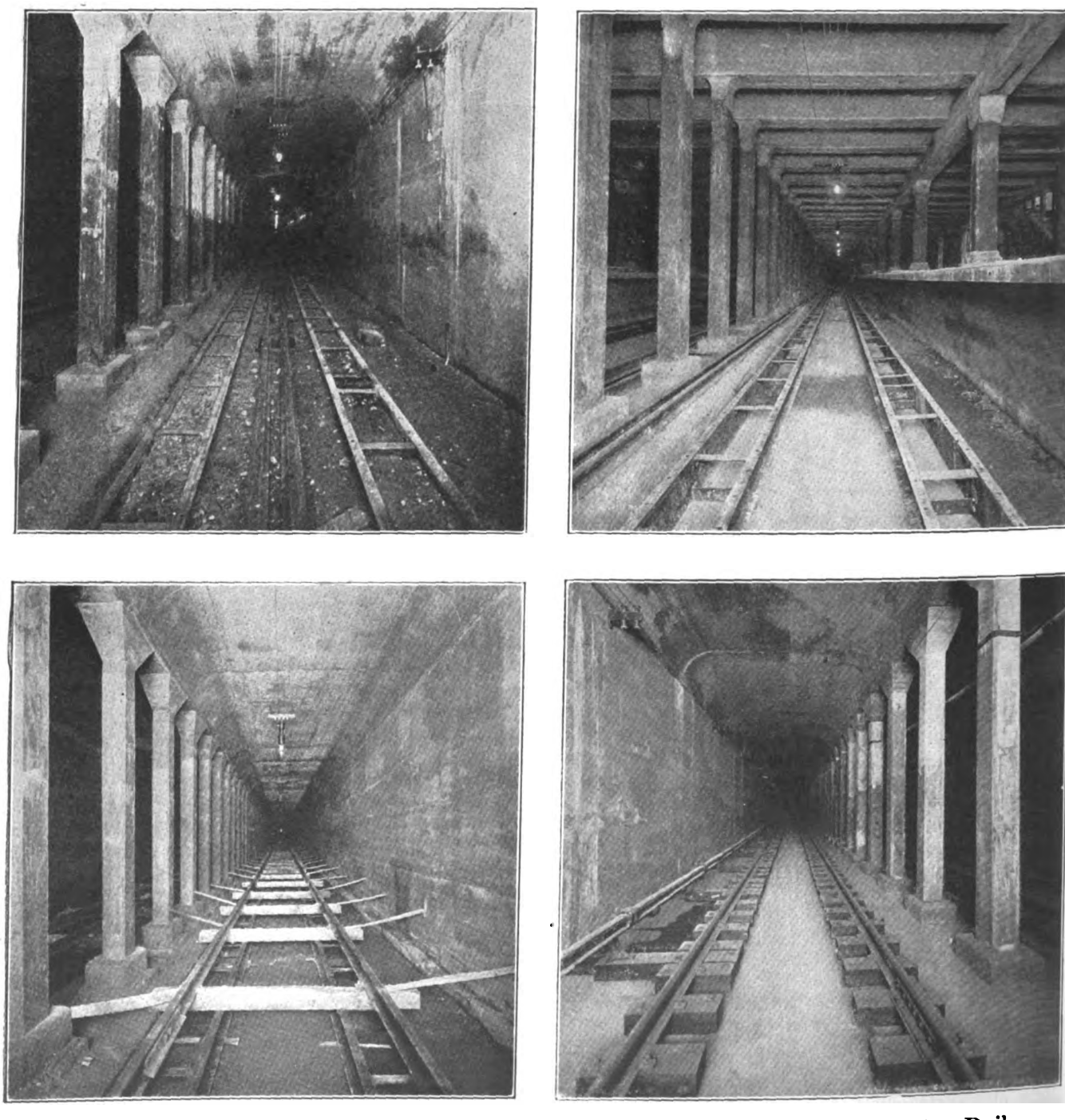
The tracks on the Market Street elevated line immediately to the west of the subway were laid at the same time with precisely the same type of rail and similar joint plates. The elevated construction consists of 6-in. x 8-in. x 8-ft. ties on stone ballast with a depth of 5 in. to 8 in. beneath the ties. The rail on the elevated structure was in such condition in 1912 as to demand renewal throughout the entire section between Twenty-ninth and Sixty-third Streets. This was done late in 1912 and early in 1913, after a life of six years, and during 1912 and 1913 the greater part of the ties were likewise renewed.

As there is no ballasted construction on any of the subway tracks in this city, the nearest approach to a comparison of maintenance cost between the subway type of construction and the ballasted type is a comparison of the subway with the section of the elevated above noted, both sections having been subjected to precisely the same amount of traffic. They are constructed with rail of the same weight and quality, and the same type of joint plates and method of fastening rails to ties.

An analysis of the expenditures running through several years, after eliminating such charges as would be common to any type of construction, indicates a maintenance cost for the subway track of about one-half that of the ballasted track, or approximately $528 per mile per year for the subway track as against $1,056 for the elevated ballasted track.

The initial cost of concrete construction is estimated at $44,352 per mile, and the ballasted construction $24,288 per mile. In the ballasted construction the cost



Philadelphia Subway Track—Views Showing the Four Steps Followed in Laying Rails

Each rail is mounted on a series of wooden blocks which are held in position by ¾-in. bolts passing through the blocks and the upper flanges of two 15-in. channels. The channels are spaced 15 in. apart by separators, and the space between them is filled with concrete so that the wooden blocks rest directly on the concrete. No ballast of any kind is used, so that the subway is very easy to keep clean.

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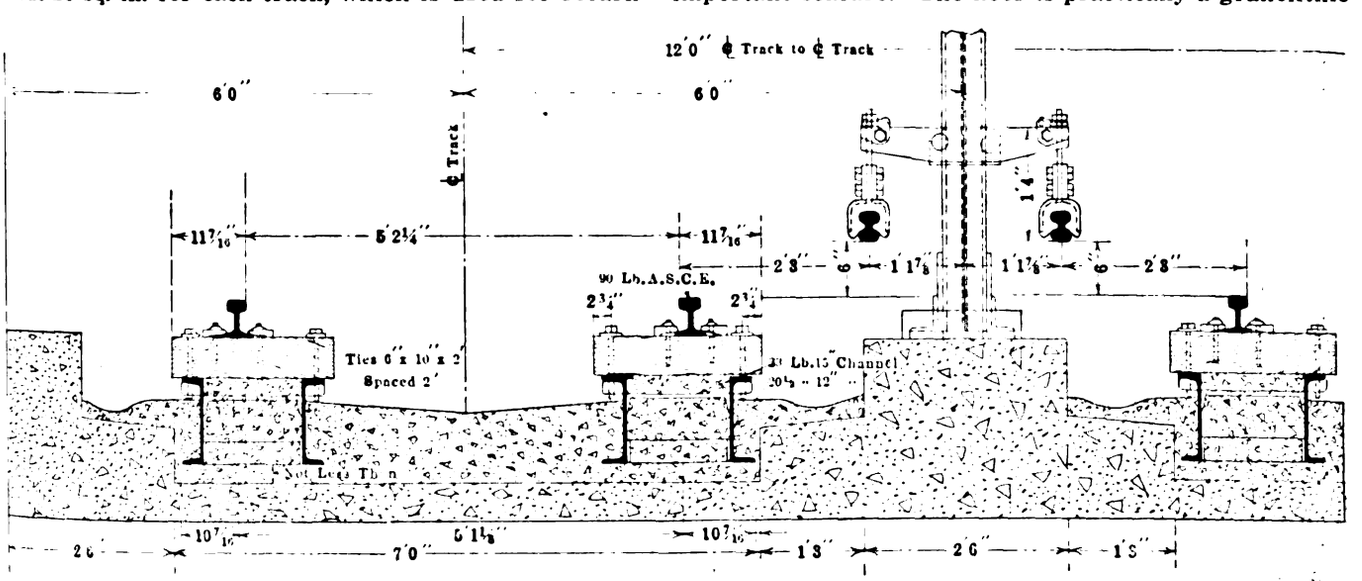
of a concrete sub-base under the ballast has been included. Basing an estimate on past experience we have placed the life of the rail in the concrete construction at ten years and in the ballasted construction at six years. As to the ties, we have no definite information as to how long untreated ties will last in the subway. The present ties are in first-class condition after nearly ten years of service, and for the sake of comparison we have placed the life at fifteen years, and the life of the ties in the ballasted construction at eight years. In both cases, of course, the timber is untreated. Basing estimates on these figures the results are, in round numbers, as follows:

Concrete Construction	
Interest on initial cost ($44,352 at 5 per cent)	$2,218.00
Sinking fund for tie renewals ($4,224 in fifteen years)	192.00
Sinking fund for rail renewals ($6,336 in ten years)	496.00
Maintenance	528.00
Total yearly cost per mile	$3,434.00
Ballasted Construction	
Interest on initial cost ($24,288 at 5 per cent)	$1,214.00
Sinking fund for tie renewals ($5,808 in eight years)	600.00
Sinking fund for rail renewals ($6,336 in six years)	918.00
Maintenance	1,056.00
Total yearly cost per mile	$3,788.00

There is therefore a difference of $354 per mile per year, or about 9 per cent, in favor of the concrete construction. In making this comparison, no reference has been made to the fact that the channels in the concrete construction provide steel of a cross-section of about 26 sq. in. for each track, which is used for return



TYPICAL CROSS-SECTION OF PHILADELPHIA SUBWAY SHOWING UNBALLASTED TRACK CONSTRUCTION

current purposes, in addition to the 18 sq. in. in the rails. The cost of return cable of an equivalent carrying capacity is thus saved.

It must be borne in mind also that the larger part of the repair work required on the elevated is performed in daylight, whereas the subway work is all performed under artificial light with the usual disadvantages incident to such work. Furthermore, a large proportion of the expenditure on the subway track was virtually inspection work, consisting largely of going over the bolts and screw spikes at frequent intervals to make sure that all were in good condition and to detect any weaknesses incident to a type of construction which had not been previously tried. With these facts in mind it may be safe to say that the difference between the maintenance cost of the concrete construction and the ballasted construction would be considerably more than as indicated above.

The object of the designers was to provide a track with a permanent substructure, to avoid the continuous and expensive maintenance due to ordinary ballasted construction, especially as such work would be required in the limited confines of the subway; to avoid vitiation of the subway air by the accumulation of foreign materials which could not readily be removed, and to make all wearable portions easily accessible for inspection and replacement with a minimum amount of labor and the least possible interference with traffic. After nearly ten years of service there is no hesitancy in saying that our aims have been fully realized, and in addition to a reduced maintenance expense a substantially greater life has been secured in the wearable portions.

The actual maintenance work so far performed in the subway aside from the inspection and the replacement of the rail on curves, has been the renewal of a comparatively small number of the short ties and the changing of a few tie bolts and screw spikes which had broken, probably from being set up too tightly. It is readily seen from the drawing that such renewals can be made with two or three men, as each bolt or each tie can be removed and replaced independently of any other.

There is ample room between rails for the storage of any material required for repairs or renewals, and practically no interference with traffic is necessary except, perhaps, single tracking for very short intervals during the period of rail replacements. A few hours at a time during "owl" car service will suffice for this operation.

The cleanliness of the subway is, of course, a very important feature. The floor is practically a granolithic surface, which can be cleaned either by flushing with water or sweeping with ordinary house brooms, both of which methods have been used effectively and to such an extent that absolutely no foreign matter of any description has been allowed to remain. The track space at station platforms is swept up each night during light traffic, and the other portions of the subway are cleaned at frequent intervals.

Finally it may be said that the ten years of experience with this construction have not indicated any defects that would suggest any desirable changes in the method of construction. Some time ago it was thought that should such construction be installed in a subway where the conditions of water to moisture would tend to cause rapid corrosion of the exposed face of the channel, it might be desirable to construct a special channel with a depressed flange so as to have the anchoring flange entirely surrounded by concrete. The need of this has not so far been disclosed by our experience.

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Employees Repudiate Peace Pact

Third Avenue and Second Avenue men in New York City Disregard Settlement Plan of Aug. 7 and Strike Without Arbitration—Commission Recommends that Interborough Arbitrate Service Contract, but Company Refuses—Service on All Lines Increasing

THE strike situation confronting the Interborough Rapid Transit Company and the New York Railways, which seemed well in hand when this paper was published last week, was made more serious on Saturday night, Sept. 9, by the extension of the strike to two lines not at all concerned, the Third Avenue Railway and the Second Avenue Railroad, and in spite of supposedly sacred agreements entered into by the men on these lines to arbitrate all grievances. In spite of this repudiation of the settlement pact of Aug. 7, however, the companies involved proceeded to offer increasingly good service. The trunk subway and elevated lines of the Interborough Rapid Transit Company offered more than normal service, and the affected surface lines showed improvement daily. At present the fight seems won by the companies, although the union leaders are threatening to call a general sympathetic strike of trade unionists in order to strengthen the car men's failing cause.

STRIKE SPREADS TO SECOND AND THIRD AVENUE LINES

The strike of electric railway employees in New York City that was initiated on the subway and elevated lines of the Interborough Rapid Transit Company and the surface lines of the New York Railways on Wednesday evening, Sept. 6, was extended on Saturday evening, Sept. 9, to the surface lines of the Third Avenue Railway and the Second Avenue Railroad. During the day the Public Service Commission for the First District exerted every effort to hold the employees on these lines to the settlement plan of Aug. 7, but to no avail.

The new strikes went into effect immediately, and on Sunday morning, Sept. 10, the residents of Manhattan awoke to a realization that the most complete transportation tie-up in its recent history was in existence. Early in the morning the situation was made more serious by similar strikes called on the Union Railway, the Bronx subsidiary of the Third Avenue Railway, and on the Yonkers Railroad and the Westchester Electric Railroad, subsidiaries in Westchester County of the Third Avenue Railway. Thus, for the major part, the peace settlement of Aug. 7 had proved a failure, for all the surface lines in Manhattan and the Bronx were again in the throes of a strike. Only the employees of the New York & Queens County Railway in the Borough of Queens and the Richmond Light & Railroad Company in the Borough of Richmond, which also came under the Aug. 7 settlement, remained loyal to the peace agreement and, with the still unaffected employees of the Brooklyn Rapid Transit Company and the non-striking employees of the Interborough Rapid Transit Company, continued to offer their services to the people of New York City.

HOW THE PEACE SETTLEMENT WAS VIOLATED

The strikes on the large Third Avenue Railway system and on the small Second Avenue Railroad were not the result of specific demands made by the union under the settlement plan and refused by the companies, but rather were walk-outs in sympathy with the strikes on the Interborough Rapid Transit Company and the New York Railways. Indeed, at a strike hearing before the Public Service Commission on Thursday, Sept. 7, William B. Fitzgerald, union organizer, had testified that a skeleton form of working agreement had been worked up for the Third Avenue Railway and was then the subject of conferences, and that as far as he knew peace and harmony prevailed and the method provided on Aug. 7 for adjusting differences in dispute was working satisfactorily.

According to a letter sent to Mayor Mitchel on Saturday, Sept. 9, by F. W. Whitridge, president Third Avenue Railway, the company had been considering in conference twenty-six demands of the union, and at the last conference, on Wednesday, Sept. 6, the company understood that it would receive in forty-eight hours a statement from the men as to what they were prepared to do. Up to Saturday nothing had been heard from them. The company, however, was ready to go ahead with arbitration with the least possible delay, and it had secured the consent of Lindley M. Garrison, former secretary of war, to act as its representative in the expected arbitration proceedings. Since Mayor Mitchel was one of the underwriters of the Aug. 7 agreement, therefore, Mr. Whitridge asked him on Sept. 9 to have the men nominate their arbitrator forthwith and also to fix some date within the next few days when if the men should not have named their representative, the Third Avenue Railway would in the Mayor's opinion be justified in considering that the men wished to abrogate their agreement.

The only answer to this letter on the part of the men was, as before stated, a strike late in the same evening. It was asserted by the union leaders that the sequence of events in regard to signing the Aug. 7 agreement and in regard to reinstating employees convicted of crime in the first New York strike a month ago showed that there was collusion between the traction lines of the city in an effort to destroy unionism, that the Third Avenue Railway in all cases was following the lead of the New York Railways and that it was only a question of time before the individual working agreements, which led to the trouble on the Interborough Rapid Transit Company and the New York Railways, would be circulated among Third Avenue Railway employees.

A FIGHT TO THE FINISH DECLARED

Before describing in detail the way in which the various transportation lines in New York were able to offer service to the public during the last week, it will probably be well to note the general moves in the whole strike situation up to the time of writing. After the union by its extension of strike orders to the Second Avenue and Third Avenue lines had showed that it did not intend to be bound by its agreement of Aug. 7, the traction officials of the city declared war in earnest on the Amalgamated Association. Collusion between the companies was denied, and it was pointed out that no individual working agreements had been circulated on the Third Avenue and Second Avenue lines. T. P. Shonts, president New York Railways, stated that it must now be apparent to everyone that it did no good to sign agreements with the Amalgamated Association and that there would be a fight to the finish. Mr. Shonts complained that some strikers were trying to intimidate loyal employees through the wives of the latter, and said that he was determined to stop this practice. Ac-

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cordingly, as shown in the accompany reproduction, the New York Railways put up posters offering a reward of $200 for evidence resulting in the arrest and conviction of any person who made to any female member of an employee's family any threat of personal violence toward such an employee or any member of his family for the purpose of intimidating him from the proper discharge of his duty. A similar offer was made by Mr. Shonts as president of the Interborough Rapid Transit Company.

President Whitridge after the Third Avenue strike order stated in a letter to Mayor Mitchel that the act of the union was obviously a breach of the agreement of Aug. 7, and that the striking employees had apparently spoken and behaved not as parties to a contract but as members of a secret society bound to obey the orders of a master. Accordingly, he accepted the men's repudiation of the Aug. 7 agreement, and would treat it thereafter as non-existent. As for the future, Mr. Whitridge said, no member of the Amalgamated Association would be employed on any of the lines over which he had jurisdiction, for the association had proved to be "a humbug." It was of no benefit to its members except the few who were officers, and it promoted disorder and disloyalty and was rapidly becoming a public nuisance. Mr. Whitridge emphatically stated in conclusion, in his letter to the Mayor, that he would have no dealings with the Amalgamated Association or with any one representing it until it was incorporated under New York laws and its accounts placed under the supervision of the Public Service Commission.

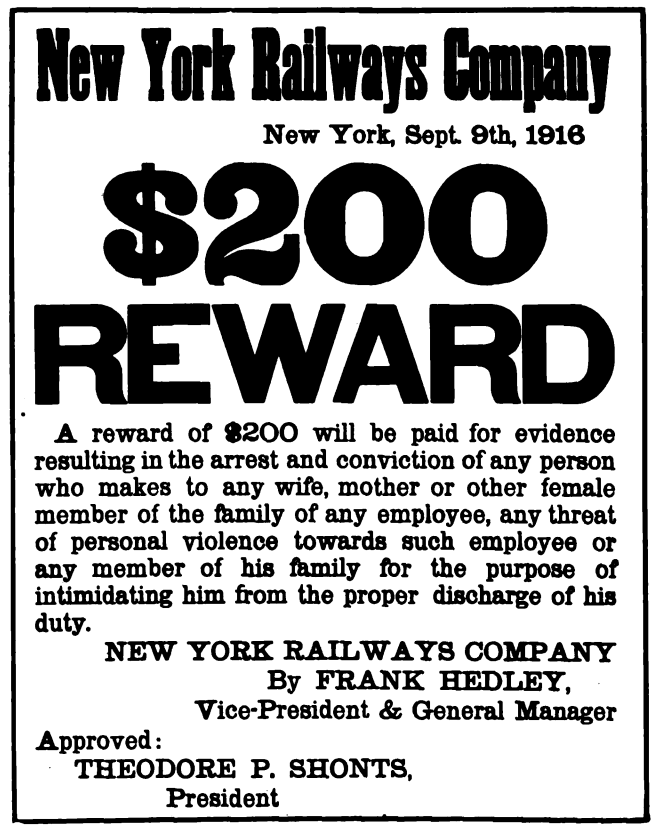
Interborough Not Fighting Unionism

In reply to a charge made on Monday, Sept. 11, by Mr. Fitzgerald to the effect that the companies had deliberately determined to crush unionism in New York, President Shonts and General Manager Hedley on the same day issued to the public an unqualified denial. The complete statement is shown in the illustration on the next page. The fact was, these officials said, the Interborough company had actually encouraged the formation of a union, to be entirely controlled by the men themselves and to include every employee on the payrolls not having disciplinary power over other employees. In short, the men of the company had an effective union of their own which was obviously satisfactory to them, and the real point underlying the existing difficulty was the determination of the Amalgamated Association to impose itself upon the company and to supplant the Brotherhood of Interborough Employees against the expressed will of the men themselves.

General Sympathetic Strike and Other Aids Sought by Union

As the week progressed, the outlook for the striking employees of the various lines gradually grew less rosy than they had expected, and various movements were instigated to strengthen their cause. The first of these was on Sunday night, Sept. 10, when delegates representing the American Federation of Labor, the New York State Federation of Labor, the Central Federated Union of New York and the Brooklyn Central Labor Union recommended a general sympathetic strike of the 750,000 trade unionists in the city in support of the Amalgamated Association. The leaders voted for this action on the ground that the right of organization was at stake. The action by the delegates was taken after Samuel Gompers, who had come to New York, had left the conference and had issued a statement saying that he favored all unions giving their moral and financial support to the car strikers, but not mentioning a sympathetic strike.

Although the threat of a general sympathetic strike in the city was at first received with forebodings by the public, events throughout the week tended to cause the belief that such a strike was for the most part only "talk." First it was explained that before a general sympathetic strike could be called, definite action would have to be taken separately by the individual unions composing the central bodies, which would require a week's time. Then, on Monday, Sept. 11, the chairman of the conference committee of delegates announced that in the event of a sympathetic strike, only those unions would be involved whose members were directly concerned with electric railway operation, such as stationary engineers and firemen, longshoremen who handle fuel for the railways, and power-house employees. This would reduce the number of new strikers from 750,000 to not more than 70,000. At this writing no definite


New York Railways Company

New York, Sept. 9th, 1916

$200 REWARD

A reward of $200 will be paid for evidence resulting in the arrest and conviction of any person who makes to any wife, mother or other female member of the family of any employee, any threat of personal violence towards such employee or any member of his family for the purpose of intimidating him from the proper discharge of his duty.

NEW YORK RAILWAYS COMPANY
By FRANK HEDLEY,
Vice-President & General Manager

Approved:
THEODORE P. SHONTS,
President

NEW YORK STRIKES—TYPE OF REWARD NOTICE PUT OUT BY NEW YORK RAILWAYS AND INTERBOROUGH RAPID TRANSIT COMPANY

strike action by even any of these has been taken, although there are threats of developments next Monday.

Another effort to cripple the companies in their efforts to offer service in spite of the strikes was seen in the offering of four experience ordinances on Tuesday, Sept. 12, to the Board of Aldermen. One, a fair sample, provided, under a penalty of $150 fine or six months' imprisonment or both, that no motorman or conductor should be allowed on any city lines without fifteen days' experience on some similar line in the city. The various resolutions were all referred to the general welfare committee, where it is expected they will remain. Still later reports, made on Wednesday, Sept. 13, were to the effect that recourse would be had to the State legislature for a compulsory arbitration law, and that the Board of Estimate and Apportionment would favorably consider a motor-bus franchise which has been before it for more than a year. It was denied, however, that the city authorities had any intention of using such means of reaching a strike settlement.

Commission Urges Use of Arbitration

In the meantime the Public Service Commission had been continuing its hearings of the prior week in the

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matter of the Interborough and New York Railways strike situation, with Mayor Mitchel as one of the underwriters of the Aug. 7 settlement sitting with Chairman Straus, the other. As a result of the investigation into the causes and the parties at fault for the strike situation, the Mayor and the commission on Tuesday, Sept. 12, handed down a memorandum recommending that the Interborough and New York Railways strikes be called off immediately and that the negotiations between the companies and the men be taken up again at the point where they were dropped before the strikes began. Asserting that the rights of the public are superior to the rights of either the strikers or the company, the commission proposed that both sides submit to arbitration the questions as to whether the individual working agreements constituted a breach of the peace pact of Aug. 7 and whether fraud, misrepresentation, coercion or intimidation was used by the company in obtaining such contracts. Furthermore, in order that the parties might proceed with the conferences where left off and that friction might be avoided, the commission suggested that they agree upon some impartial person to preside or, if they could not do that, permit the Mayor and Chairman Straus to name such an impartial person, to have no authority in reaching a decision, but merely to preserve the parties from further misunderstandings and disagreements. Finally, the commission advised that all such conferences should be held in public.

In reaching a decision embodying the foregoing recommendations, the commission was actuated by reasons stated in its memorandum, in part as follows:

"On Aug. 10, when the commission filed its memorandum on the former strike, there was no agreement covering the subways and the elevated. On Aug. 30, it appears from the testimony before us, the Interborough Rapid Transit Company received a committee of its union men, attended by the same advisers and spokesmen who appeared before us in the matter of the other railways. After discussion, Mr. Hedley informed Mr. Fitzgerald and his associates that as the same men governed the policies of the Interborough system as governed the policies of the New York Railways, they might proceed upon the assumption that the principles and policies embodied in the New York Railways agreement of Aug. 7 would be regarded as controlling in the case of the Interborough lines. It was definitely agreed to by both that the principle of freedom to organize, the principle of freedom from intimidation or coercion, and the principle of arbitration should govern. Although this agreement was not reduced to writing and signed by the parties, it was approved by President T. P. Shonts and was relied upon by both sides in their subsequent negotiations.

"Prior to and during the hearings before us, the officers of the Interborough Rapid Transit Company sought to persuade their men not to join the Amalgamated Association. After the agreement of Aug. 7 they advised their men to form an organization of their own, as suggested by the president and vice-president of the company. The company stated that these suggestions were favorably acted upon, that nearly 10,000 out of about 11,000 voted to carry out this policy and that they selected committees to speak for them and elected offi-

To the Public

Let no one be misled by the charge that the Interborough is trying to crush out unionism.

WE ARE NOT FIGHTING UNIONISM.

The fact is that the Company actually encouraged the formation of a union, to be entirely controlled by the men themselves and to include every employee on the payrolls not having disciplinary power over other employees.

The fundamental ideas of the Company in encouraging the formation of such an organization were:

1. That the men in their dealings with the Company should enjoy the benefits of collective action without expense;
2. That the public should be protected against sympathetic strikes arising out of disputes in which this Company and its employees were not concerned;
3. That more efficient service to the public would result if the relations between this Company and its men collectively were conducted within the Company's ranks and without the interference of third parties;
4. That the interests of this Company, its employes and the public they serve, would be fostered if all relations between this Company and its employes were conducted solely in the light of their common interests, rather than with reference to the interest of outside parties.

* * * * * *

Some 9,700 men out of 11,800 eligible to vote embraced the opportunity to ballot for representatives to form a general committee of this union.

A working agreement was arrived at between the Company and this Union providing increased wages and improved working conditions for the next two years.

This was a "collective bargain" just as much as any union agreement is.

But the Company went one step further: it not only agreed to a contract with the men collectively, but it asked that the agreement also be submitted to each man individually.

That it was satisfactory to the men individually as well as collectively is shown by the fact that over 10,500 have signed and are now working under it.

* * * * * *

An important feature of the Interborough Union is this provision for arbitration in the constitution adopted by the men, and unanimously approved by formal action of the Board of Directors of this Company:

"If for any reason the General Committee for the entire Brotherhood and the Officers of the Company are unable to settle any matter of mutual interest between them,—it is then the plain duty of the Brotherhood and the Officers of the Company to submit the matter in dispute to a Board of Arbitration."

Thus the men of the Interborough have an effective union of their own which is obviously satisfactory to them.

The real point underlying the existing difficulty is the determination of the Amalgamated Union to impose itself upon the Company, and to supplant the union of the Interborough employes, against the expressed will of the men themselves.

* * * * * *

This Company is only protecting its employes in their right to work and the public in its right to ride as against the efforts of the Amalgamated Association to prevent the doing of these two things.

INTERBOROUGH RAPID TRANSIT COMPANY.
FRANK HEDLEY,
Vice-President & General Manager.

Approved:
THEODORE P SHONTS.
President

New York, September 11th 1916

NEW YORK STRIKES—INTERBOROUGH DENIAL AS TO FIGHT AGAINST UNIONISM

INTERBOROUGH RAPID TRANSIT COMPANY

165 Broadway

New York, September 12, 1916.

TO ALL EMPLOYES:

We thank our loyal men for their faithful and efficient services under trying conditions.

The Subway and Elevated lines have, by your good work, carried their usual number of regular passengers and in addition many who ordinarily use the street cars.

We urge you to continue your efforts to serve the public.

We have taken precautions for your safety.

If you are insulted or threatened, point out the wrongdoers to the police and report the facts promptly so that the evidence may be presented to the courts.

A large number of such offenders are now in the penitentiary.

You have a right to go about your business in peace and we believe that the Judges and police will put a stop to law-breaking in this city.

Keep up the good work and in a short time peace will be restored.

We are proud of you.

FRANK HEDLEY,
Vice-President and General Manager.

Approved:
THEODORE P. SHONTS,
President.

NEW YORK STRIKES—NOTICE OF APPRECIATION TO INTERBOROUGH EMPLOYEES

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cers. The company contends that, as a result of the conference between the committees thus selected and their officers, working standards of wages and other matters were agreed upon; that this arrangement was submitted individually to the men, and that approximately 10,000 of them signed separately an identical memorandum or agreement embodying these terms. The company officials claim that this was done freely and fairly without violation of any of the principles of the agreement of Aug. 7 and that the men were permitted to and did exercise their constitutional rights. On the other hand, it is claimed by the officials of the Amalgamated Association that such a form of contract was in violation of the agreements of Aug. 7 and 30, and that these contracts thus signed by the men were secured through fraud, misrepresentation, coercion and intimidation.

"It appears that on Aug. 30 the officials of the Amalgamated Association first heard of the distribution of these contracts when the working standards were submitted to them as a basis for discussion. As soon as they had their counsel's opinion of the effect of this agreement upon membership in the union, they suggested that in addition to the four clauses there should be added the following:

"Nothing in this agreement is to be held to preclude any employee from joining any organization or any union, and will not preclude him from participating in any movement towards the betterment of his working conditions or the increase of his wages, and in the event that he sees fit to join such an organization with such objects in mind, it will not be considered a breach of this agreement."

"It appears from the minutes of the conference and the direct testimony before us that if such a course had been accepted, difficulty might not have arisen at this time. It is regrettable that at this point the parties apparently became distrustful of each other. From the testimony it appears that the men believed that an attempt was being made to deprive them of the rights which had been guaranteed to them by the agreement of Aug. 7. On the other hand, the company officials apparently believed that the officials of the union were seeking to prevent the men from exercising their right to prefer the Brotherhood of Interborough Employees to the Amalgamated Association.

"The union leaders concede that at this time no effort was made to utilize the processes or machinery of arbitration provided in the agreement of Aug. 30. On Sept. 1 a communication was sent to the chairman of the Public Service Commission by counsel for the men enclosing a copy of a letter to the Mayor, but attention is directed to the fact that in this communication it is expressly stated that no complaint is made 'at this time' to the commision, to the Mayor or to the chairman of the commission. Nor does there appear in the resolutions adopted by the men anything indicative on their part of readiness to follow the methods provided for in the agreement for arbitration. Yet the claim is made before us by the spokesmen for the union that on Aug. 30 there was an obligation on the part of the Interborough to arbitrate all differences that might arise, even though they involved questions of personal honor.

"It is our opinion, after listening to both sides and carefully reviewing the testimony, that whatever may be the condition of the mind of the officers of the union or the officers of the company, there is a clear duty to the public which the underwriters of the agreement of Aug. 7 and this commission have the right to assert. This controversy does not involve the issue of trade unionism in this city. To-day, as on Aug. 7, the clear, legal and moral principles governing the situation remain the same. Each side believes that it is standing for its rights, but the rights of both sides are subordinated to the rights of the public, and it remains as true to-day as Aug. 7 that the public's right to have controversy upon its railroads settled peaceably and without resort to a war of any kind is a right superior to the rights of either the men or the company.

"We believe that the agreement has not been destroyed by the acts of the parties. Though it has been violated, the moral obligation to maintain it still continues. It was deliberately made, and guaranteed by the Mayor and the chairman of this commission. The public was also a party to this agreement. Whatever the other two parties may do, they cannot deprive the public—the third party—of its rights under the agreement. It was the clear intention of all parties concerned, including the Mayor and the chairman of the commission, that neither side should resort to the strike or lockout until there had been recourse to arbitration. There should be in existence effective legislation to meet such situations as these, but in the absenec of such legislation there is no reason why the moral pressure of the whole community should not be exerted to compel both parties to observe the agreement which they state was in its essence fair and reasonable and which they regarded as 'sacred.' "

Commissioners Hayward and Hodge dissented from the first part of the finding, providing that the question whether the distribution of the individual contracts constituted a violation of the settlement plan should be arbitrated. These two commissioners were of the opinion, it was reported, that the individual contracts were sent out by the Interborough Rapid Transit Company before Mr. Hedley on Aug. 30 orally pledged the company to follow any of the provisions of the New York Railways settlement of Aug. 7, and therefore the Interborough line could not be asked to arbitrate something done during the interval while they were not under any obligations whatever.

INTERBOROUGH AND NEW YORK RAILWAYS REFUSE TO ARBITRATE

After learning of the proposals made by the Mayor and the commission, the New York Railways and the Interborough Rapid Transit Company on the same evening each issued a notice to employees refusing to consider any of the propositions put forward. In regard to the charges of fraud, etc., in the obtaining of the individual working agreements, it was averred that the best evidence of their falsity was the fact that so many employees were carrying out the contracts and rendering service in spite of the strike calls. As for arbitration and the continuation of conferences with the union, it was emphasized that no further dealings would be had with representatives or members of the Amalgamated Association.

On Wednesday morning, Sept. 13, the commission resumed its hearings in order that it might receive the formal replies of the companies and the union to its plan of settlement. In reiterating the stand taken on the previous evening, President Shonts through counsel submitted a statement in part as follows:

"The Interborough Rapid Transit Company cannot arbitrate its right to enter into agreements with 10,306 of its employees out of a total of 11,800, when the employees who have signed are content with those agreements and are endeavoring to carry them out in good faith. It cannot arbitrate its own good faith in becoming a party to those agreements, when they are definite as to pay and terms, signed by the employees upon the recommendation of their own duly appointed agents, and to-day are fully accepted by the great mass of our loyal employees.

"The New York Railways cannot arbitrate the causeless desertion of its service by its striking employees when their differences with the company were in process of orderly adjustment under the terms of the agreement

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of Aug. 7 underwritten by the Mayor and the chairman of the commission.

"The officers, agents and members of the Amalgamated Association have constantly made either veiled or open threats of a strike while we were endeavoring by conference to adjust all matters of difference with our employees. It is apparent that they cannot be depended upon to keep their agreements for the peaceable and orderly adjustment of differences.

"Any further conferences with such men would get us nowhere, and in the meantime our discipline would be demoralized, to the great injury of the public and ourselves. Both companies must respectfully decline to hold any further conferences with the officers, agents or members of this association, or of any persons affiliated with them."

UNION WOULD ARBITRATE INDIVIDUAL WORKING CONTRACTS AND MANNER OF OBTAINING THEM

The answer of the union to the proposals of Mayor Mitchel and the commission, in general one of acceptance covering all the railways then affected by the strikes, was stated by Mr. Fitzgerald in language in part as follows:

"While we are concerned mainly with the recommendations made by the Mayor and the commission, there is one statement made by the commission in its opinion which we cannot permit to pass without comment, *i.e.*, that 'this controversy does not involve the issue of trade unionism in this city.' We most decidedly take exception to this statement and submit that it is unwarranted and unjustified by the evidence.

"Any position which I might take with reference to the recommendations of the Mayor and the commission would be dependent upon the companies agreeing that all employees, including those who have been discharged by the company, be restored to their former positions and ratings without prejudice as of Aug. 29, and that both the companies and the employees be placed in the position as to all matters as of Aug. 30, this to include recognition by the company of their right to organize, their right to meet collectively and in conference with the company, and the right of arbitration of all matters in dispute which cannot be mutually agreed upon in conference.

"We will arbitrate the question of the fairness or unfairness of the individual contract of employment, called by the company 'working agreement.' We will also arbitrate the question of the fairness or unfairness of the methods employed by the company in obtaining signatures to them, and we will be only too pleased to take the suggestion of this commission that the conference heretofore held between the companies and the committee of the employees and their spokesmen should be continued with an impartial person who should have no authority to decide, but merely to preserve the parties from misunderstandings and disagreements, and that such conferences in the future should be held in public. These suggestions as to an impartial person presiding over the parties and the public character of the conferences are most excellent ones."

At this point Mr. Fitzgerald read from the memorandum of the commission that had a paragraph been added to the Interborough's individual working agreement with the men allowing them full union rights, the present strike situation might not have arisen, and then proceeded as follows:

"In view of this finding, of course, we expect that the members of our organization shall, notwithstanding these so-called 'working agreements,' have the right not only to enjoy all the benefits of our organization, but to participate in all of its deliberations in any way they see fit."

COMMISSION INVESTIGATES THIRD AVENUE CASE

In the memorandum of Sept. 12 the Mayor and the commission carefully refrained from making any reference to the Third Avenue and Second Avenue strikes, evidently because of the feeling that one general plan of settlement would be sufficient for all lines. With the rejection of its proposals, however, the commission proceeded to take up in detail the case of the Third Avenue Railway, and the first hearing was held on Thursday afternoon, Sept. 14.

At this hearing, before Mayor Mitchel and the commission, Mr. Fitzgerald repeated his charges of collusion between the Third Avenue Railway and the New York Railways, but Alfred A. Cook, attorney for the former company, stated that there had been no conference or communication, direct or indirect, between any representatives of these companies either in regard to signing the settlement pact of Aug. 7 or with reference to any unanimity of action in carrying out such an agreement. President Whitridge stated emphatically that he had had no conferences with New York Railways or Interborough Rapid Transit Company officials and had not talked or communicated with any of them regarding strike matters. Mr. Cook testified that he had not drafted any individual working agreement for Third Avenue men, and that this point to his knowledge had never been contemplated or discussed. Edward A. Maher, Sr., vice-president and general manager of the company, also declared that such an agreement had never been suggested or considered.

In regard to the company's position concerning arbitration, Mr. Cook said that when Mr. Whitridge returned from Europe on Aug. 28 he accepted without discussion the settlement agreement made in his absence, and ordered that it be carried out in letter and in spirit. At the first conference with the men Mr. Whitridge asked for an abatement of their demands in order that a mutual agreement might be made without arbitration. He at no time refused arbitration, but simply endeavored to avoid the expense and delay of arbitration by asking the employees to lessen their demands, especially on the point of wages. As the conference continued, some of the demands were agreed upon, and others were left for arbitration. At the last conference, on Sept. 6, Mr. Maher told the men that without doubt a number of points would have to be arbitrated, and that the company would like to get at the matter promptly and was prepared to go ahead at any time. The men said that they would suggest an arbitrator in about forty-eight hours. Thereupon the company selected Mr. Garrison, but the next move of the men was the strike on Sept. 9.

At the hearing the commission entered on its record the report of a conference on Sept. 9 at the Bar Association between Mayor Mitchel, Chairman Straus, union leaders and head of the Third Avenue locals. It was shown that at this meeting, which was before the strike order, the Mayor urged the men to keep the peace agreement of Aug. 7, for in his opinion to go on strike in the face of Mr. Whitridge's proposal to arbitrate would be a deplorable breach of the agreement. Mayor Mitchel stated that not even a declaration of intent or purpose on the part of the company would justify the men in breaching the contract, for if they had any grievances the only proper recourse was to arbitration under the contract itself. Chairman Straus took the same point of view, but the men refused to abide by it and struck.

HOW THE SERVICE WAS KEPT UP

The main fact clearly discernible from electric railway operation in New York City from Sunday, Sept. 10,

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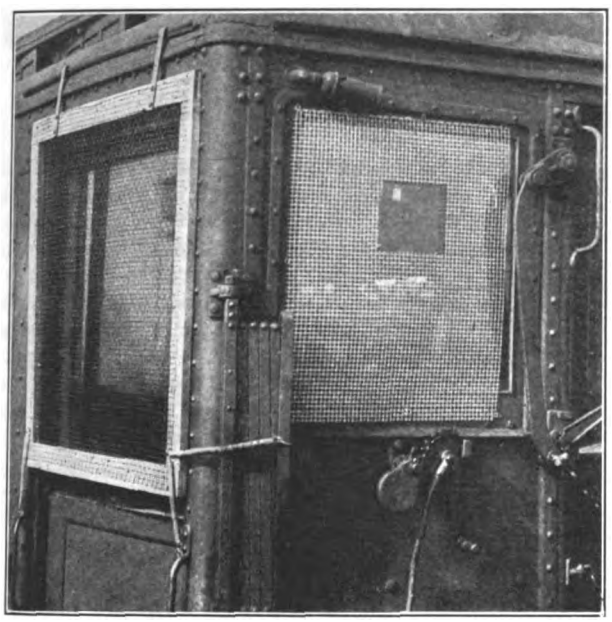
up to the time when this issue went to press was that the first strike, that on the subway and elevated lines of the Interborough Rapid Transit Company, had proved a flat failure and that the subsequent strikes on the various surface lines in Manhattan and the Bronx were gradually wearing themselves out.

On Sunday, the elevated and subway lines of the Interborough Rapid Transit Company were hit with an avalanche of passengers on account of the suspension of service on the Third Avenue and Second Avenue lines but more than normal service was offered, and the same standard was maintained during the week. On Wednesday, the elevated and subway service was 20 per cent more than normal in the rush hours. On Monday the total number of passengers on the elevated and subway



NEW YORK STRIKES—SAMPLE OF WIRE SCREENS USED TO PROTECT MOTORMEN

lines was 2,281,442, as compared with a total of 1,898,660 for the same day of last year. On Tuesday the total was 2,091,341, as compared with 1,653,653 last year; on Wednesday the total was 2,091,171, as compared with 1,635,540 last year, and on Thursday the total was 2,078,755 as compared to 1,629,166 last year. On Thursday the company reported that 10,306 out of its 11,800 employees had signed the individual working agreements. A notice issued during the week, thanking the employees for their loyal and efficient service under trying conditions, is reproduced on page 486.

Service on the New York Railways during the week, while not starting so well as expected, became gradually better. The proclamation of amnesty to striking employees if they would return before 1 p. m. on Saturday, Sept. 9, resulted in about 100 employees going back to work, and this number continually increased during the week. The company early determined not to employ strike-breakers on the surface lines, in order to avoid violence, which naturally handicapped it in offering service to the public. In spite of this fact, however, the maximum number of cars in operation gradually rose from 250 on Sunday to 327 on Thursday, the normal being about 1290. The individual contracts increased in this time from 958 to 1015. On Wednesday, the company dismissed one-third of the 3000 strike-breakers that had been secured by itself and the Interborough Rapid Transit Company, for it was found that enough experienced men could be hired to restore the service gradually to full operation with the aid of old employees. On Wednesday, ninety-five experienced men were chosen from 600 applicants.

The various sections of the Third Avenue Railway system showed different degrees of success in operating cars during the week. The lines of the Yonkers Railroad and the Westchester Electric Railroad in Westchester County did not offer any service at all to the public on account of the restrictive experience ordinances in Yonkers, Mount Vernon and New Rochelle. The Union Railway, the subsidiary operating in the Bronx, started out with thirty-two cars on Sunday and gradually increased the number to 141 on Thursday, 252 being the week day normal. The Third Avenue Railway proper, operating in Manhattan, had forty cars in operation on Sunday and increased this number to 248 on Thursday, the weekday normal being 505. On Sunday the company offered double pay to employees who remained loyal and about sixty returned at that time. More came back later, but the strikebreakers to some extent were used on the red car lines.

No strikebreakers were used on the cars of the Second Avenue Railroad. Instead of the normal 105 cars on week days the company operated from twenty to twenty-six. It was stated that most of the Second Avenue men were not on strike but were intimidated from operating the cars.

During the week the service on the surface lines was suspended at night in order to avoid violence. Extra service in suburban districts was given by the New York Central Railroad and the New York, New Haven & Hartford Railroad, and all sorts of automobile conveyances were used in the city, especially for cross-town travel. On the whole there was not much disorder in connection with the strike, owing to the precautionary measures taken by the company and the police. Wire screens, such as shown in the accompanying illustration, were used on rapid transit and surface cars, and passengers were prohibited from riding on the elevated platforms in order to keep strikers away from brakes and emergency cords. There were many instances of bricks thrown at surface cars and elevated trains and occasional attacks on those who remained on duty, but there was no rioting.

Illinois Commission Report

The second annual report of the Illinois Public Utilities Commission, advance sheets of which are just off the press, indicates the divers activities of the State regulatory body. The report discloses that the commission has entered orders in 1644 formal cases, of which thirty-nine, or 2.4 per cent, have been appealed to courts possessing jurisdiction. Of these appealed cases thirteen were carried to the Supreme Court of Illinois, which reversed the commission in only two of its orders, and reversed the Railroad and Warehouse Commission, the predecessor of the present commission, in two other orders. Thus the commission itself has been finally reversed in only one-tenth of 1 per cent of its orders. The commission, since its inception in January, 1914, to the date of the second annual report, has disposed of 770 informal cases requiring more or less extended investigation, and has received fees (principally for authorization of securities) amounting to $816,223 against disbursements for salaries and other expenditures amounting to $309,883—a net balance turned into the State's treasury of more than $500,000. A complete tabulated list of the stocks, bonds and other securities authorized by the commission shows that all stock is required by the commission to be sold at par, and, with two execptions, all bonds were required to be sold at 85 or above.

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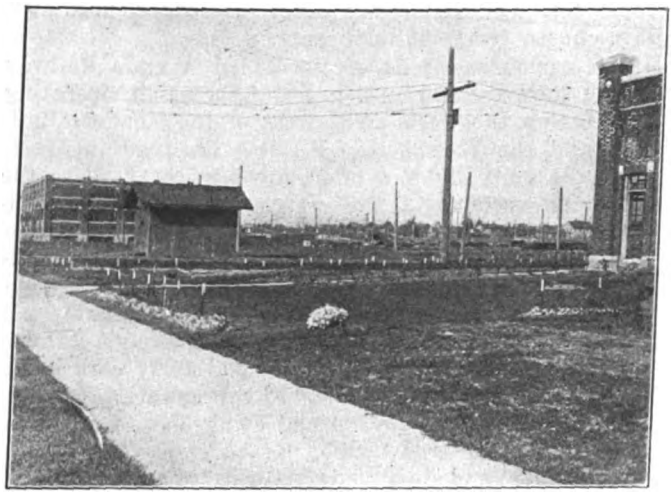
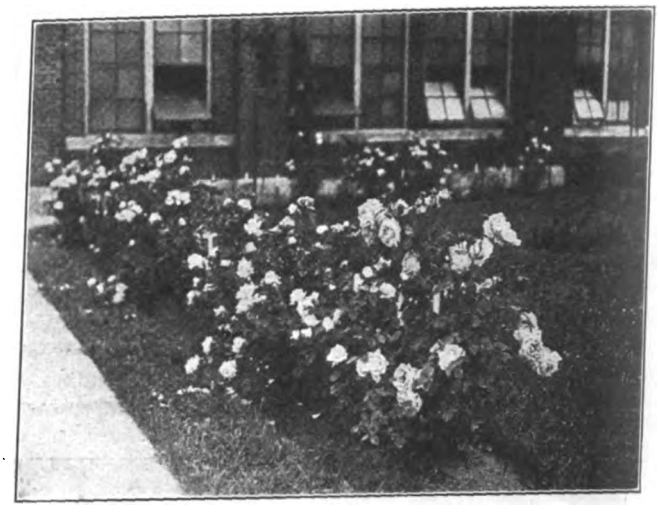


PORTLAND RAILWAY COMPANY'S FLOWER GARDEN JUST GETTING STARTED



THE OFFICIAL PORTLAND ROSE—ONE OF MANY IN THE RAILWAY COMPANY'S GARDEN

Shop Grounds Beautified by Roses

Portland (Ore.) Railway Plants a Flower Garden in Which Its Men Take a Keen Interest

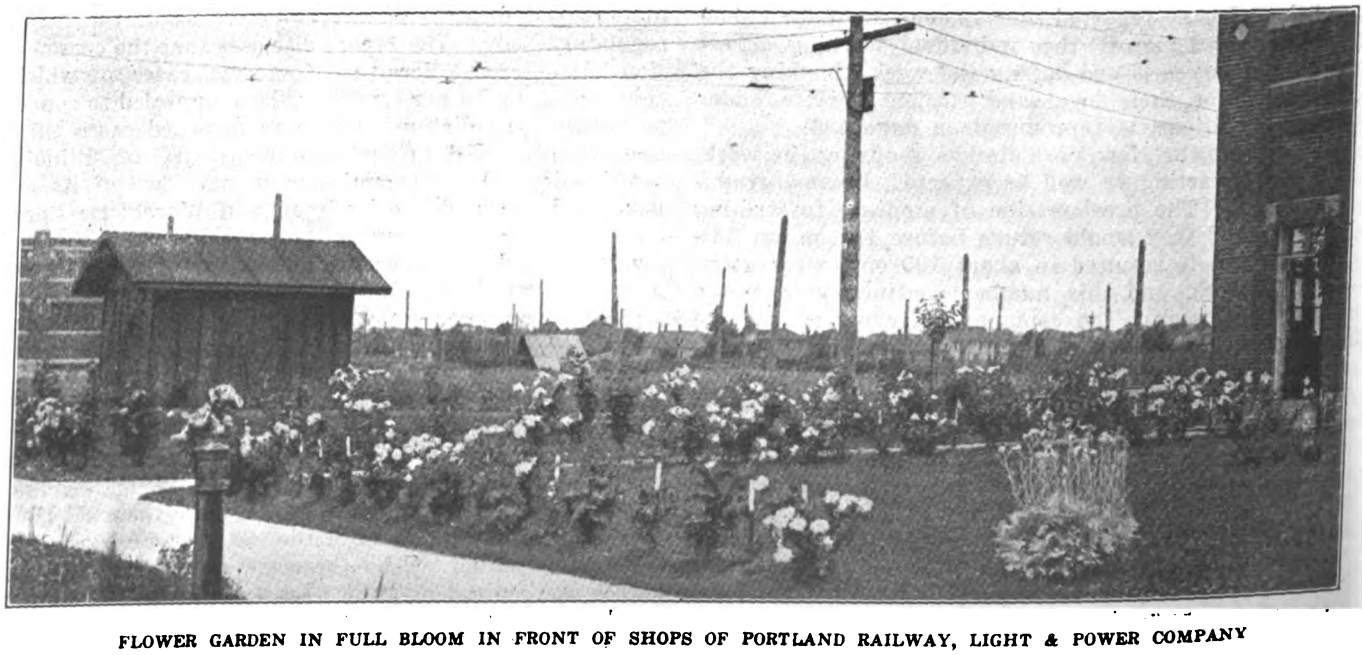
BY F. P. MAIZE
Master Mechanic Portland Railway, Light & Power Company

THE north building of the group comprising the repair shops of the Portland Railway, Light & Power Company has a frontage of about 240 ft. and stands back 80 ft. from the street. Until two years ago this approach was a rough gravel patch, a thrifty bunch of weeds here and there being the only ornamentation. A glance at the illustrations will show what a change has been made since the idea was conceived that this space might be turned into a flower garden.

A cement walk leads from the building to the street, and on each side of this walk a square about 80 ft. on a side was formed. The top layer of stones, weeds and gravel was removed and a layer of good soil taken from the company's land was laid in its place. This earth was well mixed with fertilizer obtained from cattle cars in the nearby freight yard. The squares were covered with fine sod and inclosed with a hedge of rose bushes. A few flower beds were made within these squares, and it was not long before the garden began to make a really creditable appearance.

From the very first the men showed their interest by bringing seeds, slips, bushes and bulbs, until at the present time there are tulips, daffodils, gladioli, phlox, cosmos, dahlias and more than a hundred rose bushes in this garden. Among the roses are the beautiful pink Caroline Testout, the official rose of Portland, and the magnificent, snow-white, Frau Karl Druschki, gorgeous J. B. Clarks and Ulrich Bruners, and many other choice varieties. We now have a constant succession of flowers for ten months of the year, all blooming with the profusion of growth peculiar to Portland vegetation. Many of the rose bushes have as many as fifty roses and buds in bloom at one time.

All of this work has been done without expense to the company, as the flowers have been donated and the garden is cared for by the shop men. The effect of this improvement is not restricted to the exterior, as there has been a noticeable change in the appearance of the interior of the buildings, the men seeming to take a greater pride in keeping the shops in a neat and orderly condition. Many of them show their interest in the garden by bringing their families to see the flowers on Sunday, or in the evening, and one of them expressed the general sentiment when he said: "It's a lot nicer to look at that beautiful garden than at an old gravel patch."



FLOWER GARDEN IN FULL BLOOM IN FRONT OF SHOPS OF PORTLAND RAILWAY, LIGHT & POWER COMPANY

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Holding Company Traveling Experts

The Organization and Work of the Traveling Railway Specialists Recently Appointed by Henry L. Doherty & Company Are Described in This Article

ONE of the important advantages possessed by a holding company of the operating type is that, owing to the large volume of work handled, it can afford to employ more experienced and efficient operating men and engineers than could any of its constituent companies. Further, in a large organization there are usually a number of men who have worked and studied along certain lines until they are authorities of note in their respective fields. One of the problems confronting such a company is that of utilizing the talents of its specialists to best advantage. It has been thought, therefore, that a description of the plan recently adopted by Henry L. Doherty & Company, 60 Wall Street, New York, might be of general interest.

INAUGURATION OF THE PLAN

In the belief that a better utilization of the talents of the trained specialists in the organization would result in lower operating costs and increased safety, it was proposed at the meeting of the officials of the traction group of the Doherty interests, held in Chicago last May immediately before the annual convention of the National Electric Light Association, that some of the operating officials of the company who had specialized along certain lines be appointed traveling railway specialists. The managers of the several properties approved the plan and took steps to put it into action at once. So far two appointments have been made: Albert Swartz, vice-president Toledo & Western Railway, has been appointed traveling track specialist, and Arthur Brown, master mechanic, Toledo Railways & Light Company, traveling master mechanic. These appointments were noted in the news columns of the ELECTRIC RAILWAY JOURNAL of June 10, 1916.

SELECTION OF SPECIALISTS

In the selection of these specialists it was felt that it would be a blunder to remove them permanently from their present positions and thus deprive their properties of their regular services. It seemed best, therefore, to continue them in their regular positions but to give them opportunities to get away occasionally. The plan of appointing regular operating men for such positions has several advantages to commend it. The men selected as specialists are fresh from the firing line, as it were, and the problems they are advising on are their own problems, solved or to be solved, whichever the case may be. Their viewpoint is that of the operating man, and as a result they do not tend to belittle the local problems which are bothering the officials of subsidiary companies. An appointment as a traveling specialist bestows particular recognition on a man who, by careful study and hard work, has become a recognized authority in some field of endeavor. The fact that such recognition of merit is granted to deserving men furnishes an incentive for the younger men who aspire to the higher positions in the company to study and specialize on some particular line in connection with their regular work.

Briefly stated, the duties of these specialists are: To visit and inspect, with particular reference to their respective specialties, the several railway properties forming the Doherty traction group; to promote the use of standard methods, practices and equipments, and to advise the officials of local companies on special problems. They act chiefly in an advisory capacity; that is, they do their work as any outside consulting engineer would do it, making a report of their findings and a recommendation both to the local manager and to R. F. Carbutt of the New York office of the Doherty interests, who, as railway engineer for the company, has the general supervision of their work as traveling specialists. They are expected to write up their report on a property which has been inspected before they leave the property, so that all details will be fresh in mind while the report is being written. The expense of inspection is charged against the local company just as it would be had the work been done by an outside party. Occasionally some special problem requiring time for its solution may be brought to their attention. In such cases, the work in connection with the problem is carried on by the local people, who keep the traveling specialist informed of its progress.

(Name of Company)

Total Car Miles _____ Cost of Railway Car Material 1916

Material	Total Cost	Cost per 1000 Car Miles	Miles per Unit	Manufacturer of Material	Type & Kind of Material	Unit Cost Including Freight	Date of Purchase of Material	Size of Material
Armature Coils								
Babbitt (Armature)								
" (Bearings)								
Brake Shoes								
" Heads								
" Accessories			Per Shoe					

BLANK FORM USED BY TRAVELING SPECIALISTS FOR COMPILING COST DATA

Visits to the several properties are not scheduled, the traveling specialist using his own judgment in the matter and selecting a time when he can best get away from his own property. Two or three days are ordinarily spent in the inspection of a single property. The specialist usually tries to inspect several properties in the course of one trip, and to economize time groups them geographically. A few days before starting out he telegraphs the managers of the properties he is planning to visit, notifying them of his schedule. The advance notice enables local officials to formulate the problems on which the advice of the specialist is desired.

WHAT THE SPECIALISTS ARE DOING

In their inspections this year the specialists are paying particular attention to standardization matters. In the operation of isolated properties it is often the case that methods and practices, particularly those of a minor nature, differ considerably. Standardization

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LIST OF THE DOHERTY RAILWAY PROPERTIES

Name of Company.	Location.
Amarillo Street Railway	Amarillo, Tex.
Athens Railway & Electric Company	Athens, Ga.
Bartlesville Interurban Railway	Bartlesville, Okla.
City Light & Traction Company	Sedalia, Mo.
Cumberland & Westernport Electric Railway	Frostburg, Md.
Durham Traction Company	Durham, N. C.
Hattiesburg Traction Company	Hattiesburg, Miss.
Meridian Light & Railway	Meridian, Miss.
St. Joseph Railway, Light, Heat & Power Company	St. Joseph, Mo.
St. Joseph & Savannah Interurban Railway	St. Joseph, Mo.
Manhattan & Queens Traction Corp	Long Island City, N. Y.
Toledo Group	Toledo, Ohio
Adrian Sreet Railway	
Maumee Valley Railway & Light Company	
Toledo, Ottawa Beach & Northern Railway	
Toledo Railways & Light Company	
Toledo & Western Railway.	

cuts down overhead expenses, lessens the investment in stockroom material, facilitates inspection and repairs, and makes buying on a larger scale possible.

To facilitate their study of a given property, the specialists make use of a table of cost data showing costs of the various items for the current year and for the year preceding. A blank form of the kind used for listing the cost of car material used in maintenance work is shown in the illustration on page 491. The material is listed under the main headings of: Armature coils, babbitt (armature), babbitt (bearings), brake shoes, brake heads, brake accessories, brushes and brush holders, carwheels, commutators, field coils, fuses, gear grease, gear pinions, gear wheels, glass, incandescent lamps, lubricants, motor repairs, sand, soap for car cleaning, trolley springs, washers and harps, tape, trolley poles, trolley wheels, and waste.

A study of such a table of maintenance costs enables the specialist to pick out items for which either a considerable increase or decrease in maintenance cost has been made. Also from his knowledge of maintenance costs in general he can select the items that appear either excessively low or high. An increase in cost of maintenance of a particular item is investigated to see whether it is due to some method which is producing results no better than were formerly obtained.

A decrease is investigated to see that results as good as formerly obtained are being secured and to be sure that the results secured by the cheaper process in no way militate against safety in operation. If costs for both years are excessively high, the methods are examined to see how they can be changed so as to secure as good results at a lower cost. If costs seem to be lower than the specialist thinks they should be, an examination is made to see whether the low costs are due to an attempt to get too much wear out of a given piece of equipment, and thus affect the safety of operation and possibly the cost of maintenance of some other equipment item. For example, a very low maintenance in car wheels might mean that the flanges were being worn until they were very thin, thus increasing the danger of derailments and damage to track and special work. Excessive brakeshoe costs might be due to the use of a shoe not suitable to the local conditions. In such a case the specialist, from his wide knowledge of the subject, recommends a suitable type of shoe.

In the work already done the specialists have been able to advise changes in methods and practices which will result in annual savings to one local company of several thousands of dollars per year on a single item. On many items the standardization of methods and the advice of the skilled experts will result in only small savings. However, a number of small savings in each of the companies aggregates a large total when all the companies are considered. In some cases the specialists advise greater expenditures in maintenance because, in line with the broad policies of the Doherty Organization, safety of operation is placed above cost.

Mr. Swartz has already inspected the properties located at Amarillo, Tex.; Sedalia, Mo.; Athens, Ga.; Durham, N. C.; St. Joseph, Mo.; Hattiesburg, Miss.; Meriden, Miss., and Bartlesville, Okla. He will inspect the Cumberland & Westernport and the Manhattan & Queens properties some time this summer. In this his first round of inspections he has been placing special stress on the subjects of rail bonding, tie spacing, track grinding and street paving.

Mr. Brown has not had much time to give to the work as yet, but he is planning to inspect the Cumberland & Westernport and Manhattan & Queens properties at an early date. The work he has done so far indicates that the greatest savings will be on the items of brake shoes and car accessories. It is anticipated also that there will be a material increase in safety of operation as a result of his inspections.

The managers of local properties are, of course, not bound to follow the advice of the traveling experts, but as it is up to them to make good on their respective properties, they have been very glad to receive any information which enables them to render better service at the same cost or the same service at a lower cost. The results of the work of these specialists so far has been so satisfactory that the appointment of a traveling traffic study specialist is being urged. His appointment would not mean that extensive traffic studies would be made on the different properties, but studies of the relation of the traffic to the car schedules would be instituted in an endeavor to cut down the empty-seat mileage without reducing the quality of the service.

Railway Signal Association Meets

The annual convention of the Railway Signal Association was held at the Grand Hotel, Mackinac Island, Mich., Sept. 12-14, 1916. During the convention there were presented a number of reports of committees, among which was a special committee on harmonizing specifications and standing committees on signaling practice, standard designs, wires and cables, storage battery and charging equipment, direct current relays and power interlocking. An amendment to the constitution was also submitted and passed, thus raising the dues for the active and associate members of the association to $4 per annum. Progress reports were presented also by the committees on maintenance and operation and on electrical testing.

The committee on electric railway and alternating current signaling presented specifications for alternating-current relays and for single-phase line transformers of the oil-immersed, self-cooled, outdoor-type designed for 4400 volts or less. This committee also submitted descriptive matter on alternating-current signaling, including a technical account of the resonant shunt used for shunting out from signal apparatus heavy currents of frequencies other than that for which the system is designed. A number of brief outlines were presented to place on record data covering signal installations made upon steam and electric railways that use alternating-current signals. All of the installations thus referred to, with the exception of a few of one or two blocks' length each, have been described in past issues of the ELECTRIC RAILWAY JOURNAL. Reports were also received from standing committees on direct-current automatic block signaling and mechanical interlocking.

At the annual election of officers, Charles A. Dunham, Great Northern Railway, was made president; R. E. Trout, St. Louis & San Francisco Railroad, was elected second vice-president; W. H. Elliott, New York Central Railroad, having been made first vice-president without action. C. C. Rosenger was re-elected secretary-treasurer of the association for the coming year.

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Electric Service Over the Rockies

A unique method of calling the attention of the traveling public to the electric service over the Rocky Mountains by the Chicago, Milwaukee & St. Paul Railway is shown by the accompanying illustration. This is taken from the letterhead of the stationery on the observation car of the "Olympian," which is one of the transcontinental trains operating between Chicago, Ill., and Seattle, Wash., over this route.

Annual Report of National Safety Council

The third annual report of the secretary of the National Safety Council states that 1102 new members have been gained during the past year, an increase of 91 per cent, the present membership being 2020, with more than 10,000 representatives and 3,500,000 employees. The income from dues for the year was $46,000 and the present surplus is $4,600. At the present rate the income for the calendar year 1916 will approximate $70,000.

More than 3,000,000 copies of over 270 different pieces of printed matter have been sent out. Last year the annual congress was attended by more than 1700 representatives, fifteen sections were organized and an instructive exhibit was conducted. The council spent more than $5,000 on the congress. The information bureau is now well organized and there are two librarians in charge. Among the features of the work have been special and traveling exhibits, safety meetings in the plants of members, a new series of "Safe Practices Information Leaflets," co-operation in establishing a national fire and accident prevention day, etc. A field secretary has been engaged who started work on Sept. 1, and the staff now includes an editor.

The nominating committee has also presented its report. Among the nominations to directorships is that of Edward C. Spring, manager Lehigh Valley Transit Company, Allentown, Pa.

Difficulties of New York Commission in Subway Construction Work

During construction of the new rapid transit railroads in New York City under the dual system contracts, the Public Service Commission for the First District has had to engage in many varied forms of activities. New streets have been laid out, bridges have been built, railroad tracks have been moved, tunnels built, new foundations have been placed under some of the tallest of Manhattan's skyscrapers, buildings have been cut in half, one five-story apartment house has been moved a considerable distance and placed on a new foundation, and in one instance a fire-engine house was floated bodily down the Harlem River and set in a new location. The commission's engineers are now to engage in a new venture, being no less than the changing of the course of a running stream—Downing Brook—which runs through a portion of Bronx Park. At one point the stream crosses the park line three times, and at each of these crossings runs through property which is soon to be used for a yard for the storage of subway cars of the Interborough Rapid Transit Company. The course of the stream is to be diverted entirely within the park area, at present as an open running stream, but eventually it is to be diverted into a new trunk sewer which is now under construction.

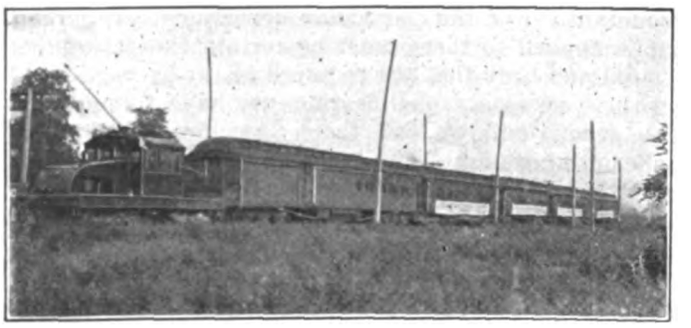
Electric Locomotives on the "Booster Special"

Special Train from Charles City to Cedar Rapids Hauled Over Four Lines by Five Locomotives

IN connection with a gas tractor demonstration held last month in Cedar Rapids, Iowa, a tractor manufacturer of Charles City arranged to run a special train of four coaches and a baggage car from the latter city to the show grounds in the former for the purpose of transporting a large company of boosters. To enhance the advertising value of this trip, the train was routed over the local electric lines as far as possible, using the steam lines for the remainder of the trip. The total length of the trip was 125 miles.

TRACTOR SPECIAL HAULED BY LOCOMOTIVES OF CEDAR VALLEY LINES

The train left the station of the Charles City Western Railway in Charles City, Iowa, at 6 a. m., a buffet lunch being served in the baggage car. From Charles City to Marble Rock it was hauled over the Charles City Western Railway, a recently electrified 1200-volt direct-current line for which power is purchased from the Cedar Valley Light & Power Company. An electric locomotive used by the railway for freight service hauled the train. At Marble Rock the train was picked up by a steam locomotive and taken over the Rock Island Railroad to Cedar Rapids, where it was coupled to a steam locomotive on the Chicago, Milwaukee & St. Paul Railway. The last named shifted the train to the lines of the Waterloo, Cedar Falls & Northern Railway, the "Cedar Valley Lines," where two 600-volt electric locomotives were coupled to it and hauled it to the show grounds, which it entered to the music of a forty-piece band brought from Charles City.



TRACTOR SPECIAL AT MARBLE ROCK, WITH LOCOMOTIVE OF CHARLES CITY WESTERN RAILWAY

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Medical Examinations of Employees*

The Author Explains the Many Advantages of Such Examinations When Employees Are Engaged and Outlines the Essential Requirements

By DR. CHARLES H. LEMON
Chief Surgeon, Milwaukee Electric Railway & Light Company

MODERN business differs from that of a quarter of a century ago in many particulars. Under the old order, the man was not considered as an entity. He came and went as the needs of the business demanded. His relation to his employer was a negative one. His joy and his sorrow were shared by no one, and the tenure of his position was dependent largely upon the whim of his immediate boss. The corporation was without a soul, and in the keen competition which necessarily occurred the man was lost sight of.

In the development of modern business, with its very humane interest in the welfare of its employees, we find the railroads many years in advance of the other industries. Until within a few years no voluntary medical services were offered injured employees in our great American industrial establishments. How different from the very beginning of their corporative lives has been the practice of the railroads in taking care of their wounded employees. They have recognized for more than a half century that injuries incident to operation were properly chargeable to the cost of operation.

Railroad surgeons have been identified in the public mind with the operation of railroads ever since railroading began. The general supervision of the health of the employees, which follows as a corollary the general employment of physicians throughout a large railway system, is a fact of importance that should not be lost sight of. The friendly suggestion by the doctor to the man who is in failing health is the human touch of the corporation.

ADVANTAGES OF EXAMINATION SET FORTH

In a diversified business such as ours the man seeking employment will represent every possible variety of human activity, from the illiterate foreigner who applies as a laborer to the highly trained engineer or accountant. For the particular department or bureau that is applied to there must be certain characteristics of mind and body that are required in the average man, and these necessary qualifications we have summarized in a group, and we call them "specifications." The applicant himself has by a process of self-elimination placed himself in a particular group when he applies to a specific department for employment. It is true he may be mistaken in his estimate of his ability, but we must at least recognize that he has specialized in his own case. This type of man, to my mind, is highly desirable, because in all but the lowest types of labor, where the bare necessities of life force the man into activity, we have the elementary idea of fitness expressed.

The purpose of specifications is not to bring a stumbling block to well intentioned applicants for employment. It is rather to standardize the type of man who shall form a group in order that the group may become efficient. The nearer the individuals of the group approach the specifications, the greater will be the effect of their team work.

In an exhaustive study of the changing personnel among trainmen, R. B. Stearns, vice-president Milwaukee Electric Railway & Light Company, prepared a comprehensive report, July 18, 1914, under the caption, "Recession Rate Among Trainmen and Estimated Average Annual Cost Properly Chargeable Against the Changing Personnel." This analysis of conditions among trainmen shows that the greatest loss from resignation occurs in the first two years of the service, and that after the third year the trainman has reached a condition of stability and the percentage of loss from resignation or discharge is exceedingly small. In this report Mr. Stearns gives a table to show average annual cost properly chargeable to the 433 trainmen in the service one year or less at that time (1913). The table follows:

TABLE SHOWING ANNUAL COST OF CHANGING PERSONNEL, MILWAUKEE, 1913

	Year 1913	Cost per Trainman in Service
(a) Practice money, at $10 each	$6,340	$14.64
(b) Wages paid conductor instructors	1,408	3.25
(c) Wages paid regular instructors (75 per cent)	3,330	7.69
(d) Rent of instructors' room (75 per cent)	270	0.63
(e) Cost of accidents and investigation	146,475	338.28
(f) Cost of damage to cars	2,573	5.94
	$160,396	$370.43

It may be concluded from the above that more care in the selection of employees to determine their relative fitness for the position, temperamentally as well as physically, may operate to effect a better class of employees and thus reduce the recession rate. This suggests the consideration of an employment bureau, wherein a careful study of the qualifications of each applicant may be made and a follow-up system inaugurated to inquire into the applicant's previous record and experience, and associate his fitness for the position with his physical, mental and temperamental qualifications. Such a bureau if properly organized might well act for all departments, and thus not only relieve the superintendent of transportation of the selection of several hundred employees annually, but relieve other departmental heads of similar burdens as well.

It will be seen, for instance, in the case of trainmen who have been in the service less than one year, that it is probably far less expensive to retain the services of an employee in the case of minor offenses of discipline during his early period of service than to discharge or allow him to resign, providing other necessary qualifications and fitness for the position have been demonstrated to be reasonably satisfactory.

It cannot, therefore, be successfully contended that the interest of the company is other than to find the man for the job and then train him for high efficiency and retain him in the service. We may infer from the relatively high recession rate which is probably characteristic of most other transportation companies, that the man who seeks the employment in nearly one-half of the cases does not do so from a firm conviction that he is fitted for the service, but rather to serve some temporary need or to fill in a gap while waiting for something to turn up. An employment bureau that could eliminate a fair percentage of these floaters would serve a most desirable purpose. The physical test will

*Abstract of paper read at Milwaukee Company Section, Oct. 28, 1915.

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eliminate a considerable percentage of applicants, and if any plan can be devised which will make their employment more attractive, such as has been the case in the last few years in this company, the recession rate hoped for by Mr. Stearns should become possible.

In the foregoing discussion we have seen that the employer will have to look about him to find the man suitable for the work in hand. We must assume that the head of a department has the best interest of his company at heart and will not employ a man who is manifestly incompetent, or who, by reason of manifest physical defects, could cause undue hazard. When labor is scarce and the management, because of the necessities of the business, holds the head of the department to an average, rather than to a high rate of pay, the temptation will become great to employ men who are physically below the average.

CHARACTER OF EXAMINATIONS

The work of the surgeon in these examinations must be absolutely impartial. It must not be so rigid in its interpretation that none but the most perfectly endowed will be able to pass. Above all, he should keep himself clear of fads, which are the bane of the medical profession, and his decision, after a careful investigation of the applicant, should be based upon actual findings rather than upon preconceived opinions. Sound lungs; a sound heart that will not flag under severe strain; a frame well knitted together; vision, at least normal in extent; hands and feet without deformity; an erect carriage; eyes which look you straight in the face; a step that is elastic, and a body free of any general blood taint; these are some of the qualifications that we must hope to attain in the average employee.

Many men who come to the examination, and to the office of a physician for the first time are visibly nervous. For such a few minutes of general conversation, which will give the applicant an opportunity to get his bearings, will frequently quiet down a heart whose beatings can almost be heard through the chest wall. That there will be a definite number of rejections, especially for the train service, goes without saying.

It is the duty of the medical examiner to stand firmly upon the result of his examination. To be influenced by the head of a department, who pleads for leniency because of the dearth of available material, is a confession of weakness. I do not think the opinion of the company's surgeon should be a last word for the departmental heads. There are times and circumstances which should justify the employment temporarily of men rejected by the medical department. The burden of the responsibility, however, should rest upon the departmental head exercising this right, and he should exercise this right only under conditions which he would feel justified in assuming that the management of the company would sanction.

It might be of interest to here briefly recite the physical requirements and characteristics necessary to employment:

1. *Age.*—Acceptable applicants for employment shall be eighteen to forty-five years old, except temporary employees, who may be employed up to fifty-five years of age. Messengers, office boys and minor clerks under the age of eighteen years may be employed by direction of a departmental head. No one shall be employed under sixteen years of age, excepting with the approval of the proper civil authorities.

2. *Height and Weight.*—Height shall be suited for the particular class of work. The weight shall correspond in general with the normal weight for the age and height, as shown by the standard table, but a variation of a maximum of 20 per cent over or 20 per cent under weight, as indicated on the table, may be permitted when other conditions are favorable. Special requirements shall be given due consideration.

Essential Physical Requirements

The following qualities will be required in all employees except in special cases where specific exceptions are provided:

3. Two good eyes.
4. Ten fingers free from deformity.
5. Arms that move freely at wrist, elbow and shoulder.
6. Legs of equal length, freely movable at the hip, knee and ankle.
7. Feet without broken arches, known as "flat-feet."
8. An elastic or springy gait.
9. Well developed chest.
10. Sound teeth.
11. Good hearing.
12. General appearance of good health.

Medical Requirements

13. No person who is a "consumptive" or who has lived in the same house with a "consumptive" within one year, shall be employed.
14. No person having venereal disease shall be employed.
15. No person with a history of "fits" or "convulsions" shall be employed.
16. No person with a habitual headache shall be employed.
17. Persons wearing glasses should not be employed except for clerical or technical positions.
18. Where a person is known to be color blind he should not be employed, as a color-blind person would not recognize a red "danger" signal.
19. No person having a hernia, varicose veins or "open sores" shall be employed.
20. No person with a spinal or other gross deformity shall be employed.
21. No person with an active skin disease shall be employed.
22. No person giving a history of mental or nervous disease shall be employed.
23. Every applicant before being employed must pass a satisfactory medical examination.
24. Manifest defectives should not be sent to the medical department for examination.
25. Employment cards should state the exact character of employment of individuals in order that the medical department may be advised as to the special medical tests required for various occupations, such as trainmen, linemen, teamsters, clerks, etc.

In addition to the foregoing essential qualifications necessary to employment, due consideration and weight are also given to personal appearance, social conditions and education and training.

No records are kept in the medical department of men applying for temporary employment, because of the enormous amount of clerical work involved. Excluding common laborers, these temporary employees represent largely a floating class, and many physical defects are found among them. Departmental heads not infrequently make permanent these temporary employees, and when they submit themselves for examination before admittance into the Employees' Mutual Benefit Association, a record is then obtained.

As applying to applicants for employment in the transportation service, it might be stated that approximately 40 per cent of those undergoing physical examination are rejected, principally on account of defective vision or for hernia.

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1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

ASSOCIATION NEWS

1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

Programs for Accountants', Engineering, Claims and Transportation & Traffic Associations Are Given —Also Notes on Meetings of Valuation and Entertainment Committees, and Revised Chicago Special Train Schedule

Programs for the Convention

Secretary E. B. Burritt has just announced the following tentative programs for the Atlantic City convention. The American Association program appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 12, 1916, page 280.

PROGRAM OF ACCOUNTANTS' ASSOCIATION

Monday, Oct. 9

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at registration booth.

2 p. m. to 5 p. m.

Meeting held in Accountants' Hall

Convention called to order.
Annual address of the president.
Annual report of the executive committee.
Annual report of the secretary-treasurer.
Appointment of convention committees.
(a) Resolutions,
(b) Nominations.
Reports of committees:
(a) Accounting definitions,
(b) Standard classification of accounts,
(c) Representing Association at Convention of Railroad Commissioners.
Paper on "The Statistician," by W. E. Jones, statistician, The Connecticut Company, New Haven, Conn.
Paper on "Commission Valuation of Public Service Properties for Purposes of Rate Regulation," by John E. Benton.

Tuesday, Oct. 10

2 p. m. to 3.30 p. m.

Joint session with Engineering Association
Meeting held in Engineers' Hall

Reports of committees:
(a) Engineering-Accounting,
(b) Life of Railway Physical Property.

3.30 p. m. to 5 p. m.

After joint session, meeting held in Accountants' Hall
Address on "Commission Accounting Inconsistencies," by Homer A. Dunn, C.P.A., Haskins and Sells, Certified Public Accountants.
Paper on "The Federal Census of Electrical Industries," by William H. Steuart, chief statistician for manufactures, Department of Commerce, Bureau of Census, Washington, D. C.

Wednesday, Oct. 11

2 p. m. to 5 p. m.

Joint session with Transportation & Traffic Association
Meeting held in Greek Temple

Reports of committees:
(a) Cost of rush-hour service,
(b) Fares and transfers.
Prepayment Systems—General Discussion.
Reports of committees:
(a) Express and freight traffic.
Address on "Some National Issues in Local Street Railway Franchises," by Clyde L. King, professor in the University of Pennsylvania, Philadelphia, Pa.
Reports of committees:
(a) Passenger, express and freight accounting.

Thursday, Oct. 12

2 p. m. to 2.30 p. m.

Joint session with Claims Association
Meeting held in Accountants' Hall

Reports of committees:
(a) Claims-Accounting.

2.30 p. m. to 5 p. m.

After joint session

Address on "The Part which Accounting has Played in the Development of Modern Industry," by John R. Wildman, professor in New York University, New York, N. Y.
Reports of convention committees:
(a) Resolutions,
(b) Nominations.
Election of officers.
Installation of officers.
Adjournment.

PROGRAM OF ENGINEERING ASSOCIATION

Monday, Oct. 9

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at registration booth.

2 p. m. to 5 p. m.

Meeting held in Engineers' Hall

Convention called to order.
Annual address of the president.
Annual report of executive committee.
Annual report of secretary-treasurer.
Appointment of convention committee:
(a) Resolutions.
Reports of committees:
(a) Power distribution,
(b) Standards (on recommendations contained in report),
(c) Special subcommittee on stranding table,
(d) Committee on standards,

Tuesday, Oct. 10

2 p. m. to 3.30 p. m.

Joint session with Accountants' Association
Meeting held in Engineers' Hall

Reports of committees:
(a) Engineering-Accounting,
(b) Life of railway physical property.

3.30 p. m. to 5 p. m.

Joint session with Transportation & Traffic Association
Meeting held in Greek Temple

Reports of committees:
(a) Block signals for electric railways,
(b) Standards (on recommendations contained in above report),
(c) Transportation-Engineering.

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Wednesday, Oct. 11

2 p. m. to 5 p. m.

Meeting held in Engineers' Hall

Reports of committees:
(a) Power generation,
(b) Standards (on recommendations contained in above report),
(c) Way matters,
(d) Standards (on recommendations contained in above report),
(e) Report of delegates to Good Roads Congress.

Thursday, Oct. 12

2 p. m. to 5 p. m.

Meeting held in Engineers' Hall

Reports of committees:
(a) Equipment,
(b) Standards (on recommendations contained in above report).

Paper on "Lighting of Cars."

Reports of committees (continued):
(c) Buildings and structures.

Friday, Oct. 13

2 p. m. to 5 p. m.

Meeting held in Engineers' Hall

Reports of committees:
(a) Heavy electric traction,
(b) Standards (on recommendations contained in above report),
(c) Electrolysis.

General business.
Report of committee on resolutions.
Report of committee on nominations.
Election of officers.
Installation of officers.
Adjournment.

PROGRAM OF TRANSPORTATION & TRAFFIC ASSOCIATION

Monday, Oct. 9

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at registration booth.

2 p. m. to 4.30 p. m.

Meeting held in Greek Temple

Convention called to order.
Annual address of the president.
Annual report of the executive committee.
Annual report of the secretary-treasurer.
Appointment of convention committees:
(a) Resolutions,
(b) Nominations.

Reports of committees:
(a) Standards,
(b) Construction of schedules and time-tables.

Paper on "Development of Schedule Makers," by H. C. Donecker, assistant general manager, Public Service Railway, Newark, N. J.

4.30 p. m. to 5 p. m.

Joint session with Claims Association

Reports of committees:
(a) Claims-Transportation.

Tuesday, Oct. 10

2 p. m. to 3.30 p. m.

Meeting held in Greek Temple

Reports of committees:
(a) Passenger traffic,
(b) Uniform definitions.

Paper on "Training Men for Supervisory and Executive Positions," by L. C. Bradley, assistant district manager Stone & Webster, Houston, Tex.

3.30 p. m. to 5 p. m.

Joint session with Engineering Association

Reports of committees:
(a) Transportation-Engineering,
(b) Block signals,
(c) Standards (Engineering).

Wednesday, Oct. 11

2 to 5 p. m.

Joint session with Accountants' Association

Meeting held in Greek Temple

Reports of committees:
(a) Cost of rush-hour service,
(b) Fares and transfers.

Prepayment systems—General Discussion.

Reports of committees:
(a) Express and freight traffic,
(b) Passenger, express and freight accounting.

Thursday, Oct. 12

2 p. m. to 5 p. m.

Meeting held in Greek Temple

Reports of committees:
(a) Rules.

"Company Publications":
(a) "Their Use and Value": F. W. Hild, general manager Denver (Col.) Tramway.
(b) "Their Preparation and Publication": Leake Carraway, Southern Public Utilities Company, Charlotte, N. C.

General discussion.
General business.
Report of committee on resolutions.
Report of committee on nominations.
Election of officers.
Installation of officers.
Adjournment.

PROGRAM OF CLAIMS ASSOCIATION

Monday, Oct. 9

9.30 a. m. to 12.30 p. m.

Registration and distribution of badges at registration booth.

2.30 p. m. to 4.30 p. m.

Meeting held in Claims Hall

Convention called to order.
Annual address of acting president.
Annual report of the executive committee.
Annual report of the secretary-treasurer.
Appointment of convention committees:
(a) Resolutions,
(b) Nominations.

Reports of committees:
(a) Employment,
(b) Ways and means.

Paper on "Workmen's Compensation Acts," by Roy C. Green, accident department Cleveland (Ohio) Railway.

Written discussion: L. S. Hoffman, general solicitor Public Service Railway, Newark, N. J.

General discussion.

4.30 p. m. to 5 p. m.

Joint session with Transportation & Traffic Association

Meeting held in Greek Temple

Reports of committees:
(a) Claims-Transportation.

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Tuesday, Oct. 10

2.30 p. m. to 5 p. m.

Meeting held in Claims Hall

Paper on "Near Side Stop," by John P. Reynolds, claim agent, Boston (Mass.) Elevated Railway.

Written Discussion: S. B. Hare, claim agent, Altoona & Logan Valley Electric Railway, Altoona, Pa.

General discussion.

Wednesday, Oct. 11

2.30 p. m. to 5 p. m.

Meeting held in Claims Hall

Paper on "Automobile Accidents and Traffic Regulations," by H. G. Winsor, superintendent of investigation and adjustments, Puget Sound Electric Railway, Tacoma, Wash.

Written discussion: A. G. Brown, claim agent, New York State Railways, Syracuse, N. Y.

General discussion.

Thursday, Oct. 12

2 p. m. to 2.30 p. m.

Joint session with Accountants' Association

Meeting held in Accountants' Hall

Reports of committees:

(a) Claims-Accounting.

2.30 p. m. to 5 p. m.

After joint session

Meeting held in Claims Hall

Paper on "Claim Work": (a) "Claim Agent—Past, Present and Future," (b) "Policies and Principles," (c) "Psychology," by E. P. Walsh, attorney United Railways, St. Louis, Mo.

Written discussion: C. G. Rice, assistant to general manager, Pittsburgh (Pa.) Railways, Pittsburgh.

General discussion.

General business.

Report of committee on resolutions.

Report of committee on nominations.

Election of officers.

Installation of officers.

Adjournment.

Chicago Convention Train Time Changed

A canvass of the members of the A. E. R. A. transportation committee for Illinois and Wisconsin, as well as a number of railway officials in that district, resulted in the change of the schedule of the Chicago special train to the Atlantic City convention. Instead of leaving from the Chicago Pennsylvania terminal on Saturday, Oct. 7, the time will be 11 a. m. Sunday, Oct. 8. The schedule and connections will be as follows:

Leave Chicago	11.00 a. m.	Leave Mansfield, Ohio	6.00 p. m.
Leave Fort Wayne, Ind.	2.30 p. m.	Leave Canton, Ohio.	7.40 p. m.
Leave Lima, Ohio	3.50 p. m.	Leave Pittsburgh, Pa.	11.40 p. m.
Leave Crestline, Ohio	5.30 p. m.	Leave Harrisburg, Pa.	6.00 a. m.
		Arrive Atlantic City	9.30 a. m.

Connections with the "Special" can be made as follows:

Leave Detroit (Michigan Central Railroad)	11.55 a. m.
Leave Toledo (Pennsylvania Company)	2.10 p. m.
Arrive Mansfield	4.30 p. m.
Leave Cleveland (Pennsylvania Company)	5.30 p. m.
Arrive Pittsburgh	9.40 p. m.

Valuation Committee

At a meeting of the American Association committee on valuation held in New York on Sept. 8 a paper by P. J. Kealy on "Overhead Charges in Valuation" was approved as a reasonable statement of one phase of the general subject. This is the paper referred to on page 280 of the issue of this journal for Aug. 12. It will be presented on Tuesday, Oct. 10. The committee also considered a code of valuation definitions prepared by C. G. Young, of the committee. Twenty-one definitions were adopted for presentation to the convention.

The meeting was attended by J. N. Shannahan, Newport News & Hampton Railway, Gas & Electric Company, chairman; P. J. Kealy, Kansas City Railways; Martin Schreiber, Public Service Railway; B. E. Tilton, New York State Railways, and C. G. Young, consulting engineer, New York City.

The Association and the Eight-Hour Bill

At association headquarters there have been received many commendations of the work of the committee on federal relations in securing the exemption of electric railways from the burdens imposed by the bill recently passed by Congress. (See issues of the ELECTRIC RAILWAY JOURNAL for Sept. 2, page 404, and Sept. 9, page 461.)

Entertainment Committee

A meeting of this committee was held in New York on Sept. 14. The entertainment program was considered, the estimate of the necessary appropriation was approved, the sub-committees were appointed and other sundry details were considered. The committee members in attendance were: E. F. Wickwire, Ohio Brass Company, chairman; W. Caryl Ely, Ohio Valley Finance Company; R. F. Hayes, Curtain Supply Company; W. G. Kaylor, Westinghouse Air Brake Company; H. N. Ransom, Westinghouse Electric & Manufacturing Company; J. N. Shannahan, Newport News Railway, Gas & Electric Company; E. P. Waller, General Electric Company; and B. F. Wood, United Gas & Electrical Engineering Corporation. W. T. Stanton, General Electric Company, also attended by invitation.

Treatment of Fence Posts for Maintenance Work

The American Railway Engineering Association Bulletin No. 187 has just been issued. A portion of the bulletin devoted to service tests of treated and untreated fence posts sets forth the results obtained by the United States Forest Service in co-operation with various state agricultural experiment stations which have been conducting a series of experiments on posts installed from 1906 to 1909.

These tests were conducted at experiment stations in South Carolina, Alabama, Louisiana, Iowa, Minnesota and Maryland. The conclusions drawn as a result of the experiments up to the time of preparing the article show that nondurable species, especially in the South, should have at least a light top treatment in addition to the heavier butt treatment. Brush treatments, soaking in cold-oil and double-tank treatments, where asphaltum was used as the heating media in the hot bath, were not very effective in preventing decay. Charring was apparently of no value, and care must be taken to have the butt treatment extend well up above the ground line. The results clearly indicate that a good open-tank treatment of fence posts with creosote will give satisfactory results in preventing decay in most of the nondurable species. Posts treated with water-gas-tar creosote and water-gas-tar have stood up very well thus far. Those treated with the creosote are in somewhat better condition than those treated with tar.

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COMMUNICATIONS

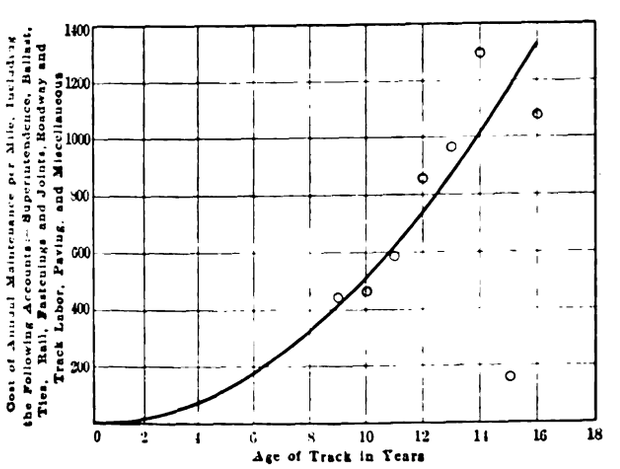
Unit for Comparing Track Upkeep Costs

NEW YORK STATE RAILWAYS
ROCHESTER, N. Y., Sept. 7, 1916.

To the Editor:

I note with interest the editorials appearing in your issues of Aug. 12 and Aug. 19 on the subject of "A Unit for Comparing Track Maintenance Costs." This is a very interesting subject and one which, if taken up and developed by the American Electric Railway Association through a committee or sub-committee, should lead to considerable economy in maintenance of track, as it is only through a study of unit costs that more efficient methods can be developed. However, the establishing of a unit cost of track maintenance is a very difficult matter on account of the variables which enter into the problem. My interest in this matter prompts me to set down a few of the ideas which I have on this subject in the hope that others may do the same, resulting in some advance along this line through the interchange of thought.

There are in general three factors which should be taken into consideration in determining the cost of track maintenance. These three factors are as follows: The interest on the original construction cost; the annual depreciation or renewal fund, and the actual money spent on labor and materials to keep the track in usable condition during its life. The only costs ordinarily used in comparing maintenance is the third, that is, the cost of labor and materials to keep the track in a usable condition.



GRAPH SHOWING RELATION IN ONE INSTANCE BETWEEN COST OF MAINTENANCE AND AGE OF TRACK

Paving, Medina block. Rail, L.S. 107-333 (9-in. Trilby). Ties, untreated oak and chestnut. Ballast, concrete. Joints, electric weld. Traffic during fifteenth year, 111,300 trips city cars, 12,360 trips interurban cars.

There is an old adage to the effect that "A stitch in time saves nine," and this applies to track as well as other things. If money is spent making track repairs promptly there will be considerable life added to the track, and this in turn will decrease the depreciation figure or renewal fund. Thus it will be seen that these two are interdependent and that a comparison of either without considering the other is liable to lead to difficulties. In other words, when maintenance figures are compared the quality of maintenance should be taken into account.

The first factor, the interest on the construction cost, is determined to a large extent by the type of construction and local conditions, so that it will be readily seen that the total figure which should be used is the sum of this and the other two items, and the engineer should so design his track as to keep the sum of these three items at a minimum under all conditions. Accounting for these three factors necessarily requires that track maintenance be compared on a unit length basis, and the cost per track mile, therefore, will probably be the best unit. The various other factors which affect the life of the track, such as vehicular wear on the pavement, density of car traffic, weight of car, speed and load concentrations, should be taken into consideration in the design of the track.

Let us take, for instance, the third factor, labor and materials necessary to keep the track in a usable condition, and follow this figure through for a period of years on a definite stretch of track. During the early life of this track comparatively little money is expended in its maintenance. As time passes, however, there will be an increased cost of maintenance each year, with the result that after a certain period this item of labor and materials would equal the interest on reconstruction. When this condition occurs, the track should be reconstructed. This, of course, assumes a rather ideal condition in which there is no interference from city authorities or others having some jurisdiction over the track in question.

If the annual amounts expended each year were plotted as ordinates and the years as abscissas there would result a curve which might be called the characteristic curve of maintenance. This curve, of course, would vary with the different track conditions, with the increase in traffic, design of track and other factors. A curve of this kind is illustrated in the accompanying diagram, which was taken from an actual example. It will be noted from this curve that variation in maintenance methods can be made which will materially alter the curve. For instance, during the fourteenth year of the life of the track in question, a little more money was spent than usual, with the result that during the fifteenth year there was a considerable decrease. This particular decrease was due to a change in the method of maintenance and illustrates the advantage of repairing track by the use of offset plates and a grinder. It will be noted from this curve too that the actual amount of money spent per mile during any particular year has little bearing on the average track mile unit cost of maintenance.

It would seem, therefore, that the only fair basis of comparison would be on the average cost of maintenance per year during the entire life of the track, or in order to compare various stretches of track which were not worn out it would be necessary to compare the accumulated maintenance to date, to which should be added information as to the type of construction, kind of traffic, etc. It would be almost impossible to lump the various factors represented by traffic conditions unless the number of revenue seats operated over this track during its entire life were used to make a comparison. The immense amount of clerical work necessary to accomplish this result would make it very difficult if not impractical. It might be well to add that the reason for selecting the revenue seat basis of comparison is that it takes into account the general efficiency of the operation of the road, and eliminates a large part of the variables.

Should it be advisable to compare the maintenance of track on the mile per year basis, it would probably be well to separate the paving maintenance from that which pertains directly to the track, as frequently types of pavement are required by city authorities which are not suitable for track construction. This

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would also eliminate one of the variables, which is vehicular traffic on the street. In order further to compare track, it will be necessary to subdivide the types of construction, such as, open track on interurban and suburban lines, and sub-surface track in paved or unpaved streets.

It might be of interest here to call attention to an empirical formula which has been developed and used by this company and found to approximate closely the maintenance conditions in this city. This formula is as follows:

200 + (31½ × the average number of cars per hour (taking the entire year as a basis)) = (in dollars) the average annual maintenance per mile of track in paved streets.

The average annual maintenance in this case is the total accumulated maintenance divided by track life.

While this formula would undoubtedly not meet all of the conditions in the various cities, nor does it meet all of the conditions here, it has been found to give approximate results in a number of cases.

The foregoing analysis is given merely to indicate something of the study which must necessarily be given to a subject before any definite conclusions can be drawn regarding what would constitute a fair unit cost of maintenance for track. At the present day there is not a successful manufacturer who does not investigate his unit costs, and inasmuch as railroading is the manufacture and sale of transportation, it is certainly necessary to determine the various units which go to make up the costs of manufacturing transportation. I therefore, heartily commend your efforts along this line.

D. P. FALCONER,
Engineer Maintenance of Way.

NEW YORK STATE RAILWAYS

SYRACUSE, N. Y., Sept. 6, 1916.

To the Editors:

Your recent editorials on the subject of a "Unit for Comparing Track Maintenance Costs" are very interesting and cover the subject in most of its phases. The cost per track-mile seems to me to be the proper unit if all physical and operating conditions are taken into account. It would be necessary, of course, to classify it into open track, track in dirt streets and track in paved streets, and then take into account types of construction, amount and speed of traffic, and any other conditions which may affect the maintenance cost.

In a paved street it does not seem to be advisable to separate the pavement from the track, as generally the repair of one necessitates the repair of the other and the two should be considered as a complete structure. Pavement maintenance costs, however, should be kept as a matter of information. If track is placed in a paved street and cars are not operated over it, the maintenance on the pavement would be practically little more than the same pavement in a street without the car track, unless the vehicular traffic is very heavy.

In comparing track maintenance costs, the question of the degree of maintenance is an important consideration. In general, the maintenance is based on an arbitrary percentage of the receipts rather than on the fact that "a stitch in time saves nine," a basis which would be more satisfactory to maintenance engineers. The mechanical and electrical departments have entirely different problems to deal with. Cars are pulled in and overhauled at stated intervals and thus kept up to a certain standard, while, on account of the high cost of work in streets, a way engineer would not be permitted to excavate and examine joints and ties for defects at stated intervals. Track repairs are generally not made until they are absolutely necessary, with the possible exception of grinding joints. On open track construction the problem is more simple. Track walkers keep joint bolts tight and spikes driven, and generally an inspection of ties is made twice a year. Incidentally, I believe the inspection method to be more efficient and economical than arbitrarily to renew so many ties a year, based on some average figures or assumptions.

In general, it is not as practical to standardize the maintenance of civil engineering structures as it is mechanical and electrical, on account of the mileage of territory covered, physical conditions and the construction and maintenance being subject to the whims of public authorities and the public in general.

E. P. ROUNDEY,
Engineer Maintenance of Way.

THE DENVER CITY TRAMWAY COMPANY

DENVER, COL., Sept. 8, 1916.

To the Editors:

I have always believed a unit to measure track maintenance efficiency was necessary. Although the many types of track construction and various classes of paving used seem to make this difficult, it must be remembered that many large manufacturing establishments have made time studies and compiled cost records of all sorts and kinds of work. Hence, it would seem that the problem confronting the way engineer should be capable of solution.

Possibly one reason that greater progress has not been made in the development of these scientific data is that there has been too much "cut and try" in track building and maintenance. We have developed track foremen largely from laborers, and they have had to get their education by hard knocks and experience. They have, as a rule, done wonderfully well, but how much better would they have done had their training been "planned" for them and had they, in most cases, been recruited from sources where brain and brawn were at a balance instead of brawn tipping the beam.

We have heard maintenance of way engineers severely criticised for their maintenance costs per mile of track, but after conditions were investigated the person criticised has been found to be doing very well, all things considered. Many times I have seen unit costs prepared on a mile of track basis that covered only certain items whereas those of other companies, supposed to cover the same work, included other items properly chargeable. I believe that cost figures for comparative purposes should be made up for each type of rail, joint, tie, ballast, paving base and paving wearing surface installed, that a sketch showing a cross-section of various combinations of these be included with the cost figures and that a statement covering the character of the charges put through to make up these costs. The cost and amount of materials used as well as the hours of labor and rates of pay should be very carefully shown. I cannot see any other way of arriving at figures that can be used to compare one property with another or one man's ability with that of another.

I can hear a great many engineers saying: "Lord! What a mass of detail such a scheme involves," and perhaps for that very reason it will not be worth doing. But if manufacturers, compelled by keen competition find it advantageous to know what they are doing, why should not the street railway company that is a victim of the "shrinking nickel"? I firmly believe this is a matter that should take up the time of a committee on costs and cost finding, and that it can be adjusted in no other manner.

I trust that this whole matter will be aired in your columns in a real constructive way.

EDWARD A. WEST, Chief Engineer.

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Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

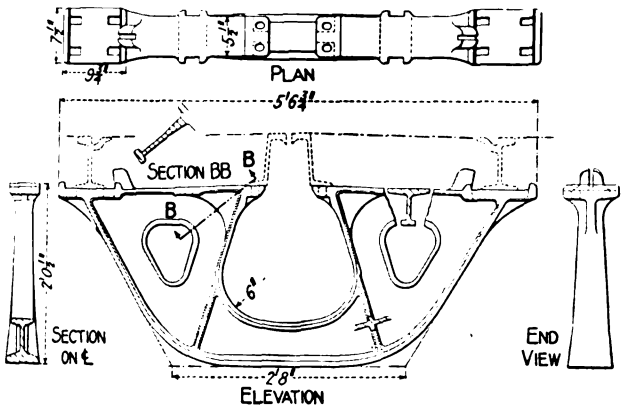
Experience with Removable Trolley Shoe—Headlight of Novel Type—Grinding Joints for 40 Cents on the Boston Elevated—Improved Yoke for Conduit Railway in Washington, D. C.—Electric Track Switches in New England—Getting Lighting Arresters Ready for Season of 1917

Improved Yokes for Conduit Railway

Old-Type Yokes Being Replaced by New to Withstand Modern Street Traffic

BY C. S. KIMBALL
Engineer Way and Structures Washington Railway & Electric Company, Washington, D. C.

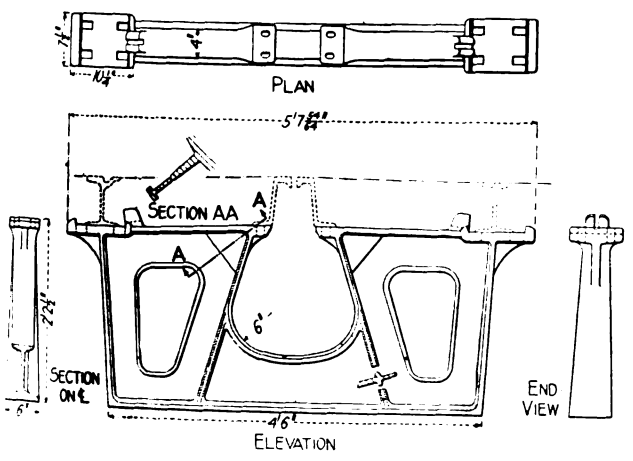
As there are so few conduit railways in the United States one hears very little of the problems of the engineers connected with these lines. It may be of interest, however, to the readers of the ELECTRIC RAILWAY JOURNAL to know that the yokes which are now being used in new track and on existing track wherever necessary to replace those broken in service, or whenever there is



CONDUIT YOKE FORMERLY STANDARD WITH WASHINGTON RAILWAY & ELECTRIC COMPANY, WASHINGTON, D. C.

an opportunity to substitute a new yoke for an old one, are radically different in design from those which still support the larger part of the track in Washington, D. C.

The differences between the old and the new design are clearly shown in the accompanying drawings. Since the original track was installed, more than twenty years



NEW CONDUIT YOKE DESIGNED TO WITHSTAND MODERN HEAVY STREET TRAFFIC

ago, there has been a very considerable increase in the weight of equipment which it is called upon to carry. While the old yokes have in general given excellent service, a number have failed in recent years due to breakage near the middle, their weakest part. In these yokes there is no direct support under the rail, whereas in the new type there is a broad, flat base 4½ ft. wide which sets much more securely upon the foundation.

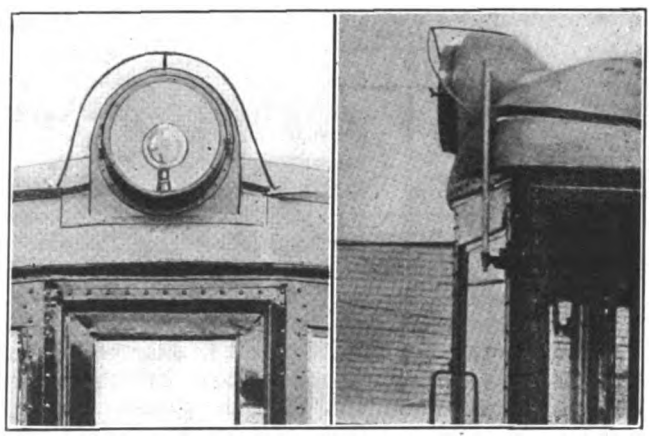
The new yokes weigh about 500 lb. as compared with 350 lb. in the old type, and they are of a good quality of gray cast iron. They are molded at present at the foundry of Davis & Thomas in Catassauqua, Pa.

Headlights Recessed in Car Roof

New Design of Headlight Proves Satisfactory for High-Speed Road

BY JAMES W. BROWN
Superintendent of Shops Wilkes-Barre & Hazleton Railway and Lehigh Traction Company

Recessed headlights have been used on the new equipment of the Wilkes-Barre & Hazleton Railway and of the Lehigh Traction Company and have given complete satisfaction. Owing to the high speed at which these interurban cars are operated, it was desired to place the headlights in such a position that the light would project a considerable distance farther than the braking distance. It was also desired to place the headlight



HEADLIGHTS RECESSED IN ROOF OF CAR ON WILKES-BARRE & HAZLETON RAILWAY

where it could not be reached easily or broken. The illustration herewith is of the GE Form J-28 headlight which has been installed on this equipment.

These headlights are recessed in a hood at each end of the roof and covered with a sheet steel housing. They are equipped with a dimmer, consisting of resistors wound on insulated porcelain tubes and enclosed in a steel frame placed underneath the car.

This stationary headlight has done away with a great deal of trouble and annoyance that was experienced with the old headlights in carrying them from one end of the car to the other. Now a trainman has only to

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turn off the snap switch at one end of the car and to turn on the one at the other end. These new headlights have not given us any trouble up to the present time and all that it has been necessary to do so far was to clean the glass in the hood.

Installation and Maintenance of Car Lightning Arresters

The Author Describes Types of Arresters and Their Location on Top and Underneath Cars

BY R. H. PARSONS
Electrical Foreman

As winter approaches the question of lightning arresters should be a prominent one in the minds of railway superintendents, master mechanics and, last but of course not least, lightning arrester manufacturers.

In the first place all arresters should be put in good condition before the summer storms commence. Winter is the proper time for lightning arrester inspections, tests and renewals. During the course of such inspections it will be found that many arresters are so badly damaged as a result of the storms of the previous summer as to necessitate complete replacement. In making such replacements the type of arrester best adapted to local conditions should be chosen for it must be borne in mind that the best is none too good.

There are nearly as many types of lightning arresters as there are types of cars and of course each master mechanic has his favored or disfavored type and

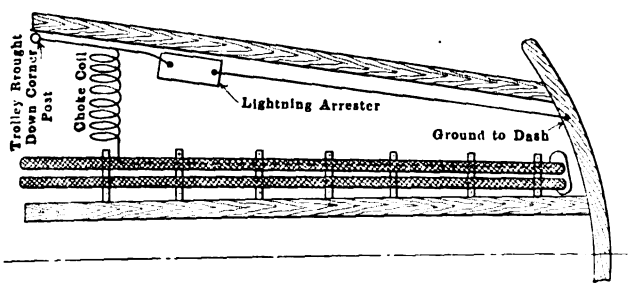


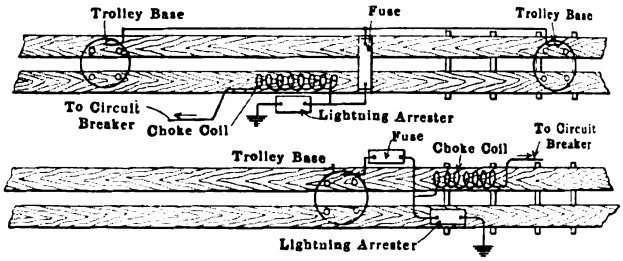
FIG. 1—ARRESTER UNDERNEATH THE CAR—WIRING LAY-OUT FOR OLD CARS

each manufacturer is sure his arrester is best. It seems worth while, therefore, to point out a few of the practical considerations other than those pertaining to operation which should be taken into account in the selection of new arresters.

To facilitate mounting, an arrester should be rugged and compact. It is desirable that it be adapted to mounting in any position or location, and that the labor of mounting be a minimum. Also the arrester should require very little care and attention and to facilitate inspection should be so designed that it can readily be tested in service. Of course the first cost should be reasonable. Naturally, an arrester that will fulfill all requirements is hard to find.

The function of the lightning arrester is the protection of electrical equipment from damage by lightning. The desired result is ordinarily obtained by providing a by-path, consisting of one or more spark gaps in series with a resistance, connected between trolley and ground. The gaps do not permit discharges to take place at the ordinary line voltages but offer little resistance to the high voltage lightning disturbances. The line voltage, however, tends to maintain the arc across the spark gaps after it has once been started by the high voltage discharge and it is in the means of preventing or destroying this arc that manufacturers differ so widely in their methods of construction.

The trouble with the earlier types—and with some of the later types for that matter—was that the voltage at which the arrester would start to discharge was higher than the breakdown voltage of the armature and field insulation, with the result that motor windings were usually damaged before the arrester got into action.



FIGS. 2 AND 3—ARRESTER ON TOP OF THE CAR—WIRING LAY-OUTS FOR TWO TROLLEY AND ONE TROLLEY BASE EQUIPMENTS

It will be borne in mind that the insulations of a few years ago were not barriers against voltages of 3000 or 4000, and that the lightning arresters of that time were not designed to carry off static at voltages lower than these. It might be mentioned here also that the proper point to set a lightning arrester at the present time is only a little above the line voltage, the common practice among street railways that give proper attention to their arresters being in the neighborhood of 1000 volts.

Among the newer arresters on the market, the aluminum cell or electrolytic type is accepted as the most efficient of all devices for protection against lightning. The electrolytic arresters built by the different companies differ in construction but operate on the same principle. This type of arrester depends for its operation on the peculiar properties of a film deposited electrolytically on aluminum trays. This film prevents the flow of current at normal voltages, but offers a free path for currents at high voltages or for static discharges. Upon cessation of the abnormal stress the film regains its original resistance instantly. This arrester is conceded to be the best on the market for protection when it is in perfect condition. It is especially well adapted

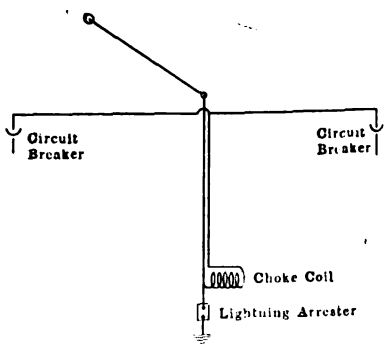


FIG. 4—FAULTY ARRANGEMENT OF CAR WIRING

for station use, where it can receive the attention ordinarily given storage batteries. It has been recommended by one manufacturing company for pole and car use, but for both these uses the following objections are found: The arrester must be removed and stored during the winter; it takes up more space on a car than can ordinarily be spared; it is practically impossible to place the arrester on the roof of a car; if placed underneath the car body it is subjected to dust and wheel wash; the class of men ordinarily found in carhouses are neither skillful enough nor careful enough to give it the

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attention it would require for car service. If this arrester were kept in proper condition there is no question as to its usefulness, but if neglected, it would be far inferior to other types. It is also a question if it would survive the bumping and bouncing over rough tracks. The high cost is a further deterrent to its adoption for car work.

Although much depends upon the type and adjustment of the lightning arrester used, more depends on its condition, location and general relation to the car wiring. A lightning arrester would be useless without a choke or kicking coil, which in turn would be equally as useless if not properly placed.

It is the opinion of those who have given the question much study, that the proper place for both choke coil and lightning arrester is on the roof of the car, and as near the trolley base as possible. One reason for this is the simplicity and efficiency of the wiring. There is no doubling back of the trolley lead, and the path for the lightning discharge is direct. The arrester on the roof is, of course, subjected to the full force of the rain, but clean, pure water is not harmful, especially as the delicate parts of the arrester can be easily protected. The rain runs off quickly, and when the sun shines again the arrester is soon dry. On the contrary, when placed underneath the car it is subjected to water, mud and dust, and is not in a position where it will dry if it becomes wet.

When located in the car it has the advantage of accessibility (perhaps) and protection from the elements, but the time a lightning arrester is particularly useful is during a thunder storm, and a lightning arrester working is apt to make some noise. Not infrequently during a heavy discharge a lightning arrester is blown up, commonly speaking, and it would be at just the time when passengers are nerved up on account of the storm that this would occur. The considerations of safety and comfort to passengers, therefore, oppose the placing of the arrester inside the car. Often the lack of head room prevents the location of the lightning arrester on the roof. In such cases it should be placed underneath the car.

A sketch, Fig. 1, is here shown of the wiring of the lightning arrester and choke coil on old type cars wired with canvas covered cables. The ground wire can be run to the dash, which is connected mechanically to the bumper, side sill, bolster or side bearings, and thence through the trucks to ground. Satisfactory wiring layouts for the lightning arrester circuit where the arrester is located on top of the car are illustrated in Figs. 2 and 3.

A few rules to be observed in the installation and care of lightning arresters are:

The wires in the lightning arrester circuit should be as straight and free from bends and sharp turns as possible, and should be securely connected to the nearest ground. If there must be kinks in the wiring make them in the trolley circuit.

When the lightning arrester is located underneath the car the trolley lead where it is run down the corner post or other similar place should not be placed near the wiring of other circuits.

Kicking coils should be made on spools at least 5 in. in diameter, and should have at least ten turns—a larger number is better. The old-time choke coils 2 in. in diameter were a mistake.

The wire used in the lightning arrester circuit should be No. 6 B & S or larger.

The connection of the fields to the trolley end and the armature to the ground end of the motor circuit will be found effective in saving armatures from damage by lightning.

Cutting in the lights during a storm will give a greater number of easy paths for lightning discharges, and at the expense of a light socket or lamp will often save the motor equipment.

Avoid carefully all conditions similar to that in Fig. 4. This sketch illustrates one of the disadvantages of placing the arrester underneath the car.

Electric Track Switch Practice

Features of Installation and Maintenance on Two New England Railways

The Boston Elevated Railway has about 300 Cheatham electric track switches on its system. There are also eight Collins electric switches which have been installed comparatively recently.

During the past three years thirty-one new automatic switches have been installed, and additions are being made from time to time as the volume of traffic at junction points warrants the expense. The other factor which determines the advisability of installing a switch

MOTOR-OPERATED TRACK SWITCHES AT THE BUSIEST CORNER IN NEW ENGLAND

of the automatic type is the amount by which the movement of traffic would be facilitated. On the Elevated Railway trunk lines the use of electric switches is becoming standard practice, as the cost of operating hand switches, together with the delay to traffic, makes the use of them uneconomical, the total extra costs easily exceeding the maintenance costs for electrically-operated units.

The question whether an electric switch shall be installed to supersede a hand-operated switch is finally decided by the division superintendent. He makes the recommendation, which is passed upon by the superintendent of transportation or the superintendent of traffic, or both in conjunction. The question of these switches is finally decided by the superintendent of wires.

Maintenance is divided between the maintenance of way department and the wire department. The former renews the links and lugs only; the latter cares for the electrical connections to the links, including the plungers.

The Collins switches of the U. S. Electric Signal Company, as recently installed, are equipped with small motors, which give a slow motion to the switch and prevent splashing in wet weather. These are installed at locations where there are many pedestrians crossing. Two are on Washington Street at the intersection with Summer, the "busiest corner in New England." In this equipment the switch cannot be thrown between the trucks of a car by a following movement under the

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contactor; the street box is automatically sealed and is not dependent on the proper making up of pipe joints or gaskets; a positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are small and are mounted on standard ears; and standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

Cheatham switches are located at many points throughout the system. Some are placed in the loops at carhouses, where a large number of prepayment cars with trailers are handled. Three are at Arlington Heights loop (where a prepayment area is to be established), and three at the Watertown carhouse. It is probable that electric switches will be installed at storage turnouts in all loop tracks, as they facilitate the handling of cars running on five-minute headway or less.

SOLENOID-OPERATED TRACK SWITCHES AT COPLEY SQUARE, BOSTON, MASS.

Maintenance costs of Cheatham switches for eleven months ending June 1, 1916, are as follows:

On surface lines, outside subways, 278 switches, total for labor and materials	$2,775.78
In subways north, ten switches, total for labor and materials	37.22
In subways south, three switches, total for labor and materials	13.39
In Boylston Street subway, one switch, total labor and materials	12.69
Total for 292 switches	$2,839.08
Average	9.72

The Bay State Street Railway, Boston, Mass., has twenty American automatic switches, four Collins automatic switches, both the product of the United States Electric Signal Company, seventeen Cheatham and three Squires electric track switches. These switches are at important junction points, in the following cities and towns, where main lines converge: Boston, Chelsea, Revere, Haverhill, Lawrence, Lynn, Salem, Saugus, Everett, Malden, Lowell, Fall River, Quincy and Weymouth. All the Cheatham switches are of the quick-moving type.

The location of an electric switch is determined by the general superintendent, often on the recommendation of the division superintendent. It is probable that several new units will be installed this year on the Bay State system, though none have been ordered as yet.

In the dispatcher's telephone equipment of the interurban division of the Iowa Railway & Light Company at Cedar Rapids, Iowa, phonograph horns are attached to the transmitter and to the receiver. It is thus possible for the dispatcher to sit at his desk and use the telephone without being hindered by ear pieces and cords.

Trolley Shoe Practice

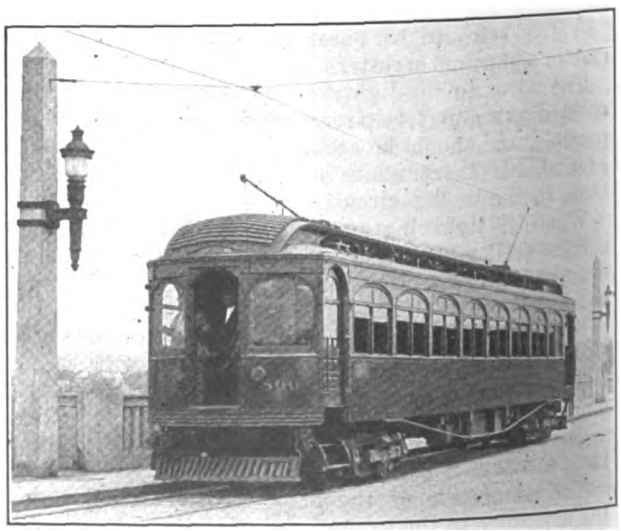
Results of Experience with New Overhead Contact Device Are Given

Less than six months ago the development of the Miller trolley shoe made the principle of the sliding contact for the collection of current applicable to cars using the ordinary trolley poles. The April 29 issue of the ELECTRIC RAILWAY JOURNAL described this shoe, which is manufactured by the Miller Trolley Shoe Company of Boston, Mass., and announced that it had just been placed on the market. The shoe is now in use on more than sixty electric roads. Among the lines on which it has become standard are the Portland & Lewiston Interurban Railway, the Central Maine Power Company, the Lehigh Valley Transit Company (interurban service), the & Jacksonville Railway, (interurban and locomotive service), the Alton & Jacksonville Railway, Chicago & West Towns Railway, Tri-City Railway and the Chicago, Harvard and Geneva Lake Railway.

VIEW OF TROLLEY SHOE

The advocates of the Miller shoe state that it clings to the wire giving excellent contact and practically eliminating the noise, vibration and arcing that are common with the ordinary trolley wheel, and it is said that with much less tension on the trolley pole, it has been possible to increase the speed around curves where trouble was formerly experienced with poles leaving the wire.

Many of the roads which have adopted the trolley shoes first put them on the cars which were operated in high-speed service, the Lehigh Valley Transit Company being a typical example. Harry Branson, superintendent of equipment of this road, has installed them on the cars operating on the limited service between Allentown and Philadelphia, Pa. On this service it has been reported that the trolley shoes have averaged more



CAR EQUIPPED WITH TROLLEY SHOES IN LIMITED SERVICE BETWEEN PHILADELPHIA AND ALLENTOWN, PA.

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than 10,000 miles of service before having to be replaced.

Railway men who are unfamiliar with this shoe raise the question of the wear of the trolley wire when the sliding contact is mentioned. Micrometer measurements made by the railway above cited, however, indicate no additional wear on the wire.

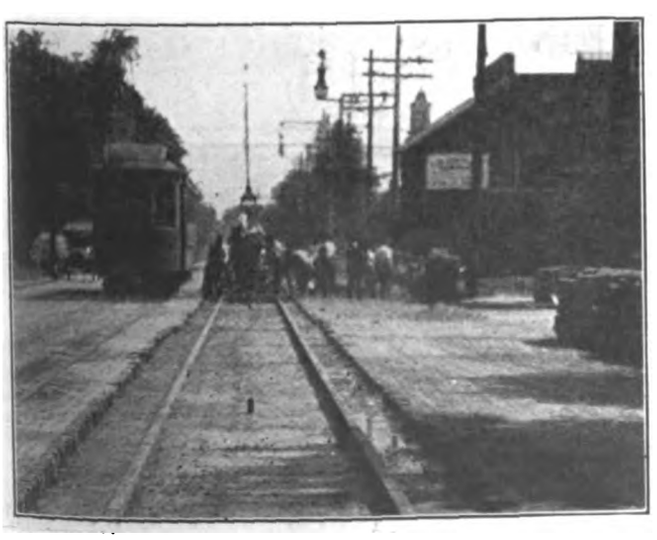
Prepared Blocks and Wedges Speed Up Track Leveling

The accompanying illustrations show the reconstruction of tracks on the lines of the Northern Ohio Traction Company in Akron, Ohio. In this construction work the rails were laid on International twin steel ties embedded in concrete, which forms the foundation for the paving brick. In order to facilitate the work of

WORKMEN LEVELING TRACK IN AKRON, OHIO

leveling the track, the company used special blocks and wedges made by The Steele-Alderfer Company, Cuyahoga Falls, Ohio. The blocks measure 6 in. x 8 in. x 8 in. and the wedges 2 in. x 4 in. x 8 in., tapered on one size, hardwood being used for both.

Track levelers often use for this purpose rough blocks and wedges chopped out of any available material. If the material is knotty or crooked-grained, considerable time is required to make wedges that will serve the purpose. Thus the men have to stop at short intervals to cut out a new supply of wedges. This waste of time is eliminated by the use of the prepared blocks and wedges. The blocks are laid underneath the rail and the wedges are inserted on either side. Two men then drive in the wedges until the rail is level.



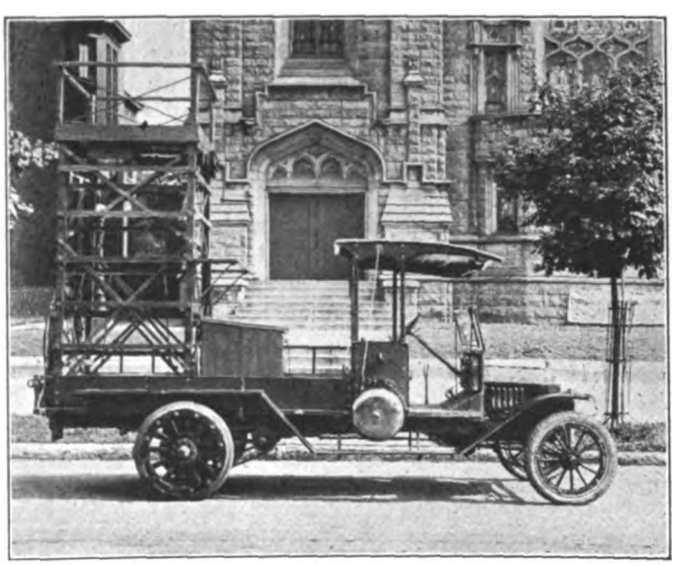
TRACK WORK COMPLETED AND READY FOR PAVING BLOCKS

New Louisville Line Truck

Railway Finds One-Ton Truck Is Rugged and Speedy and Efficient in Hilly Country

An automobile line truck has recently replaced an old-style wagon and eight mules in Louisville, Ky. It is used by the Louisville Railway motive power department, of which Frank H. Miller is superintendent. The outfit consists of a line tower mounted upon a truck which is manufactured by the Smith Form-a-Truck Company of Chicago, Ill. This truck uses the Ford automobile chassis as a power plant, and slips over the frame, reinforcing it throughout the entire length. The Ford rear axle is used as a jackshaft, on which are mounted two sprockets for the double chain drive to the rear wheels. Solid tires having a 3½-in. tread are used on the rear wheels and the front wheels have pneumatic tires on demountable rims.

As shown in the accompanying illustration, the tower itself is built on the rear of the truck. It is made in two parts, the upper section of which is capable of being raised and lowered to suit the work which is being done. The maximum height above the ground is



LIGHT AND SPEEDY LINE CAR USED BY LOUISVILLE (KY.) RAILWAY

15 ft. 8 in. and the minimum 10 ft. An 8-ft. ladder is carried for extra high work or for going down into manholes. Mounted on the side of the car is an 18-in. single stroke warning gong, which is operated by a rope which hangs over the driver's seat.

Some years ago the Louisville Railway undertook to use automobile line trucks, but for their service the types available were unsatisfactory, and they were given up. The truck described above, however, has given excellent satisfaction. It is ready for service at any time and for emergency repair work it has been found especially efficient. The weight of the truck is 4600 lb. complete, including two men, material, tools, etc. It will carry an overload of about 50 per cent of its rated 1-ton capacity.

The Urbana & Champaign Railway, Gas & Electric Company, Champaign, Ill., has placed a large American flag in electric lights over the three-story station and general office building in Champaign which it occupies jointly with the Illinois Traction System.

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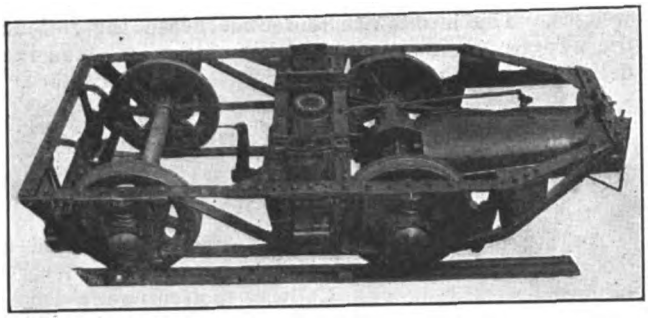


MOTOR TRUCK OF STEAM MOTOR CAR SHOWING MOUNTING OF ENGINE

Steam Motor Car Used by Vermont Railroad

All-Steel Passenger Car with Smoking and Baggage Compartments Is of Excellent Design

The White River Railroad of Vermont is operating between Bethel and Rochester a steam motor car, the construction of which represents a distinct advance in the development of railway motor cars. The route between Bethel and Rochester, about 20 miles in length, passes through the White River Valley, which is one of the many beautiful sections of New England. Rochester itself while not a large city is a progressive trading center for a considerable population living in the surrounding towns. The new car is an important addition to the railway service of this locality. It is the product of the Unit Railway Car Company of Newton, Mass., which is affiliated with the Stanley Motor Carriage Company of Newton, manufacturers of steam automobiles.

The car body was constructed by the Laconia Car Company in Laconia, N. H. It is about 50 ft. long, and seats forty-four passengers. The front end of the car has a baggage compartment, a smoking compartment, and the motorman's cab. The car has plush seats, electric lights and the standard equipment required by the Interstate Commerce Commission. The accompanying illustrations show the general appearance of the car, the seating arrangements and the motor truck.

One of the unique features of the car is its power plant. The steam is generated in a vertical fire-tube boiler, comprising about 600 tubes, each ¾ in. in diameter. The working steam pressure is 500 lb. per square inch. Kerosene is the fuel used, the flow being controlled automatically by the boiler pressure.

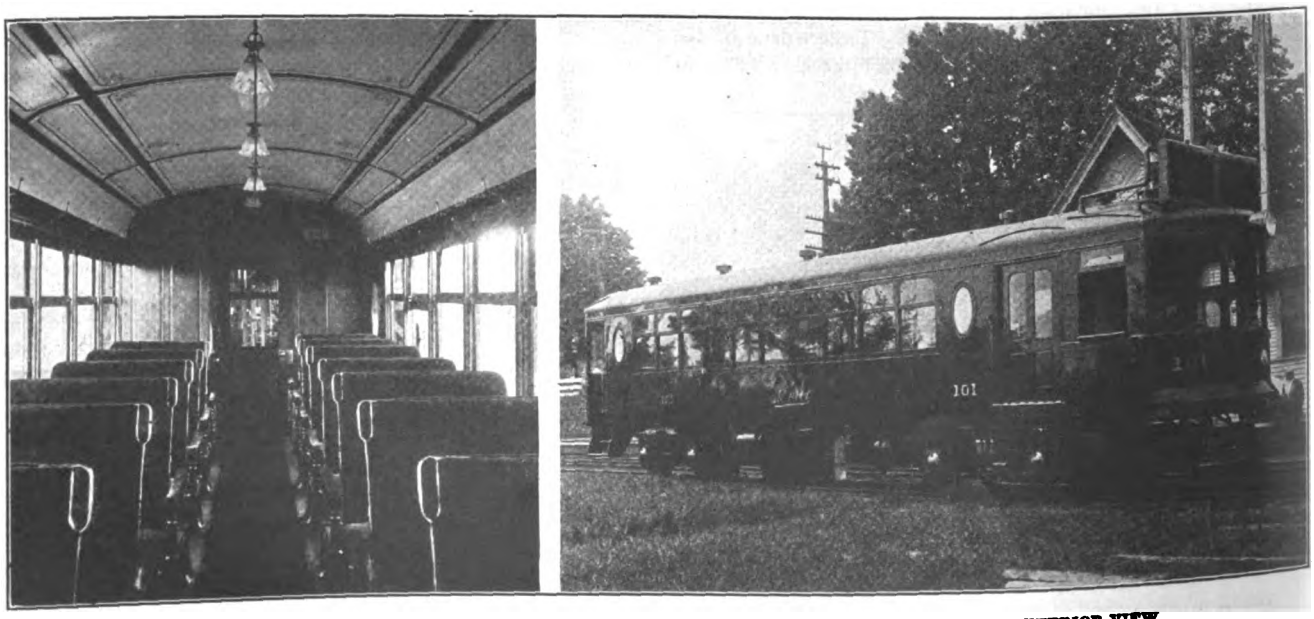
The engine is a single unit connected directly to the driving axle by spur gears. It is of the two-cylinder, double-acting, simple type which has been developed for automobile use by the Stanley Company. The rating is 60 hp., by which is meant the power which can be delivered continuously to the rims of the driving wheels. The reserve power is such that 200 hp. can be developed for starting, acceleration or climbing hills. The car is capable of a sustained speed of 45 m.p.h.

From the engine the steam passes to the condenser, which is of the automobile radiator type. There is only a small loss of steam, so that the 150 gal. of water carried is sufficient for 1000 miles. In ordinary service the car runs about 5 miles per gallon of kerosene.

It is believed that this type of car has a field in developing traffic on branch lines and lines where the present patronage does not warrant electrification. It has also been offered as a possible solution of the "owl car" problem.

New Interlocking Machine for Pacific Electric Railway

The Pacific Electric Railway is installing an electro-pneumatic interlocking machine in its terminal at Sixth and Main Streets, Los Angeles, Cal. The machine will have a twenty-three-lever frame, consisting of eight signal levers, ten switch levers with standard detector circuit equipment and five spare levers. This machine will be provided with sectional route locking, and an illuminated track diagram will be mounted directly above the levers. Two element 50-cycle vane relays will be used in connection with the detector circuits. A total of nine two-position and eleven three-position light signals will be used in this installation. In the train shed the light signals will be suspended from the elevated structure. A special feature in the design of these signals is the use of lenses in the side of the light housings whereby the motorman is able to observe the indication even though he be directly opposite the signal. The background of these signals is shaped so as to prevent all direct light from shining through the side lenses and giving a false indication. The contract for the material for this installation has been awarded to the Union Switch & Signal Company.



INTERIOR VIEW OF STEAM MOTOR CAR SHOWING SEATING ARRANGEMENTS; EXTERIOR VIEW

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NEWS OF ELECTRIC RAILWAYS

MR. WHITRIDGE DEMURS

Files with the Governor a Letter Taking Exception to the Public Service Commission Holding Him to Accountability for Strike

Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., has made public a letter which he wrote on Sept. 1 to Governor Whitman of New York dealing with the letter addressed previously to the Governor by Chairman Straus of the Public Service Commission, in which the chairman gave an account of the activities of the commission in connection with the first of the recent strikes in New York. The commission in its original finding placed the blame for the strike on Mr. Whitridge. Mr. Whitridge was then abroad. He now takes exception to the conclusions of the commission. His letter to the Governor contained copies of his correspondence with Mr. Stevens, then chairman of the Second District Commission, in which he took exception to the last seven lines of the public statement of Mr. Stevens to the newspapers with respect to the conditions of the strike settlement of 1913 in Yonkers. He then characterized these lines as erroneous and as containing a further expansion of what he said, to which he did not assent. His letter of Sept. 1, without this correspondence, follows:

"I was yesterday, Aug. 31, shown a copy of letter addressed to you by Oscar S. Straus, dated Aug. 10, giving an account of the activities of the Public Service Commission during the previous month and saying that that commission had learned important lessons which they hoped to utilize for imposing further legislation.

"This letter is largely taken up with a discussion about me and what I have done and left undone. The commission has not hesitated to say that:

"'There can be no question that the strike on the Yonkers and Westchester lines and the events which followed in the train of this strike, including the strike on the other branches of the Third Avenue Railway and the threatened difficulties with the lines of other companies throughout the city, came about as the immediate and logical result of the attitude of Frederick W. Whitridge, president of the Third Avenue Railway, and the actions he took in the matter proved conclusively that he either intentionally violated the agreement he had made with the men to arbitrate and which he was in honor bound to keep, or that he was so negligent in his duties to his stockholders, his employees and the public, as to forget entirely this important agreement.'

"The notion that I had the power to loose or bind the forces of destruction and disorder, which have broken out in this country within the last few weeks, even though I had been here, instead of 4000 miles away, is sufficiently absurd on the face of it, but in consequence of the declaration I have quoted, some of the newspapers and some of the public have got it into their heads that I have deliberately violated a contract or agreement to arbitrate all the differences with my employees. That is an odious charge. I resent it and it is not true. I say to you that I have never made any such agreement, that no such agreement now is or ever was in existence, and nobody, so far as I know, ever pretended that any such agreement did in fact exist down to the time of this declaration of the Public Service Commission. In the absence of any formal agreement, which the commission did not dare even in my absence to allege, they produced a stenographer's report of a conference, which I had with F. W Stevens, chairman of the Public Service Commission of the Second District, in 1913, and undertook to spell a contract out of that report which had laid under the dust for nearly four years without having been heard from. The conference was held for the purpose of inducing the Yonkers men, who had been on strike, to return to work, and for no other purpose. That object was accomplished largely through the tact of Mr. Stevens, and to assist him I agreed to arbitrate certain things under certain conditions, if it became necessary. It did not become necessary because the men had no grievances which they wished to arbitrate. What I said about arbitration at that time related to the settlement of the Yonkers strike in 1913, which we were then discussing, and did not relate to anything else or to anything which had occurred or which might occur in 1914, 1915, or 1916, and nobody ever pretended it did.

"After the conference was over, copies of this stenographer's report were sent to the men. It was not sent to me. I did not initial it and to this day I have never seen it, but a day or two after the meeting, I saw a newspaper report, in consequence of which I telegraphed exceptions to Mr. Stevens.

"The endeavor to spell a permanent agreement for arbitration out of the stenographer's minutes upon this state of facts, I do not care to characterize, although the commission's remark that 'we have already developed the fact' throws some light upon their mental processes. Still less do I wish to enlarge upon the manner in which the stenographer's minutes were used at recent hearings.

"I understand from Mr. Cook, our counsel, that his complaint of the procedure of the commission was made to it directly, and Mr. Maher, whose testimony was not completed, informs me that his position has not been correctly or fairly represented."

WAGES UNDER INDIVIDUAL CONTRACTS IN NEW YORK

The schedule of wages of trainmen of the New York (N. Y.) Railways contained in the individual working contracts referred to in the ELECTRIC RAILWAY JOURNAL for Sept. 9 are based on a ten-hour day. The rates for conductors on the electric lines are as follows: First year, $2.60 a day; second, third and fourth years, $2.90 a day; fifth and sixth years, $3.10 a day; seventh, eighth, ninth and tenth years, $3.20 a day; eleventh, twelfth, thirteenth, fourteenth and fifteenth years, $3.30 a day; sixteenth year and thereafter, $3.40 a day. The rates for motormen on the electric lines are as follows: First year, $2.60 a day; second, third and fourth years, $2.90 a day; fifth and sixth years, $3.10 a day; seventh, eighth, ninth and tenth years, $3.20 a day; eleventh, twelfth, thirteenth, fourteenth and fifteenth years, $3.30 a day; sixteenth year and thereafter, $3.40 a day. The rates for conductors on the storage battery lines are as follows: First year, $2.60 a day; second year, $2.70; third year and thereafter, $2.80. The rates for motormen on storage battery lines are the same as those for conductors on these lines. The rates for conductors on the horse car lines are $2.50 a day for the first year and thereafter. The rates for drivers on these lines is $2.50 a day for the first year and thereafter.

Clockmen are to receive $2.50 a day for the first year and $2.60 the second year and thereafter. Terminal men are to receive $2.50, $2.80 and $2.95. General inspectors are to receive $3.75. Truck inspectors are to receive $3.50, and line inspectors are to receive $3.50 a day and $3.60 a day. Starters are to receive $2.90 a day, $3.00 a day, $3.20 a day and $3.60 a day. Switchmen and flagmen are to receive $1.95 a day, $2.00 a day, $2.20 a day, $2.30 a day and $2.50 a day. Road and school instructors are to receive $3.15 a day, $3.65 a day and $3.90 a day. Register inspectors are to receive $2.50 a day. Janitors are to receive $2.00 a day. On storage battery and horse car lines inspectors are to receive $3.10 a day, starters are to receive $2.70 a day, $3.00 a day and $3.10 a day. Switchmen and flagmen on these lines are to receive $1.95 a day. Janitors on these lines are to receive $2.00 a day. Truck and car drivers attached to these lines are to receive $1.95 a day, $2.05 a day, $2.20 a day and $2.30 a day.

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BANGOR STRIKE DECLARED OFF

The motormen and conductors of the Bangor Railway & Electric Company, Bangor, Me., who went on strike on Aug. 26, voted late on Sept. 9 to declare the strike off. The company had made no promises or concessions, and the strike was a complete failure on the part of the Amalgamated Association of Street & Electric Railway Employees of America. The company has reinstated about twenty men who went out on strike. These men conducted themselves properly during the period of the strike. They were re-engaged as new men, however, and have started in again with the company at the foot of the list.

As previously stated in the ELECTRIC RAILWAY JOURNAL, the service of the company had been practically normal for some time past despite unusual demands made upon the company for transportation. On the night of Sept. 8 Charles E. Hughes, the Republican nominee for President, spoke in the Auditorium, located about a mile from the Public Square in Bangor. Besides the other regular service the company that day maintained a two-minute schedule from the center of Bangor to the Auditorium. The cars on this run in particular were crowded to capacity.

Public sentiment on the side of the company increased steadily. At first the police were inclined to be somewhat lax in affording proper protection to the company, but any cause for complaint on this score that did exist was removed by the later activity of those charged with the work of enforcing the laws.

A feature of the strike was that despite the many new employees and with cars operating on almost normal schedule there was only one accident. This occurred on a car operated by an old employee and was not due to carelessness or negligence on the part of the company. In fact, in the history of the company there were never so few accidents. This is considered especially remarkable because of the numerous obstacles which the company was obliged to overcome. Out of 130 employees who worked as motormen and conductors and carhouse employees, only twelve remained loyal to the company at the declaration of the strike. The company had to build a new organization practically as large as the one which it had at the inception of the strike. Despite these obstacles, the company was able to break the strike and is now being complimented upon the attention, courtesy and fine appearance of the men who compose the new personnel. The new men are all residents of Bangor or Penobscot county and have thoroughly at heart the best interests of the community, of which most of them have been a part for many years.

REPRISAL ADVOCATED IN BUFFALO TAX CASE

In an effort to force the International Railway, Buffalo, N. Y., to drop its action for a review of its special franchise assessment made by the State Tax Commission, William S. Rann, corporation counsel of Buffalo, has recommended to the City Council that he be authorized to start a proceeding before the Public Service Commission for a reduction of fares charged by the railway on its city lines from 5 cents to 4 cents. The recommendation will be considered by the five members of the Council at its next meeting.

The special franchise assessment made by the State Tax Commission valued the company's properties and rights at $12 557,500. This was reduced to $8,573,850, and upon this the city levied a tax which became a lien on July 1, 1916. The company has instituted legal proceedings to have this assessment reviewed in the courts and is now seeking to have the matter sent to a referee for trial.

It will be necessary in the defense to have the company's properties appraised. The cost of the appraisal will be $50,000, of which $20,000 is now available. In view of the fact that the appraisal must be made, the corporation counsel says this same evidence could be used in the proceeding to have the rate of fare reduced. Their recommendation to the Council also points to the last financial statement of the company on file with the Public Service Commission which shows increased net earnings. In conclusion Corporation Counsel Rann says: "There is, I think, good reason to believe that the company could earn a net return of more than 6 per cent upon the present valuation of its property at the rate of fare of 4 cents."

SHORT STRIKE IN QUEBEC

A number of the employees of the Quebec Railway, Light & Power Company, Quebec, Que., who had organized themselves into a union, went on strike on Aug. 30 for the purpose of obtaining an increase in wages and recognition of their union by the company. The strike was confined to the lower section of the city. The upper town and Sillery sections of the system were not affected, that part of the system being operated by non-union employees. According to H. G. Matthews, general manager of the company, the men in the company's employ were under agreement to abide by the present scale of wages until Dec. 1, 1916. The company therefore took out ten warrants for breach of contract against the moving spirits in the strike and announced that the warrants would be executed unless the men returned to work by noon. A temporary settlement was effected through the intervention of Aldermen C. J. Lockwell and E. Therriault and Louis Letourneau, who prevailed upon the company to withhold the warrants. Subsequently these parties, together with Hector Laferte, counsel for the strikers, obtained a letter from the company agreeing to have the matters in dispute submitted to arbitration under the provisions of the Lemieux Act. The men returned to work at once and by evening all cars were again running on schedule. On Sept. 6 the company chose J. L. Perron as its representative on the board or arbitration, while the employees named Hector Laferte. The two arbitrators will follow the usual custom of selecting a third arbitrator.

BIDS FOR CONSTRUCTION MATERIAL RECEIVED

The Public Service Commission for the First District of New York during the week ended Sept. 9 received bids for the installation of tracks on the Seventh Avenue branch of the Lexington Avenue Rapid Transit Railroad. This is the line which connects with the first subway near Forty-third Street and Seventh Avenue, and forms what will ultimately be, together with the upper west side portion of the first subway, the new west side through line under the dual system. The low bidder on the contract was the firm of Engel & Hevenor, New York City, the unofficial total of whose bid was $229,440. The contract provides for the laying of tracks from a connection with the first subway in Times Square under Seventh Avenue and other thoroughfares to a connection with the first subway again in Battery Park and also in the Brooklyn extension of the Seventh Avenue line. Practically all the materials, including ties and rails, employed in the work will be furnished to the contractor by the city. These have been purchased by the Public Service Commission for the city under separate contracts. The contract for the construction of the line was formally awarded to Engel & Hevenor by the commission on Sept. 14.

Bids have been opened by the commission for the supply of special work, including frogs and switches and necessary appurtenances to be used in the construction of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway. All of the work is to be delivered within four months. The Ramapo Iron Works, New York City, was the low bidder at $11,427.

The commission on Sept. 28 will receive bids for the construction of a railroad yard in connection with the White Plains Road extension of the first subway. The yard will be located one block east of White Plains Road and will cover an area of several city blocks. Entrance to the subway yard will be from the north, and to the elevated yard from the south. The whole space to be occupied by both yards is about 800 ft. x 1100 ft. There will be storage room for nearly 600 cars in the subway yard, and for about 300 cars in the elevated yard.

The commission has granted an application of the New York Municipal Railway Corporation for an extension of time of two years to July 27, 1918, to complete the construction and begin the operation of the additional tracks on Fulton Street, Brooklyn, and an extension of two years to Feb. 2, 1918, to complete the construction and begin the operation of additional tracks on the Broadway line in the same borough. One cause for the extension of time has been the decision to rebuild the elevated structure at East New York, the contract for which was approved last

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January and will require approximately two years to complete. Discussion over the disposition of the tracks on Fulton Street, west of Cumberland Street, is also an important factor in the grant of the extension of time in respect of that line.

INJUNCTION SOUGHT TO PREVENT COERCION IN ATLANTA STRIKE

On Sept. 7 Judge John T. Pendleton at Atlanta, Ga., signed a temporary restraining order directed against the officers and some thirty or forty individual members of the union linemen of the Georgia Railway & Power Company, who are on strike, and directed them to appear in court on Sept. 16 and show cause why a permanent injunction should not be issued. In its petition the company asks for a permanent restraint of the defendants from attempting to coerce men willing to enter the employ of the company; from molesting them personally, or harassing them; from picketing the company's premises, or loitering near those premises; from violence, threats of violence, insults, indecent talk, abusive epithets, and other attempts at coercion of men already in the company's employ, with intent to make them break their contracts with the company, or of men willing to take jobs, to keep them from taking those jobs.

The company alleges that the majority of the men employed in the line department who were members of the union and went on strike, did not want to strike, and were contented with their work, and quit their jobs only on order of their union officers.

The history of the strike is set out in the petition, which shows that on Aug. 5 the company discharged, "in the proper conduct of its business, for good and sufficient reasons," J. L. Carver, E. P. Smith and another man named Castleberry; that on Aug. 11 it received a demand from the local union, presented by Purcell, Pollard, Carver and others, that the men discharged be reinstated, this demand being accompanied by the threat of strike; that on Aug. 12, "against the desire of the majority," sixty-five men in the line department quit in a body. Altogether, according to P. S. Arkwright, president of the company, less than 100 men have quit the employ of the company since the strike began. The places of the strikers have been filled. The company is unwilling to take the strikers back in a body.

INCREASE IN WAGES FOR LOUISVILLE MEN

Two weeks after a delegation of motormen and conductors employed by the Louisville (Ky.) Railway and the Louisville & Interurban Company waited on President T. J. Minary, favorable action on their request for an advance in wages was taken by the board of directors. This advance, 1 cent an hour all around, is given in the expectation that the trainmen will continue to co-operate with the company in the safety-first work, and to meet the advance, estimated to total $40,000 annually, that amount has been set aside out of the accident fund. The scale heretofore has ranged from 21 cents to 24 cents on all city lines, although on the country lines the 25-cent men are advanced to 26 cents an hour. The employees affected number about 1000 men. In announcing the advance in wages Samuel Riddle, superintendent of transportation, issued a statement to the men, reading in part as follows:

"Our board of directors, on carefully considering an increase of wages, has been confronted with a large falling off in receipts during the past three years and finds that an increase can be made possible only by an increase of receipts and a further reduction in accidents. The accident campaign, by reason of the faithful co-operation of motormen and conductors, proved successful and the management believes that by greater effort and concerted action on the part of motormen and conductors better service can be rendered which will better please the public and result in increased travel, and also in a further reduction in accidents. With this expectation in view it has been decided to set aside $40,000 out of the accident fund to be paid as a premium, beginning Sept. 16, 1916, at the rate of 1 cent an hour to motormen and conductors in the service as of Sept. 15, 1916."

Increase in Wages in Beaumont.—Notices have been posted announcing an increase of 2 cents an hour in the pay of conductors and motormen employed by the Beaumont (Tex.) Traction Company and the Jefferson County Traction Company. The increase went into effect on Aug. 15.

Reduction in Taxes Asked.—The Northern Texas Electric Company, Fort Worth, Tex., has applied to the city for reduction of taxes. The application states that jitney competition lowered gross in 1915 by $250,000 and that so far in 1916 loss has been $150,000. The claim for reduced taxes is based on the depreciated value of the franchise because of jitney competition.

Buffalo City Men to Operate Interurban Cars.—Under the terms of an agreement reached between Nathan A. Bundy, as receiver for the Buffalo (N. Y.) Southern Railway, and its platform men, motormen and conductors of the International Railway will operate cars from the Buffalo city line to the Main Street terminal. Heretofore the interurban men operated cars over the Buffalo tracks.

Contract for Subway Approaches to Cleveland Bridge Awarded.—The board of County Commissioners on Sept. 9 awarded the contract for building the subway approaches to the new Superior-Detroit Avenue bridge across the Cuyahoga River to the Bates & Rogers Construction Company, Chicago, Ill., for $624,992. The estimate of the cost of the work furnished by W. A. Stinchcomb, county engineer, was $672,000.

Trenton Working Agreement Signed.—The working agreement between the Trenton & Mercer County Traction Corporation, Trenton, N. J., and its employees, has finally been signed. The agreement is in the same form in which it was decided upon several weeks ago. The men for a time refused to sign it, wanting an additional clause inserted providing certain pay for extra men. The clause was finally left off.

Fenders to be Required in Helena.—Mayor R. R. Purcell of Helena, Mont., says that steps will be taken at once by the city officials to compel the Helena Light & Railway Company to install satisfactory fenders on all cars operated in Helena. This statement comes as the result of the death of Elmer Hoeppner, killed by a car at the corner of Main and Grand Streets. The coroner's jury placed the blame for the accident on the railway.

Baltimore Bridge Franchise Value Fixed.—On Sept. 5, the city of Baltimore, Md., voluntarily fixed the price of the franchise to the United Railways & Electric Company on the New Hanover Street Bridge at $107,943. Between that figure and the original estimate by the city of the value of the grant there is a difference of more than $500,000. More than half of the $107,000 can be paid in five annual installments, if the United Railways & Electric Company so elects.

Northern States Preferred Stock Sales.—During the month of August $56,800 of 7 per cent preferred stock of the Northern States Power Company was sold to 144 of the company's customers in home territory. Total sales since the stock was first offered to the company's patrons amount to $801,400 held by 1475 customer-stockholders. The conditions under which this stock is sold to customers were described at length in the ELECTRIC RAILWAY JOURNAL of Aug. 12, page 264.

Birmingham Wage Negotiations Begun. — J. S. Pevear, president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., is quoted as follows in regard to the negotiations covering terms of service for the employees: "There is nothing of interest to the public in what we are doing now. The organization has been recognized by the company, and only the terms of the contract are left to be worked out between the company and the men. The matter will be left to arbitration in the event that we cannot agree."

Lincoln Street Railway May Cease Operations.—In the Lincoln Street Railway cases the Public Utilities Commission of Illinois granted authority to a utility to discontinue completely its street railway operations in the city of Lincoln. The company made a showing for discontinuing an

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established utility service, based upon continued annual operating losses. The commission held that the company, with the permission of the city of Lincoln, should not be compelled to continue the further operation of its street railway business.

Laurel Line Increases Wages.—Yardmen, conductors and motormen employed by the Lackawanna & Wyoming Valley Railway, a third-rail electric system operating between Wilkes-Barre and Scranton, Pa., were granted an increase in wages on Aug. 30, following a conference of railway officials and a committee of the employees. The new scale of wages became effective on Sept. 1. It provides, for motormen and conductors on electric locomotives, wages of 40 cents an hour, an increase of 1½ cents; trainmen on local and express service, 35½ cents, an increase of 2 cents; brakemen, 27½ cents an hour, an increase of 1 cent, and switchmen, an increase of 1 cent an hour.

Some Cleveland Questions up for Settlement.—Fielder Sanders, street railway commissioner of Cleveland, has submitted to the City Council a plan for relieving congestion at Euclid Avenue and East Ninth Street. He proposes so to reroute cars that no cars will be allowed to turn at right angles at that corner. During the rush hours vehicles are to be held to the same rule. The Council has asked the Cleveland Railway to report on the desirability of purchasing the track to the North Randall race tracks. The street railway committee has indorsed legislation providing for inclosed steps leading from the Payne Avenue terminal to the 105th Street crosstown line. Accident suits aggregating $225,000 in damages were filed against the company during the week ended Sept. 2. Seven of the suits were filed by one firm of lawyers. One for $50,000 was brought by the father of a sixteen-year-old girl who was struck by a car some time ago.

Buffalo Southern Railway Strike Off.—After a series of conferences between a committee of bondholders of the Buffalo (N. Y.) Southern Railway and its employees, which culminated in an agreement on Aug. 31, the strike of platform and trackmen, which has been in effect since last May, has been called off. There will be no increase in wages for the platform men and the same conditions will continue as prevailed before the strike. Platform men are restored to the number required to operate the cars with their former seniority rank and all prosecutions resulting from the strike will be dropped. The men will receive 25 cents an hour for the present and whether or not an increase will be granted later will depend upon the result of arbitration conferences. Trackmen will receive an increase of 3 cents an hour and it is agreed that ten hours shall constitute a day's work and any employment shall be considered as a day. Partial service was restored between the Buffalo city line and Ebenezer, Orchard Park, Armour and Hamburg on Sept. 3, but owing to the damage done by strikers and their sympathizers it will be some time before there is complete restoration of service.

PROGRAMS OF ASSOCIATION MEETINGS

New England Street Railway Club

The outing of the New England Street Railway Club, which is to be held in Springfield and Holyoke on Sept. 21-22, will be attended by the entire membership of the club if the Springfield Street Railway, the Holyoke Street Railway and the other important business interests in those cities have anything to say about it. On Sept. 12, the Springfield Board of Trade, through its convention bureau, sent out a special letter to all members of the club extending a cordial invitation to visit the city and see its many attractions and saying that no pains will be spared to make this outing one long to be remembered. The Holyoke Board of Trade is also showing great interest in the outing and is sending out a letter pointing out the places of interest, industries, etc., in that city and offering to assist in making the visit of the club to that city a memorable one. Finally, lest the members will overlook the eventful date, a series of reminder cards has also been sent out by "Bemis," which is short for the Bemis Car Truck Company. The last of these reminders reads: "If broke, come anyhow."

Financial and Corporate

ANNUAL REPORT

Brazilian Traction, Light & Power Company, Ltd.

The income statement of the Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., in Canadian currency for the year ended Dec. 31, 1915, follows:

Revenue from securities owned and under contracts with subsidiary companies	$5,339,192
Interest on advances to subsidiary companies	273,683
	$5,612,876
General and legal expenses, administration charges and interest on loans	218,074
Surplus available for dividends	$5,394,802
Dividends	4,849,380
Surplus carried forward to profit and loss	$545,422

While the combined earnings of the companies in Brazilian currency fully realized the expectation of the board, being considerably greater than those of the previous years, the result was not so satisfactory when such earnings were converted into Canadian currency. For some years prior to the outbreak of the European war, the value of the milreis for sight bills on London was approximately 16d. During the latter part of 1914, however, the average value fell to approximately 13d., and in 1915 showed a further depreciation to an average of approximately 12.5d. Converting the earnings during 1915 at the average rates prevailing prior to the war, the net revenue in Canadian currency would be increased by more than $3,000,000.

During the first half of 1915, dividends on the ordinary shares at the rate of 1½ per cent each were paid on March 1 and June 1 respectively. As, contrary to expectations entertained earlier in the year, the exchange value of the milreis continued to fall, the board decided to limit the dividends payable on Sept. 1 and Dec. 1 to one-half of 1 per cent each, making a total dividend of 4 per cent for the year.

Although rigid economies were effected, the cost of operation and maintenance was adversely influenced by the rise in the price of materials, and by the enormous advance in ocean freights. This advance particularly affected the earnings of the gas business, as owing to the requisition by the British government of some of the steamers employed in the company's service for carrying coal, it became necessary to charter other steamers at rates greatly exceeding those which would have been payable under normal conditions. With a return to normal conditions the revenue of the company should be not only equal to that obtained prior to the war, but should show a considerable and steady increase. Conditions generally in Brazil are showing distinct signs of improvement. All the coffee purchased for exchange purposes during 1914 and at the beginning of 1915 was disposed of, and at prices which realized a sum in excess of that which it is estimated would have been received had the usual method of making remittances been followed.

The operations of the Rio de Janeiro Tramway, Light & Power Company, Ltd., for the year resulted in substantial increases in earnings in all departments except the tramways. The earnings of this department showed a slight decrease. The loss came from the first three months of the year, after which the receipts compared favorably with those in 1914. The passengers carried during the year totaled 191,556,302 as compared to 192,103,635 in 1914, while the car-miles were 24,409,259 and 24,815,078 respectively. During the year the company built and put into operation eleven cars and progress was made on thirty trailers.

The tramways department of the Sao Paulo Tramway, Light & Power Company, Ltd., also showed slightly decreased earnings for 1915, but the present outlook is good, inasmuch as the earnings for the first three months of 1916 exceeded those for the corresponding period of last year. The passenger traffic in 1915 fell off from 53,732,292 to 51,574,145, while the car miles decreased from 9,496,091 to 9,425,231. This branch did little new construction during the year.

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FUTURE OF MEXICO TRAMWAY

Bondholders at Meeting in October Will Consider Policy to Be Pursued Pending Improved Mexican Conditions

The bondholders of the Mexico (Mex.) Tramways and all its affiliated companies have been addressed by the National Trust Company, Ltd., Toronto, Ont., the trustee of each of the trust deeds securing the several issues of bonds, in regard to a meeting of the security holders to be held in London, England, on Oct. 4, at which meeting important general questions of policy relating to the future conduct of the companies' business, pending an improvement of conditions in Mexico, will be laid before the bondholders for their approval. The trust company refers to the default in the payment of bond interest on account of the extraordinary conditions which prevailed in Mexico and says that of a total of £12,330 371 of bonds outstanding more than £7,553,066 have been deposited with the committee. The company says that it would have been of little use to convene bondholders' meetings until a policy based upon first-hand information as to the conditions in Mexico could be recommended. It then refers to the study of the properties made by F. H. Phippen and E. D. Trowbridge, referred to at length in the ELECTRIC RAILWAY JOURNAL of July 15, 1916, page 118. Mr. Phippen will attend the meeting to amplify his report and answer inquiries. The resolutions intended to be placed before the formal meeting for the approval of the bondholders are as follows:

1. Approving the policy heretofore adopted and the policy recommended for the future as explained by circular letter dated June 27, 1916, issued by the trustee and by the bondholders' committee constituted by agreement dated Feb. 18, 1916.

2. Appointing a committee to represent and act for the holders of all the said bonds and with such constitution and powers as to the meeting may seem advisable.

3. Authorizing and directing the trustee to waive defaults committed or to be committed by the company in payment of interest and sinking fund on the bonds and otherwise on such conditions and for such periods as the meeting may think fit.

4. Determining what steps shall be taken for the protection of the bondholders' interests and to obtain for the bondholders control of the future conduct of the affairs of the company.

5. Authorizing, subject to such conditions and limitations as may be approved by the meeting, the creation and issue of prior lien bonds ranking in priority to the said bonds upon all or any of the assets of the company.

6. Authorizing the trustee to vote or to permit the company to vote at meeting of the bondholders of the Mexican Light & Power Company, Ltd., any bonds of that company held as part of the mortgaged property in favor of resolution similar to those herein referred to.

7. Precluding any bondholder from taking any proceedings against the company on his bonds or the coupons, or for the enforcement of the security therefor without the approval of the said committee.

8. Determining upon what conditions the management and control of the company's assets shall be permitted to remain vested in the board of directors and authorizing the trustee to permit the company to hold and manage, and to exercise voting and other rights in respect of, the mortgaged properties and to receive the income thereof.

9. Authorizing the trustee to concur with the company in executing and doing such supplemental trust deeds, documents and things as it may consider necessary to give effect to any resolutions passed at the meeting, and for the protection of the trustee in carrying the said resolutions, trust deeds and documents into effect, and authorizing the trustee to act upon or in accordance with any direction or resolution of the committee.

10. Generally any other resolutions which the meeting may consider desirable for the protection of the bondholders or for giving effect to the recommendation of the trustee or the bondholders' committee at such meeting.

11. Agreeing to the modification of the rights of the bondholders against the company and its property to the extent necessary to give effect to any such resolutions, supplemental trust deeds and documents.

REORGANIZATION OF ALBIA PROPERTIES

The protective committee representing the holders of the bonds of the Albia (Iowa) Interurban Railway, of which Guy Morrison Walker is chairman, has arranged to organize a new light and railway company to succeed the Albia Interurban Railway, the property of which was sold under foreclosure some time ago. The new company is to be known as the Albia Light & Railways Company. It will take over the property disposed of at foreclosure, paying the committee therefor new first mortgage 5 per cent gold bonds equal to 70 per cent of the par value of the present outstanding bonds of the Albia Interurban Railway and 6 per cent preferred stock in an amount equal to 30 per cent of the par value of the outstanding bonds. In addition, the organizers of the new company agree to secure all the outstanding bonds of the Albia Gas Company and to exchange them for bonds of the same issue as those given to the bondholders so that the new bonds will be a first mortgage on all the property. It further has agreed to pay all the expenses of the committee and raise the necessary cash to pay off the preferred claims, the receivers' fees, etc., so that the committee will be able to distribute the new bonds and the new preferred stock without any deduction for expenses of any kind.

Under the plan, bondholders receive par in new securities for par of old Albia Interurban Railway bonds, 70 per cent thereof in new first mortgage 5 per cent bonds and 30 per cent thereof in new 6 per cent preferred stock. The new bonds will be in the denomination of $1,000 and $100. Fractions of bonds less than $100 and fractional shares of stock will be covered by the issue of script, which will be exchangeable in amounts of $100 or multiples thereof for bonds and shares of preferred stock. The reorganized company will have authorized and outstanding $400,000 of common stock of a par value of $100 and $100,000 of 6 per cent non-cumulative preferred stock of a par value of $10. The new bonds are dated July 1, 1916. The total authorized amount is $500,000, of which $250,000 are outstanding. Interest is payable January and July at the office of the Empire Trust Company, New York, N. Y. The bonds are due in 1941. There is no sinking fund provided and the bonds are non-callable. The $250,000 of bonds at present unissued are reserved for extensions and additions. During the period that the property was operated by the receivers, the net profits were spent in improvements to the property by order of the court.

The officers of the Albia Light & Railways Company, the successor company, are: Albert L. Fowle, president; Merle R. Walker, vice-president; A. S. Leyland, secretary; Ralph W. Bayer, treasurer.

ELECTRIC RAILWAY VALUES DEPRECIATE

The Washington State Tax Commission, in compiling the regular June schedule for 1916, estimates the depreciation in valuation of the electric railways in Washington on account of automobile competition since the 1915 schedule was compiled, at $2,747,180. This will reduce taxation receipts from such lines $48,075. The reports for the year ending Dec. 31, 1915, show decreases in gross and net receipts in both freight and passenger earnings of almost every electric line in the State. This reduction in receipts has prevented enlargements and extensions, and the decrease in valuation is figured on account of depreciation and obsolescence of equipment, formerly overcome by replacement and improvement.

On this subject *The Electrogram* of the Puget Sound Traction, Light & Power Company, Seattle, Wash., said in a recent issue:

"The decreased valuation and consequent loss of taxes from electric railways is of course primarily a loss to the stockholders of the companies, but it is also a loss to all other taxpayers, who must make up the deficit in public revenues, and to patrons of the street railways who will suffer in loss of service as the companies are forced to retrench, owing to losses caused chiefly by unregulated auto competition. The situation is serious enough to cause every thoughtful citizen to consider whether it would not be the best policy to regulate auto transportation just as strictly as electric railways are regulated."

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American Railways, Philadelphia, Pa.—Newburger, Henderson & Loeb, Philadelphia, Pa., bankers, have made public a statement in connection with the acquisition of the Electric Company of New Jersey, the Pennsgrove Electric Light & Power Company, the Clementown Township Electric Improvement Company, the Williamstown Electric Company and the Woodstown Ice & Storage Company by the American Railways, referred to originally in the ELECTRIC RAILWAY JOURNAL of June 10 and Aug. 12 in connection with the application of the American Railways to the Board of Public Utility Commissioners of New Jersey, for permission to consummate the purchase. The purchase of these properties dates from Sept. 1. They are taken over through the subsidiary of the American Railways known as the Electric Company of New Jersey. The district served covers territory on a line south of the West Jersey & Seashore Railway and embraces a population of 85,000. Part of the power used will be generated as at present at the power plant at Bridgetown, N. J., owned by the American Railways, and additional current will be supplied directly from Wilmington through a duplicate power system running under the Delaware River and thence by transmission lines to Paulsboro, Salem and other places. The taking over of these properties brings under the single ownership of the American Railways, without competition, the entire electric light and power business of the valley of the Delaware on both sides of the river for a distance of 100 miles.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—Justice Wesley Dudley in the Supreme Court has authorized George Bullock as receiver of the Buffalo & Lake Erie Traction Company, operating between Buffalo, N. Y., and Erie, Pa., to issue $140,000 of receiver's certificates, $135,000 of which will be used to retire securities to this amount, and the balance to improve the company's property.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—The National City Company, New York, N. Y., and Halsey, Stuart & Company, Chicago, Ill., are offering for subscription $3,620,000 of first mortgage 5 per cent gold bonds of the Chicago, North Shore & Milwaukee Railroad, the successor to the Chicago & Milwaukee Electric Railroad, dated July 1, 1916, and due on July 1, 1936. The total authorized issue of the bonds is $10,000,000. They are callable as a whole or in part on any interest date at 105 and interest. The bonds are in coupon form, registerable as to principal, in interchangeable denominations of $1,000, $500 and $100. The Continental & Commercial Trust & Savings Bank, Chicago, Ill., is the corporate trustee.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—The Kanawha Traction & Electric Company has applied to the Ohio Public Utilities Commission for authority to issue $2,000,000 of bonds. As noted in the ELECTRIC RAILWAY JOURNAL of Aug. 26, page 375, the attorneys for the company recently filed a mortgage dated Aug. 1 with the court at Parkersburg to the Fidelity Trust Company and Van Lear & Black as trustees to secure an issue of $5,000,000 of bonds to be put out in serial issues of such amounts as the needs of the company require. It was then stated that series A of these bonds would be issued in an amount sufficient to refund $1,500,000 of two-year 5 per cent notes of the Kanawha Traction & Electric Company due on June 15, 1917, and $150,000 of bonds of the Marietta Traction Company which mature early in 1917.

Northern Ohio Traction & Light Company, Akron, Ohio.—E. W. Moore, vice-president of the Northern Ohio Traction & Light Company, has announced that 80 per cent of the stock required to bind the sale of the property to Eastern financial interests has been deposited. The agreement provides that 95 per cent of the stock shall be deposited. The meeting of stockholders scheduled for Sept. 12 in Akron was postponed.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company has retired the $87,000 of 6 per cent bonds of the City & Suburban Railway which remained outstanding of the original issue of $1,000,000. The bonds were dated Sept. 1, 1891, and were due Sept. 1, 1916. Their retirement was provided for under the terms of the indenture securing the first and refunding 5 per cent bonds of the Portland Railway, Light & Power Company.

Youngstown & Southern Railway, Youngstown, Ohio.—The property of the Youngstown & Southern Railway was sold at public auction on Sept. 7 to W. J. Blackburn of Youngstown, who represented the bondholders. The price was $650,000, two-thirds of the appraised value. On the following day application was made to the Ohio Public Utilities Commission for authority to sell the property to the Youngstown & Suburban Railway for $1,550,000, a reorganization of the old company. The Interurban Realty Company, a subsidiary of the new corporation, has been organized to take title to about 1000 acres of coal land owned by the Youngstown & Southern Railway at West Point.

DIVIDENDS DECLARED

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., quarterly, 1½ per cent, preferred.

Eastern Power & Light Corporation, New York, N. Y., quarterly, 1¾ per cent, preferred.

Galveston-Houston Electric Company, Galveston, Texas, 3 per cent, preferred.

Interborough Consolidated Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.

Interborough Rapid Transit Company, New York, N. Y., quarterly, 5 per cent.

Kansas City (Mo.) Railways, 2½ per cent, preferred.

Manhattan Railway, New York, N. Y., quarterly, 1¾ per cent.

Philadelphia (Pa.) Traction Company, $2.

Springfield Railway & Light Company, Springfield, Mo., quarterly, 1¾ per cent, preferred.

United Light & Railways, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; 1 per cent, common.

West End Street Railway, Boston, Mass., $1.75, common.

West India Electric Company, Kingston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,		'16	$97,834	*$76,352	$21,482	$27,831	††$6,178
1 " "		'15	91,243	*62,182	29,061	17,021	‡12,159

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.

1m., July,		'16	$50,976	*$24,655	$26,321	$11,468	$14,853
1 " "		'15	46,154	*22,690	23,464	11,086	12,378
7 " "		'16	261,592	*146,717	114,875	79,630	35,245
7 " "		'15	236,091	*134,785	101,306	76,811	24,495

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., July,		'16	$932,505	*$587,455	$345,050	$98,634	‡$270,260
1 " "		'15	806,482	*474,990	331,492	98,265	‡256,409

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m., June,		'16	$476,959	*$210,273	$266,686	$217,661	‡$49,025
1 " "		'15	444,458	*193,753	250,705	213,061	‡37,644

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., June,		'16	$139,003	*$86,288	$52,715	$36,237	$16,478
1 " "		'15	119,734	*78,188	41,595	36,349	5,246
6 " "		'16	722,320	*483,885	238,435	217,813	20,622
6 " "		'15	625,123	*434,619	190,505	216,276	†25,771

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., July,		'16	$164,595	*$90,293	$74,302	$36,704	$37,598
1 " "		'15	136,446	*78,781	57,665	36,221	21,444
7 " "		'16	886,916	*574,179	312,737	254,517	58,220
7 " "		'15	761,570	*513,400	248,170	252,496	†4,326

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m., July,		'16	$44,930	*$30,663	$14,267	$7,987	‡$6,325
1 " "		'15	49,783	*30,801	18,982	8,000	‡11,053

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., July,		'16	$50,044	*$44,504	$5,540	$6,015	†$591
1 " "		'15	42,611	*43,287	676	$8,345	‡6,676

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., July,		'16	$569,275	*$371,502	$197,773	$120,688	‡$78,599
1 " "		'15	472,148	*319,416	152,732	120,284	‡33,748

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m., July,		'16	$23,125	*$22,400	$725	$1,815	††$1,064
1 " "		'15	26,016	*22,719	3,297	1,590	‡1,737

*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the N. Y., N. H. & H. R. R. under guarantee, also interest on notes held by the N. Y., N. H. & H. R. R. not credited to income of that company.

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Traffic and Transportation

BOSTON SERVICE INVESTIGATION COMPLETED

Massachusetts Public Service Commission Concludes Extended Study of Service—Present Methods Approved

An extended study of the service of the Boston Elevated Railway in the Jamaica Plain district has been completed by the Massachusetts Public Service Commission, resulting from a petition of Representative Alfred J. Moore and others for restoration of crosstown surface line facilities from Forest Hills to Park Street via Hyde Square. As the result of various changes residents of Jamaica Plain have been deprived of all through service to Forest Hills and have been obliged to make two transfers, one at the Jamaica Plain carhouse and another three minutes later at the Forest Hills elevated terminal station, in order to reach points in the Roslindale, Germantown, Mount Hope and Mattapan districts of Boston, as well as points beyond in Dedham, Hyde Park and Milton. The inconvenience of this arrangement, with respect to transfers at the Jamaica Plain carhouse, will shortly be minimized by improvements at this point. The company is installing additional tracks and loops with suitable facilities for the lay-off of cars and is also constructing a prepayment area which will permit of a bodily transfer being made under shelter instead of in the street.

From all the evidence available, the commission believes that the present method of routing cars from the Hyde Square district is consistent with sound principles of street railway operation and is not at variance with any reasonable standard of public convenience in that district. Most of the travel from the district is on the Dudley Street line, which, in conjunction with the elevated lines from the Dudley Street station, affords the quickest service to the business center of Boston; the Tremont Street line furnishes service without change, and by the most direct route, to all stations in the Tremont Street subway; and for those passengers, relatively few in number, who desire to reach points in the Back Bay district, free transfers are given at Roxbury Crossing and at the intersection of Tremont and Northampton Streets. The commission finds that the number of passengers from the Hyde Square district now making such a transfer is too small to justify an additional through line, and that the inconvenience of the present transfer arrangements is no greater for the people of the Hyde Square district than for the much larger number of persons from Brookline, Cambridge and other suburban communities who must also transfer to reach Huntington Avenue and other surface points in the Back Bay district. The commission says that any attempt to establish through service for every small group of riders on every available route in the Boston Elevated system would result in gross waste of the revenues contributed by the riding public and would be utterly impracticable from an operating standpoint.

Improvements in Jamaica Plain service are now under way. To relieve the congestion of travel during rush hours on the South Huntington Avenue and Dudley Street lines the company has agreed to operate a trailer service in rush hours on both these lines. This service is now in partial operation and is to be increased. An important improvement has also been effected by a rearrangement of stops on Center Street, Jamaica Plain, in the heart of the factory district, so as to permit the simultaneous loading of three single cars or two two-car trains, instead of only one car at a time, as previously. The company has assigned additional men to superintend the loading of these cars at this point, and the inspection department of the commission has been advised by leading factory officials that these arrangements have proved satisfactory to their employees and have also resulted in expediting the entire service over Center Street in Jamaica Plain (the principal artery of travel) during rush hours. In addition to these changes the commission is of the opinion that free transfer privileges should be established at Jackson Square.

TEXT OF PENNSYLVANIA JITNEY DECISION

Commission Holds Jitney to Be a Public Service Company and Requires Certificate of Public Convenience

Brief mention was made in the ELECTRIC RAILWAY JOURNAL of Sept. 9, page 461, of the decision of the Public Service Commission of Pennsylvania holding any one operating a "jitney bus" over a fixed route and regularly soliciting the carriage of passengers for hire to be a public service company within the meaning of the Public Service Company Law and requiring such operator to secure a certificate of public convenience from the commission. The report and order of the commission follow:

"The complaint in this case sets forth that the respondent who is a resident of the borough of Tarentum, Allegheny County, 'is now and has been for some time past engaged in the business of a common carrier of passengers between the village of Natrona and the boroughs of New Kensington, Arnold and Parnassus, Westmoreland County, Pa., and between the boroughs of New Kensington, Arnold and Parnassus and the borough of Aspinwall, Allegheny County, Pa., and that as such common carrier he is the owner and operates a motor-driven vehicle or automobile having State license No. 41,288, commonly known and referred to as a "jitney bus," and solicits and transports passengers between the said and intervening points for hire.'

"In the answer of the respondent submitted under oath these averments are admitted, excepting that it is alleged that he does not travel upon, over and adjacent to the street car tracks of the complainant the full length of the route traversed by him, but travels over only a portion of said route, being the route between Natrona, Brackenridge and through East Deer Township where there is only one public highway used in common by complainant and the general public. For further defense the respondent answers that he is not a common carrier of passengers nor a public service company within the meaning of the act of July 26, 1913, and that he is not subject to the provisions of said act; that if he is a common carrier the act of July 26, 1913, does not apply to him and if it does so apply it is unconstitutional in failing to give notice of said matter in its title.

"At the hearing had upon this complaint the respondent was called and testified that he usually operated between Tarentum and Natrona and Natrona to New Kensington, going usually up Fourth Avenue to Allegheny and from Allegheny to Third Avenue. The automobile employed by him for the service which he was rendering was a five or six-passenger E. M. F. car. Although the affidavit alleged that an application had been presented by respondent to this commission for a certificate of public convenience, the records of the commission negatives the statement.

"Under all the evidence the case comes squarely within the rulings of this commission. In Scranton Railway vs. Walsh (P. U. R. 1916, D. 18), and for the reasons therein stated complaint must be sustained. The complainant is engaged in the business of a common carrier of passengers; for this service he has not applied for nor received from the Public Service Commision a certificate of public convenience authorizing him so to do. An order will, therefore, be issued directing the respondent, W. T. Alter, his servants, agents and employees, to cease and desist from carrying on the aforesaid public service business until he shall have obtained from this commission a certificate of public convenience in approval thereof under and in accordance with the provisions of the public service company law approved July 26, 1913.

"This matter being before the Public Service Commission of the Commonwealth of Pennsylvania upon complaint and answer on file, and having been duly heard and submitted by the parties and full investigation of the matters and things involved having been had, and the commission having on the date hereof made and filed of record a report containing its finding of fact and conclusions thereon, which said report is hereby approved and made a part hereof:

"Now, to-wit, Aug. 25, 1916, the respondent W. T. Alter, his agents, servants and employees, are ordered to cease and desist from carrying on the public service mentioned in the above report until they shall have obtained from this commission a certificate of public convenience in approval thereof under and in accordance with the provisions of public service company law."

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BAY STATE STREET RAILWAY FILES NEW FARE SCHEDULE

Following the recent decision of the Massachusetts Public Service Commission relative to proposed fare increases on the Bay State Street Railway, the company has filed a new schedule with the commission covering all the routes on the system outside the fifteen urban groups of lines exempted by the board from higher fares at the present time. The new schedule establishes a 6-cent fare unit in place of the previous 5-cent rate on about 370 routes, the number of proposed increases on the various divisions being as follows: Lowell, sixty-four; Lawrence, forty-six; Haverhill, forty-five; Reading, Woburn and Gloucester, about ten; Lynn, six; Salem, nineteen; Chelsea, three; Fall River, eighteen; Taunton, seventy-two; Brockton, fifty-two; Quincy, thirty; Hyde Park, five. School tickets are to be sold at one-half the regular rates in all divisions. Nearly 300 of the above proposed increases apply to through routes.

Examples of the proposed increases as affecting longer-distance travel on the system follow:

Route—North of Boston	Fare Schedule in Cents: Present	Proposed
Merrimack Square, Lowell, and Winthrop Square, Medford	25	29
Merrimack Square, Lowell, and Woburn Square, Woburn	20	23
Merrimack Square, Lowell, and Malden Square, Malden	25	28
Merrimack Square, Lowell, and Haverhill Transfer Station	25	26
Merrimack Square, Lowell, and Massachusetts-New Hampshire State line	10	11
Lawrence Transfer Station and Malden Square	25	28
Lawrence Transfer Station and Reading Square	15	17
Lawrence Transfer Station and Wakefield Square	20	23
Reading Square and Malden Square	10	11
Lawrence Transfer Station and Salem	25	28
Haverhill and Newburyport	20	23
Boston to Marblehead (Scollay Square to Fort Sewall)	15	16

Route—South of Boston	Fare Schedule in Cents: Present	Proposed
Fall River and Taunton	25	28
Brockton and Lund's Corner, New Bedford	45	53
Bridgewater Center and Lund's Corner, New Bedford	35	42
Bridgewater Center and East Providence	30	35
Brockton and Nantasket Beach Steamer Landing	30	35
Campello (Brockton) and Mattapan Square, Boston	20	23
Neponset (Boston) and Nantasket Beach Steamer Landing	20	23
Quincy Square and Center Street, Brockton	20	22

No change in through or local fare limits and no change in transfer limits or reduced rate tickets (except school tickets) is contemplated in the new schedule, which is planned to take effect on Oct. 9, 1916. No formal hearings will be required by the commission, and it is expected that the above rates will receive early approval in the light of the finding in the case dated Aug. 31.

INTERNATIONAL RAILWAY ADVERTISES NIAGARA

Large display advertisements are being used in the daily newspapers of Buffalo and throughout western New York by the International Railway, Buffalo, N. Y., announcing the completion and successful operation of the Western Electric-Davis flood-lighting system on the American cataract and rapids at Niagara Falls, N. Y., and the operation of the new Spanish aerial tramway over the Whirlpool in the lower river rapids. These two new attractions at the Cataract City have greatly increased travel over the Buffalo & Niagara Falls division of the International Railway and over the Upper Bridge and Park and River divisions along the Canadian gorge. Cars are now being operated from Buffalo on a fifteen-minute schedule throughout the day and in the early evening traffic has been so heavy a seven-and-a-half-minute schedule has been put into effect. Cars are operated every few minutes over the Park and River division between the Canadian end of the Upper Bridge and the Whirlpool where the Spanish aerial tramway is located. The Niagara Gorge Railway, operating the American gorge route line along the lower river, has put into operation an especially constructed flat car upon which is mounted a powerful electric searchlight. The searchlight car precedes a number of open observation cars through the Niagara gorge at night on a searchlight trip of the lower river rapids. This has increased travel through the gorge and over the gorge route belt line at night. No extra charge is made for the night trip.

SERVICE TRIPLED TEMPORARILY

The San Diego & Southeastern Railway, San Diego, Cal., recently decided to make some changes in its train service to Encanto, Lemon Grove, La Mesa, El Cajon and Santee. This new service will be put in on trial for a month or two. The purpose of introducing it is to learn whether or not the people residing in these communities are willing to patronize the railroad, as against the jitneys. If the authorities controlling the jitney situation regulate the jitneys satisfactorily and the receipts from the passenger service take care of the expenses, the company expects to put on gasoline equipment consisting of motor cars and trailers and continue the new service indefinitely.

W. Clayton, vice-president and managing director of the company, in a statement which he issued, said in part:

"If the public will patronize the railroad sufficiently to enable it to meet its expenses, we will give them the best possible service in proportion to the receipts. If, on the other hand, the public is not going to patronize the railroad, then we may just as well frankly admit that the railroad cannot continue any longer in the passenger business. The receipts from the passenger service show continuous loss, and, unless we can cover this loss, we shall have to cease entirely running passenger trains over the Cuyamaca branch. All we ask at the present time is that you and the people you represent shall co-operate with the railroad in trying to solve the present situation, which is unsatisfactory to all of us."

For some time only three trains each way have been operated over this division. A general curtailment was found necessary after the storm of last winter, owing to unregulated auto stage and auto truck competition, fully as much as to the fact that great expense was incurred following the damage done by the storm. On Aug. 28 the service was tripled and nine trains each way are being operated between Thirteenth and N Streets and Santee, the present terminal of the road.

PRESIDENT SHOUP PROTESTS JITNEY COMPETITION

Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., has sent a letter to the Board of Public Utilities and to A. L. Stephens, the city attorney, protesting against the operation of jitney buses along the same streets that the street cars use in Hollywood. The letter follows:

"On behalf of the Pacific Electric Railway I desire to enter formal protest against the operation of jitney buses in competition with our Hollywood line using the same streets, for the following reasons:

"1. There are not enough nickels used for transportation in this section to support the two classes of transportation. The 5-cent fare is a very low rate for the distance between the center of Los Angeles and the center of Hollywood. The bulk of the business is carried for a long distance. The average rate per passenger per mile, the density of traffic considered, is far below the normal rate as determined by rates in other cities of like population.

"2. The Pacific Electric Railway has accepted franchises in the city of Los Angeles under certain obligations, as to reduced rates for school children, carrying certain classes of city employees free, certain obligations as to transfers, and as to a dependable and adequate service.

"It has further obligated itself to construct and maintain sections of the streets occupied on Sunset Boulevard between the central section of Los Angeles and the Hollywood district, and on other highways in that district. Since 1910 it has spent on Sunset Boulevard and in the Hollywood-Colgrove section nearly $1,000,000 in the paving and reconstruction of lines incident to paving.

"It pays 5¼ per cent of its revenues as tax to the State of California and pays also franchise taxes to the city of Los Angeles. Franchises granted this company, under the law likewise laid certain obligations upon the city, direct or implied. At the time of the granting of these franchises

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there was no other form of public street transportation except street railways. Against undue competition with street railways the law made provision whereby the other company could not occupy the same street for more than five blocks in one direction, and when a company occupied the same street for five blocks or less it had to pay with the first company its proper share of the burden of investment and maintenance of the tracks jointly used.

"Competition is now being permitted without regard for what may be due a service and investment established under franchise. The jitneys have a nominal tax compared with that the electric railways have to bear. The argument is offered that this tax should be nominal because the investment is so small. The reason the investment is so small is that the public and the railways are furnishing the roadbed free to the jitneys. If this argument had any value at all, then the electric railways should be furnished free roadbed and taxes reduced on the ground that the public had assumed the main investment burden.

"I ask that you give consideration to these conditions, and am registering this protest at this time for the reason that, in my judgment, under the conditions existing this competition, if maintained, in addition to being unjust to the electric railway, will in no great time be of necessity disastrous to the street railway service as it is now being furnished."

Accident on Ohio Road.—One of the limited cars on the Cleveland, Southwestern & Columbus Railway, Willoughby, Ohio, left the track and turned over at Galion on Sept. 7. Eight persons were injured, but only one was seriously hurt.

Two Killed on Michigan Line.—Two persons were killed and fourteen were injured, two fatally, on Sept. 8 in a head-on collision between two cars on the Michigan United Railway at Rives Junction, 10 miles north of the city of Jackson.

Springfield Jitney Cases in Status Quo.—By a stipulation filed by all parties in the complaint of the Springfield (Ill.) Consolidated Railway against operators of jitneys in the city of Springfield, no further action will be taken by the Illinois Public Utilities Commission unless either party desires to reopen the hearings.

Newspaper Campaign Against Jitneys.—Under the heading "The Street Car Versus the Jitney," the San Antonio (Tex.) Traction Company is running a series of large display advertisements in the San Antonio papers in which are set forth the superiority of the street car over the jitney as a means of transportation, and other reasons why the street car should be patronized by the public in preference to the jitney.

New Wall Map of B. R. T. Line.—The Brooklyn (N. Y.) Rapid Transit Company has just issued a wall map, 32 in. by 40 in. in size, showing in colors the surface and rapid transit lines of the system, and in addition the foreign rapid transit lines which form a part of the rapid transit system of Greater New York. The new map shows graphically the magnitude of the territory served by the Brooklyn Rapid Transit System.

Co-operation Toward Accident Prevention.—Street railway operatives and automobilists in Lexington, Ky., have begun to co-operate to reduce the number of accidents on the streets of that city. The safety-first committee of the trainmen's organization waited on the garage owners and the automobile clubs and proposed that they should use special caution, especially when backing or driving out of garages onto the streets. Motormen promised to exercise care when running past such points.

Builds a Public Playground to Aid Safety Work.—A safety-first innovation has been made by the Illinois Traction System in St. Louis, where the company is building a public playground with the idea in view of keeping the children of a congested neighborhood off the street. It will accommodate about 100 children and is equipped with swings, sand piles, shelters and various amusement devices. The playground is located at Twelfth Street, adjoining the company's entrance right-of-way into the city of St. Louis.

Temporary Order Against Abandonment of Line.—A temporary restraining order was granted to the village of Woodville, Ohio, on Sept. 6, to prevent the Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio, from tearing up its tracks through the village streets. The hearing will take place on Oct. 7. Some time ago Theodore Luce, Detroit, purchased the property for $140,000 and, because it is not paying, decided to junk it. The light plant at Bowling Green is to continue in operation, as it is yielding a profit. Farmers along the line recently appealed to the Public Utilities Commission on the ground that the company has no right to withdraw the service. The road connects Woodville, Pemberville, Scotch Ridge, Bowling Green and Totogany.

Interurban Roads Benefited by Strike Prospects.—Interurban railways at Louisville were thrown into prominence unusual to them during the two or three weeks that the railroad strike threatened. R. H. Wyatt, freight and passenger agent of the Louisville & Interurban Railway, stated that the steam roads' troubles benefited the electric lines. Not only were there numerous inquiries from shippers, who never had made use of the electric lines, as to what service they could expect, but numbers of shippers who had previously used the steam road service turned to the electric lines during the week before the strike was to be called. This and the shortage of cars on the steam lines were credited with a large increase in the business of the electric lines, and everything in the way of equipment of the Louisville & Interurban lines was in full use.

Steam Railroad Reduces Service by Four Trains Daily Because of Jitneys.—Within a month after the paving of the highway between Astoria and Seaside, some 19 miles apart on the Oregon coast near the mouth of the Columbia River, a fleet of jitney buses appeared and absorbed practically all the passenger traffic between these two points. The jitneys did not cut fares, but, on the contrary, established a charge of $1 for the same trip that could be made by rail for 75 cents. Passengers preferred the jitneys even at the higher rate and within a short time the Spokane, Portland & Seattle Railroad, a branch of which system connects these two cities, was running trains with only two or three passengers to the car. On Aug. 27 the company discontinued the two local trains each way which had formerly been required to handle the traffic.

Exclusive Tourist Right for International Railway.—The International Railway, Buffalo, N. Y., which operates the Park & River division between Chippawa, Ont., on the upper Niagara River and Queenstown, Ont., at the entrance into Lake Ontario, has been granted the exclusive right to carry tourists through the power-house zone in Queen Victoria Park, Niagara Falls, Ont. Military authorities have erected high barbed-wire entanglements in the vicinity of the Canadian-Niagara Power Company's properties and all tourists, except those on cars of the International Railway, are excluded from the zone. Cars are operated through the zone under military guard. The Niagara Falls Queen Victoria Park Commissioners have refused to accede to the request of hack men and chauffeurs for permission to take tourists through the power-house zone. The section of the park cut off from tourists adjoins the Canadian horseshoe falls.

Railway to Install Autos in Sacramento.—The Pacific Gas & Electric Company, Sacramento, Cal., intends as soon as possible to put two automobiles in service to relieve the conditions which exist east of Twenty-eighth Street, from M to T Streets. One of the proposed routes is from Twenty-eighth and M Streets east to Sierra and California Avenues to the upper Stockton Road and thence to Twenty-eighth and P Streets. The other proposed line is from Twenty-eighth and P Streets to Guthrie Station, thence south to the T Street court and from T Street court to Tweny-eighth and T Streets. On arriving at the respective terminals the cars will return over the same routes. By installing this service the company will be in a position to take care of the increased population. It is the intention of the company to operate these machines with carmen in uniform, the driver receiving fares and issuing and receiving transfers the same as the trainmen do on the regular cars of the company.

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Market Street, Without Jitneys, a Show Place Again.—The jitneys have been excluded from Market Street, San Francisco, Cal., during certain hours as noted recently in the ELECTRIC RAILWAY JOURNAL. This has had a most beneficial effect upon traffic and has resulted in the restoration of the street to its former appearance and attractiveness. In commenting on this feature the San Francisco *Call* said: "Have you noticed the change in Market Street? It looks like the Market Street of old—wide, clean, safe for those who wish to cross it, and traffic moves swiftly and without crowding. That is the ostensible result of the enforcement of the ordinance. It has returned Market Street—at least from 10 o'clock in the morning until 4 o'clock in the afternoon—to its old place in the community. Market Street used to be to San Francisco what Fifth Avenue or Broadway is to New York, or State Street to Chicago. It was the first of the 'sights' shown to the visitor on his arrival in San Francisco."

"Anti-Pass" Law Affects Louisville Lines.—Under provisions of the "anti-pass" law enacted by the last Kentucky Legislature, and effective on Jan. 1, 1917, the Louisville (Ky.) Railway will curtail its reduced fare privileges to teachers and school children, unless the courts interpret the law to the contrary. The law specifically exempts only pupils of public or parochial schools riding to and from school, and school inspectors. There are no school inspectors in Louisville. At present pupils of all private schools in Louisville and all school teachers receive the half-fare privilege. Charters of two of the three Louisville lines which were merged by the Louisville Railway stipulated half rates to students and teachers and the question is whether these provisions apply to the present system as a whole or whether they are nullified by the new law. The attitude of the company is that it would willingly continue to extend the half-fare rates to all students and all teachers if permitted to do so by law.

Union Jitneys Prohibited from Making Special Trips.—Drivers of jitney buses in San Francisco who are members of the Jitney Bus Operators' Union are prohibited from making side trips or charging more than 10 cents for transportation of passengers, according to an order recently issued by the Joint Council of Teamsters, which is the union governing body of all vehicles. This action followed a protest by the Chauffeurs' Union, which claimed that the jitney union is violating the terms of agreement in the union charter which it received. In this charter it was stipulated that jitneys were to be used as jitneys only, and should not compete with taxicabs. Practically all taxis in San Francisco are driven by union chauffeurs, receiving union wages, and it is claimed that the taxi companies threatened to reduce the wages unless jitney bus drivers were compelled to live up to the agreement made when they joined the ranks of organized labor. The judiciary committee of the Board of Supervisors is now considering a regulation which will prohibit the use of jitney buses for any purpose except hauls over specified routes and prevent them from competing with taxicabs or with other cars that are let out for rent.

Considering Jitney Rules in Maryland.—The Public Service Commission of Maryland and owners of jitneys recently threshed out the new rules for pitneys which the commission framed in June. The rules were devised with a view to insuring public safety. More than 300 owners of motor cars were present or represented by counsel during the discussion. Representatives of several large passenger motor lines operating between suburban points appealed to the commission for even stronger regulations which would prevent "tramp jitneys" running on no regular schedule from running in at starting points of regular lines and driving bargains to carry passengers any distance they might care to travel along the regular established routes. The commission agreed to change the rule for determining the maximum carrying capacity of passenger vehicles by providing that 16 in. of seating space be allowed for each passenger, except that this shall not apply when the number of passengers exceeds the carrying capacity of the car's chassis. It was also decided that in case of the larger buses a seat need not be provided for every person provided the capacity of the chassis was greater than the weight of the total seating capacity.

Personal Mention

H. B. Ross, superintendent of the Southern Traction Company at Waco, Tex., was presented with a gold watch recently by the motormen and conductors on the local lines in appreciation of his efforts in securing an increase in wages for them.

S. B. Irelan, second vice-president and general manager of the Bartlesville (Okla.) Interurban Railway, has been appointed manager of the City Light & Traction Company, Sedalia, Mo., to succeed Harry D. Frueauff, whose appointment to the Montgomery Light & Water Power Company, Montgomery, Ala., was noted in the ELECTRIC RAILWAY JOURNAL of Sept. 9.

James H. Murphy, superintendent of Division 2, South, of the Bay State Street Railway, with offices in Taunton, Mass., has been appointed temporarily to the position of general superintendent of that division, which office has been held for many years by George F. Seibel. Mr. Seibel, who is supervising architect of the buildings for the company, will devote his whole time, temporarily at least, to the mechanical end, and Mr. Murphy will have entire charge of operation of Division 2, South, which includes Taunton, Fall River and Newport. Mr. Murphy has been identified with railway service in Taunton for many years. His first position was that of tow boy. Later he went into the machine shop. Twenty-eight years ago he went to work on the horse cars as a driver. He has also served as starter and dispatcher.

Frank Hammond, general agent of the Birmingham Railway, Light & Power Company, Birmingham, Ala., is the editor of *The Buzzer*, published weekly in the interest of the employees of the company. Mr. Hammond was born in Greenville, S. C., on Nov. 15, 1882. His education was limited to the grammar school. At seventeen he was employed as shipping clerk with the Charleston & Western Carolina Railway, which position he resigned after two years' service to accept a place as freight clerk with the Carolina Supply Company. After about a year's service he resigned on account of ill health and lived in quietude for about a year. In 1903, while visiting friends in Birmingham, he secured a job as bookkeeper with the Standard Oil Company, where he remained for eighteen months, resigning to accept a position as salesman with the Birmingham Railway, Light & Power Company, in February, 1905. He was subsequently promoted to the position of chief salesman, assistant commercial manager, commercial manager, and general agent, which position he now holds.

T. Lee Miller, whose appointment as financial vice-president and efficiency engineer of the Fort Wayne & Northern Indiana Traction Company, with headquarters at Fort Wayne, Ind., was announced in the ELECTRIC RAILWAY JOURNAL of Sept. 9, was graduated from Cornell University with the degree of mechanical engineer. Immediately after he was graduated, Mr. Miller became connected with the firm of Marwick, Mitchell & Company, New York, efficiency and cost engineers. While with them he installed the cost and efficiency system for the Buick Automobile Company at Flint, Mich., and also for the Southern Iron & Steel Company of Birmingham, Ala. Upon leaving the last named firm he entered the service of the Toledo Railways & Light Company, Toledo, Ohio, as assistant to F. R. Coates, president. He resigned from that company a year ago last September to become New York manager of sales of the Sangamo Electric Company with particular reference to bringing out the system for the Economy railway meter. It was from the Sangamo Electric Company that Mr. Miller resigned to become connected with the Fort Wayne & Northern Indiana Traction Company. Mr. Miller is an associate member of the American Institute of Electrical Engineers, associate member of the American Society of Mechanical Engineers, member of the American Electric Railway Association, member of the National Electric Light Association, member of the National Geographical Society and a member of the Engineers' Club of New York.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Peoria, Ill.—The Peoria & Chillicothe Electric Railway has received a forty-eight-year franchise from the Council to operate over the tracks of the Peoria Railway to and from the north end of Adams Street. The franchise provides that the company enjoy this right free of any charges or assessments.

Henderson, Ky. — The city of Henderson has passed a twenty-year electric railway franchise which Mayor Johnson will sign, and which will in all likelihood be sold to the Henderson Traction Company. By the terms of the franchise extensions will be added to the present lines and school children will be provided with half-fare rates.

Worcester, Mass. — The Worcester Consolidated Street Railway has received a franchise from the Council to construct a third track in Salem Square. The company was also granted a franchise for an extra track in Salisbury Street to Lincoln Square, to connect its tracks in Channing Street and Cambridge Street and to lay an additional track in West Boylston Street.

Brooklyn, N. Y.—The Public Service Commission for the First District of New York has granted the New York Municipal Railway a two years' extension of time to July 27, 1918, in which to complete the construction and begin the operation of the additional tracks on Fulton Street, Brooklyn, and an extension of two years to Feb. 2 1918, to complete the construction and begin operation of additional tracks on the Broadway line.

Buffalo, N. Y.—The International Railway has petitioned the City Council for permission to lay double tracks and operate cars in Elmwood Avenue, from Hertle Avenue to the north city line, a distance of almost ½ mile. No opposition has developed and it is expected this application, together with the company's request for a franchise to lay double tracks and operate cars in Franklin Street from Chippewa to Allen Streets, a distance of ½ mile, will be submitted to voters for approval at the next general election in November.

Lackawanna, N. Y.—Application has been made to the City Council of Lackawanna by George Bullock as receiver for the Buffalo & Lake Erie Traction Company for a franchise to lay tracks and operate cars through Sixth Street from the Hamburg Turnpike and across C Street to property being purchased by the company from the Stoney Point Land Company for the purpose of erecting a carhouse.

East Cleveland, Ohio.—The J. L. Free Land Company has received from the Council of East Cleveland a twenty-five-year franchise to construct a line on Noble Road between Euclid Avenue and Mayfield Road. [March 4, '16.]

TRACK AND ROADWAY

Selma Street & Suburban Railway, Selma, Ala. — Plans are being made by this company to build an extension of its Selma Avenue line to the municipal swimming pool.

Pinellas West Coast Railway, St. Petersburg, Fla.—It is reported that this company will be in the market for 60-lb. relaying rails for a 1½-mile line. H. C. Case, president. [Sept. 9, '16.]

St. Petersburg-Tampa Railway, St. Petersburg, Fla.—The survey for this company's proposed line from St. Petersburg to Tampa will be made by C. E. Burleson, St. Petersburg. George S. Gandy, Sr., St. Petersburg, president. [Aug. 12, '16.]

West Coast Electric Railway, Sarasota, Fla.—It is reported that Philadelphia capitalists have financed this company's proposed line between Tampa and Sarasota. It is estimated that the cost of the project is about $700,000. A. E. Townsend, Sarasota, general manager. [Aug. 26, '16.]

Georgia Railway & Power Company, Atlanta, Ga.—It is reported that this company's extension to Emory University will be completed by Sept. 27.

Aurora, Mendota & Western Railroad, Aurora, Ill.—This company, which proposes to construct a line between Aurora and Mendota, has applied to the Public Utilities Commission of Illinois for permission to issue $450,000 of stock. [Aug. 12, '16.]

East St. Louis & Suburban Railway, East St. Louis, Ill.—Work has been begun by this company constructing new track on Collinsville Avenue from Illinois Avenue to St. Clair Avenue.

Muscatine, Burlington & Southern Railway, Muscatine, Iowa.—Plans are being considered for equipping the Muscatine, Burlington & Southern Railway for electrical operation. Negotiations, it is understood, are now under way for the purchase of electric motor equipment.

Kentucky Traction & Terminal Company, Lexington, Ky.—A report from this company states that extensive plans are under way for the improvement of the bathing beach and bath houses at Blue Grass Park, prior to the opening of the season in 1917.

Biddeford & Saco Railroad, Biddeford, Me.—This company will extend its tracks up North Street to the Eastern division of the Boston & Maine Railroad. It is reported that eventually a loop will be built to connect with the present line at the corner of Elm and Main Streets.

Bay State Street Railway, Boston, Mass.—This company is installing a block-signal system on its Fall River and Taunton branch. Work will soon be begun by the company installing iron and steel poles on Main Street, Gloucester, in place of the wooden poles now used.

Boston (Mass.) Elevated Railway.—Work has been begun by the Boston Elevated Railway, reconstructing its tracks on Salem Street from Converse Square to Auburn Street; 110-lb. girder rails are being used.

Worcester (Mass.) Consolidated Street Railway.—Work will soon be begun by the Worcester Consolidated Street Railway double tracking its line on Hamilton Street.

United Railways, St. Louis, Mo.—The northern extension of the Taylor line of the United Railways from Florissant Avenue to Broadway, was opened for regular traffic on Sept. 1. This extension connects the manufacturing district of North Broadway and Baden with the residential districts of West and Northwest St. Louis. The Lee and Seventh Street lines of the company have been merged. The Seventh Street line formerly operated north to Morgan Street and the Lee line south to Pine Street, and thus doubled the congestion. Hereafter the southbound cars will operate east on Carr Street to Broadway, to Elm Street, to Seventh Street, and thence over the old Seventh Street route. Northbound cars will turn east at Seventh and Elm Streets, instead of north, go to Broadway, to Lucas Avenue, and thence over the old Lee line route. The cost of the change was about $11,000.

International Railway, Buffalo, N. Y.—The work of laying double tracks in Bailey Avenue, from Seneca Street to Broadway, more than 2 miles, is being rushed by the International Railway in an effort to complete the work before winter. This is the first of the 6-mile stretch of track to be laid in Bailey Avenue from Seneca Street to the north city line under the new franchise. The line will greatly relieve the congestion on the Fillmore Avenue and Abbott-South Park lines, especially to and from the large mills and other industries in the South Park section of the city. With the completion of this line the company will be in the market for additional equipment. All available cars are now in use during the rush-hour periods. The company has completed the laying of new double tracks in Main Street from the Cold Spring carhouse to Hertle Avenue, 2½ miles. Work has been in progress since early spring, and despite the heavy north and south bound traffic over this line, service was not seriously interrupted. Cars were operated over a single track for a few blocks at a time while laborers were laying the second track. For a few days while switches and crossovers were being laid in front of the Cold Spring carhouse, all cars which operated in Main Street were rerouted over East Ferry and Jefferson Streets to Main Street.

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Interborough Rapid Transit Company, New York, N. Y.—During the week ended Sept. 9 the Public Service Commission for the First District of New York received bids for the installation of tracks on the Seventh Avenue branch of the Lexington Avenue line. The low bidder on the contract was Engel & Hevenor, New York City, the unofficial total of whose bid was $229,440. The Ramapo Iron Works, New York City, was the low bidder at $11,427 for the supply of special work, including frogs and switches and necessary appurtenances to be used in the construction of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway. Bids will be received by the commission on Sept. 28 for the construction of a railroad yard in connection with the White Plains Road extension. The yard will be located one block east of White Plains Road and will cover an area of several city blocks. Further references to these contracts are made on page ——.

East Cleveland, Ohio.—It is reported that construction will be begun this fall by the J. L. Free Land Company on its proposed line on Noble Road between Euclid Avenue and Mayfield Road. The cost of the line is estimated at $35 000. [March 4, '16.]

Philadelphia, Pa.—Following the announcement by Mayor Smith that a $10,000,000 portion of the new city loan is to be floated by a bond issue Nov. 1, Director Twining, of the department of city transit, announced on Sept. 7 that estimates for work on three sections of the huge subway loop would be called for in a few months and that the contracts would be awarded in January. It is estimated that about one-quarter of this $10,000,000 will be devoted to transit and port improvement purposes. According to Director Twining, the major portion of the 1917 construction work will have to do with the subway loop and the Frankford elevated. The preliminary plans for this work will be passed upon by the Public Service Commission engineers within a week or so. After this the department will immediately proceed with the plans in detail. Director Twining, speaking of the loop contracts, explained that those for the Eighth Street, the Locust and Arch Streets sections would be awarded first, while the Broad Street section, which involves the more difficult engineering problems, will be awarded two or three months later. Director Twining believes the Frankford elevated will be completed as far as Ridge Street by the end of 1917. Several other contracts, principally for work in the City Hall section, will be awarded some time at the end of the present year, it is said. This will probably include the City Hall station.

Philadelphia & Garrettford Street Railway, Upper Darby, Pa.—Work has been begun by this company on the construction of an extension from Parker Avenue, Collingdale, to the Chester turnpike in Sharon Hill. William J. Torrington Company, Philadelphia, has the contract for the work. It is stated that the company contemplates the construction of an extension to Chester.

Bristol (Tenn.) Traction Company.—Announcement has been made by this company that on Oct. 1 car service on its 3-mile belt line on the Virginia side of Bristol will be discontinued owing to jitney opposition.

Beaumont (Tex.) Traction Company.—Work has been begun by this company on the reconstruction of its tracks on Magnolia Avenue with heavy rails.

Marlin-Temple Interurban Company, Marlin, Tex.—With impressive ceremonies attended by citizens from Marlin and Temple and other towns which the Marlin-Tempie Interurban Company will touch, the cornerstone of the bridge over the Brazos River, 6 miles from Marlin, was laid on Sept. 9. S. D. Hanna, chief engineer, said this was the beginning of actual construction work which will be pushed till the road is completed. [Sept. 2, '16.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—Construction work has been completed and operation begun on the new cut-off of the Ogden, Logan & Idaho Railway between Hot Springs and Brigham City. The new line is located from ½ to 2 miles west of the present line between Brigham City and Hot Springs and represents an expenditure of about $300,000. The old line will be operated from Brigham City to Willard about 8 miles, but for the remainder of the distance to Hot Springs the track will be torn up.

Puget Sound Traction, Light & Power Company, Bellingham, Wash.—The Puget Sound Traction, Light & Power Company is expending thousands of dollars this year in improving its roadbed and tracks in Bellingham. The company also is completing the renewal of two bridges across Whatcom Creek, and in addition to this will soon have laid a considerable amount of new 80-lb. rails on Harris Avenue. The Pacific Northwest Traction Company, also of the Puget Sound Traction interests, is making considerable improvements, including roadbed, rails, etc.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—The Merydith Construction Company, Marietta, Ohio, has received a contract from the Kanawha Traction & Electric Company to erect a reinforced concrete viaduct. The cost of the viaduct is estimated at $60,000.

***Marengo, Lake Geneva & Northern Railway, Marengo, Wis.**—It is reported that the Cortlandt Engineering Company, New York, has been awarded a contract by the Marengo, Lake Geneva & Northern Railway for the completion of its line from Marengo to Delavan, Wis. A $700,000 bond issue has been taken by the Cortlandt Engineering Company.

SHOPS AND BUILDINGS

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa.—This company has awarded a contract to H. A. Maine & Company, Waterloo, for the construction of a new terminal station at Fourth and Mulberry Streets, Waterloo. It is stated that the structure will cost about $75,000.

Hutchinson (Kan.) Interurban Railway.—This company reports that during October and November it will construct a new carhouse with a capacity of twenty-four cars.

International Railway, Buffalo, N. Y.—The Frontier Electric Railway, owned by the International Railway, has been granted an extension of time by the North Tonawanda City Council until Aug. 1, 1920, within which to complete the freight terminal which will be constructed in North Tonawanda along the line of the road which it is building between Buffalo and Niagara Falls, N. Y.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—This company has recently completed a 1300-volt transmission line 11 miles long from its main line near Manzanola to Olney Springs and Crowley. The energy will be used for lighting and power purposes in the two towns as well as by the farmers and ranchers en route. A line has also been extended to Cheraw.

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—It is reported that this company is contemplating the construction of an electric plant. T. R. Osmond, St. Augustine, general manager.

Indiana Railways & Light Company, Kokomo, Ind.—This company reports that it has purchased one 5000-kw., 80 per cent power factor, General Electric turbo-generator and Wheeler Condenser & Engineering Company surface condenser for delivery next spring.

Schuylkill Railway, Girardville, Pa.—This company contemplates the construction of a new power plant at St. Clair.

Pennsylvania Railroad, Philadelphia, Pa.—A 20 000-kw., 11,000-volt, 25-cycle, turbine unit complete with a 24 000 sq. ft. surface condenser and auxiliaries, has recently been ordered by the Pennsylvania Railroad from the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa. This turbine is for installation in the company's Long Island City power house, which supplies power for the operation of the Pennsylvania Terminal and the Long Island Railroad.

Reading Transit & Light Company, Reading, Pa.—This company will erect a new transmission line to Kutztown.

Galveston (Tex.) Electric Company.—This company has purchased additional ground just north of and in the same block with its power station at which current for operating the Galveston traction lines and lighting the city is generated. According to A. H. Warren, general manager, this land is purchased as a site for an addition to the power plant when the same is needed, which is expected within the next few months.

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Manufactures and Supplies

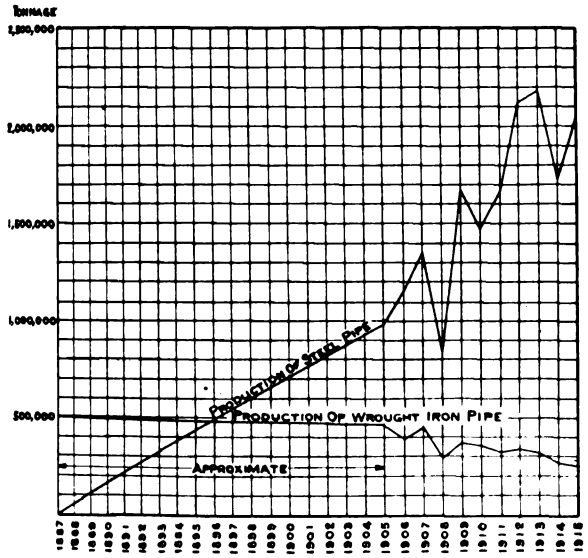
PRODUCTION OF STEEL PIPE

Doubles in Last Ten Years Due in Large Measure to Growth of Electric Railways

In 1896 the production of steel pipe first equalled the production of wrought-iron pipe. Since then the rate of increase in steel pipe production has been very rapid, while the production of wrought-iron pipe has fallen off.

These statements are based on figures issued by the National Tube Company and on statistical data contained in a special bulletin on the production of iron and steel issued by the American Iron and Steel Institute. The data are graphically presented herewith.

The growth of electric railways and their widespread rehabilitation in cities have in no small way accounted for this increased demand for steel piping. Steel piping has a



COMPARATIVE PRODUCTION OF STEEL AND IRON PIPING

great many uses in the electric railway industry. It is employed for steam and other piping and for boiler tubes in power generating stations, and it is used, as well, in very large quantities for street trolley poles as installed within city limits and for trolley car poles, passenger railings, conduits and in the more common services in various railway buildings.

Steel pipe was first made in 1888. The tonnage that year was 300, while last year 2,037,266 tons of skelp was produced for the manufacture of steel pipe.

TO INCREASE SALES IN THE FAR EAST

Special Government Agent Rhea Will Start Next Month on Extended Tour to Benefit Manufacturers of Electric Railway Apparatus

Frank Rhea, who has recently been appointed special agent of the Bureau of Foreign and Domestic Commerce, Department of Commerce, to investigate the field for American railway and tramway supplies in the Far East, expects to leave Seattle Oct. 25 and his first objective point will be New Zealand. He then expects to visit Australia, the Philippines, China, Japan and Manchuria, Straits Settlements, India and South Africa, then go to London, where he expects to arrive in about twenty months. In the meantime he is interviewing manufacturers and others interested in the trade in railway and tramway apparatus in the Far East. Among others seen have been The J. G. Brill Company and the Baldwin Locomotive Works.

As stated in the issue of Aug. 26, manufacturers and others who wish to get in touch with Mr. Rhea before he leaves this country should address the division of commercial agents, Bureau of Foreign and Domestic Commerce, Custom House New York. This is the new office opened in New York by the bureau to keep in closer touch with business houses interested in foreign trade.

Mr. Rhea has had an experience which well fits him for this investigation of railway trade conditions. After graduation as a civil and electrical engineer from the University of Pittsburgh in 1892, he was a member of the force of the Union Switch & Signal Company for fifteen months. He then went with the Pennsylvania Railroad as foreman of signals at the Broad Street Station for one and one-half years. He resigned from this position to become connected with the Philadelphia Telephone Company, but after a short time returned to the employ of the Pennsylvania Railroad He was then for five and one-half years signal inspector of the Pennsylvania Lines West and following that for seven years engineer maintenance of way of the same system. This was from 1896 to 1908. In the latter year he joined the General Electric Company, and for five years was connected with the railway commercial engineering department of that company. In 1913 he resigned to join the valuation force of the Interstate Commerce Commission and until his present appointment has been engineer of the Eastern District.

TRACK BONDING AT A MAXIMUM

Delayed Work of the Last Three Years Accounts for Large Increase in Bonding

Notwithstanding the fact that the cost of copper has forced the manufacturers greatly to increase the selling price of rail bonds, the quantity sold so far this year has far exceeded that sold during the corresponding period last year. These statements are confirmed by officials of several bond manufacturers. No doubt the main reason for the comparatively large amount of bonding work that is being done this year is that very little work was done during the years of 1913, 1914 and 1915. Traffic conditions in those years forced the roads to restrict their purchases, and therefore no bonding was done except that which was absolutely necessary. This statement while true for the country as a whole of course does not apply to all roads. Some of the interurban lines which installed signals rebonded all of their tracks within the signalled territory, since good bonding is essential to the proper working of a signal system in which the track rail circuit is required for control.

The Electric Railway Improvement Company, Cleveland, Ohio, reports that for the first half of 1916 it did considerably more business than for the same period in 1915. This company has recently taken over the Cleveland Railbond Company and will manufacture and sell the Cleveland patented bonding machines in addition to promoting the sale of Erico bonding cars and bonds for application by the electric welding process.

Another large manufacturer reports that while his rail bond business for the first half of 1916 was large, as compared with 1915, the orders during July and August fell below those for the previous six months. However, it is to be expected that a reduction in orders will take place as the bond season nears a close.

The largest bonding jobs now under way are in New York City, where the heavy third rails of the New York Municipal Railway and the Interborough Rapid Transit Company's new extensions are being very heavily bonded. The Interborough third rail weighs 175 lb. per yard and will be bonded with bonds having an equivalent of 3,000,000 circ. mil.

ALUMINUM TRANSMISSION WIRE PROBABLY AVAILABLE DURING 1917

Conditions in the producing and selling divisions of the aluminum industry have been such that for some time the Aluminum Company of America has not been in a position to offer its wires and cables for sale to the electric railway and transmission industries. Notwithstanding the fact that production has been speeded up to the greatest possible extent, the demand for aluminum has been so great that the manufacturer has been constrained to distribute its sales particularly to those fields in which there is no substitute

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for aluminum. The price of aluminum has been exceptionally high, due in particular to the European war. One large producing plant in Canada was commandeered by the Canadian government and this reduced the production. In England the government has restricted the use of aluminum to war materials only, and in this country the improvements in automobile design calling for a greatly increased amount of aluminum per automobile manufactured, coupled with the enormous increase in the number of automobiles sold, has created an abnormal demand for aluminum. However, the Aluminum Company of America, through one of its officials, has stated to a representative of this paper that during 1917 it expects to re-enter the electric railway and transmission fields for the sale of its products and particularly for the sale of its steel core aluminum transmission cable which has given such excellent service during the last few years.

A NEW FIRM OF ENGINEERS

F. H. B. Paine, William McClellan and H. T. Campion announce the formation of the engineering partnership of Paine, McClellan & Campion, with offices at 25 Church Street, New York City, and 1420 Chestnut Street, Philadelphia.

Mr. Paine is the son of Charles Paine, prominent a few years ago as a railroad engineer and executive. He began his electrical career in 1886 as a student with the Westinghouse laboratories in Pittsburgh, and during the following twenty years took an active part in many electrical enterprises both in this country and abroad. In 1905 he became general manager of the construction work of the Ontario Power Company. This was the earliest large development of long distance transmission in this country. Later he took charge of the development of the Niagara, Lockport & Ontario Power Company, finally becoming its vice-president and general manager. In 1911 he opened an office in New York as a consulting engineer and counsellor to public utilities. He has specialized in valuations and appraisals, rate-making, management and organization, as well as all problems of intercorporate relations, contracts, etc. During this time the New York Telephone Company called him to become chairman of the committee of appraisal in connection with the New York rate case before the Public Service Commission. He also is the representative of the American Institute of Electrical Engineers on the joint national committee of overhead and underground line construction.

A résumé of Mr. McClellan's life was given on page 378 of the issue of this paper for Aug. 26, when announcement was made of his appointment as dean of the Wharton School of Finance and Commerce of the University of Pennsylvania.

Mr. Campion was connected for a number of years with the Philadelphia Rapid Transit Company and its predecessors, finally becoming assistant to the chief engineer, William S. Twining. His particular responsbilities here were the design and construction of carhouses, substations and powerhouses. About 1905 he left the Philadelphia Rapid Transit Company to take charge of the Philadelphia office of the Reinforced Cement Construction Company, and had charge of the reinforced concrete forebay work of the Ontario Power Company at Niagara Falls. In 1907 he associated himself with Mr. McClellan, mentioned above, to carry on a constructing and consulting engineering business.

J. A. HANNA JOINS J. G. BRILL COMPANY STAFF

J. A. Hanna announces that on Oct. 1 he will become associated with The J. G. Brill Company and will resign as vice-president and sales manager of the Niles Car & Manufacturing Company, Niles, Ohio.

The Niles company is now directing its greatest efforts toward the automobile motor truck business. Last year when electric railway car orders were very scarce, it started to build motor trucks in order to keep its shops busy and this business has shown such progress that the major portion of the Niles capital and plant will henceforth be devoted to the manufacture of motor trucks.

Mr. Hanna states that for the present he will retain his office at the Niles Car Works and thus be in position to assist in the completion of Niles car orders still unfilled. Joe Hanna, as he is familiarly called by so great a number of electric railway men, has been a faithful adherent to the car building business for more than thirty years. He first was engaged in the service of The J. G. Brill Company in 1884 and remained with them seven years as storekeeper, cost estimator, truck expert and salesman. During the following twenty-five years he acted at different times as sales agent for Jewett, Stephenson and Niles cars and for McGuire, Peckham and Baldwin trucks, with offices in New York, Chicago, Philadelphia, Cleveland and Niles. Mr. Hanna on Oct. 1 also will resign as district sales agent for the electric truck department of the Baldwin Locomotive Works.

DELIVERIES MADE AS GOODS ARE COMPLETED

Some electrical manufacturers are now so crowded with orders waiting to be filled that some of them are shipping machinery in parts as completed. That is to say, if a generator is ordered, and the exciter is ready for shipment a month or two in advance of the generator itself, the exciter is boxed up and shipped to the buyer, while it may be some weeks after before the generator will arrive. Likewise, if an order came in for a number of motors of different sizes, the buyer would probably receive the motors in odd lots. This has become necessary so as to make available every possible square foot of factory space for operation in spite of the increased shipping cost.

ROLLING STOCK

Manhattan City & Interurban Railway, Manhattan, Kansas, is contemplating the purchase of two one-man cars.

Schuylkill Railway, Girardville, Pa., has ordered four cars from The J. G. Brill Company for delivery about Dec. 15.

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received an order from the Connecticut Company for 15,000 trolley ears.

Westinghouse Traction Brake Company, Wilmerding, Pa., has received an order for air brake equipment for the forty-two elevated cars recently ordered from the Pressed Steel Car Company by the Boston Elevated Railway.

Homer C. Johnstone, formerly with the Midvale Steel Company, has been appointed manager of the steel department of Gaston, Williams & Wigmore, Inc. Mr. Johnstone served for fourteen years as manager of the Chicago and New York offices of the Midvale Company and is well known in the steel trade.

Edison Storage Battery Company, Orange, N. J., announces the opening of its Los Angeles office in the San Fernando Building. James F. Rogan, who has been acting as local distributor of Edison storage batteries at Los Angeles, will become resident manager. This company also maintains two other offices on the Pacific Coast, one at 206 First Street, San Francisco, in charge of District Manager E. M. Cutting and another at 65 Columbia Street, Seattle, with F. C. Gibson as resident manager.

ADVERTISING LITERATURE

Carnegie Steel Company, Pittsburgh, Pa., has issued a pamphlet on bulb sections.

General Electric Company, Schenectady, N. Y., is distributing a booklet entitled "Railway Line Material for Direct Suspension," containing detailed descriptions of overhead line devices.

Stow Manufacturing Company, Binghamton, N. Y., has issued bulletin No. 100 on electric motors; bulletin No. 101 describes and illustrates electric tools and bulletin No. 102 on flexible shafts.

Lincoln Electric Company, Cleveland, Ohio, has issued a booklet on induction motors for 2 or 3-phase alternating current. This booklet contains a number of illustrations showing installations.

Alexander Milburn Company, Baltimore, Md., has issued a booklet on oxy-acetylene welding and cutting apparatus. This booklet outlines the process of welding and cutting and contains a number of illustrations which show the equipment in operation.

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Electric Railway Journal

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SINKING FUND ACCOUNTING

Although electric railway sinking funds are not so prevalent as in those days when rapidly recurring obsolesence almost placed railways in the category of "wasting-asset" companies, quite a number are still used in connection with existing mortgages. In handling them, railway accountants have often been confronted with fine problems, not all of which seem to have been solved to the satisfaction of every one. For this reason, special interest should attach to the article by W. H. Forse, Jr., published elsewhere in this issue, which contains valuable notes on the proper accounting treatment of various points and is in the main an example of that interpretative thinking which characterizes the modern accountant. Much of the confusion in regard to sinking fund accounting, we suspect, arises from the lack of understanding of its basic theory and also from a sometimes lazy and a sometimes wilful carelessness in the use of accounting terms. If some men know the difference between sinking funds and sinking fund reserves—that sinking fund accounting affects only the real or asset and liability accounts, while sinking fund reserve accounting concerns only the surplus account and appropriations therefrom—it often is not evident from their words. This should not be, for no railway accountant should fail to do all in his power to help place utility accounting on an exact and scientific basis.

BEST WISHES TO THE BOSTON ELEVATED

The change in the presidency of the Boston Elevated Railway, announced elsewhere in this issue, comes at a time when the company is facing one of the greatest crises in its history. It is reason for congratulation that the road is to retain the able services of its former chief executive as chairman of the board of directors while placing its immediate administration in the hands of one of the most brilliant executives and exponents of the "square deal" among the younger men which the electric railway industry has produced. Engineers, too, must feel gratified that another of their own profession has been found worthy to fill so important a place in the transportation field as the presidency of the Boston system. The administration of the Boston Elevated has always called for the broadest cooperation among the small group of men to which the direction of its affairs has been committed. The devotion of these men to the best interests of the railway for years has been marked by a willingness of individuals to seek results first and to let personal fame take care of itself. The combined talents of the organization will be needed as perhaps never before in the forthcoming difficult task of securing an adequate return for the services rendered the public. The best wishes of the industry and of this journal go to Chairman Bancroft and President Brush as each takes up the duties of his new office.

VIOLENCE IN NEW YORK STRIKE

During the past week there has been an increase in the number and virulence of the attacks by strikers and their sympathizers on electric cars operating in New York. Citizens who are exercising their right to ride on the cars are being made the target of stones and other missiles, and serious injuries have resulted. These outrages mark the disappointment and desperation of the strikers in their failing cause. The responsibility of this lawlessness is directly upon the leaders of the strikers. Whether they have openly advocated assaults on the cars may be open to question, but we have seen no evidences of active measures on their part to stop these outrages. The willingness to accept such benefits as they think will result from these assaults makes the strike leaders participators in them in fact even if not under the law. We do not believe, however, that the New York police will permit the establishment of any reign of terror in this city. The sentiment of the city, the precedents in the case of previous outbreaks and the performance of the authorities in this particular contest, all indicate that disorder will not be tolerated. The physical difficulties of preventing sporadic cases of attack or of apprehending the perpetrators when such an attack is made, we admit, are great. Nevertheless the police department of New York has had for many years the reputation of being "the finest" that we believe it is equal to the task. The announced decision of the district attorney to seek indictment for assaults on cars under Section 1991 of the Penal Code which provides penitentiary sentences of from five to twenty years on conviction may also act as a deterrent.

KEEPING STOCKHOLDERS INFORMED

A noteworthy example of the special reports that might be issued to enlighten stockholders on matters affecting their company, is the one recently sent out by the United Railways of St. Louis, as noted elsewhere in this issue. Feeling that the stockholders were especially interested in the condition of the property after the payment of the $1,839,205 of mill tax judgments, the management decided that it was an opportune time not only to explain this point but also to outline the important problems now confronting the company. Consequently a special report was issued for the first six months of 1916, as elaborately constructed

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as the regular annual report and presenting in detail the position of the company concerning its power supply, taxes, franchises, maturing securities and future construction needs. We cannot emphasize too much the desirability of such reports. It is customary, of course, to issue special notices to stockholders about reorganizations or changes in corporate affiliations, and certain progressive companies issue monthly or quarterly financial statements, but special reports could be used more extensively to explain to stockholders unusual expenditures, unexpected operating conditions, the settlement of long pending questions and changes in company policy. One of the four major methods of establishing good public relations, as we stated in the outline on this subject in the ELECTRIC RAILWAY JOURNAL of Sept. 2, is to have a clean internal financial history, in the securing of which special reports to stockholders constitute a material and most important help. The question of the cost of such reports will be raised, but in this connection it will be well to bear in mind that in public relations work a penny-wise policy can very easily be carried to a disastrous extreme. An important feature of the St. Louis report is the data on the power situation of the company, on which there has been some public discussion. An abstract of this part of the report, giving the rates paid for hydraulic and steam power and the future "power" policy of the company, is published on pages 531 and 532.

"REINFORCED STEEL MAGNET" FOR DALLAS, TEX.

The new interurban terminal in Dallas, Tex., which was opened to the public this month, not only provides excellent traffic accommodations for the four lines entering Dallas, but it has also gone a long way in fostering the good will of the community which it serves. The terminal is an eight-story modern office building with a spacious waiting room on the main floor and the terminal tracks at the rear. In the construction of the building 90 per cent of the contracts were given to local concerns, and at the opening reception a large sign referred to the building as a huge reinforced steel magnet which would attract millions of visitors to Dallas each year. The fact that these interurban lines carry 6,000,000 passengers annually and that only 35 per cent of these make local trips shows that the railway company's prediction is within reason. Thus it was particularly emphasized that the prosperity of the city and that of the interurban lines go hand in hand, and that the new enterprise, by stimulating travel to Dallas, will increase the local trade and boost the "Buy It in Dallas" movement. As a means of further advertising the interurban lines, the railway officials had moving pictures taken of the throngs that crowded the building on the opening day. These pictures will be shown in one of the leading Dallas theaters and in many other cities of Texas.

The terminal, including land, building and tracks, cost about $1,500,000. It thus belongs in the class of expensive electric railway terminals such as have been built at Newark, N. J.; Milwaukee, Indianapolis, Denver, Los Angeles, Cal.; Oklahoma City, and Vancouver, Can. There are other and less expensive terminals also in smaller cities. The building of such terminals indicates that the railways consider it a paying investment to have themselves represented by buildings which appeal to the civic pride of their communities as well as increase the railway facilities. By the use of such a terminal station instead of the plan of looping the interurban tracks through the city, the public is provided with an attractive waiting quarters with comfortable rest rooms and other conveniences; a common transfer point is obtained, and the railway has much better facilities for selling tickets and handling traffic.

COMPANY SECTION EXHIBIT AT THE CONVENTION

The American Association committee on company sections and individual membership is planning what should be a very instructive and attractive feature of the convention. The sections have been asked to demonstrate their work by means of exhibits, and the results of their efforts will be viewed with interest not only by the representatives of companies which already have sections but, it is hoped, especially by those which have not. While the section movement is still in its infancy, the sections are numerous enough to make a creditable showing. By so doing, they will help tremendously in stimulating interest in the movement and they will reflect credit upon their companies and themselves. Tangibility is important in any line of work, for as long as claims as to benefits are nebulous and general they do not carry much weight. Visible testimony is convincing and compels attention.

It is true that this particular kind of work does not lend itself readily to illustration, but that it can be illustrated in unique and attention-compelling ways can readily be demonstrated. The main thing is for the most ingenious person or persons available in each section to concentrate attention on the matter at once, calling in the assistance of the publicity department of the company if necessary, so that ideas of such originality will be generated that they will in turn produce the enthusiasm necessary for a live exhibit.

Without venturing to suggest in detail how the exhibits can be made most effective, one or more of the following items should certainly be included in each: Neatly lettered charts on a fairly large scale could be used to show the growth of the section, the proportion of available men enrolled, the subdivision of the membership among the departments of the company and other statistics which lend themselves to graphical presentation. First-class photographs, preferably framed uniformly, illustrating social events, "stunts," dramatic performances, groups of officers and of members at meetings, etc., would be particularly effective. Enlargements would be best for this purpose as the pictures must be viewed from some distance. Manuscripts of papers rendered at meetings could be arranged for ready inspection, and they would be most attractive if inclosed in soft leather or cloth covers. Samples of advertising matter used in announcing section events would be excellent material for the exhibit because these were necessarily designed to attract attention. Collections

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of clippings from newspapers and technical journals should also be effective as showing the impression made by the section upon the community and the outside world. The value of getting such an exhibit as this together is twofold: In the first place it serves the general publicity purposes outlined above, and, second, it forces the section to review its own activities carefully and thus cannot but stimulate to further effort.

ARE ELECTRIC RAILWAY ENGINEERS SUPERFICIAL?

The members of the American Electric Railway Association and its affiliated associations have now in their hands a large amount of text of reports which are to be presented at the Atlantic City convention. Among these, the reports of the Engineering Association committees are conspicuous not only on account of the bulk of the pamphlets containing the preprints, but because they show an enormous amount of detail work in collecting data and arranging them for convenient reference. All of these reports will be fully covered in the report issue of the ELECTRIC RAILWAY JOURNAL, that of Oct. 14, wherein the reports will be abstracted at length and an editorial study of their contents will be presented. In the intervening three weeks, however, serious study will be given to all of the reports, but those of the Engineering Association will require the most effort on account of their wide scope and the large number of pages of text which they comprise.

Take for example the reports of the committees on power generation and distribution which together contain more than 100 pages of text, mostly data and specifications. Some study will obviously be required to master the contents of these reports. When one considers the attention given to 100 pages of text in an engineering college course of study, he realizes that a superficial examination of these reports will neither prepare him to participate in the discussion at Atlantic City nor intelligently to read the abstracts of the discussion in the report issue of the ELECTRIC RAILWAY JOURNAL. Take for more detailed examples the tables of data on rotary converters and their transformers, the tables of operating and cost data on power generation, the elaborate statistics on third-rail construction, the specifications for overhead line material, the treatise on concrete pole design, and other such material. While the reports on power generation and distribution have been cited as examples, exactly the same remarks can be applied to the report on way matters, that on equipment and several others.

There are two ways of appropriating the results of the work necessary in getting together such data as are contained in these reports. One may say "That's fine stuff; I shall file it for reference and look it up when I need it"; or he can treat the text as a lesson assigned to him for study by the industry, and on which he will be expected to recite either at the convention or when the first problem requiring the use of the data arises. Foreign engineers say that American engineers are superficial, that we do not study deeply into the problems which we attack. There is a good chance between the present date and that of the convention to demonstrate that this is not so, at least as far as electric railway engineers are concerned.

NEW YORK'S LUCKY STAR

For many years New York City has been lucky in that its local transportation affairs have not been dominated by any irresponsible outside labor influences, but many citizens in the hustle and bustle of metropolitan life have failed fully to realize this fact. If they do not do so now, however, after the strike events of the last two weeks in the city, they are dead to the meaning of current events. The repudiation of the settlement plan of Aug. 7 by the union employees of the Third Avenue Railway and the Second Avenue Railroad, characterized by Mayor Mitchel and Chairman Straus of the Public Service Commission as an act without justification, shows in all probability what would have been the future attitude of the union men and leaders toward the "sacredness" of the settlement plan had it remained in force.

It is well for the city, therefore, that the exposé has come at this early date, and now we hope the public will better understand why the railways, none of which was opposed to collective bargaining of its employees directly with the management, refused recognition of the Amalgamated Association; why practically all of the Interborough Rapid Transit employees saw fit to maintain their own union in spite of the attempted proselyting of the Amalgamated Association; why they remained peaceably at work, while the misguided employees of other lines, completely unconcerned, violated their peace agreements solely for the profit of the Amalgamated Association, and why the proposal of a general sympathetic strike has up to this time been so coldly received by labor leaders in general.

As a matter of fact, we believe that the public is in a better position to understand such things than it was a short time ago. The hold-up of Congress by the four steam railroad brotherhoods, the contemptuous disregard of the settlement agreements in New York and the palpable efforts to obtain through the assistance of public officials what neither justice nor equity would countenance—all these indicate too clearly the habitual weapons of a certain type of unionist in whose good faith it would be folly to place much trust. Nor has the threat of a general sympathetic strike in New York City served any other purpose than to show to the citizens of the city how far their convenience would be sacrificed to bolster up a deservedly losing cause.

It is indeed fortunate for New York that the Interborough Rapid Transit Company, knowing the character of the unionists with whom it would have to deal, avoided all the evils that would have resulted therefrom and assured a more amicable and a more nearly permanent peace to its employees and itself by encouraging the men to form their own internal brotherhood. Fortunate, too, is it that the unions on the surface lines saw fit to throw down the gauntlet as a result, for that course has without doubt secured for New York freedom from the unbridled domination of an outside transportation union for many years to come.

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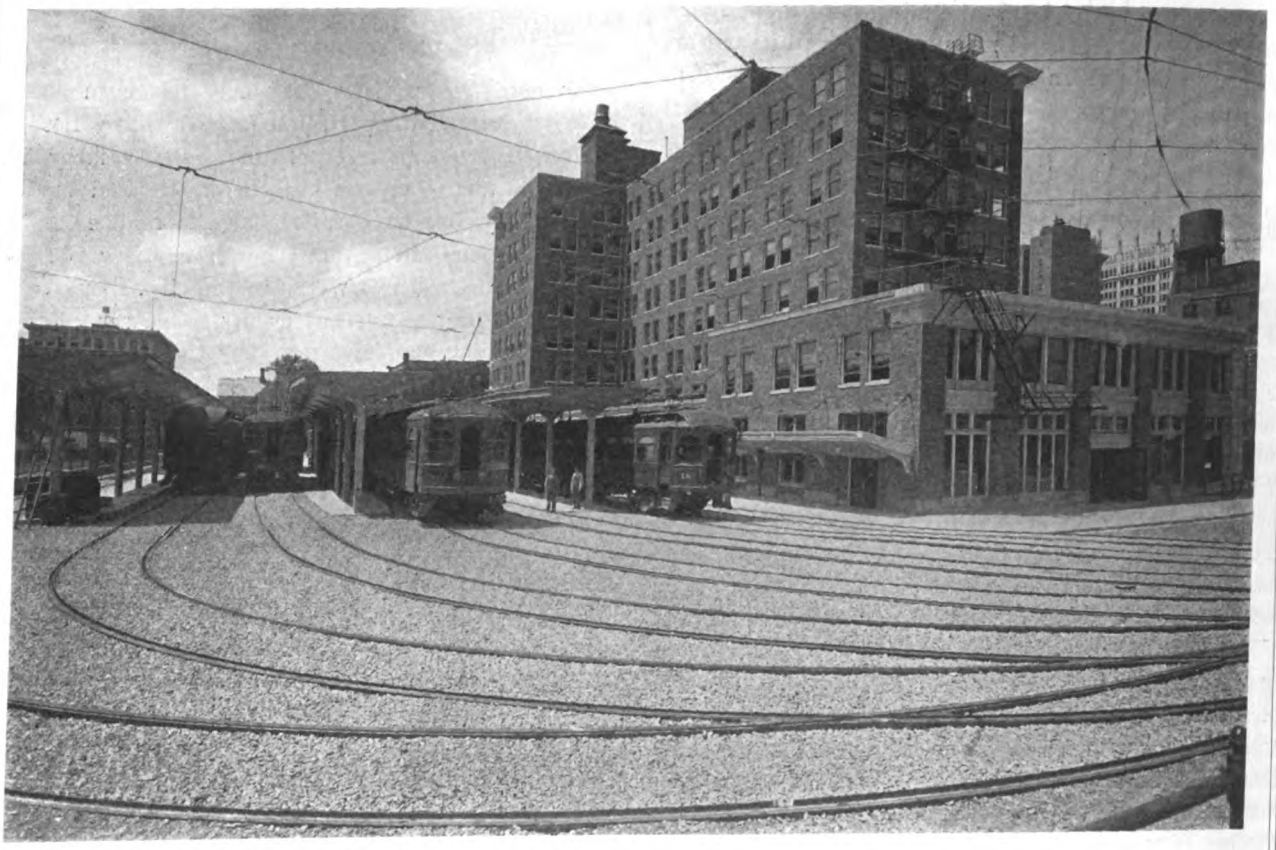

SEVEN THROUGH TRACKS SWINGING INTO TERMINAL YARD. VIEW TAKEN FROM POSITION A ON TRACK LAYOUT

SEVEN THROUGH TRACKS LEAVING TERMINAL YARD. VIEW TAKEN FROM POSITION B ON TRACK LAYOUT

Eight-Story Interurban Terminal Building and Tracks in Dallas, Tex.

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Dallas Railway Completes Seven-Track Interurban Terminal

By EDWARD T. MOORE
Local Manager Dallas Street Railway and Lighting Properties

WHILE it is not the largest, either in height or track capacity, the recently completed interurban terminal in Dallas, Tex., is one of the most perfect structures of its kind in America to-day. The builders have endeavored to combine the best features of the terminals of Indianapolis, Los Angeles, Columbus, Denver, Milwaukee, Oakland, Springfield, Terre Haute and Hamilton, Ont., and profiting by the experience and mistakes of others, they have succeeded in producing a splendid interurban terminal.

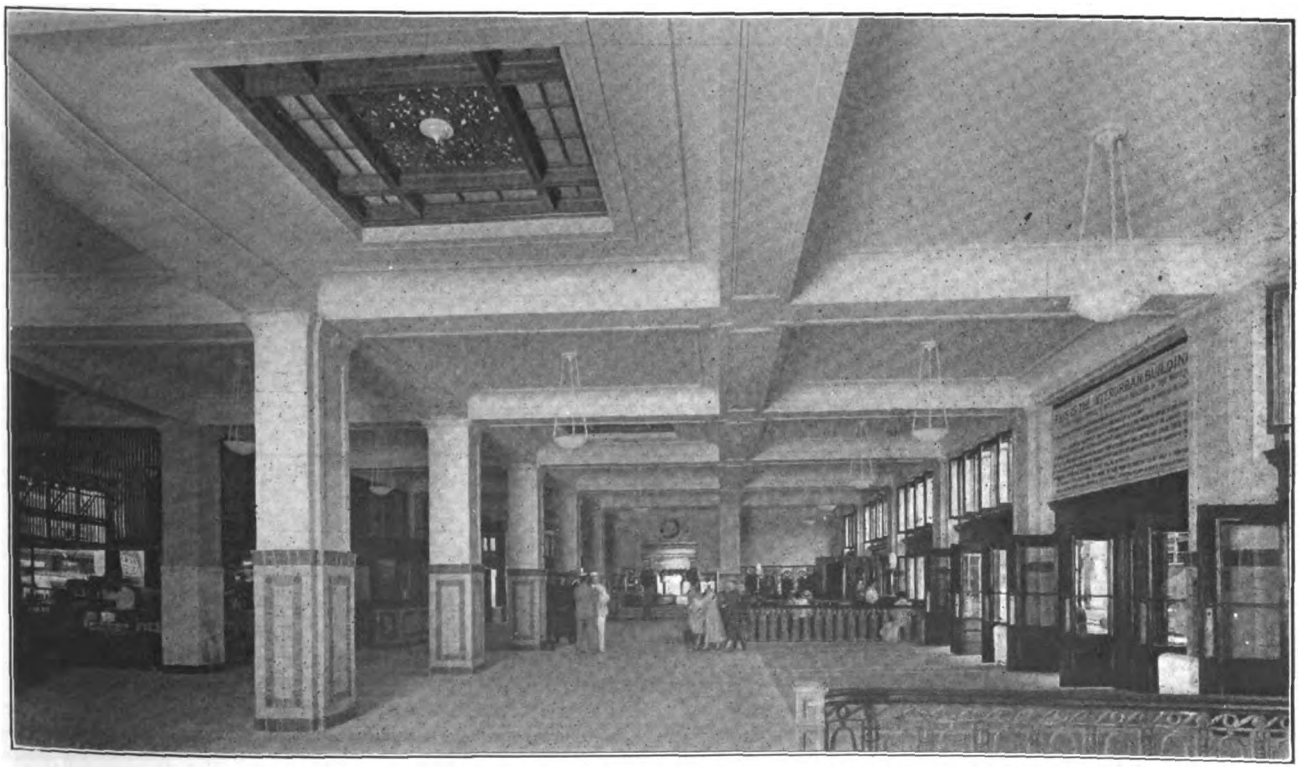
The four interurban lines entering Dallas use this terminal. These lines are the Waco division and the Corsicana division of the Southern Traction Company, the Denison-Sherman division of the Texas Traction Company, and the Fort Worth division of the Northern Texas Traction Company. The aggregate track mileage of these four divisions is 265, and last year the lines carried more than 6,000,000 passengers. Approximately 35 per cent of the passenger traffic on the four divisions mentioned consists of the passengers boarding and alighting from the cars within the city limits of Dallas. These lines are now managed and operated by the Stone & Webster Management Association, and the terminal was designed and constructed by the allied Engineering Corporation. The ownership of the property, however, rests nominally with the Dallas Interurban Terminal Association, of which Charles F. W. Wetterer, Fred H. Farnham and the writer, who is manager of the Dallas street railway and lighting properties, are the trustees.

After the financial and franchise arrangements were completed last autumn, the Engineering Corporation on Dec. 11, 1915, began clearing the site for the terminal, and the structure was rapidly rushed to completion. In spite of the many difficulties experienced in securing material and supplies, the terminal was finished and formally opened to the public on Sept. 1, four months ahead of the scheduled time. The rapidity with which the building was completed is considered remarkable under the circumstances, and the contractors have thereby established an enviable reputation throughout the Southwest.

The accompanying map shows the location of the ter-

CHARACTERISTICS OF THE DALLAS TERMINAL

The cost of land, building and tracks was $1,500,000. The building has eight stories and basement and it is 83 ft. x 217 ft. in size. The area of the terminal site is 54,000 sq. ft., and the areas of the waiting, baggage and parcel rooms are as follows: Waiting room, 6400 sq. ft.; baggage room, 1454 sq. ft.; parcel room, 326 sq. ft. There are seven through tracks, which have a capacity of twenty-four cars. Four interurban lines use the terminal, and these have a mileage totaling 265. Some 6,000,000 passengers are carried annually by the interurban lines.



MAIN WAITING ROOM OF DALLAS INTERURBAN TERMINAL BUILDING

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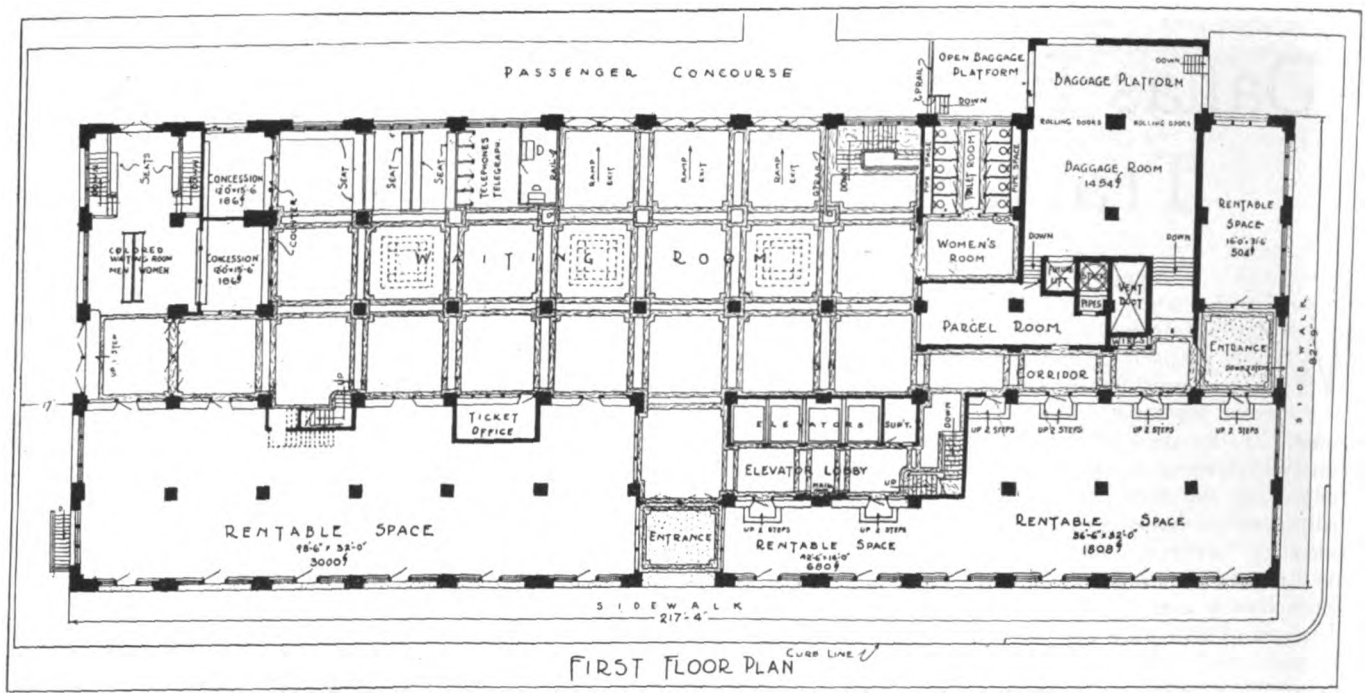
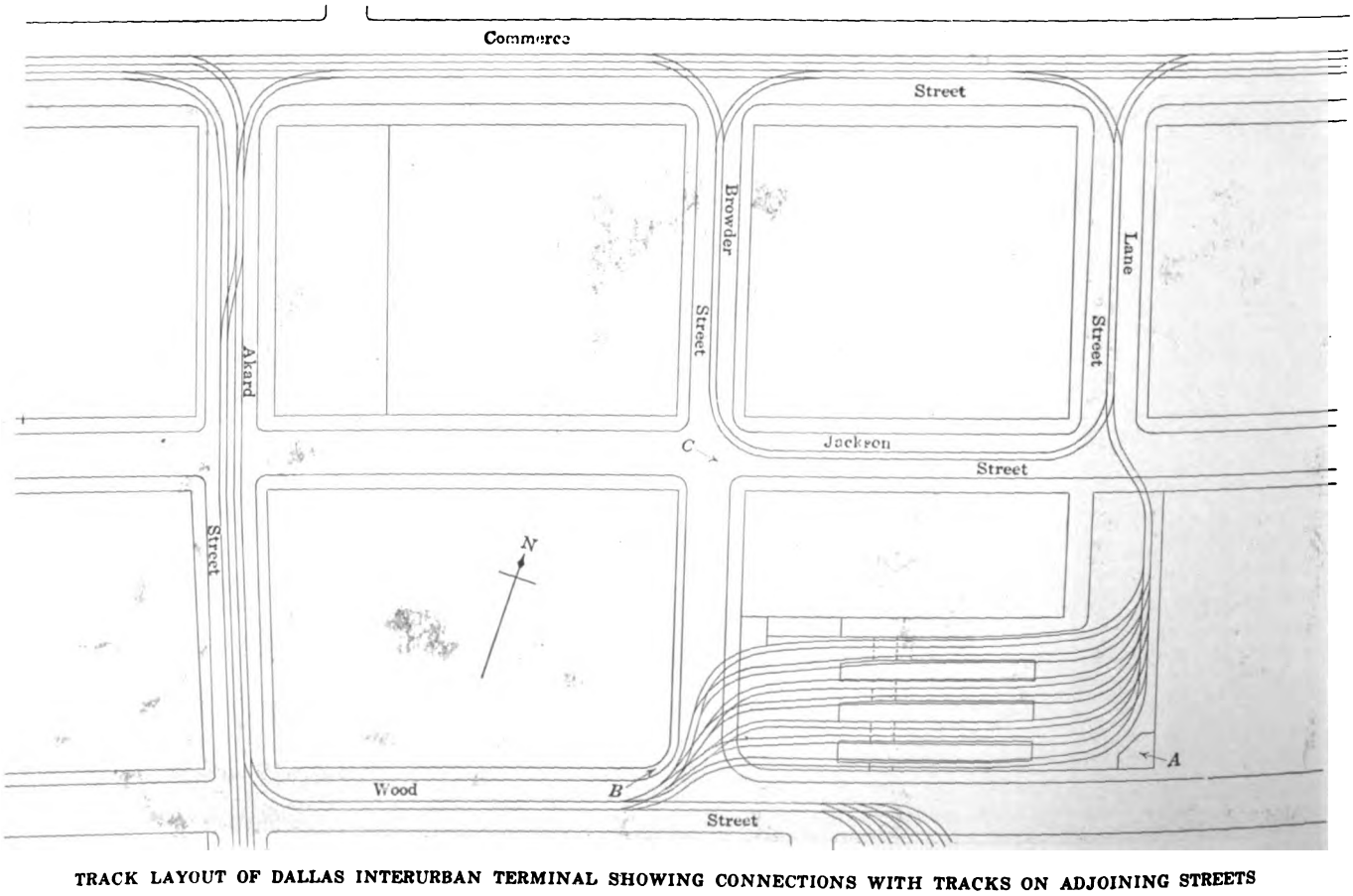


ARCHITECT'S PLAN OF MAIN FLOOR OF DALLAS INTERURBAN TERMINAL BUILDING

minal site, which is a tract of land fronting 284 ft. along Jackson Street east of Browder Street, 189 ft. on Browder Street south of Jackson Street, and 284 ft. on Wood Street east of Browder Street. Upon this site has been erected the eight-story terminal building, fronting 217 ft. on Jackson Street and 83 ft. on Browder Street. East of this main structure and to the south are to be found the network of special work and terminal tracks, while on the southwest corner of the tract is situated a two-story brick and concrete trainmen's house.

The terminal building is monolithic in type, with a reinforced frame, brick curtain walls and terra cotta trim. The architectural style is that of the late Italian Renaissance. Perhaps the most attractive feature of this handsome structure is the commodious waiting room, which is shown in one of the accompanying illustrations. The room is on the main floor, and has an area of 6400 sq. ft. It is well lighted by day through a row of windows along the south side, and by night it is indirectly illuminated through frosted bowls hung from the ceiling. Its terrazzo floors with Tennessee



TRACK LAYOUT OF DALLAS INTERURBAN TERMINAL SHOWING CONNECTIONS WITH TRACKS ON ADJOINING STREETS

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gray marble borders, the refreshing combination of gray and green tile in the wainscoting, and the simple beam ceiling, with handsome lighting fixtures, present a most pleasing and harmonious appearance. The ventilation is provided by three motor-driven exhaust fans concealed above the ceiling of the room and by opening a row of windows on the south side.

WAITING ROOM CONVENIENCES

The ticket office, centrally located along the north side of the waiting room, was designed with the future development of traffic in mind. There are four windows, one for information, one for regular ticket sales, one for colored patrons, and an extra window for heavy business. Opening from the west end of the waiting room is the women's rest room, where a maid is constantly in attendance. Couches, comfortable chairs and reading matter make it a restful retreat. The baggage room, with an area of 1454 sq. ft., is situated in the southwest corner of the terminal building. The baggage and parcel checking window opens into the main waiting room. As the terminal is strictly a passenger station, all express matter will be handled at some location other than on the terminal property.

East of the main waiting room is a smaller but equally attractive waiting room for the negro patrons. In finish it is similar to the main waiting room, and like it is equipped with large comfortable oak settees. A drug store, the display room of the Dallas Electric Light & Power Company, a restaurant, barber shop, fruit store and newsstand will occupy the rentable area on the main floor, which faces on Jackson and Browder Streets and has auxiliary entrances from the waiting room.

Five passageways make the entrance to and exits from the waiting room simple. One of these is through the display room of the Dallas Electric Light & Power Company at the northwest corner of the building. Another is through a drug store facing on Jackson Street. The third is the main entrance itself on Jackson Street. The fourth is an entrance from Browder Street, and the fifth, which is used principally by colored patrons of the terminal, is on the east side of the building, facing an extension of Lane Street.

Besides using a large space on the main floor for a display room, the Dallas Electric Light & Power Company will have one of the substations and the meter and service departments of the company located in the basement, which was especially designed to accommodate the electrical apparatus. The floors above the waiting room are used exclusively for offices. The second floor is occupied by the general office of the street railway and lighting companies and by the local office of the Stone & Webster Engineering Corporation. The tenants on the other floors include the Southwest General Electric Company, the Texas Power & Light Company, the Texas Traction Company and the Southern Traction Company. Before the building was ready for occupancy over 90 per cent of the office space had been contracted for.

Admirably situated near the heart of the business district, the terminal is an average of 4.7 blocks distant from thirteen of the principal retail stores, six blocks from nine of the principal banks, 8.9 blocks from twenty-three of the principal wholesale houses, 4.7 blocks from nine of the principal theaters, 4.3 blocks from the sixteen other important office buildings, and 3.5 blocks from the largest six hotels.

One of the accompanying illustrations shows the location of the tracks in the terminal region. On leaving Commerce Street at Lane Street, all interurban cars operate over a single track to the terminal property, one block distant. Here the single track fans out into seven through tracks, located south of the main building and parallel to it. Interurban cars on leaving the terminal run south on Browder Street to Wood Street, west on Wood Street to Akard Street, north on Akard Street to Commerce Street, and thence to their respective destinations. The seven tracks in the terminal have a combined capacity sufficient to accommodate twenty-four interurban cars of the largest type. Except for the seventh track, which is adjacent to Wood Street, the tracks are in pairs separated by concrete concourses. Concrete shelters protect the passengers on the concourses during inclement weather. The seventh track is provided with a pit, where emergency repairs can be made.

The plan is to have only emergency repairs made at the terminal. Across Wood Street and south of the terminal property is a tract 82 ft. x 151 ft. on which storage tracks are to be laid to accommodate about eighteen additional cars. All of the special work is of 127-lb. Lorain Steel Company section No. 397 rail. The connecting rails in the streets are 103-lb. Lorain Steel Company section No. 478, while the tracks on the terminal property and the storage tracks are of 80-lb. A.S.C.E. rail.

FRONT VIEW OF DALLAS INTERURBAN TERMINAL BUILDING TAKEN FROM POSITION C ON TRACK LAYOUT

On the southwest corner of the terminal property a two-story brick and concrete trainmen's house has been erected. On the first floor of the building supplies for the car cleaners and repair men are kept. The upper floor is used for trainmen's quarters, and is provided with shower baths, lockers and game tables.

Beginning on Oct. 2, Dr. Samuel Sheldon will give, on Monday evenings, a series of thirty lectures and recitations on electric traction and transmission at the Brooklyn (N. Y.) Polytechnic Institute in connection with the evening technical courses.

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How to Use Sinking Funds

Sinking Funds Not Set Aside So Much Now, But Under Existing Mortgages Providing for Them Perplexing Problems Arise—Author Describes Proper Accounting Treatment

By W. H. FORSE, JR., C. P. A.
Secretary-Treasurer Union Traction Company of Indiana, Anderson, Ind.

THE sinking fund requirement is a common-sense safeguard which is to be expected in cases where the security behind the mortgage is a diminishing quantity or one subject to violent fluctuation. For example, a bond issue put out by a manufacturing corporation may contain a sinking fund provision because of the more or less unstable character of the business. The process may be one which is subject to the white heat of competition, such as is found in the rapidly changing automobile industry, or it may be an undertaking that is liable to be revolutionized in a day by new scientific discoveries, inventions or tariff changes. In all of these cases adequate sums should be set aside to fund investment or debt as the oils, minerals, timber or other assets are sold, or when abnormal profits are being earned as the result of temporary extraordinary conditions.

SINKING FUNDS NOT NOW USED SO MUCH IN THE RAILWAY FIELD

When the electric railway industry was young, it was common to require sinking funds. The motive power had, within a comparatively short period, been changed from animal traction to underground cables, and then to the crude electric railway motors of a generation ago. Bankers naturally expected other revolutionary changes, and as a matter of precaution required that sinking funds be written into the early mortgages in order that the debt might be reduced before the dread specter of "obsolescence" appeared.

How different are the conditions in 1916! Electricity is operating cars over 40,000 miles of city streets and interurban railways in the United States alone, and conservative steam railway operators have adopted this form of energy for hauling heavy trains over the Rockies, for ridding great city terminals and tunnels of smoke, and for furnishing commuters with frequent, rapid suburban service. The electric railway industry has become so well established that it is now considered better practice to omit sinking fund requirements from mortgages unless there are peculiar local conditions, not common to the industry as a whole, which must be taken into consideration.

The sinking fund ordinarily used provides that sums must be set aside annually or at other periodical intervals to retire debt or investment. The modern electric railway in a growing community, however, can generally find better use for its surplus earnings in making the extensions and improvements demanded by the public and regulatory bodies. Improvements cannot always be financed out of earnings, and additional bonds must frequently be issued. In fact, the rapid growth of American cities has in the last decade required millions of dollars of increased capital to be invested in betterments and additions to existing electric railways. In the face of such facts, it would hardly be worth while for an electric railway to set aside $100,000 to meet a sinking fund requirement for the retirement of bonds in one year, and in the same or following year issue $200,000 worth of bonds to finance extensions and improvements to the railway property.

Moreover, bonds containing sinking fund provisions are not attractive to the investor if the mortgage provides that they can be "called" by serial numbers, because the investor buying a long-term security does not care to face the possibility of being required to reinvest at a time when conditions may be unfavorable. Furthermore, if bonds retired through the sinking fund are to be purchased in open market, the company may be required to pay a premium and thus be penalized for retiring evidences of debt highly esteemed by the holders. This is a "tax" which is undesirable, to say the least.

SINKING-FUND PAYMENTS NOT CHARGES AGAINST CURRENT INCOME

Sinking funds are still found in the electric railway field, however, and the accountant is at times required to solve perplexing problems relating to them. There is considerable misapprehension concerning the proper treatment of sinking funds, and many business men otherwise well informed have the impression that they are properly chargeable against the income account. This opinion has prevailed in some quarters because it so frequently happens that sinking fund installments are paid out of gross income. The regularity of the payments and the fact that there is often no other source than current income for obtaining such moneys have resulted in an incorrect grouping, in some cases, of sinking fund payments with interest, taxes and other fixed charges. It is apparent, however, that sinking fund payments for retirement of funded debt or investment merely change the form of assets and liabilities and do not affect the income account.

Montgomery in his work entitled "Auditing—Theory and Practice" says: "Sinking fund requirements to retire bonds, etc., must not be confused with depreciation allowances," and "sinking fund installments are capital expenditures, and do not properly appear among operating expenses, but should be stated as deductions from net profits when ascertained." In the case of the Winnipeg (Man.) Hydro-Electric Company the by-laws and charter provided that the annual interest and sinking fund payments should be made out of the "revenues" of the utility, but Judge Robson of the Manitoba Public Utilities Commission called attention to the fact that the sinking fund payments constituted a repayment of capital investment and must be accounted for through capital account. Sinking funds, in short, are means for retiring capital obligations, and while mortgages may in some cases provide that the installments thereof shall be paid out of net income, it does not necessarily follow that the mortgagor must show by his accounts that such sinking funds have been charged against income.

The fictitious "Northern Interurban Railway," let it be supposed, has a property mortgaged for $20,000,000, and an annual sinking fund requirement of $100,000, to be used in retiring mortgage bonds. In 1916 its net income or surplus for the year amounts to but $50,000 before making provision for the sinking fund. If it has $2,000,000 cash in its treasury and applies $1,000,000 of it to retire mortgage bonds under a provision

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granting it that privilege, the $1,000,000 would certainly not be charged against income or surplus account. Then why should the $100,000 annual charge be considered a "deduction from income"?

To take another case. A newly incorporated company acquired the assets by outright purchase and assumed the obligations of several old public utilities. Among the obligations were two series of bonds which provided for sinking funds, whereby 2 per cent of the face value of bonds outstanding was to be deposited annually with the trustee of the mortgage. The new company was confronted with an obligation to meet the sinking fund requirements, with no surplus to draw upon. The question of sinking fund payments had nothing whatever to do with income. In this case the company sold some of its property not required in operation as a public utility and not covered by the mortgage, instead of borrowing money to pay the sinking fund installments. When it assumed obligations of the companies which it acquired, and carried out the sinking fund requirements, the liabilities (in part funded debt) were reduced from time to time as the sinking fund money was utilized in retiring bonds.

The assets changed their form from time to time as property was converted into the cash used to retire the bonds, but these operations had nothing whatever to do with the income account or the (nonexistent) surplus account of the newly incorporated company. If the company had borrowed instead of selling property, its balance sheet, after the transaction had been entirely completed, would have shown an increase in floating debt and a similar decrease in funded debt, it being assumed that a short-term loan had been negotiated for the purpose of retiring bonds in accordance with sinking fund provisions.

Accounting for Sinking Fund

The Interstate Commerce Commission profit and loss accounts for electric railways (issue of 1914) contain accounts providing for "appropriations of surplus" for sinking fund and other reserves, for investment in physical property and for dividends. The text of the Account No. 309, pertaining to appropriations of surplus to sinking fund and other reserves, provides that amounts charged to this account shall be concurrently credited to one of two balance sheet accounts which are mentioned. In order to trace the theory of the official system of accounting, a fictitious example of a railway mortgage will be used as an illustration.

The "Great Eastern Electric Railway" has a bond issue of $20,000,000; interest is payable April 1 and Oct. 1 at the rate of 5 per cent per annum, and its mortgage provides for a sinking fund of 2 per cent per annum of the total bond issue. It is required that the bonds be kept alive and draw interest while in the sinking fund, the interest to accumulate and be used in retiring more bonds. There is a cash balance of $230,000 in the hands of the trustee on Jan. 15, after the semi-annual sinking fund installment has been paid by the railway. The trustee buys $205,000 of bonds at 95 and interest on Feb. 1, paying therefor the sum of $198,166, which includes $3,416 interest Oct. 1 to Feb. 1 on $205,000 of bonds. The total amount of bonds redeemed through the sinking fund is $1,205,000, including those last purchased. The company owns and operates its property, and the plan of accounting for the transactions is shown below.

The monthly accrual of bond interest deductible from income would be based upon the $18,795,000 of bonds outside the sinking fund, the Interstate Commerce Commission having ruled that the account "interest on funded debts" shall not include charges for interest on funded debt obligations issued or assumed by the accounting company and owned by it, whether held in its treasury, in sinking or other reserve funds, or pledged as collateral. The commission apparently takes the stand that bonds in the sinking fund are "owned" or "controlled" by the corporation, a ruling to which some accountants object.

The interest, amounting to $3,416, paid by the trustee as part of the purchase price of $205,000 of bonds, presents a peculiar but simple problem. It is not known in advance that the purchase will be made at the time and for the amount stated, but the interest on these bonds will properly be included in the monthly accruals deducted from income from October to February, or until they are taken into the sinking fund. From that time forward the interest on these bonds is excluded from the deduction-from-income or so-called fixed-charge accounts.

The interest on bonds kept alive in the sinking fund, drawing interest which accrues to the benefit of the sinking fund, has nothing whatever to do with the income or annual net profits of the corporation. This interest, added to the fixed installments withdrawn from the business for sinking fund purposes, is used for reducing the bonded indebtedness of the company. The money may be taken out of gross receipts, or it may be obtained by selling property no longer needed. The transaction is merely a method of changing the assets and liabilities, for the asset cash is reduced and the indebtedness represented by bonds in public hands is likewise reduced.

The railway accountant desires to set up monthly accruals of the sinking fund in order to segregate this item from the so-called "free" surplus. It may be found necessary later on to use a large part of the surplus for property betterments or some unexpected thing, such as floods or financial stress, and the surplus is not "free" in the sense that it is available for dividends to stockholders. Nevertheless, the accountant accrues each month one-twelfth of the annual charge and concurrently credits the balance sheet account "sinking fund reserves," thus carrying out the wishes of the directors of his company that the recurring liability be shown in the accounts.

Sinking Fund Versus Sinking Fund Reserve

There is considerable difference between a sinking fund and a sinking fund reserve, although each title is sometimes loosely applied to the other. Much of the confusion is probably caused by the fact that the term "reserve" is used in connection with banking and insurance in an entirely different sense from that in general accounting practice. Bankers consider a reserve analogous to cash or an equivalent of cash, but in accounting phraseology "cash" and "reserve" are not synonymous. A sinking fund in the strict sense is a "fund raised by annual contributions for the purpose of providing means for paying off a funded debt" (Hatfield). A fund may be defined as "a stock or accumulation of assets, either money or convertible wealth, brought together for a particular purpose" (Pace). On the other hand, a sinking fund reserve may be defined as simply a bookkeeping title of an account.

The fund is tangible, being money or other assets ear-marked for a special use, while the reserve is a term used in accounting for indicating certain desires or policies. An entry may be made opening up a reserve account to which sums are credited monthly, for the purpose of indicating an accruing liability, but the establishment of this account does not mean that funds are in bank to meet the obligation. There is no assurance or guaranty that a reserve will be used for the

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indicated purpose, but a fund given to a trustee for a specific purpose or deposited in the bank to meet a certain contingency is a tangible asset to meet a fixed obligation and is generally so used. When the purpose for which a sinking fund reserve account was created has been actually carried out, the account itself disappears by cross entries unless it is retained as an open record and perpetual reminder of the disposition that has been made of a portion of the book surplus.

DISCOUNTS, PREMIUMS AND RENTALS

When $205,000 "Great Eastern Electric Railway" bonds are purchased at 95, there is a discount or saving of $10,250 which must be disposed of in the accounts. This is not "income," in the sense that income is ordinarily considered, but it is a credit to the profit and loss account. Without considering here the price at which the securities may have been originally sold, it may be said that they are re-acquired at a price which extinguishes $100 of funded debt for $95 in cash. The net worth of the corporation, which has carried its bond liability on the books at face value, is increased by the amount of the discount, and the book surplus is written up accordingly. If acquired at a premium the book surplus would be correspondingly reduced.

The remarks regarding the "Great Eastern Electric Railway," as before stated, are based upon the supposition that it owns and also operates its railway property. In case the company should lease its property to the "Consolidated Eastern Railway," which agreed to pay the lessor's sinking fund installments as part of the rental, receiving no credit therefor except as rental, the method of accounting would be considerably changed. The "Consolidated Eastern Railway" accounts would in such a case treat the sinking fund payments as a fixed charge, or deduction from income, the account being "rent for leased roads" in the Interstate Commerce Commission classification of accounts. There are not many leases which treat sinking funds in this manner, it being generally considered more equitable that sinking fund payments made by a lessee on account of a provision in the mortgage of the lessor be accounted for not as rental but as a reduction of funded indebtedness for which the lessee is entitled to compensation or relief.

Builds Line in Record Time

The Missoula (Mont.) Electric Street Railway, which is owned by former United States Senator W. A. Clark, has established a record for laying a line. On Aug. 10 the Great Western Sugar Company announced that it would build a $1,000,000 sugar factory at Missoula on a site 1.6 miles from the city limits. Officials of the company conferred with Senator Clark regarding an extension of the railway to the site of the new plant. H. L. Bickenbaugh, superintendent of the local railway, was informed by Senator Clark that the line would be in operation within a month. Rails, trolley wire, ties, and poles had to be purchased, and a considerable amount of grading done.

A crew of men was put to work the day after the building of the line had been authorized. Before Sept. 10 the track was laid, the trolley wires strung, the feeders were installed and the Great Western Sugar Company was requested to give orders as to when it desired its factory material moved over the new line. The construction cost about $13,000 a mile. Freight service is maintained on the line in Missoula, but it is estimated that the freight business will be increased 60 per cent by the coming of the sugar factory to that city.

Trolley Guide to Washington, D. C.

Co-operation of Electric Railways Has Resulted in the Publication of an Attractive Folder

AN excellent example of co-operation in publicity work is furnished by the getting together of the Washington Railways & Electric Company and the Capital Traction Company of Washington, D. C., in the publication of a folder of unusual intrinsic value. When opened out, the folder becomes a sheet 18 in. x 24 in. in size, on one side of which is a remarkable bird's-eye view of the city of Washington in colors, the work of H. H. Green. When folded, it is 4 in. x 9 in. in size, the two sides being attractively decorated, as shown in the accompanying halftone. A quarter of one side of the open sheet is taken up with a map of the city, on which the electric railway lines are shown in red. Where the lines extend beyond the field of the map, the points reached by them are indicated and the distances to these points are given. The map is provided with

COVERS OF THE NEW WASHINGTON (D. C.) TROLLEY TRIP FOLDER

marginal scales and an index accompanies it so that the public buildings and other points of interest can readily be located. The remaining space in the folder is filled with brief descriptions of the most important buildings and other sights of the city, several illustrated with halftone engravings.

The purpose of this folder is to impress upon travelers the attractiveness of their national capital and to facilitate their visit to the points of interest by means of the electric railways while they are in the city. The folder was prepared by the Matthews-Northrup Works, Buffalo, N. Y. It is planned to distribute it so that as far as possible travelers who are including Washington in their tours will be provided with copies before they arrive there.

Negotiations are about to be concluded by the Government of Uruguay for the purchase of the commercial electric tramway system of Montevideo, which includes the following lines: Union and Maroñas, Buceo and Union, Este and Reducto, and Sayago and Colon, and other properties valued at approximately $16,000,000.

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United Railways Power Situation

The St. Louis Traction Company in a Special Report to Its Stockholders Gives Power History, Present Outlook and Comparative Costs

IN the financial and corporate department of this week's issue there appears an analysis of the financial part of a special semi-annual report issued to stockholders of the United Railways of St. Louis for the first six months of 1916. Besides such financial data, however, the report contains matter on other subjects deemed by the management to be of interest to stockholders. Among these subjects is the power situation of the company, concerning which the company's position is as shown in the following abstract of the power section of the report.

At the present time power for the operation of the United Railways of St. Louis is obtained from (1) Water power purchased; (2) Union Electric power purchased, and (3) power produced in the plants of the United Railways. The plants of the United railway are run chiefly as peak plants at a load nearly up to their capacity and at other times are maintained as a reserve against any emergency which might require their use.

For the first six months of 1916 power statistics of the company are as follows:

Average distribution of power on kilowatt-hour basis:	
Electric Company of Missouri (water power)	58.1 per cent
Union Electric Light & Power Company	31.6 per cent
United Railways plants	10.3 per cent
Distribution of peak load:	
Electric Company of Missouri (water power)	40.8 per cent
Union Electric Light & Power Company	27.0 per cent
United Railways plants	32.2 per cent
Total kilowatt hours during first six months of 1916	92,217,593
Average week day peak	54,000 kw.
Average daily load factor	40.3 per cent
Cost of water power per kilowatt hour	0.577c
Cost of Union Electric power per kilowatt hour	0.836c
Cost of all purchased power per kilowatt hour	0.669c
Cost of generated power (operation and maintenance only) per kilowatt hour	0.924c
Average cost of all power per kilowatt hour	0.695c

WATER POWER PURCHASED

The special report to stockholders contains a resumé of the power history of the United Railways since its organization in 1899. To pass over the earlier details, it appears that after the World's Fair in 1904, the business of the United Railways grew rapidly until the financial depression of 1907 and 1908. Conservative estimates as to the power requirements contemplated an increase in demand of at least 10 per cent per year. In 1907 and 1908 negotiations were under way for the sale of water power from Keokuk in St. Louis. The United Railways was not financially able to build an economical power plant of its own, and the price of $25 per horsepower year, which at 60 per cent load factor amounts to about 0.625 cents per kilowatt hour, was attractive because it was lower than steam power was costing at that time, and there was no indication that the economy of steam power plants would ever be greatly improved. The water power was also attractive on account of the small number of men required to furnish and distribute it, as that seemed to offer immunity from the danger of the source of power being tied up by strikes.

On Oct. 26, 1908, therefore, the United Railways contracted for 27,500 hp. of water power with the right to use 30,000 hp. on peak. If this privilege is taken into account, the price per horsepower year is $22.92 instead of $25. On account of changes in the voltage and point of delivery, the contract price has been reduced $68,750 per year. This reduction is effective Jan. 1, 1916, and reduces the price per horsepower year to $22.50 or $20.62 if the peak is taken into account, and the price per kilowatt hour to 0.577 cents instead of 0.625 cents.

The period of the contract is for ninety-nine years divided into eleven consecutive periods, of which the first period is five years from the initial service date, the next nine periods ten years each and the last period four years. At the end of the first five-year period of service and at the end of each succeeding ten-year period of service there shall be an adjustment made in the price of $687,500 per year, depending upon the price of standard Illinois mine run coal during the last two years of any such period. For each cent that the average price of such mine run coal exceeds the sum of $1.42 per ton the price for service shall be increased one-half of 1 per cent. There is a corresponding reduction in price in case the price of mine run coal is less than $1.42 per ton.

Delivery of power under this contract began July, 1913. The Electric Company of Missouri, which is the successor of the Mississippi River Power Distributing Company, built a transformer station on Page Avenue just west of the city limits. At this transformer station power transmitted from Keokuk at 100,000 volts is transformed to 13,200 volts, at which voltage it is delivered to the United Railways.

UNION ELECTRIC POWER PURCHASED

Under the terms of the water power contract of 1908, the latest date for delivery of water power was February, 1914. After the contract had been made there was so much delay in financing the water power project that it seemed delivery would not be made before that date, if it was made at all. It was necessary to have additional power for the increasing load of the company for 1910, and as at that time delivery of water power was doubtful, a ten years' contract for additional power was made with the Union Electric Light & Power Company to take effect Jan. 1, 1910. This contract was on more favorable terms than the one in effect at that time, a modification of the first 1903 contract made in 1906 and extending until Aug. 1, 1914.

The amount of power to be delivered under this new contract was as follows: 1910, 6000 kw.; 1911, 9000 kw.; 1912, 12,000 kw.; 1913, 15,000 kw.; 1914, 10,000 kw., Jan. 1 to Aug. 1; 1914, 20,000 kw., Aug. 1 to Dec. 31; 1915, 15,000 kw.; 1916, 15,000 kw.; 1917, 12,000 kw.; 1918, 10,000 kw., and 1919, 5000 kw. The contract specifies during each year the number of kilowatt hours for which the railway company agrees to pay during each calendar month. This number of kilowatt hours is based upon a 45 per cent load factor.

The price which the company pays for this power is as follows: (a) A fixed charge of $15 per annum per kilowatt ($1.25 per month). (b) An operating charge of 0.45 cents per kilowatt hour. (c) Any special tax that the producer might be required to pay in connection with this contract. The cost of power taken under this contract has averaged about 0.835 cents per kilowatt hour.

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When the United Railways was organized in 1889, it inherited from the constituent companies seven electric plants and a number of cable plants. The electric plants were all small in size, of antiquated design, unreliable in operation, expensive to run and poorly located. In 1907 when the Suburban System was taken over, another electric generating plant was inherited.

In 1900 the St. Louis Transit Company rebuilt the plant at Park and Vandeventer Avenues which formerly belonged to the Lindell Railway, and installed therein 12,000 kw. of direct-current machinery, the largest unit being 2250 kw. This machinery was what was considered modern at that time. The plant not being located upon water, it was necessary to use city water for condensing purposes, and cooling towers were installed so that the condensing water could be used over and over again. A new plant of 6900 kw. capacity was also built in 1900 at Broadway and Salisbury Street. Of this capacity 4500 kw. was direct current and 2400 kw. alternating current. This plant also was not located upon water and it was necessary to use cooling towers in connection with the condensing system.

The plants of the company built in 1900 have become antiquated on account of the great improvements in the design of steam machinery since that time. Operated at their full capacity, they could not supply one-third of the present demand for power. Under the most favorable conditions their efficiency has never exceeded 0.60 cents per kilowatt hour for operation and maintenance alone, neglecting interest on investment, depreciation, obsolescence and all fixed charges. A proper allowance for these fixed charges would be about 0.5 cents per kilowatt hour. This would make a proper charge for generated power as compared with purchased power of more than 1 cent per kilowatt hour if the plants were always operated under the most favorable conditions.

Comparison of Generated and Purchased Power

It would be interesting, the stockholders are told in the special report, to estimate what the cost of generated power would have been if the United Railways had carried out its original intention in 1903 of building a new power plant and had started by installing the machinery purchased at that time. To explain this point, it may be said that the growth of the company's business had been very rapid after the consolidation, and in order to take care of the anticipated business during the World's Fair in 1904 it was deemed necessary for the company to have additional power. In 1903 the St. Louis Transit Company decided to put up a power plant and contracted for 16,000 hp. of Stirling boilers and 14,000 kw. capacity of turbine generators for installation in this new plant. After contracts for the purchase of this machinery had been made, it was determined that the St. Louis Transit Company could not make financial arrangements to procure the money to build this power plant, or even to pay for the machinery under contract. In order to relieve the company from this embarrassing situation and insure power for the future operation of the road, especially during the World's Fair period, the first contract was made with the Union Electric Light & Power Company on June 26, 1903, under the terms of which that company took over the machinery which the St. Louis Transit Company had ordered and agreed to furnish power under certain conditions.

The United Railways is now purchasing about 37,000 kw. of power, so that the original installation just described would have constituted about one-third of the plant necessary to supply the power now purchased. The economy of steam apparatus in 1903 was low and the cost per kilowatt was high as compared with similar machinery at the present time. If the plan of building a power plant in 1903 had been carried out, it would have been necessary to add to this plant from time to time, and the plant at present would consist of 45,000 or 50,000 kw. of machinery representing all the stages of the art between 1903 and 1916. Although the machinery purchased within the last few years would be efficient, the machinery in the primary installation and that installed during the first half of this period would not show such economy.

Taking all these factors into consideration, and using as a basis the operating costs of the large Ashley Street plant of the Union Electric Light & Power Company during this period, the report states that a conservative estimate of the present cost per kilowatt hour of power produced by this hypothetical plant would be about 0.80 cents. This should be compared with the costs of purchased power during the first six months of 1916 as follows: Cost of purchased water power, 0.577 cent; cost of purchased steam power, 0.836 cent, and average cost of all purchased power, 0.669 cent.

If a new steam plant of about 45,000 kw. capacity were built at the present time in a desirable location on the river, equipped with the most modern machinery, it would involve an expenditure, including transmission lines, of not less than $3,500,000. From such a plant operating on a railway load, an economy of 0.6 cents per kilowatt hour could be expected. It is evident, however, the report states, that up to the present time it has been to the marked financial advantage of the United Railways to have purchased power rather than to have attempted the financing of its own generating plants.

Future Power Requirements

At the present time the peak of the load is about 55,000 kw. A conservative estimate of the power required next year is 6 per cent in excess of this peak, or a maximum of 58,500 kw. The capacity of one of the railway plants is now being increased 1200 kw. by certain changes. Under the terms of the contract the power received from the Union Electric Light & Power Company decreases 3000 kw. on Jan. 1, 1917.

The situation is now as follows:

1916 Operation	
Peak	55,000 kw.
Water power supplied under contract	22,400 kw.
Steam power supplied under contract	15,000 kw.
Capacity of railway plants	20,400 kw.
Reserve capacity	2,800 kw.

1917 Operation	
Peak	58,500 kw.
Water power supplied under contract	22,400 kw.
Steam power supplied under contract	12,000 kw.
Capacity of railway plants	21,600 kw.
Deficit	2,500 kw.

The contract with the Union Electric Light & Power Company for steam power, which in 1916 calls for 15,000 kw., expires at the end of the year 1919. By that time it is conservatively estimated that the gradual increase in service will cause an increase in load of 10,000 kw. This amount, when added to the amount of power now being purchased from the Union company, calls for facilities available in 1919 having 25,000 kw. capacity. A power plant to furnish 25,000 kw. at all times should have at least 35,000 kw. capacity. The report concludes, therefore, that the United Railways is confronted with these alternatives: (1) The beginning in the near future of the construction of a new power plant with an original installation of 35,000 kw. of machinery requiring the expenditure of a large sum of money. (2) A new contract with a power company for a gradually increasing supply of power as needed.

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Pneumatic Machines Reduce Tamping Gangs from Six to Two

The Experience of a Number of Electric Railways and Actual Test Data Show Excellent Results in Reduction of Labor Cost and Indicate Increased Stability of Track and Roadbed

By H. L. HICKS
Ingersoll-Rand Company, New York

THE development of the pneumatic tie tamper was the natural outgrowth of a demand for a mechanical device that would reduce the cost of ballasting track. The pneumatic tamper has now been in use for about a year and a half on electric railway work, and from the results obtained it is safe to say that this type of machine has come to stay. Its use is already widespread and it is not idle fancy that warrants the prediction that the pneumatic tie tamper will in the course of time practically supersede all hand tamping.

PNEUMATIC TIE TAMPING—FIG. 1—TYPICAL TAMPING MACHINE

The pneumatic tie tamper, as its name signifies, operates on compressed air. It is a percussive tool similar in action to the pneumatic riveting hammer. The tamper (Fig. 1) consists of a barrel section, containing a free moving piston, a suitable extended handle with grips for holding it and a tamping bar. The last is inserted in the end of the barrel and is loosely held in place by a retainer fitting over a collar on the tamping bar itself. The piston reciprocates rapidly and delivers a succession of blows on the upper end of the tamping bar which in turn transmits the impact to the ballast.

Pneumatic tie tampers are operated in pairs (Fig. 2), one tamper on each side of a tie. Their weight, 37½ lb. each, is sufficient to feed the tools down as the ballast is forced under the tie. All that is required of the operators is to hold and guide the machines. The tamping bars rest on the ballast and force it down and under the tie. In starting, these tampers are held vertical with the broad faces of the tamping bars parallel with the tie. This position is maintained until the bottom of the tie is reached when they are swung outward until at the proper angle to force the ballast under the center of the tie.

In the operation of the pneumatic tamper the tamping bar is practically stationary, transmitting to the ballast the rapid blows received from the piston. The absence of reciprocating motion makes the guidance of the machine an easy matter. The operator is able to avoid striking and injuring the ties and can guide the tamping bar in between switch points, cross-overs and similar places where he could not swing a pick or wield a tamping bar. It has also been a matter of observation that the pneumatic tamper does not crush the ballasting material.

The pneumatic tamper operates most efficiently on air at 65 lb. to 75 lb. pressure. In terminal yards and on systems where electro-pneumatic signals are used it has been found both convenient and entirely practical to use air from the signal service line, as the small amount used does not impair the operation of the signals. In ordinary traction work air is supplied from a portable compressor, usually electric driven. The customary provision of 300 ft. of hose gives a large working radius without moving the compressor.

While the pneumatic tie tamper works in any kind of ballast it is advisable to change the dimensions of the tamping bar face to suit the size of ballast and thus secure maximum effect from the available power. In

PNEUMATIC TIE TAMPING—FIG. 2—A WORKING UNIT. TWO MEN WITH TAMPERS AND ONE MAN SHOVELING BALLAST

crushed stone, 2 in. or over in size, a bar with a face 3 in. x ⅝ in. gives best satisfaction; with smaller stone or gravel a tamping face 3 in. x ⅞ in. is most effective and in tamping sand, dirt or cinders a still larger face, 3 in. x 1⅛ in. secures the greatest efficiency.

It is interesting to note the experiences of several electric railways with the pneumatic tamping machines.

The Public Service Railway of New Jersey in extending its trackage in East Orange started tamping with two pneumatic tampers operated from a portable compressor (Fig. 3). The average day's work of three men, two tampers and a shoveler, was sixty ties tamped on both sides for their whole length. Two-inch stone ballast was used and the track lifted 6 in. The foreman's comment to the writer was that ten men hand tamping might beat the two machines but six men could not keep up with them. To expedite still further

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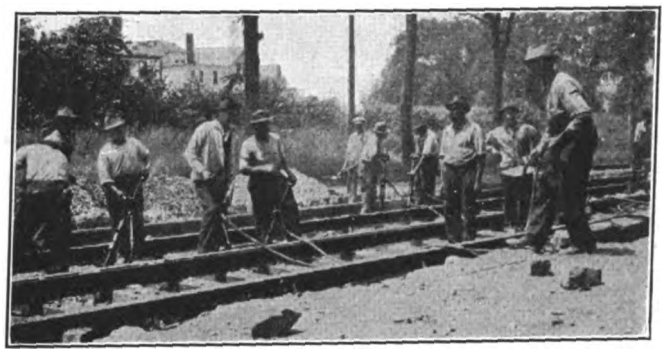
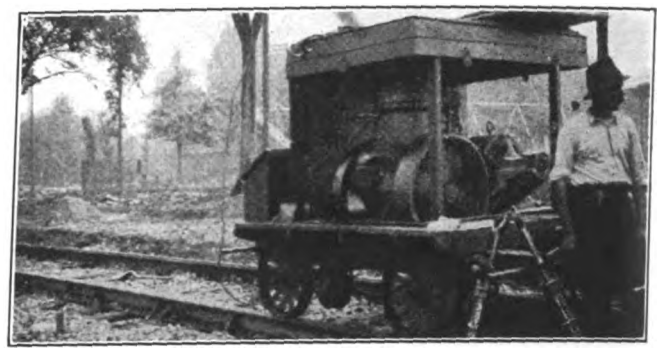
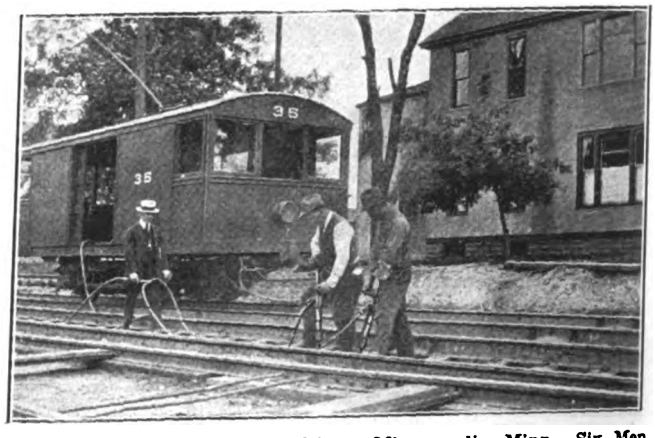


Pneumatic Tie Tamping—Fig. 3—Six Machines in Use on Double Track Extension in East Orange, N. J.



Pneumatic Tie Tamping—Fig. 4—Standard Compressor-Car, Public Service Railway, New Jersey



Pneumatic Tie Tamping—Figs. 5 and 6—Tamping Sand and Gravel Ballast, Twin City Traction Lines, Minneapolis, Minn.—Six Men Hand-Tamping Replaced by Two Men with Machines

Pneumatic Tie Tamping—Fig. 7—One-Armed Man Operating Tamper, Twin City Traction Lines

Pneumatic Tie Tamping—Fig. 8—Tamping Stone Ballast on Dual System of Rapid Transit in Queens Borough, New York City

Pneumatic Tie Tamping—Figs. 9 and 10—Tamping Dirt-Gravel Ballast, on Lines of Indianapolis Traction & Terminal Company—Six Men with Shovels Replaced by Two Men with Machines

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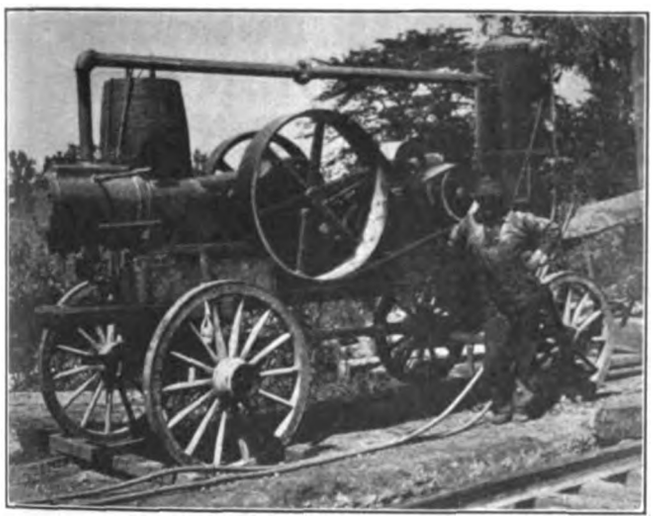
the construction work an additional double unit of two pairs of tampers, operated from a similar compressor of large size, was placed in operation (Fig. 4).

At Minneapolis the Twin City Rapid Transit Company prepares the roadbed for new track by grading with a steam shovel, dumping in stone ballast and rolling it smooth with a steam roller. A layer of gravel is then added, the ties and track are laid and sand gravel ballast dumped in for tamping. Observations show that on this work two men (Fig. 6) with pneumatic tampers do the work of eight men (Fig. 5) who formerly did tamping by hand. The average time required to tamp the full length of a tie on both sides is one and one-quarter minutes. When the operators noticed that their work was being timed they made a record of three-quarters of a minute. One of the most striking features of the work done here was a demonstration (Fig. 7) that a tamper could be operated by a one-armed man. The discovery was gratifying, not only to the individual but to the company on which he was dependent.



PNEUMATIC TIE TAMPING—FIG. 11—COMPRESSOR FOR ROAD TRANSPORTATION IN ADVANCE OF TRACK LAYING

Thomas Crimmins & Sons, contractors for the laying and ballasting of the track on the concrete viaduct of the rapid transit system extension in Queens Borough, New York City, used four pneumatic tampers operated from a gasoline driven compressor (Fig. 8). The conditions here were rather unusual. The concrete structure had been filled between the sidewalls with 3-in. crushed stone, the depth varying from 5 to 10 ft. This was covered with a 3-in. layer of 2-in. stone, the track then laid and 2-in. stone ballast of an average depth of 12 in. dumped on for tamping. This construction necessitated very thorough work on the part of the tamping machines, to secure a permanently stable roadbed. An average of 550 ft. of track or about 367 ties per day were pneumatically tamped by a gang consisting of four men operating the tampers, two men shoveling ballast and four jacking up and aligning track.

On one of the lines of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., the failure of continuous welded track due to excessive warping made relaying necessary. After employing six men shovel-tamping the dirt gravel ballast two pneumatic tampers (Fig. 10) were tried out and found to do more work than the hand labor, which they replaced (Fig. 9). While the time record of their performance was variable due to the necessary delays in replacing the warped rails, their efficiency of operation was very satisfying to the company. For supplying compressed air to the tampers a standard straight line Ingersoll-Rogler compressor was mounted on a heavy construction wagon together with a short-belted electric motor and air receiver (Fig. 11).

Investigation of results seems to justify the claims that machine tamped track is of greater stability and permanence than hand tamped track. Unfortunately no test data are available on electric railway work. The results obtained by the New York Central may be of interest as an indication of the quality of the work done by this type of machine. As a test 800 ft. of track was machine tamped and a similar length hand tamped. At the end of six months the comparative stability was measured with the following results:

Greatest Settlement		Least Settlement		Average Settlement	
Hand	Machine	Hand	Machine	Hand	Machine
0.116 ft.	0.063 ft.	0.018 ft.	0.004 ft.	0.067 ft.	0.033 ft.

This experiment was conducted on track over the Hackensack Meadows, New Jersey, where the foundation was soft, and for that reason not the ideal place for the purpose. The comparative results observed have been unofficially verified in electric railway work but exact figures have not been compiled.

How European Roads Deal with Strikes

Mr. Fox Says That Unionism Undermines Discipline and Cites Examples from Abroad of Attitude of Municipalities in Such Cases

IN a letter to the *New York Times* of Sept. 18, John P. Fox, transportation expert, discusses the subject of strikes on electric railways in this country and abroad. Among other things he says:

"It seems to one who has impartially investigated the results of transit strikes in other cities that the public has almost always been the chief sufferer in the end. Higher wages have been followed by inferior service, while unionism has undermined discipline at the expense of safety and the proper treatment of passengers by employees. No one will question the fact that unions have their place, and that strikes are necessary in certain trades, nor the possibility that transit workers may need better conditions and higher wages on some of the lines in New York. But, whether the railway companies are right or wrong in the present instance, the victory of the Amalgamated seems sure to be an injury to the public. Unionism has been carried so far on transit systems in this country that the people must now step in and insist on the consideration of their rights.

"The strongest arguments against the interference of the unions with public transportation are to be found in the experience of British cities. On no transit lines are the workers better treated than on the municipally owned and operated systems of England, with their nine-hour day, six days a week, free uniforms, a week's vacation every year with pay, pensions, bonuses for safety, and frequent increases of wages. And yet these model transit systems, which are generally charged with paternalism, in order to maintain discipline and give adequate service to the public, have found the unions a menace, and have on more than one occasion fought them with every weapon used by the New York companies, such as refusing union recognition, locking out men, employing strikebreakers and even prominent citizens to maintain service, declining arbitration, refusing to reinstate strike leaders, and taking men back only on signing individual contracts.

"The stories of the English tramway strikes read

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surprisingly like the New York strike up to the present time, and it is to be hoped that this one will end in the same way, with the subordination of unionism and unreasonable demands to the interests of the public.

"On the Halifax municipal system in 1906 the men struck to compel the reinstatement of a motorman who had caused a fatal accident resulting in the loss of two lives and injuries to other passengers. The city employed strikebreakers, gradually replacing them with local men, refused arbitration on the ground that it could not discharge new men, and took back only a small number of the strikers who were sufficiently penitent and could be given work.

"The English railroad strike of 1911 was coincident with a widespread condition of unrest on the tramway systems, and caused several inconsidered strikes in the large cities. While the municipal managers at times conceded something to the men in order to stop the epidemic of strike fever, the public interests were kept foremost, only reasonable concessions being made; while in some cities the unions were handled without gloves. In Leeds, the men started to strike without notice or any good cause, in spite of the plea of the mayor for a day's delay to initiate arbitration. They were promptly locked out by the manager, obliged to accept the very terms they had rejected, and sign a three years' agreement.

"In Glasgow, where one might expect the unions to have the greatest hold, the sternest measures of all were applied. Concessions had just been made to the men before they went out, so that little consideration was shown them. The municipal manager was given absolute power to handle the strike. Arbitration was refused because it carried with it reinstatement of all the men, and it was decided to retain all new men and never to let certain strikers return. In this case the city itself broke up the union because of its interference with a public service.

In Liverpool, more leniency was shown in taking back the strikers, because they admitted they had been misled, and promised never to strike again. When the men suddenly left their posts in the municipal power house, threatening the city's lighting supply as well as current for the cars, prominent young men took the places of the strikers, and kept the fires, engines, and dynamos going day and night. When the strike was over these volunteer citizens formed a permanent body to respond in future emergencies. Public money as well as private funds were given to the municipal employees who were loyal during the strike.

"While the New York transit lines are not operated by the city, many of them are owned by it, and no city in the world is so dependent on transit as New York is. Unionism has twice interrupted the service, and if the English municipal systems were justified in taking extreme measures to serve the public, are not the New York companies all the more justified, and should not the authorities support them to the end in preventing further interruptions? If the strikers were misled and are penitent, let them be taken back as individuals, but under conditions which will make them remember that they deserted positions of public trust.

"The transit systems of New York and the character of their employees have been steadily improving in recent years. To give in to the union now would demoralize discipline and endanger all the progress in the treatment of the public on the cars. It is greatly to be hoped that the strikers will see their mistake and avoid further conflict.

"To recognize the union would also mean a constant rise in wages without regard to the ability of companies to pay the increase. That is what is alarming the companies in union cities. While freight rates can be raised on railroads, it is impossible to raise city fares. With the obligations of the dual system to face and a heavier cost of subway construction than ever expected, the City of New York is certainly interested in keeping down the operating expenses of the companies, unless taxes are to be burdened with future deficits."

Fire and Accident Prevention Day

THE National Fire Protection Association has cooperated with the National Safety Council in preparing for the celebration of a "Fire and Accident Prevention Day" on Oct. 9. In this they will have the assistance of the National Association of Credit Men, the Fire Marshals' Association of North America and the International & Dominion Association of Fire

POSTER USED IN ADVERTISING FIRE AND ACCIDENT PREVENTION DAY

Chiefs. President Wilson and the state governors will issue proclamations and the trade organizations in every town of 10,000 inhabitants and over will be reached. The accompanying illustration is from a large poster, in colors, of which copies, accompanied by suggestion pamphlets, are being sent to all those who desire them. The pamphlet is designed to be helpful in planning the day's exercises.

A recent survey of the several thousand employees of the various companies included in the Illinois Traction System shows that 1200 have been with the company more than five years, 400 more than ten years, seventy for a term of fifteen years, forty-three for twenty-five years, five for thirty-five years and two for forty-five years.

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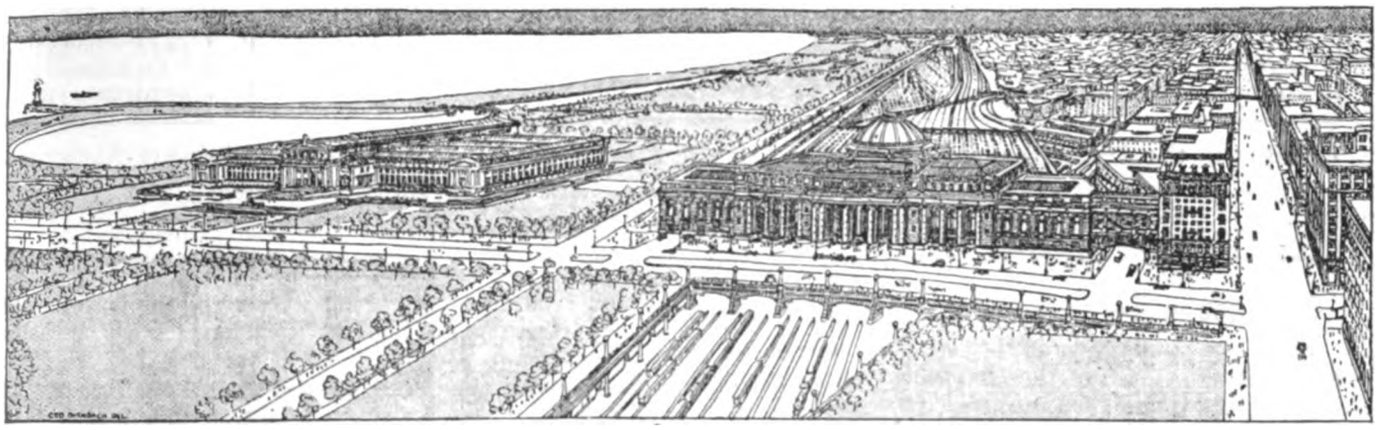


BIRD'S-EYE VIEW OF TERMINAL DEVELOPMENT PROPOSED BY ILLINOIS CENTRAL RAILROAD FOR CHICAGO LAKE FRONT

Illinois Central Proposes Three-Level Union Station for Chicago

The Illinois Central Railroad has submitted to the railroad terminal committee of the City Council plans for a new $20,000,000 terminal to accommodate every railroad entering Chicago excepting those using the Northwestern and Union stations. A. S. Baldwin, chief engineer of the railroad, states that the complete development of this plan necessitates the electrification of suburban traffic.

In the proposed terminal station the tracks enter on three levels. The uppermost would contain twenty-four passenger tracks, the middle level would be devoted to freight and express traffic, while on the low level, to be reached by subway, suburban traffic would be handled.

The accompanying illustrations reproduced from the Chicago *Herald* of Sept. 21 are typical of the drawings submitted by Mr. Baldwin to the terminal commission on Wednesday of this week. They show a head house or station proper with a frontage of about 700 ft. and a depth of 250 ft. Its architecture is of Ionic style and it is designed to harmonize with the Field museum under construction to the east. In the bird's-eye view a hotel is shown located on the corner of Michigan Boulevard and Twelfth Street extended toward the east. A bridge across Indiana Avenue extended north to Grant Park connects the hotel with the station.

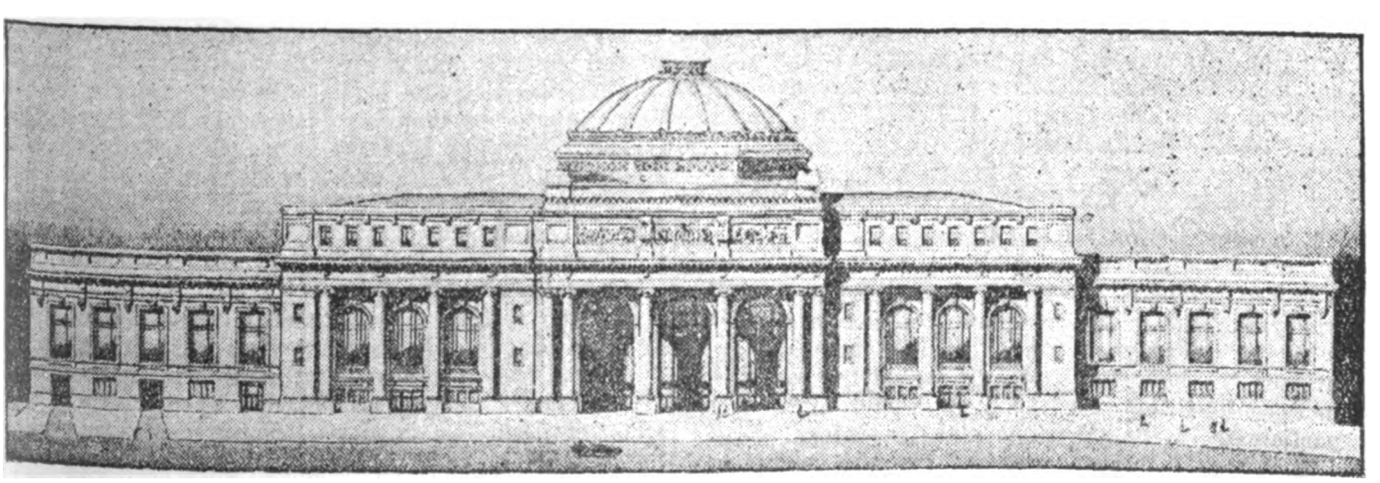
The plan calls for the separation of grades at Eighteenth Street, the long distance trains ascending and the suburban trains descending. It is also proposed to purchase a 200-ft. strip immediately north of Eighteenth Street extending to the south branch of the Chicago river, to intercept other lines which might contract to use the terminal. There would be an entrance into the terminal yards at Eighteenth Street, a distance of about 3500 ft. from Twelfth Street. This connecting line would be brought to the yard at a considerable elevation.

It is also proposed to extend the Twelfth Street surface car line to the east boundary of the Illinois Central property, the tracks being depressed under Michigan Boulevard.

At present no agreements have been made with the other roads which would have to use the terminal to make it a complete success. There is also no definite proposition regarding electrification. While, as stated above, Mr. Baldwin considers the electrification of the suburban lines necessary for the complete development it is not necessary to a partial development as the lines can be brought in on the present level.

The committee showed interest in the plans presented but suggested a more tangible proposition which was promised within a month. In the meantime the other roads interested refuse to commit themselves as to their attitude in the matter.

The Court of Appeals at Vancouver, B. C., has decided that the liability for paying the damages in the Main Street runaway car case of September, 1914, in which the pranks of mischievous school boys resulted in a collision between runaway freight cars and a street car, with two deaths and numerous accidents, falls upon the British Columbia Electric Railway. The Appeal judges have relieved the Dominion Creosoting Company, which as the consignee of the freight cars was made a co-defendant in all the suits, from liability to pay damages.



FAÇADE OF PROPOSED LAKE FRONT RAILROAD TERMINAL FOR CHICAGO

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1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

ASSOCIATION NEWS

1916 CONVENTION ATLANTIC CITY OCTOBER 9 TO 13

Changes in the Tentative Program for the Atlantic City Convention of the Association Are Announced—At a Meeting of the Manila Company Section the Duties of Trainmen Were Discussed

Changes in Tentative Convention Program

Since the publication of the tentative convention programs in the issues of the ELECTRIC RAILWAY JOURNAL for Aug. 12, page 280, and Sept. 16, page 496, the following changes have been announced:

American Association.—The first committee report on Tuesday morning, Oct. 10, will be by the convention committee instead of the committee on subjects. Capt. S. D. Embick, United States Coast Artillery Corps, will deliver an address on Tuesday morning on "Electric Railways and Preparedness," in place of Brig.-Gen. Erasmus M. Weaver. The last report on this morning will be that of the committee on cost of passenger transportation service.

To the Wednesday morning program two committee reports have been added at the end; those on street traffic and conference with the United States Bureau of Standards as to the Safety Code.

At the Thursday morning session Frank J. Sprague, consulting engineer, New York, will give the address on "The Physical Development of Electric Railways," and A. B. Leach, A. B. Leach & Company, New York, one on "The Financial Development of Electric Railways." The first report on this morning will be one by the committee on recommendations in the president's address.

Accountants' Association.—The committee on passenger, freight and express accounting will not present the report scheduled for Wednesday afternoon.

Engineering Association.—The report of the delegates to the National Good Roads Congress will be the last item on the program for Wednesday afternoon.

Claims Association.—At the Monday morning session the written discussion on "Workmen's Compensation Acts" will be presented by Leonard J. Tynan, attorney Public Service Railway, Newark, N. J.

Transportation and Traffic Association.—At the joint session with the Engineering Association on Tuesday afternoon the block signal committee report will be discussed first.

On Thursday afternoon T. S. Wheelwright, president Virginia Railway & Power Company, Richmond, Va., will speak on "Company Publications, Their Use and Value"; and J. A. Braden, passenger agent Northern Ohio Traction & Light Company, Akron, Ohio, will speak on "Company Publications, Their Preparation and Publication." These are in addition to the speakers on these topics already announced.

Capital Traction Men Get Together

Company section No. 8 started off the fall work with a "get together" meeting on Sept. 14 with a round hundred members present. J. H. Hanna and D. S. Carll, vice-presidents of the company, congratulated the section on the progress made in eight months and expressed the hope that not only would the membership increase but that the members would more actively participate in the programs and discussions.

G. Thomas Dunlop, attorney for the company, described in an instructive manner the operation of the claims and legal departments, and explained how greater co-operation between the claims and other departments could be fostered. Paul Proctor of the transportation department and Charles Richmond of the mechanical department also entertained the members with piano and vocal numbers. It was announced that the next meeting of the section will be held on Oct. 19.

Discussion of T. & T. Association Reports

President H. A. Nicholl of the Transportation & Traffic Association has sent to the general managers of member companies and others copies of a letter emphasizing the importance of attendance at the convention and participation in its proceedings. He directs attention to the program of the T. & T. Association meeting printed in the September issue of the association magazine and in the ELECTRIC RAILWAY JOURNAL for Sept. 16.

Annual Meeting Manufacturers Association

The American Electric Railway Manufacturers Association will hold its annual meeting on Wednesday, Oct. 11. Arrangements have been made for the use of the Park Avenue hall of the Marlborough-Blenheim Hotel. This hall is on the ground floor directly under the main office of the hotel. The exact hour of the meeting will be announced in the Convention Daily issue of the ELECTRIC RAILWAY JOURNAL.

Duties of Trainmen Discussed in Manila

Joint company section No. 5 held its nineteenth monthly meeting in Manila on Aug. 8 with forty-three members present. The paper of the evening was on "Duties of Trainmen" by Eugene Wagor, traffic inspector in the transportation department.

Mr. Wagor outlined clearly the elements of cultivating good-will on the part of the public, stating that in years of railroad and street car service he had never found a passenger whose anger could not be dissipated by courteous treatment. He gave the trasportation men valuable practical advice, emphasizing the importance of poise. To quote him directly on this point: "Some conductors can have a car full of passengers and their fares all collected with no show of hurry or excitement, and one thus able to give the proper attention to passengers boarding and leaving the car, answering all questions without snapping their heads off. They can give the proper signals to their motormen, thereby preventing costly accidents and long stops which all cost money to their company; and they can do this without causing unnecessary delays to their passengers, who are in a hurry to reach home in time after the completion of their day's work.

"The motorman and conductor must always bear in mind that they have very trying jobs, serving the public, but they also have passengers on their cars who may have had equally as trying a day as themselves. On the other hand, we have the conductor who rides at the same point and with the same kind of a load who has not half collected his fares, his cap is on the side of his head, his coat is unbuttoned and he is wet with perspiration from unnecessary excitement and worry. He

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is unable to answer his passengers' questions politely and he signals his motorman to go ahead without looking to see if there are passengers trying to get off or on the car. He misses fares, accepts old or late transfers, etc."

An excellent point made by Mr. Wagor was that the man who uses the most power in operating his car is the most tired out when he leaves the carhouse at night. This is due to the fact that he wastes his own physical energy in applying the brakes with too much force. As another result the equipment suffers also.

The paper was discussed by representatives of several departments, and in closing the discussion, vice-president C. N. Duffy humorously called attention to the advantages which the employees have over the stockholders. He said: "We employees should congratulate ourselves on the advantage that we have over the owners of the property in that we, unlike them, have no money invested in the property subject to the risks and uncertainties of the business; that we receive our wages first while the owners receive theirs in the shape of returns on their investments providing the profit from operation yields such returns; that we as employees could easily change our business if we cared to do so, that the owners of the property could not unless they could get out of it the 14,000,000 pesos which they have invested in it."

COMMUNICATIONS

Mr. Henry on Public Relations Outline

AMERICAN ELECTRIC RAILWAY ASSOCIATION
INDIANAPOLIS, IND., Sept. 14, 1916.

To the Editors:

I have been very much pleased with the work in your issue of Sept. 2 on "Improvement of Public Relations." This is certainly finely done and cannot but result in a great deal of good. I have gone over it carefully and must say that I have never seen anything on the subject so well done. The industry is very much indebted to you for it. CHARLES L. HENRY, President.

Unit for Comparing Track Upkeep Costs

THE SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION
DALLAS, TEX., Sept. 8, 1916.

To the Editors:

I have been reading with very much interest the editorials and communications on a desirable unit for comparing track upkeep costs, and the more that the subject is exploited the greater is the proof of the writer's contention that "there ain't no such animal." The reason for this is that there are too many variants—almost as many as there are miles of paved-in electric railway track in the United States. If the variants were confined to the track itself, it would even then hardly be possible to find a unit that could be made to include them all and still be convenient and accurate for comparison. But when it is remembered that there are outside variables almost as innumerable as those in the track, it is easily appreciated that such a unit is an engineering, operating and statistical impossibility. Both of the communications in the Sept. 2 issue of the JOURNAL emphasize this point. Mr. Berry goes into the matter a little more thoroughly than does Mr. Mitchell and, taking up his own suggestions, he would have in the neighborhood of 1500 variables, divided fairly evenly among the three "classes" which he suggests.

Personally, I fail to see why the time, thought and exertion of the A. E. R. E. A. should be wasted on this matter when any unit on which they might agree would be an absolutely arbitrary one and of no value for general comparison. There are so many pressing matters at the present for the attention of the A. E. R. E. A. which are infinitely more valuable and are infinitely more easy to achieve than this will-o'-the-wisp of a "track upkeep unit."

The same is true with regard to the space occupied by the disquisitions on this subject in the technical journals, in convention and committee proceedings, etc. A thorough reading of all the written matter on this subject shows that it consists almost entirely of either impracticable suggestions for such a unit or of disquisitions on the fact tending to prove that such a unit is an impossibility at the present time.

H. S. COOPER, Secretary.

Corporations as Employers

JOHN A. BEELER, CONSULTING ENGINEER,
BOSTON, MASS., Sept. 16, 1916.

To the Editors:

One does not hear the term "soul-less corporation" used as it was twenty years ago for the reason that the big corporations are usually the best employers. Individual employers cannot begin to give their employees the benefits accorded by means of pensions and kindred advantages accorded by the large incorporated concerns.

The article appearing in the JOURNAL for Sept. 2 on "Improvement of Public Relations" was the most concise and complete résumé of things desirable along those lines that I have seen. From personal experience with a number of the policies enumerated, I know that they pay in every way not even excepting the financial side. However, when a company enters into such methods purely from a selfish desire to profit financially thereby, it means failure from the start.

First and always the plan adopted must be because it is right to do so. That fact established is the first step. Then the administration of the policy must be sincere, never losing sight of the fact that the basis is to do what is right. This fosters internal enthusiasm in the concern which, when it pervades the organization to the point of absorption, bubbles over, inoculating patron and public. Then it is a success.

JOHN A. BEELER.

Name for One-Man Car

CHICAGO, ILL., Sept. 18, 1916.

To the Editors:

Seeing in your issue of Sept. 16 an inquiry as to a suitable name for the "one-man car," I suggest the name "Tram-Bus." A FRIEND.

New testing codes have been issued by the American Society of Mechanical Engineers, which contain rules for conducting performance tests of power plant apparatus, such as boilers, reciprocating steam engines, steam turbines, pumping machinery, compressors, blower and fans, complete steam power plants, locomotives, gas producers, gas and oil engines and water wheels. These codes have been prepared by a committee of experts, the power test committee, under the chairmanship of George H. Barrus, and represent six years of work of the former testing codes of the Society.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

New Insulator Clamp to Replace Tie Wires—Trolley Wire Which Broke but Six Times in Eight Years—A Track Sander that Hits the Curves—Homemade Rail Grinder with Extra Derailing Wheels—Improved Ball-Bearing Journal Box—Simple Circulating Pump for Air Compressor

Trolley Wire Experiences of the Union Railway, New York

Long Life Records of Wire Which Is Used Under Severe Operating Conditions

BY J. D. KENT
Electrical Engineer of the Company

The earlier installations of trolley wire on the Union Railway lines in the borough of the Bronx, New York, were of No. 00 hard-drawn copper. However, as early as 1908 it was found desirable to install wire of greater toughness and larger cross-section on Westchester Avenue between Kelly Street and a point 200 ft. east of Prospect Avenue. This pioneer installation, put up in the spring of 1908, comprised ½ mile of No. 0000 grooved Phono-Electric wire. This wire has been in use since that date on a route with car headways as low as thirty seconds, therefore a record of its behavior is not out of place.

Like its predecessors, the wire is carried in a trough which is suspended from the cross-struts of the elevated railway structure at this location. Up to 1908 the height of the trolley wire varied according to the height of each cross-strut, so that trolley wheels were frequently dewired at the breaks in grade of the overhead. The new wire, however, was suspended to remain consistently parallel to the paving.

A far more difficult operating condition which could not be solved so readily was that of clearance. The distance between car roof and trolley wire was so scant that the wire had to be offset 10 in. to 12 in. in order that the pole might clear the springs of the trolley base. Naturally, this offset introduced considerable side wear on the wire. Another bad condition was due to the fact that the tracks were on a 4 per cent grade.

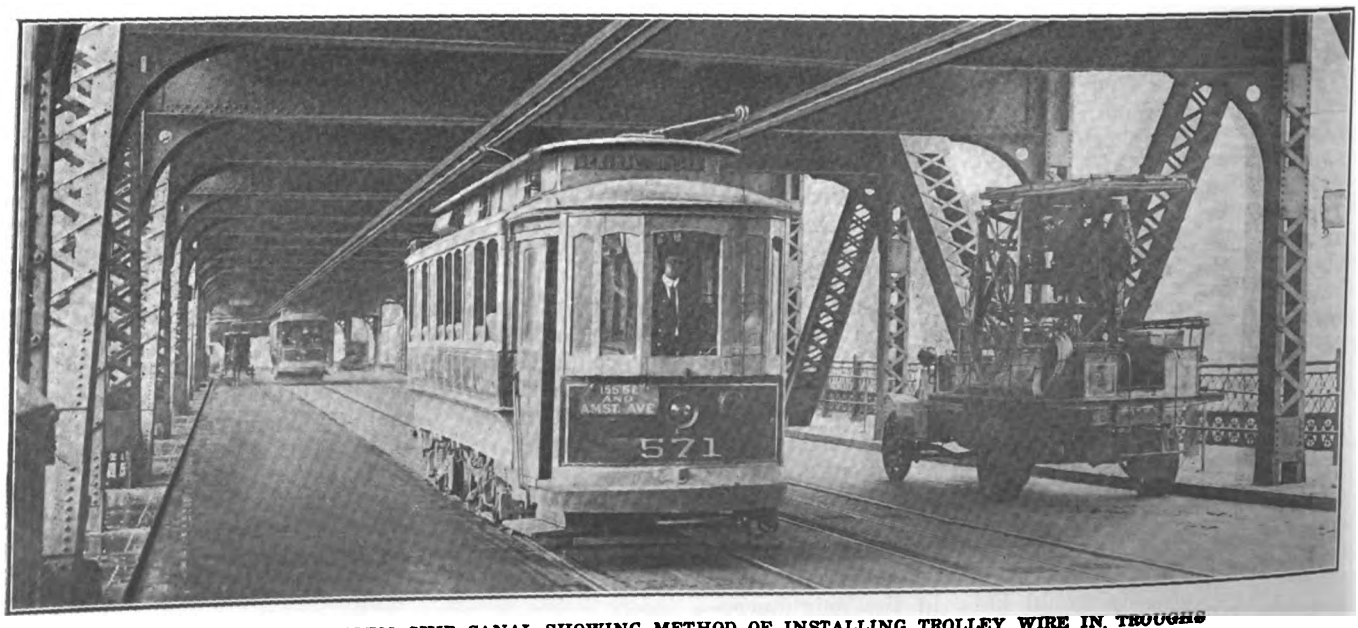
It has been noted that the original wire was No. 00 hard-drawn copper. Under the severe operating conditions described, this wire had to be renewed at least twice a year, and breaks were frequent, sometimes occurring within a week after erection of the wire. The record of the present wire to June, 1916, shows a total of six breaks in eight years, and but one break was due to car operation. The other breaks were due to fouling by high vehicles.

Recent calipering of this pioneer layout shows that the diameter of the wire has worn down from the original dimension of 0.482 in. to an average of 0.360 in., and a minimum of 0.205 in. As long portions of this wire are approaching the 40 per cent wear allowed for this wire, it will be replaced during the current year. When scrapped this No. 0000 composition wire will have given more than sixteen times the life of No. 00 copper—a most remarkable record.

LATER INSTALLATIONS

As a continuation of the original ½-mile described, the company put up during May and October, 1914, 4 miles more of the same No. 0000 grooved wire to replace No. 00 copper. The 4½ miles cover Westchester Avenue between Third Avenue and Southern Boulevard. Another case of rapid wear was on the 1/5-mile stretch under the Third Avenue elevated structure between 145th and 149th Streets. The wires are carried from short bulldog hangers, excessive wear arising in the center of the bulldog clamps which are about 3½ in. long. The No. 00 copper here was replaced with the No. 0000 composition in June, 1914, and is still in good shape, although the rush-hour headway under it is one-half-minute or less.

The latest replacement of a long length of No. 00 copper with grooved No. 0000 composition wire is for 4



BRIDGE ACROSS HARLEM SHIP CANAL SHOWING METHOD OF INSTALLING TROLLEY WIRE IN TROUGHS

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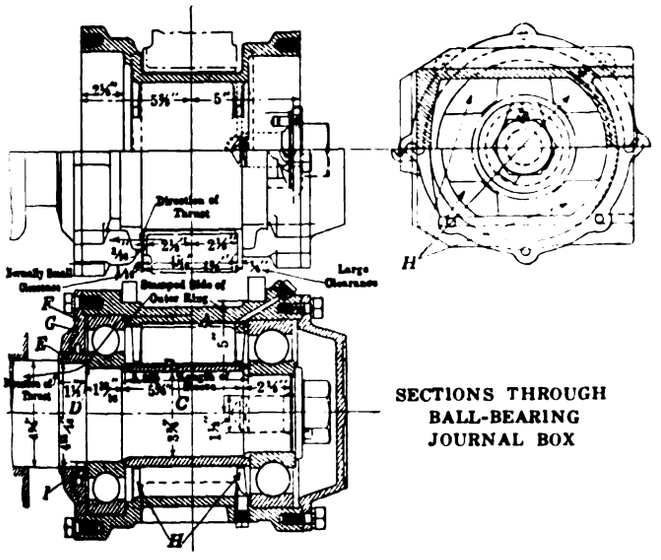
miles put up during May and June, 1915, on White Plains Avenue between Gun Hill Road and the city line. The four car lines on this route have a combined headway slightly below two minutes. An unusual installation of No. 0000 Phono-Electric wire is on the bridge which spans the Harlem Ship Canal at 223d Street. The length of this installation, including the bridge approaches, is ¼ mile. The wire, extending between Isham Street and 225th Street, replaces an iron bar construction which had been found to be too noisy.

An Interchangeable Ball-Bearing Journal Box

This Box Complete with Bearings Can Be Slipped on the Axle and Locked Securely to It

BY O. BRUENAUER
General Sales Manager Gurney Ball Bearing Company

In the ELECTRIC RAILWAY JOURNAL of June 10, 1916, page 1036, there appeared an abstract of a paper given by the writer before the Illinois Electric Railways Association on "Application of Ball Bearings to Railway Car Journals." The following description of a journal

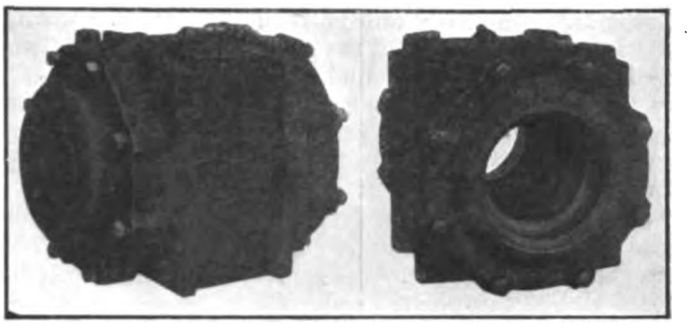


SECTIONS THROUGH BALL-BEARING JOURNAL BOX

box, complete with bearings which has been designed for use on standard trucks is supplementary to that paper.

With this journal box all that is now required by a car builder or user is to turn down the axles to fit the bores of the bearings and provide for a suitable locking device on the end of the axle. The box with the bearings may then be slipped over the axle and may also be taken off as a unit when wheels are to be changed.

The drawing herewith shows the standard box designed for use on a 25-ton street car. The general principles of the design are the same for all purposes and



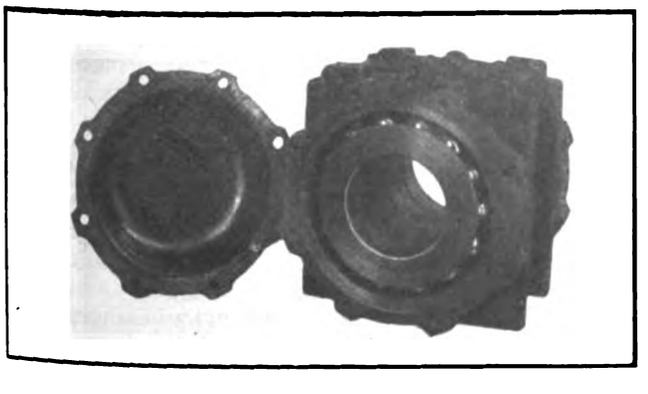
BALL-BEARING JOURNAL BOX READY FOR MOUNTING

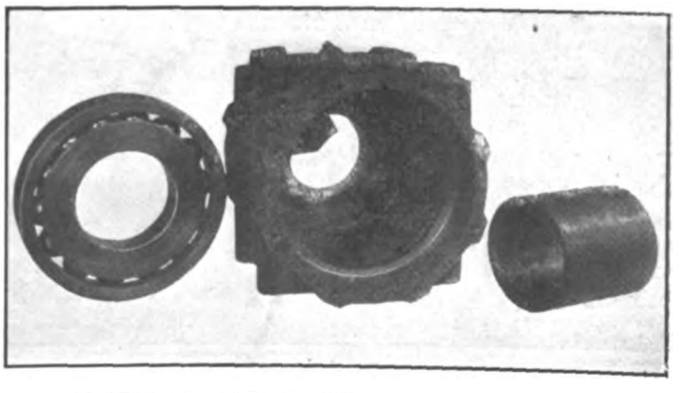
the variations are governed merely by the size of bearing that will be required for certain weights of cars and the type of truck to which the boxes are to be applied.

The bearings used in connection with these boxes, which are also shown herewith, are of the "radio-thrust" type. The balls make contact with the races at an angle which affords a thrust capacity of 100 per cent of the radial capacity. Due to the angular contact of these bearings, the slack or end play must be taken up. The method of taking up this end play is one of the characteristic features of the design.

As shown in the drawing which appears opposite, the thrust sides of the outer rings of the two bearings face each other. Between the respective faces of the inner rings of the two bearings is the spacer sleeve *C*. Its length, *B*, in relation to the shoulder distance *A* is such that when the bolt on the end of the axle is screwed down, the inner rings of the bearings with the intermittent spacer sleeve are locked tight against the shoulder *D* on the axle, and bring the outer rings of the bearings in proper contact with the shoulder of the box. No matter how tight the bolt may be screwed down there can be no cramping of the bearings. The whole design is entirely independent of any adjustment and the locking device, which is the bolt, may be screwed down as hard as the threads will permit.

When the car is going straight ahead the bearings in the box take purely radial load. In going through a right-hand curve the inside face of the pedestal, having normally a clearance of 1/16 in. with the inside face of the slide of the box, will come in contact with the inside face of the right-hand box, thereby transmitting the thrust in the direction indicated on the drawing onto the inside bearing in the right-hand box. This inside bearing is at this moment carrying the least radial load, while the maximum radial load is carried by the left-hand box. The left-hand box is not in contact in any way laterally with the pedestal and no thrust can be transmitted onto its bearings for the reason that there is very large clearance (¼ in.) between the outside face of the left-hand pedestal and the outside faces of the box slides. In other words, when the car sways to the left the pedestals are in contact only on the inside face





DETAIL VIEWS OF INTERCHANGEABLE BALL-BEARING JOURNAL BOX

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of the right-hand box and no thrust whatever is being transmitted on any one of the other three bearings. This method of distributing radial and thrust loads in such a way as to make the bearings with the least radial load carry the thrust and to relieve the bearings carrying the maximum radial load of all thrust makes decidedly for safety and economy of construction.

Since the boxes are furnished complete with the spacer sleeve, perfect interchangeability of parts is obtainable. In consequence any man of ordinary intelligence who is capable of handling a monkey wrench can mount the boxes on the axle. Under ordinary conditions there is no necessity for taking the bearings out of the box. Eight lugs, *H*, support the spacer sleeve in a central position when the box is not on the axle.

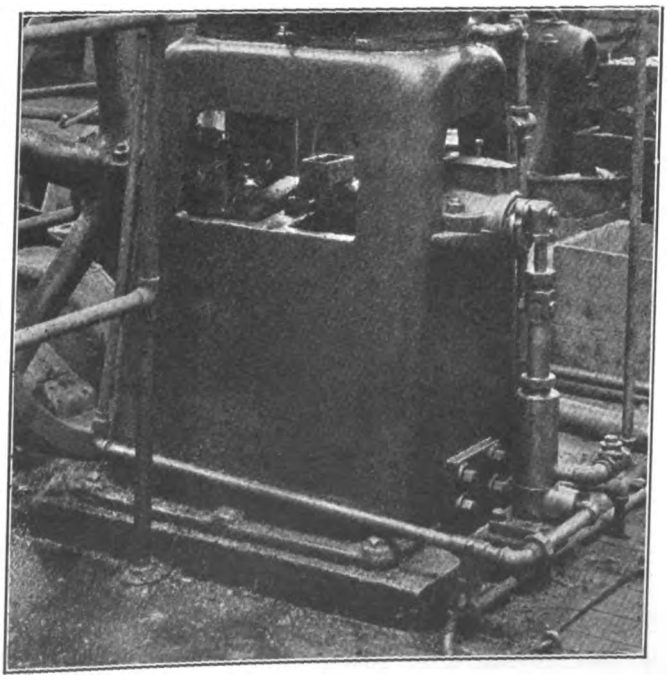
On the rear end of the box next to the wheel is a dirt seal which has been mentioned previously. A stationary collar, *F*, is screwed to the box. Collar *E*, revolving with the axle, fits with a given clearance into the collar *F*. As a result there is a grist-mill action with surfaces revolving against each other. Grit or dirt between these two surfaces is driven out and none can get in. The device is at the same time an oil seal. Screw plugs for filling the box with lubricant and for draining it are provided at the top and bottom of the box respectively.

In this type of bearing the designers have aimed to eliminate the difficulties connected with the assembling and adjustment of bearings by mechanics unskilled in such work. By furnishing it as a unit the required accuracy of machinery and absolute interchangeability of parts are assured.

Pump Cuts Down Compressor Circulating Water Cost

BY HARRY BRANSON
Superintendent of Equipment, Lehigh Valley Transit Company, Allentown, Pa.

The yearly water bill of the Madison Street shop of the Lehigh Valley Transit Company, Allentown, Pa., formerly amounted to about $200. It is now less than $50. The little pump shown at the side of the air compressor in the accompanying illustration has accomplished this saving for the company.



AIR COMPRESSOR EQUIPPED WITH SMALL CIRCULATING WATER PUMP

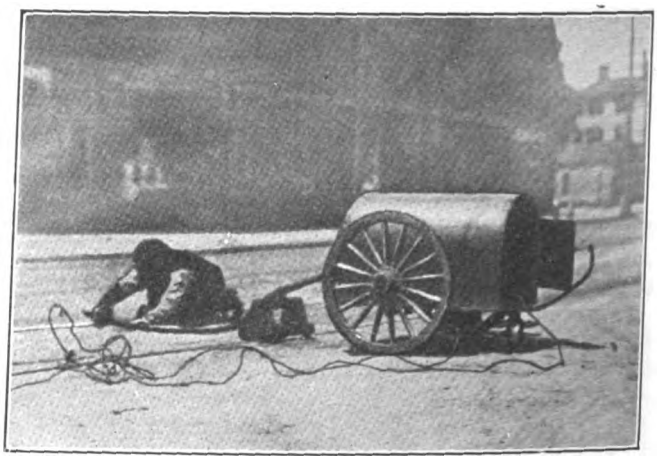
The compressed air for shop use is supplied by an air compressor having two 8-in. x 8-in. cylinders and a speed of 100 r.p.m. Formerly the circulating water for the compressor was taken from the city mains and wasted after passing through the water jacket. A pump, designed by the writer and made in our own shops now maintains a constant supply of circulating water. A tank 18 in. in diameter and 4 ft. high is located about 20 ft. above the compressor. From this tank the water flows by gravity through the compressor jacket and down to the pump, which forces it back to the tank. All of the piping is ¾ in. in diameter. The pump plunger is 1½ in. in diameter, and has a 6-in. stroke. It is connected by a short link to a small crank on the compressor crankshaft. The water is taken in at the bottom of the pump through a ball valve. The outlet pipe, which is just above the intake, is provided with a check valve.

This method of supplying cooling water for an air compressor is simple and can be readily applied in any shop as one means of reducing the water bill.

Rail Grinders on the Boston Elevated Railway

The Boston Elevated Railway since 1899 has been using a flexible shaft grinder made up in the company's shops at a cost of about $350 which includes a 1.5-hp. electric motor installed on a light two-wheel cart, as shown in the accompanying illustration. The shaft of this grinder is made by the Stow Manufacturing Company, of Binghamton, N. Y. The shaft is 8 ft. in length and connected to the motor through a universal joint.

The company now has six of these machines in service. These grinders can be used for work in grooves,



PORTABLE RAIL GRINDER USED IN BOSTON, MASS.

on the tread, and along the gage line. The wheel used is 10 in. in diameter and 1 in. thick for groove or gage-line work, and 1.5 in. thick for the tread grinding.

Considerable work is done with this grinder following the electric welding by the three Indianapolis welders. Other uses are grinding center plates and special work.

The cart which carries the motor stands alongside the track without impeding traffic to any extent. The wheel and shaft are easily removed on the approach of a car, and as readily replaced in working position, the weight of this portion of the machine being about 30 lb.

With skillful manipulation, which an intelligent trackman soon acquires, excellent work can be done with this machine. The roadmaster estimates that the average cost for grinding joints is about 40 cents each.

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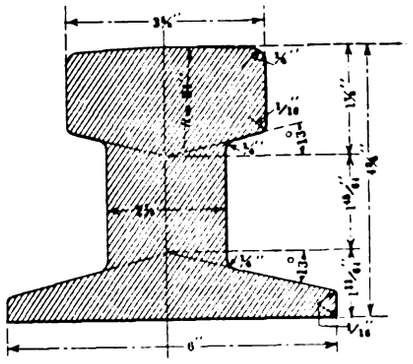
150-Lb. Third-Rail for New Lines of the Interborough in New York City

The Interborough Rapid Transit Company will install approximately 100 miles of 150-lb. third-rail on its new lines which form part of the dual system of rapid transit of New York City. The accompanying illustration shows the cross-section of the third-rail that has been developed for these lines. The actual weight is 153 lb. per yard, and the cross-section is slightly more than 15 sq. in. The principal dimensions are shown in the illustration. The rail will be supplied in 60-ft. lengths, 10 per cent of which may be shorts.

The specifications for this rail call for a carbon content of not less than 0.15 per cent and a resistivity of



150-LB. NEW THIRD-RAIL FOR THE INTERBOROUGH RAPID TRANSIT COMPANY

not more than seven times that of annealed copper. The percentages of manganese, sulphur, phosphorus, silicon, etc., are not specified.

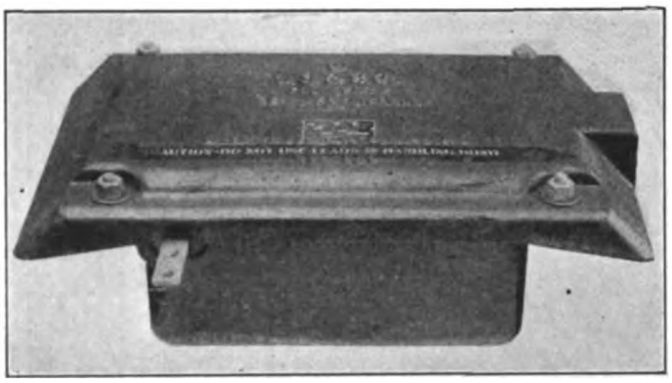
A notable fact in connection with this rail is that the percentage of carbon is unusually high for a material having such high conductivity. This means that the rail will be stiffer, that the installation will be simplified, and that it can be used in 60-ft. lengths, thus requiring approximately one-half the usual number of bonds.

A Protected Impedance Bond

The latest development in impedance bonds for use on electrified portions of trunk lines as well as on interurban railways is that of the bond shown mounted in its case in the accompanying illustration. The connections for the rails are brought out at the side rather than at the end, and the bond has a cover designed to prevent the breaking of the bond or leads by dragging equipment. The rail connections are brought out in such a way that the cables leaving the bond will lie between two ties. An end opening is provided for the neutral connection between bonds. These bonds are of two capacities, rated at 500 amp. and 1500 amp. direct current per rail. They will take care of a 20 per cent unbalancing without the impedance of the bond being seriously affected.

The purpose of these bonds is to provide a low resistance path around insulated joints for propulsion current and at the same time to provide sufficient impedance to the a.c. signaling current to maintain a potential which will allow the track winding of a relay to be normally energized. A train on the track section to which the bond is connected will short-circuit its windings, in this way producing zero potential across the relay terminals. These bonds are manufactured by the Union Switch & Signal Company, Swissvale, Pa., under the balanced bond patents.

Bonds similar tc the above are being used in the electrification of the Chicago, Milwaukee & St. Paul Railway



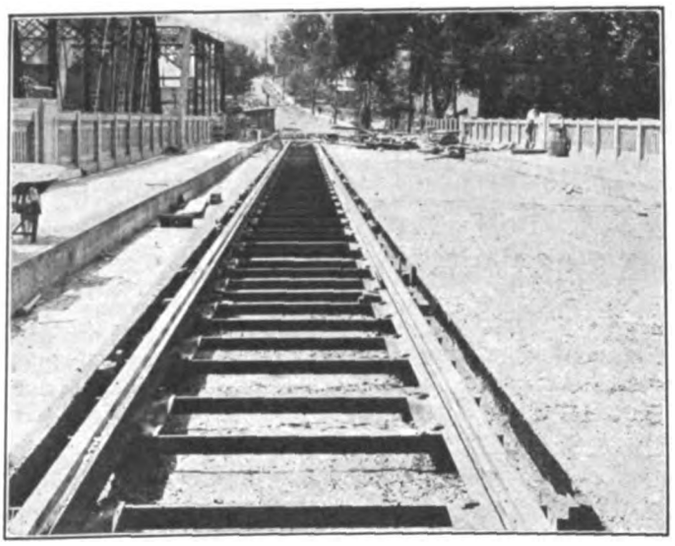
IMPEDANCE BOND WITH PROTECTING COVER DESIGNED TO FIT BETWEEN TWO TIES

through the Bitter Root and Big Belt Mountains in Montana and Idaho.

Steel Ties Used in Shallow Roadbed

The accompanying illustration shows the installation of track of the Mahoning & Shenango Railway & Light Company on the new concrete arch bridge across the Mahoning River at Warren, Ohio. This is another instance in which International twin steel ties have been used on a concrete bridge where the clearance between the base of rail and the concrete floor of the bridge is small. As shown in the illustration, the top and sides of the track trench are painted with a heavy tar preparation, so that the track construction can be renewed at the end of its life without disturbing the bridge floor.

The first large installation in which the steel twin ties were placed on concrete bridge floors was the con-



TRACK INSTALLATION ON CONCRETE BRIDGE, WARREN, OHIO

struction of the track on the Brooklyn-Brighton Bridge at Cleveland, Ohio, described in the ELECTRIC RAILWAY JOURNAL for Oct. 16, 1915, page 834. Here the clearance under the rail was only 4 in. Since then there have been many instances in which engineers have used the shallow steel ties for locations having limited clearance.

The Kansas City Railway's mechanical department welds all its broken motor frames by the thermit process. Although it is somewhat more expensive than other welding processes that could be employed, the thermit furnishes a much stronger weld, at least one has never been broken in service, and it is possible to reinforce the motor frame wherever this is required.

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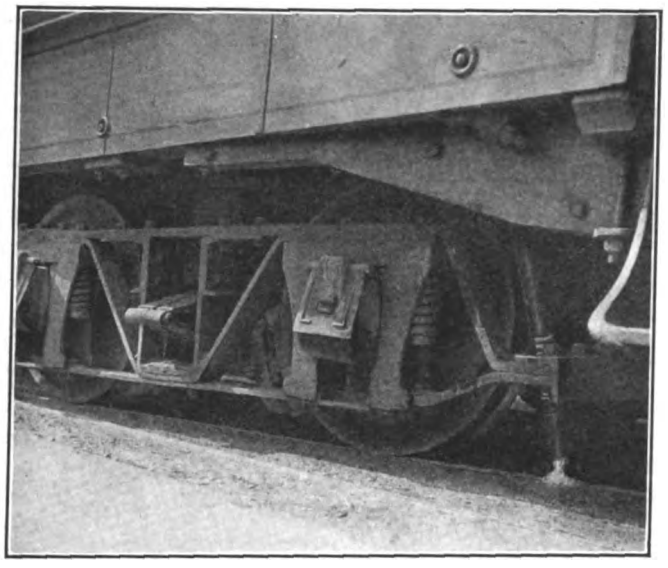


TRACK SANDER INSTALLED ON A DOUBLE-TRUCK CAR OF THE MILWAUKEE NORTHERN RAILWAY

A Cheap Track Sander

The Haese Track Sander Company, Milwaukee, Wis., has recently placed on the market a new track sander, shown herewith. This device consists of a flexible telescoping spout of No. 16-gage, cold-rolled steel and is double-walled throughout to be used in connection with air. The inner lining is constructed so that the sand cannot escape, and it is impossible for water or slush to get up into the sander. The upper end of this sander is fastened to the car and the lower end to the truck, which causes it to follow the rail with the truck as shown.

This sander has been used in actual service for more than a year on the Milwaukee Northern Railway and has been found to give satisfactory results. According to the claims of the maker, car wheels last longer, rail wear on sharp curves is reduced, time and power are saved in starting, and accidents are prevented by the use of the sander.

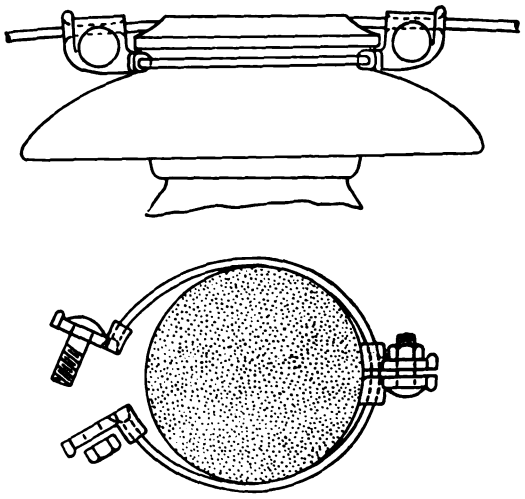
A Well-Designed Home-Made Portable Air Compressor

Frequent calls for compressed air service in various parts of the repair shops of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., as well as at the company's substations, created a demand for a portable air compressor outfit. This was supplied by the compactly-built, well-designed equipment which is shown in the accompanying illustration. A standard Westinghouse 14-cu. ft. air compressor is mounted on a substantially built truck and connected through a governor and automatic control equipment to a reservoir tank mounted on a strap-iron frame over the compressor proper. The truck was built in the railway's shops, and the complete air compressor outfit was assembled there. The automatic control cuts the compressor out of service when the air pressure reaches 70 lb. and puts it in service again at 65 lb. The compressor is equipped with a flexible cord to connect it to the source of energy, and a section of hose makes it possible to furnish compressed air for practically any service. The labor cost in assembling this equipment was about $10, and aside from the wheels on the truck, the material and the equipment used was some that had been on hand in the railway company's shops.

AIR COMPRESSOR MOUNTED ON A TRUCK IN SHOPS OF BENTON HARBOR-ST. JOE RAILWAY

A Novel Insulator Clamp

An improved insulator clamp, shown herewith, has just been patented and placed on the market by Edwin D. Hatch, consulting engineer, New York City. This



NEW INSULATOR CLAMP WHICH REPLACES TIE WIRE

device is made of two clamping members and a piece of wire extending around the insulator head. Each clamp consists of two pieces of sherardized malleable iron with a bolt extending through the center. The clamps are hinged at the ends so that they can readily take any vertical angle above or below a horizontal which the line wire may assume in passing over a hill or up the side of a mountain.

According to the maker, these insulator clamps are not rigid, but are designed, nevertheless, to be used with any size of insulator. Clamps of other designs are said to have injured insulators by chipping or causing crystallization of the line wires. Again, clamps which have not been designed to meet slight variations in insulator sizes either fit the insulator head too tightly or too loosely, with the result that some part is injured. Many times, line wires have been carried entirely above the insulators when they were somewhat smaller than usual, thus causing the clamps to carry the load instead of the top of the insulators. The clamping members at each end are free to move around the encircling wire so that, should the insulator top groove be slightly off center, adjustment can readily be made for such a condition.

It is claimed that this clamp can be installed at prac-

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tically the same cost as an ordinary tie, since it takes a much shorter time to attach the clamps to the line wire, and that the work can be done for about half the amount it costs for an ordinary tie, for the reason that cheap labor can be employed. The method of installing these clamps is to pull the wire to the correct tension with block and tackle for a number of spans, and while it is being thus held the wire is inserted in the clamp, the bolt tightened up, and the blocks slacked off.

Rail Grinder Made from Scrap

Frequently a little skill and ingenuity will make a repair shop scrap heap or a quantity of stored useless material yield a useful piece of equipment. In any event such was the case with the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., when the need for a rail grinder coupled with a resourceful master mechanic produced one which operates perfectly. This rail grinder consists of a wooden framed truck fitted with a motor-driven grinding wheel which is adjustable both vertically and horizontally. The truck is equipped with a set of adjustable wheels for removing it from the track when on paved streets. A view of this grinder is shown in the accompanying illustration.

The grinding wheel is driven by a chain belt which

HOME-MADE RAIL GRINDER USED ON THE BENTON HARBOR-ST. JOE RAILWAY

connects it to a 5-hp. d.-c. motor. The motor was a piece of discarded equipment, and so were the chain belt and the shaft on which the 4-in. x 12-in. carborundum grinding wheel is mounted. The motor is set up on a 4-in. x 16-in. plank which also carries the grinding wheel. The plank in turn is supported on three vertical screws fitted with hand wheels, so that the grinding wheel may be adjusted vertically, and one horizontal hand screw gives it a 4-in. horizontal adjustment. The grinding wheel is mounted over the track rail and the top is boxed and covered with a glass shield so that the operation may be observed, and at the same time the eyes of the workmen are protected. Two hand screws with swiveled castings and flanged wheels are mounted on one end of the grinder truck so that it may be removed from the track by lowering these wheels to the pavement. Two men experience no difficulty in derailing the grinder which weighs about 800 lb.

The track wheels and axles upon which the grinder is mounted were also reclaimed from the scrap pile. The wheels are 20 in. in diameter and they have 2-in. treads and ¾-in. flanges. The hand screws were obtained from a local junk dealer so that practically the only new material in the complete grinder was the carborundum grinding wheel and the lumber and bolts used to fasten the truck frame together. When this grinder is moved over the road it is coupled to one of the roadway utility cars, and when in service it is moved along the track by hand.

PIT LIGHTS IN SHOPS OF LEHIGH VALLEY TRANSIT COMPANY

Pit Lights Mounted on Girder Rail

The proper lighting of the repair pits in railway shops is a matter which is often neglected. The result is that insufficient illumination is obtained, the lamps are frequently broken and short-circuits occur in the long lamp cords which are commonly used.

To obviate these difficulties, Harry Branson, superintendent of equipment Lehigh Valley Transit Company, has mounted the pit lights in the Madison Street shops of the company on the side of the track girder rails, as shown by the accompanying illustration. The lamps are protected by a heavy wire netting, but they are accessible on the ends so that they can be easily renewed. The heavy sheet of tin between the lamps and the rail acts as an excellent reflector.

Corrosion Forces Rail Renewal

As a general proposition, corrosion is seldom the actual cause for making a rail renewal, although in many instances it is largely contributory. Recently Charles H. Clark, engineer maintenance of way Cleveland Railway, in taking an inventory of the tracks in need of rehabilitation during the construction season of 1916 made an interesting experiment to determine the extent to which a rail was corroded. Although the exposed surface of the rail shown in the accompanying illustration indicated that repairs would carry the track over for at least another season, an examination of the rail web showed that it was practically corroded through. The accompanying illustration shows where Mr. Clark drove an ordinary clay pick through the web. It will also be noted that practically a knife edge, indicating the advanced stage of the corrosion, had formed along the edges of the rail base.

VIEW OF CLAY PICK DRIVEN THROUGH CORRODED RAIL WEB

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NEWS OF ELECTRIC RAILWAYS

NEW YORK STRIKES WELL IN HAND

Threat of General Trade Union Strike, However, May Cause Further Trouble in New York City

A frantic effort on the part of leaders of the Amalgamated Association of Street and Electric Railway Employees to bolster up the losing strikes in New York City, in the face of constantly bettered service on the surface lines affected, has been the outstanding feature during the last week. Since this paper went to press last week the strike situation has spread to cover the New York & Queens County Railway, thus involving all the lines except one that were included under the peace settlements of Aug. 6 and 7. Under the threat of a general sympathetic strike of trade unionists in the metropolis, the strikers have been endeavoring to induce the public authorities and business interests to force the companies to bow to the union's terms, but the railways have steadfastly refused to treat with the Amalgamated Association in any way, and the proposal of a general sympathetic strike has been received with marked apathy by trade union leaders and with frank displeasure by the public. In general, therefore, the situation has shown improvement, except that disorder in the last few days has increased. Increased vigilance on the part of the police, however, and the determination of the city authorities to punish guilty strikers to the full extent of the law bid fair to keep the situation in hand.

To take up the strike story where left off last week—on Friday, Sept. 15, the Third Avenue Railway announced new wage schedules of 27 cents per hour for the first year and 30 cents per hour thereafter for its motormen and conductors, the former rates being 26 cents per hour for the first year, 29 cents per hour for the second-fifth years and 30 cents per hour thereafter. The storage-battery car rates were also increased from 25 cents per hour the first year to 26 cents per hour, and from 27 cents to 28 cents thereafter.

Late in the same day the Public Service Commission for the First District issued a formal finding of culpability against the organized employees of the Third Avenue Railway for their breach of the peace settlement of Aug. 7. All the commissioners joined with Chairman Straus and Mayor Mitchel in holding that the strike was an "action without justification and in violation of their compact." They stated that the strike should be called off at once, but this suggestion was disregarded by the union leaders.

On Saturday the Brotherhood of New York Railways Employees offered to permit strikers to return to work as members of this organization. Attached to this offer was the condition that they should return as workers lower in seniority rank than those who had remained loyal, as well as those who had entered the service of the company since the strike started. The returning strikers, however, would receive the same pay they had prior to the new wage scale of Sept. 3, and they would not forfeit their seniority to a greater extent than falling in line behind those now in the service of the company. Their conditions would be still further improved after six months of faithful service.

The first definite action along the line of authorizing a general sympathetic strike of trade unionists was taken on Friday night, when the Central Federated Union of New York recommended that "as a preliminary to the general strike, all unionists, such as Tidewater Boatmen and Longshoremen, International Brotherhood of Teamsters, engineers, firemen and plumbers, and such other trades whose labor is keeping the traction cars running, stop work," and that there be a general boycott of all the traction lines in New York. Beginning with Saturday, however, it became increasingly evident that the unions involved in this "preliminary move" were less interested in the losing fight of the Amalgamated Association than in the possible settlement of grievances of their own. The first step in the general strike was expected on Monday, Sept. 18, but only two of the unions mentioned in the recommendation of the Central Federated Union took strike votes, and these concerned demands of their own to be submitted in due course.

The union leaders on Monday at a conference with Mayor Mitchel made another attempt to force the traction lines to arbitrate certain points, and the advisory committee of unionists issued a statement to the effect that if by Friday, Sept. 22, at 2 p. m., the Mayor had failed to secure a peace settlement, a time for the general strike would be designated. The traction officials said, however, that the strikes were broken, that they had to look out for the interests of their loyal employees and that there was nothing to arbitrate. Conferences during the week between the traction officials, the city authorities and representatives of the Merchants' Association and the Chamber of Commerce failed to bring any change in the situation.

Late on Thursday, Sept. 21, Mayor Mitchel and Chairman Straus sent a letter to the trade union leaders, stating in part as follows: "Conditions which you have indicated might follow general sympathetic strikes would be grossly violative of the laws and would convulse the civilized and orderly life of the community. We wish to make it unmistakably clear to you that to prevent those conditions the full civil and military powers conferred by law upon the Mayor will be employed."

The existing strike situation was somewhat broadened on Monday night by the entrance of some union employees of the New York & Queens County Railway into the controversy. About 200 out of 560 motormen and conductors of this line, in spite of the settlement agreement of Aug. 7, went out on strike at midnight, because, it was alleged, the Queens company had furnished men for Manhattan lines to use as strikebreakers. President William O. Wood denied that any employees had been sent to help out in Manhattan.

The service offered on the various lines during the week showed improvement. The rapid transit lines continued to carry more than the number of passengers carried a year ago, and the surface operation increased each day. From 327 cars on Thursday, Sept. 14, the New York Railways without strikebreakers increased its service to 540 cars on Thursday, Sept. 21, out of a normal of about 1290. During the same period the service of the Third Avenue lines in Manhattan rose from eighty-three cars to 139 cars, the normal being 505 cars, while the allied Union Railway in the Bronx increased its car total from 141 to 181, the normal being 252. The Second Avenue Railroad, with a normal of 105 cars, did not increase its service by more than a few cars to a total of twenty-seven. Starting with half operation after the strike on Monday night, the New York & Queens County Railway gradually bettered its service. The lines of the Yonkers Railroad and the Westchester Electric Railroad, the Westchester County subsidiaries of the Third Avenue Railway, offered no service during the week on account of the restrictive experience ordinances in force.

No night service was offered on the surface lines in Manhattan until Monday, Sept. 18, when three Third Avenue Railway cars ran on cross-town lines until 11 p. m. After that this company kept on increasing its night service, and the New York Railways made an endeavor to lengthen its service gradually, but the lines were handicapped by outbreaks of violence, the first really serious ones since the strikes started. On Wednesday night strikers attacked four cars near Central Park and had to be dispersed by police reserves. After this the district attorney's office announced that strikers and strike sympathizers guilty of injuring persons through attacks on street cars would be prosecuted under the section of the penal law providing for penitentiary sentences of five to twenty years for such offences. On Wednesday night Theodore P. Shonts, as president of the Interborough Rapid Transit Company and the New York Railways, announced that a reward of $200 would be paid for evidence resulting in the conviction of any person who injured a passenger by throwing missiles.

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PURCHASE OF POWER RECOMMENDED

Engineers Advise Against Rehabilitation of Old Plant at Cleveland

At a conference in Cleveland, Ohio, on Sept. 15 it was decided to abandon and scrap the Cedar Avenue power station of the Cleveland Railway as the result of an unfavorable report from F. Sargent of Sargent & Lundy, and to purchase power from the Cleveland Illuminating Company and build a new 12,000-kw. capacity 60-cycle substation on the site of the old power house.

Mr. Sargent's report to Fielder Sanders, Street Railway Commissioner of Cleveland, follows in part:

"I have made an examination of the Cedar Avenue power plant of the Cleveland Railway and have investigated from an engineering point of view the proposed scheme of the Cleveland Railway for the installation of a new mixed pressure turbine of 5000 kw. capacity and beg to submit the following comments:

"The Cedar Avenue power plant of the Cleveland Railway was originally designed and located as part of a dual manufacturing process, in which the steam was first used for the manufacture of electric power for the railway by reciprocating engines and direct current generators and the exhaust steam was used for the manufacture of salt.

"The plant was evidently located from a point of view of the economic distribution of a certain amount of direct current for driving the street railways and more or less with a view of a favorable location for the manufacture of salt.

"The part of the process relating to the manufacture of salt has now been permanently abandoned and the plant is used solely for the manufacture of electric power, the steam being exhausted into the atmosphere.

"The plant as it now stands, while in a good state of repair and very reliable in operation, is not economical. From a fuel consumption point of view it requires at least double the coal per unit of output as compared with the latest practice in large plants. Progress has been such since this plant was built that the machinery, from the boilers to the generators inclusive, is obsolete in type and arrangement as compared with the best modern practice.

"The location of the plant is such that no natural water supply suitable for condensing purposes is available and artificial cooling of condensing water in this locality is not practicable because of the liability of damages to surrounding property from entrained water blown out of the towers and freezing where it falls in winter time and wetting surrounding property in summer time. In high winds the discharged finely divided water will carry one-half mile or more from the plant. We have experienced much difficulty from damage suits due to the use of cooling towers in similar locations in Chicago.

"It is a great mistake to erect cooling towers of large capacity in thickly populated districts of large cities because it is bound to lead to trouble with surrounding property owners.

"This means that the scheme proposed by the Cleveland Railway, in our opinion, is not a practicable one and is not competent to earn the economy that has been estimated in the report when this question of damages to surrounding property is fully considered.

"There is no practicable way that we can recommend to rehabilitate this plant in a manner that will pay the cost of rehabilitation.

"In view of the situation as herein presented it will probably be unnecessary for us to prepare any further recommendations in regard to power supply, but if anything more is desired we shall be very glad to meet your wishes."

Mr. Sanders' report to the City Council follows in part:

"I beg to report that the request of the railway company for permission to rehabilitate its Cedar Avenue plant has been carefully investigated by this office. As a result of an investigation of months by the regular engineering force and consulting experts especially hired in the city, your commissioner has come to the conclusion that the Cedar Avenue power plant as now constituted is causing a great loss to the railway company, that power is being generated there at just about twice what it should cost. This is not due, however, to uneconomical management, but to the inherent drawbacks of the plant itself, the same being inefficient, obsolete, and requiring twice the coal per unit of power that it should. We feel, therefore, that there is a loss at the present time of nearly $200,000 a year in the operation of this plant as now constituted which loss will continue to grow instead of to decrease. The proposition of the railway company to rehabilitate is, in our opinion, impracticable. After much discussion with the railway engineers, they now concur in that view, and agree even if rehabilitated according to their scheme, that power cannot be produced as cheaply as it can be bought in this city, and further, that the resultant damage to the neighborhood of the plant will be great.

"In view of the fact that the amount of money involved in this plant including the salt works, exclusive of land, is estimated at $1,265,565, and the importance of the question of disposing of it obvious, your commissioner was unwilling to rely wholly upon the opinion of your engineers and the company's engineers and secured the advice of Sargent & Lundy, electrical engineers of Chicago. Frederick Sargent made a careful investigation of the plant as it now stands and reports that 'there is no practical way that we can recommend to rehabilitate this plant in a manner that will pay the cost of rehabilitation. The scheme proposed by the Cleveland Railway, in our opinion, is not a practicable one and is not competent to earn the economy.' I inclose herewith a copy of his report.

"The reproduction value of the plant, including the salt works, but exclusive of land, has been carefully estimated at $1,265,565, from which, however, will be deducted, if your body approves the proposition, the salvage value of the machinery, which will amount to approximately $115,565. Under the Tayler franchise, as now constituted, if the plant is abandoned, it will be necessary for Council to authorize an over-expenditure in the maintenance account of $1,265,565, this sum of money will be placed in a suspense account and by agreement between the company and the city will be reduced at the rate of $20,000 a month until it is extinguished, thereby spreading the amount over a period of five years. This procedure, if carried out, in my opinion, will not affect existing conditions, because according to the figures the purchase of power will save approximately $200,000 a year. At the end of five years the initial loss will be made good, and then there will be at least ten years of steady saving of $200,000 a year during the life of a new substation.

"In addition to authorizing this over-expenditure in maintenance, it will be necessary for Council to authorize the expenditure of $250,000 for the building of a converting substation at the site of the Cedar Avenue power plant, which will be a capital charge, and also to authorize the entering into a contract by the Cleveland Railway for the purchase of its power in the future.

"I beg to recommend that Council take this action immediately, as it seems, in my opinion, to be absolutely necessary and advisable."

$1,000,000 FREIGHT TERMINAL PROPOSED FOR DETROIT

An investment of $1,000,000 is involved in the plans of the Detroit (Mich.) United Railway for the construction of its freight terminal in Detroit to take the place of the terminal it has long occupied at Congress and Fifth Streets.

The new terminal will occupy nearly three city blocks between Dequinder and Chene Streets and Monroe Avenue and Macomb Street. The property includes the old Pullman car shops purchased by the company several years ago and used as the general shops of the company. Outgrowing the accommodations as general shops, the company has been gradually constructing handsome new shop units on its Highland Park property. These units, now all nearly completed and occupied, form one of the most perfect car shops in the country. East of the old car shops at Dequinder and Macomb Streets the company has purchased the additional territory required and is preparing to remove or raze the buildings now on it.

The plans for the new freight terminal are practically ready and when the work is done Detroit will have the finest accommodations possible with a layout of tracks designed for exceptionally rapid handling of freight.

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MAYOR CALLS AMALGAMATED OFFICER A MIGHTY BAD MAN

By unanimous vote the City Commission of Harrisburg, Pa., on Sept. 12 refused to amend the jitney regulations and referred the initiative petition presented through the efforts of the striking trolleymen of the Harrisburg Railways to the people, who will vote upon the measure at the election on Nov. 7. Reduction of the bond from $2,000 to a $1,000 pool, to cut down the license fees and the penalties for violations were prayed for. Behind the movement were the striking trolleymen and jitney drivers who were led in their campaign by J. J. Thorpe, of the Amalgamated Association. Mr. Thorpe talked to newspapermen in the Council Chamber just after the passage of the measure. He is reported to have said:

"What could we expect? We didn't expect anything else but that they would do exactly what they have done; they are only controlled by the Harrisburg Railways and merely are carrying out the instructions of the Harrisburg Railways and not the request of the public. The people will be on the job at the polls this fall and there will be the damndest stir-up in politics round here that you have ever seen. Some of our friends will take the walking plank."

Mayor Meals is reported to have commented as follows on Mr. Thorpe's statement:

"If he doesn't shut his head we'll make him. Our oaths of office, I suppose, mean nothing in his estimation. He's not even a citizen here; he's only here in the interests of the few dollars he gets out of it. The strike could and would have been settled—but for him—six or eight weeks ago. On a Tuesday morning, I don't recollect the exact date, he would not let his men meet the company except as a committee from the union. On the following Friday he agreed to eliminate the union, and so submitted this to me in writing—and I've got the typewritten statement. It is signed, I think, by Hugh McLaughlin, but it came through Thorpe. Then immediately after that President Musser stated that he would not meet the strikers except individually. The citizens of Harrisburg did nothing to him, yet he strikes back at the citizens by threatening to organize every branch of labor, even, I suppose, to the washwomen and street sweepers. Those are the kind of dogs that we don't want in Harrisburg. You can say for me that I consider him a mighty bad man."

PRESIDENT BRUSH OUTLINES BOSTON ELEVATED NEEDS

In an interview in the Boston *Globe* of Sept. 18, Matthew C. Brush, president of the Boston Elevated Railway, referred briefly to the problems confronting the company in relation to the forthcoming investigation of its financial requirements by a legislative recess commission. Hearings will begin at the State House, Boston, on Sept. 25. Mr. Brush stated that at that time the company will present a full statement of the conditions which the road is facing. He emphasized the burdens placed upon the system by the construction of subways and intimated that it is not fair that the entire burden of expense in this direction should fall upon the car-rider. The increase of land values in West Roxbury, Cambridge, Watertown, Belmont, Arlington, Brookline, Brighton and Newton following the opening of subways reducing the running time between these suburbs and the center of Boston was cited and the present frequent service contrasted with former facilities. The burdens of the transfer situation were also touched upon. Fifteen million paper transfers were wasted last year by passengers. In the course of his remarks Mr. Brush said:

"It is a delicate problem that of transfers, but its treatment will certainly be one of the important points to be set before the committee. For in one way or another we must have increased net revenue for our company, and that means relief in some sort from the burdens—of which I consider the subways the greatest—which our company carries and which are imposed on no other company doing a like business elsewhere. I want the people of Greater Boston to take pride in this big company of ours. When a hitch occurs and some man finds he is not getting the service he thinks he should, I want him to realize that it is not because of the size of our job, in handling 600,000,000 persons a year, and not because we, the company officials, are not trying to give the best we can. Everybody in Boston has always been very kind to me, and I appreciate it, and I shall do my best for them and for Boston. I have no secrets here; you can come and see me at any time, and what you ask, if I am able, I will answer. Square dealing and all above board—that is all I can offer you."

COURSE IN CONCRETE CONSTRUCTION WORK OFFERED

The Portland Cement Association, representing the manufacturers of Portland cement in the United States and Canada, recognizing the value of schooling and appreciating the training that a young man may gain even by a short association with a competent corps of instructors, is co-operating with the Lewis Institute, Madison and Robey Streets, Chicago, in offering a special course in concrete work for contractors and foremen. The course, which will be a practical one, will open on Monday, Oct. 9. Prominent engineers and contractors will assist in the instruction and lectures. The expense for attendance will be small and there are no entrance requirements. Electric railway engineers are invited to consider the value of this course for their foremen in charge of concrete work.

RESTORING TRAFFIC IN PARIS

In the ELECTRIC RAILWAY JOURNAL for Sept. 9, page 463, an item was published to the effect that street cars of the Paris (Tex.) Transit Company were again being operated by means of power from the plant of the Texas Power & Light Company at Waco. The item as worded may have conveyed the impression to some readers that the Paris Transit Company had not been operating cars since March. The fire in Paris to which reference was made started about 5.30 p. m. on March 21, destroyed nearly all of the business district and 50 per cent of the residences. The Paris Transit Company lost four cars out of the total of eight, and more than 2 miles of trolley were down out of a total of 6 miles. At 1 p. m. on the afternoon of March 24, three days later, service was resumed with the four cars that had been saved, one of the principal deterrents to the earlier operation of cars being the impassable condition of the streets, due to inability to secure sufficient labor to clear away the debris promptly. The old plant of the company was completely destroyed by fire, but power was immediately available from a new Diesel plant recently completed and in full operating condition at the time of the fire. Four days later, or about March 28, cars purchased in Waco were received and placed in service by the Paris Transit Company, thus completely restoring the schedule. The company reports that the receipts have increased steadily and are at the highest they have ever been. The Waco connection referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 9 was recently effected to assist the local plant in taking care of the greatly increased loads due to power consumption by local industrial concerns. In the ELECTRIC RAILWAY JOURNAL of May 6, 1916, page 861, appeared an article on the fire in Paris giving the facts in connection therewith and illustrated with halftones showing the ruins of the carhouse of the Paris Transit Company and the ruins of the office and power plant of the Texas Power & Light Company.

Wages Increased in Port Arthur.—The Port Arthur (Tex.) Traction Company has advanced the wages of its trainmen. The increases range from 1 cent an hour for newly employed men to 3 cents an hour for men in the employ of the company for five years or longer.

Movies of Electrics.—For the purpose of informing Pennsylvania Railroad employees of developments in the electrification of steam railroads, motion pictures of the electrification of seven railroads were shown on Sept. 20 at the West Philadelphia Branch of the Young Men's Christian Association in Philadelphia.

New Working Agreement in Manchester.—An agreement which will run for two and a half years has been reached between the Manchester (N. H.) Street Railway and its employees. The employees asked for an increase in wages and other changes in working conditions, including car tickets entitling them to ride on the cars without the neces-

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sity of showing their badges in lieu of regular fare. The new agreement makes no change in the hours of labor, but provides for an increase in wages. The request for the change to car tickets for the employees was waived by the representatives of the men.

Increase in Wages on Niagara Gorge Line.—Burt L. Jones, general manager of the Niagara Gorge Railway, Niagara Falls, N. Y., operating the American Niagara gorge route line, announces a new wage scale for platformmen. All employees, including track and carhouse men, have been granted voluntary increases, effective at once. The scale of the platform-men is: First-year men, $65 a month; 26 cents an hour for second-year men; 28 cents an hour for third year; 30 cents an hour for fourth-year men, and 33 cents an hour for all who have been with the company more than four years.

Postponement of Cincinnati Loop Lease Vote.—The Rapid Transit Commission of Cincinnati, Ohio, has apparently reached the conclusion that submission of the terms of the lease of the proposed rapid transit loop to the voters at the November election is impossible. So many features enter into this important matter that the seven weeks remaining before the election will not be sufficient for their consideration. Frank S. Krug, chief engineer of the commission, said that the computation of the data secured through the traffic survey can not be completed before Nov. 1. These data are of importance in fixing the terms of the lease and not much headway can be made until the results can be had for use.

Philadelphia Transit Conference Postponed. — A conference between Mayor Smith, William Hancock and Col. Sheldon Potter representing the city of Philadelphia, Pa., and T. E. Mitten, president of the Philadelphia Rapid Transit Company, Director of City Transit Twining and Ellis Ames Ballard, counsel for the transit company, scheduled for Sept. 21, has been indefinitely postponed. This action was taken by Mayor Smith when he learned that Mr. Mitten would be unable to be present because of a death in the family. The Mayor said he would call another meeting as soon as Mr. Mitten returned to the city and could take up the business. A conference of the city transit directors to consider the conditions of the lease of the proposed new rapid transit lines to the Philadelphia Rapid Transit Company was held earlier in the week.

Violence Resorted to in Harrisburg. — The first violence growing out of the strike of the trainmen of the Harrisburg (Pa.) Railways in several weeks occurred Saturday night, Sept. 16, when Motorman Martin A. Brandt had his skull fractured by a rock. Brandt was operating a Hummelstown line car which ran over and killed George W. Fox, who was lying intoxicated on the car tracks in a lonely place 5 miles east of the city. When Brandt returned from Hummelstown near the scene of the accident a huge rock was hurled through the window striking him on the head. He stuck to his post for more than a half mile and then fell unconscious. The county police and detectives in the employ of the Harrisburg Railways are at work on clues which they believe will lead to the arrest and conviction of the motorman's assailants.

Schenectady Arbitration Award Announced.—The arbitractors' award in the settlement of the wage differences between the Schenectady (N. Y.) Railway and its employees has been made public. It provides for a three-year agreement, increased wages and the restoration of the practice of giving passes to employees. Motormen and conductors will get a 2-cent increase from May 1, 1916; one-half cent increase next May and one-half cent increase in 1918. Other employees of the company also benefit. The situation with respect to wages on the Schenectady Railway became acute in May, when the men struck to enforce their demand for a flat increase of 5 cents an hour. The company at that time offered an increase of 2 cents an hour, to be in effect for the next two years, and an additional 1-cent increase for the third year. Arbitration was agreed to after the men had been out on strike thirty-six hours. Only the questions of wages and length of the agreement were arbitrated. The conditions under which the arbitration was conducted were published in the ELECTRIC RAILWAY JOURNAL for May 13, page 920.

Financial and Corporate

RAILWAY INVESTORS ORGANIZE

The committee of stockholders under the leadership of John Muir, a New York banker, which became active at the time of the recent railway labor crisis in Washington, has now organized on a permanent basis as the Railway Investors' League. An official advertisement states:

"The Railway Investors' League has been formed to consolidate for protective and beneficial action that immense power and influence now unused but vested in thousands of unorganized small investors. Whether you own one share or one thousand shares of stock, a single $100 bond or larger amounts, your active aid is needed. You can help to protect your own investment and safeguard the principles of constructive enterprise on which the country has been built up. The purpose of the league is to assert, maintain and defend the rights of railway security holders, to guard against attacks from without and within.

"Impelled by the passage in Congress of the Adamson law, under which four classes of railroad employees are granted a large increase in wages without consideration of the merits of their demand, the general need for such an organization became imperative. Refusal on the part of the defiant labor leaders to abide by the principle of arbitration, intensified by presidential endorsement, has created a natural fear of similar demands from other employees. Guided by this and other unfortunate experiences which have demonstrated the necessity, the organization committee issued a preliminary statement which is meeting with a quick response."

TAXABLE VALUATIONS IN IOWA

The 1916 taxable valuations for interurban electric railways in Iowa, as fixed by the executive council of the State last July and now published in that body's forty-fifth annual report, total $2,005,163 for 486.24 miles of road. The 1915 valuations for the same electric lines amounted to $1,810,491 for 477.80 miles of road. The total taxable valuation for all the steam railroads in the State for 1916 is $78,865,593 for 10,029.38 miles of road, as compared to a 1915 valuation of $78,880,376 for 10,016.71 miles of road. Other 1916 valuations follow: Transmission lines, $308,075; equipment companies, $235,800; sleeping cars, $430,186, and express property, $311,653.

The detailed lengths and taxable values of Iowa interurban railways as of Jan. 1, 1916, are shown below:

	Miles of Road	Taxable Value Per Mile	Total Taxable Value
Cedar Rapids & Marion City Railway	21.94	$8,500	$186,490
Centerville Light & Traction Company	7.84	3,500	27,440
Charles City Western Railway	23.35	3,500	81,725
Davenport & Muscatine Railway	25.27	3,500	88,445
Fort Dodge, Des Moines & Southern Railroad	117.97	3,500	412,895
Inter-Urban Railway	64.20	3,500	224,700
Iowa & Illinois Railway	33.05	3,700	122,285
Iowa Railway & Light Company	55.09	3,700	203,833
Mason City & Clear Lake Railroad	14.62	4,500	65,790
Oskaloosa & Buxton Electric Railway	2.30	3,700	8,510
Southern Iowa Railway & Light Company	10.00	3,000	30,000
Waterloo, Cedar Falls & Northern Railway	110.61	5,000	553,050
Total	486.24	.....	$2,005,163

INITIAL P. R. T. DIVIDEND

The Philadelphia (Pa.) Rapid Transit Company on Sept. 20 declared an initial dividend of 2 per cent, payable on Oct. 11 to stock of record Oct. 4. Retiring directors of the Philadelphia Rapid Transit Company were re-elected at the annual meeting. The board met later and organized by re-electing the retiring officers. At the annual meeting of Union Traction Company stockholders on Sept. 20 James G. Balfour and John C. Gilpin were elected to the board to succeed George W. Elkins and Jacob S. Disston. The other directors were re-elected.

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ANNUAL REPORTS

United Railways of St. Louis

The comparative income statement of the United Railways of St. Louis, St. Louis, Mo., for the six months ended June 30, 1915 and 1916, follows:

	1916	1915
Transportation revenue	$6,163,836	$5,717,056
Revenue other than transportation	47,469	45,347
Gross earnings from operation	$6,211,305	$5,762,403
Operating expenses	$3,421,879	$3,403,145
Depreciation	745,357	627,054
Taxes	403,734	359,111
Total	$4,570,970	$4,389,310
Income from operation	$1,640,335	$1,373,093
Miscellaneous income	50,346	48,220
Gross income	$1,690,681	$1,421,313
Deductions from income	1,282,714	1,306,193
Net income	$407,967	$115,120
Dividend on preferred stock	.....	.....
Surplus	$407,967	$115,120

The foregoing figures are contained in a special semi-annual report to the stockholders. It is stated that as a result of the settlement of the old mill tax litigation and the payment of $1,839,205 for the adjudicated claims, there were a number of inquiries from stockholders as to the condition of the property. The company, therefore, deemed it an opportune time to place before the stockholders a statement of present condition, while at the same time outlining the important problems confronting the company, such as in the matters of the mill tax situation, the power situation, maturing securities and new property requirements. The company's position on the power question is stated elsewhere in this issue.

The financial statement included in the report shows that the gross earnings from operation during the first six months of 1916 increased $448,902 or 7.79 per cent as compared with those of the corresponding period last year. The operating expenses showed a net increase of $18,733 or 0.55 per cent owing to an increase in wages and in the amount set up for damages and law expenses. The total expenses, including depreciation, increased $137,036 or 3.4 per cent as compared with the corresponding period last year.

The income from operation, after deducting the total expenses and taxes, increased $267,242 or 19.46 per cent as compared with the same period last year. The gross income increased $269,367 or 18.95 per cent. The fixed charges decreased $23,478 or 1.8 per cent owing to the retirement of Southern Railways 6 per cent bonds May 1, 1915, and the St. Louis & Meramec River Railroad 6 per cent bonds May 8, 1916, and also to the purchase of various underlying bonds. The net income, therefore, gained $292,847 or was more than tripled.

The total number of passengers carried for the first six months of 1916 as compared with the corresponding period of 1915 was as follows:

	1916	1915
Revenue passengers, 5 cents	121,642,725	112,371,381
Revenue passengers, 2.5 cents	2,545,424	2,292,102
Total	124,188,149	114,663,483
Transfer passengers	66,312,251	60,158,867
Total passengers	190,500,400	174,822,350

The percentage of revenue passengers using transfers during the first six months of 1916 was 53.40. During the first six months of 1915 it was 52.47, an increase of 0.93 per cent.

The capital expenditures made by the company for the six months ended June 30, 1916, were as follows: Real estate, buildings, tools and fixtures, $56,797; track and roadway construction, $19,228; electric line construction, $3,454, and cars and electrical equipment of cars, $12,033; total, $91,513.

From July 1, 1910, to June 30, 1916, there was expended on the property of the company: In maintenance, $9,912,346; in reconstruction of property paid for out of depreciation reserve, $5,371,879, and in construction and in betterment and improvements, $1,528,019; total, $16,812,246. All of this sum was paid out of the earnings of the property, and none represents money obtained from new capital issues. The total is 22.985 per cent of the gross earnings during those years. The growth of the city has been slow during that time, and a comparatively small sum has been necessary for additional tracks and equipment. If St. Louis had grown as it did previous to that time, the report states, the earnings would not have sufficed to enable the railway to keep pace with the growth of the city.

Sooner or later, it is hoped, business conditions in St. Louis will improve, and the accompanying growth in population will require large additional capital expenditures for tracks, cars, car storage, substations, feeders and other new and additional equipment. Moreover, between the present date and October, 1924, bonds mature to the extent of $27,448,000. The probable construction demands in the near future and these maturing bond issues, together with the burden of increased taxes, make the amounts of money available from earnings inadequate for these purposes. How these maturing bonds may be taken care of and how this additional capital may be raised is a matter of anxious concern which the management is presently considering and, it promises the stockholders, will continue to consider in the expectation of a timely solution of the problem.

The report reviews in detail the history of the mill tax litigation, which last May was finally decided against the company as to taxes from 1903 to 1910, amounting with interest to $1,839,205. This sum was paid on June 16. The taxes from 1910 to the present time amount, with interest, to approximately $1,500,000. No judgments have been obtained for these taxes, although suits have been filed by the city and will probably come up for trial this autumn. The report states that in justice to the interests of the stockholders, the board of directors has always felt that it was in duty bound to resist the payment of a tax which it considers excessive and illegal.

Lima Light, Power & Tramways Company

The operations of the Empresas Eléctricas Asociadas (Lima Light, Power & Tramways Company), which holds practically a monopoly of the electric railway, power, and light in Lima, Callao, and several of the suburban towns in Peru, showed a small general decrease for 1915. The bonds of this company are largely held in London, but there is also considerable local and American capital invested in it. The net profits for 1915, after setting aside the sum of $141,129 for the amortization account and writing the sum of $204,393 off the books against bad debts, etc., amounted to more than $145,950, but owing to the agreement made with the bondholders in London whereby the amortization service on the bonds was suspended from June 30, 1914, for a period of two years, no dividends may be distributed from profits during this period.

The gross income for 1915 amounted to $1,880,035 as compared to $1,913,469 for 1914, a decrease of $33,434. Of this amount $836,045 represents the cost of operation during 1915, as compared to $804,233 in 1914, an increase of $31,812.

The gross revenues of the urban and interurban tramways in 1915 amounted to $997,641 as compared to $997,712 in 1914, a decrease of $71. The cost of operation amounted to $614,154 as compared to $585,465 in 1914, an increase of $28,689. The net revenue amounted to $383,487 as compared to $412,246 in 1914, a decrease of $28,759. These figures represent the Lima Urban Tramway, the line from Lima to Chorillos, the Lima-Callao and Magdalena tramways. The net revenues showed a decrease in all cases except the Magdalena line, on which there was a net increase of $8,059.

The gross revenues from freight traffic in 1915 amounted to $131,371 as compared to $173,971 in 1914, a decrease of $42,600. The running expense in 1915 amounted to $146,244, as compared to $164,223 in 1914, a decrease of $17,979 The net loss in 1915 was $14,873, a decrease of $24,620. No section of the company's service suffered a greater commercial depression than the freight lines during the last year, owing to the paralysis of the maritime movement and the decrease in the volume of imports at the port of Callao.

The total length of the company's lines is 136 kilometers. The number of interurban cars in operation was fifty-two, of urban cars seventy-five. This company uses large quantities of American electrical equipment and goods, and most of the new cars installed in recent years have been of American manufacture, especially the modern high-power cars on the suburban lines.

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ELECTRIC RAILWAY STATISTICS

Returns for First Half of 1916 and 1915 Show Increased Expenses and Taxes But Higher Net

A comparison of electric railway statistics for the six months, January-June, 1916, with figures for the corresponding months of 1915, made by the information bureau of the American Electric Railway Association, indicates a noticeable improvement in the electric traction business of the United States. Data for the six months representing 7444 miles of line of companies scattered throughout the country show an increase in operating revenues of 8.08 per cent, in operating expenses of 5.68 per cent, and in net earnings of 12.10 per cent, while data representing 6391 miles of line indicate an increase in taxes of 6.58 per cent, and in operating income of 13.09 per cent. The number of revenue and transfer passengers carried by companies representing 6587 miles of line increased 7.21 per cent, while the revenue car mileage increased 3.32 per cent. The Western District seems to share but little in the improved business conditions of the other sections of the country.

Of the three groups shown on Table II, the Western, represented by 2029 miles of line, shows an increase in operating revenue of 3.97 per cent, in operating expenses of 3.45 per cent and in net earnings of 4.94 per cent. Returns for about 97 per cent of this mileage show an increase in the amount of taxes paid of 5.07 per cent and in operating income of 4.94 per cent.

The Southern group, represented by 689 miles of line, shows an increase in operating revenue of 7.18 per cent, in operating expenses of 1.83 per cent and in net earnings of 15.82 per cent. Returns, however, for about 75 per cent of this mileage indicate a decrease in operating expenses of 1.37 per cent and increases in taxes of 9.52 per cent and in the operating income of 12.53 per cent.

The Eastern group, represented by 4726 miles of line or about 60 per cent of the total mileage, indicates an increase in operating revenue of 9.61 per cent, in operating expenses of 6.78 per cent and in net earnings of 14.22 per cent. Returns representing about 83 per cent of this mileage show an increase in the amount of taxes paid of 7.01 per cent and in operating income of 15.78 per cent.

On the whole the number of passengers carried has increased, as has the number of revenue car miles run. While the Eastern District shows an increase of 8.35 per cent in the number of passengers carried and one of 3.40 per cent in the number of car miles run, the Southern shows an increase of 11.23 per cent in the number of passengers and an increase of 5.66 per cent in the number of car miles. The increases in the Western district have been the smallest of the three groups shown—the number of passengers increasing but 4.41 per cent and the number of car miles run 2.81 per cent. All of the districts show a decrease in the operating ratio, the United States as a whole indicating a decrease from 62.68 in 1915 to 61.29 in 1916. The operating ratio of the Western district is higher than those of the other districts and has decreased least of all.

The returns for June shown in Table I indicate a considerable improvement over a similar comparison for the

TABLE I—REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR JUNE, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
*United States**	Amount	Per Cent Increase	Amount	Per Cent Increase
Operating revenues	$17,683,491	9.43	$14,655,069	8.53
Operating expenses	10,753,952	4.98	9,047,654	4.50
Net earnings	6,929,539	17.14	5,607,415	15.71
Taxes	.....	....	1,006,379	16.63
Operating income	.....	....	4,601,036	15.51
Operating ratio, per cent:				
1915	63.39	....	64.11	....
1916	60.81	....	61.74	....
Miles of line represented.	7,444	....	5,955	....
*Eastern District**				
Operating revenues	$12,712,800	11.40	$9,947,131	10.53
Operating expenses	7,661,574	6.56	6,129,928	6.28
Net earnings	5,051,226	19.64	3,817,203	18.10
Taxes	.....	....	656,928	21.71
Operating income	.....	....	3,160,275	17.38
Operating ratio, per cent:				
1915	63.00	....	64.09	....
1916	60.27	....	61.62	....
Miles of line represented.	4,726	....	3,481	....
*Southern District**				
Operating revenues	$793,311	7.07	$589,579	5.59
Operating expenses	460,024	2.19	328,647	d0.67
Net earnings	333,287	14.63	260,932	14.70
Taxes	.....	....	49,270	9.43
Operating income	.....	....	211,662	16.00
Operating ratio, per cent:				
1915	60.76	....	59.26	....
1916	57.99	....	55.74	....
Miles of line represented.	689	....	533	....
*Western District**				
Operating revenues	$4,177,380	4.28	$4,118,359	4.38
Operating expenses	2,632,354	1.11	2,589,079	1.16
Net earnings	1,545,026	10.16	1,529,280	10.31
Taxes	.....	....	300,181	7.93
Operating income	.....	....	1,229,099	10.90
Operating ratio, per cent:				
1915	64.99	....	64.86	....
1916	63.01	....	62.87	....
Miles of line represented.	2,029	....	1,941	....

NOTE—Letter *d* denotes a decrease.

*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River, exclusive of the Greater New York. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

TABLE II—REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR SIX MONTHS, JANUARY TO JUNE, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
United States	Amount	Per Cent Increase	Amount	Per Cent Increase
Operating revenues	$100,582,214	8.08	$96,527,216	8.00
Operating expenses	61,644,132	5.68	59,099,293	5.66
Net earnings	38,938,082	12.10	37,427,923	11.91
Taxes	.....	....	6,460,469	6.58
Operating income	.....	....	30,967,454	13.09
Operating ratio, per cent:				
1915	62.68	....	62.58	....
1916	61.29	....	61.22	....
Miles of line represented	7,444	....	6,391	....
Eastern District				
Operating revenues	$71,515,049	9.61	$69,063,491	9.69
Operating expenses	43,106,096	6.78	41,640,646	6.87
Net earnings	28,408,953	14.22	27,422,845	14.28
Taxes	.....	....	4,389,185	7.01
Operating income	.....	....	23,033,660	15.78
Operating ratio, per cent:				
1915	61.88	....	61.89	....
1916	60.27	....	60.29	....
Miles of line represented	4,726	....	3,917	....
Southern District				
Operating revenues	$4,603,197	7.18	$3,362,416	3.91
Operating expenses	2,703,059	1.83	1,899,210	d1.37
Net earnings	1,900,138	15.82	1,463,206	11.67
Taxes	.....	....	295,663	9.52
Operating income	.....	....	1,167,543	12.23
Operating ratio, per cent:				
1915	61.80	....	59.51	....
1916	58.72	....	56.48	....
Miles of line represented	689	....	533	....
Western District				
Operating revenues	$24,463,968	3.97	$24,101,309	3.98
Operating expenses	15,834,877	3.45	15,559,437	3.44
Net earnings	8,629,091	4.94	8,541,872	4.97
Taxes	.....	....	1,775,621	5.07
Operating income	.....	....	6,766,251	4.94
Operating ratio, per cent:				
1915	65.05	....	64.89	....
1916	64.73	....	64.55	....
Miles of line repesented.	2,029	....	1,941	....

NOTE—Letter *d* denotes a decrease.

TABLE III—TRAFFIC AND OPERATING STATISTICS OF ELECTRIC RAILWAYS FOR SIX MONTHS, JANUARY TO JUNE, 1916

	Revenue and Transfer Passengers		Revenue Car Mileage		Miles of Line Represented		Operating Revenues Per Revenue Car Mile (cents)*		Operating Expenses Per Revenue Car Mile (cents)*		Net Earnings Per Revenue Car Mile (cents)*	
	Amount†	Per Cent Increase	Amount†	Per Cent Increase	Amount	Per Cent Increase	Amount	Per Cent Increase	Amount	Per Cent Increase	Amount	Per Cent Increase
United States	2,026,275	7.21	277,380	3.32	6,587	...	28.99	4.02	18.50	1.98	10.49	7.81
Eastern district	1,342,134	8.35	176,881	3.40	4,214	...	30.40	5.34	19.29	2.71	11.11	10.22
Southern district	66,782	11.23	13,154	5.66	413	...	21.51	3.86	13.48	d2.67	8.03	17.05
Western district	617,359	4.41	87,345	2.81	1,960	...	27.27	1.30	17.67	1.03	9.60	1.80

NOTE—Letter *d* denotes a decrease. †The last three figures are omitted.

*The figures in these columns are based upon the revenue car mileage shown in this table. As some of the companies reporting do not show car mileage, however, the returns from those only showing both car mileage and revenues, expenses, etc., have been used in arriving at the above shown figures.

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previous month, though, of course, they are not strictly comparable because of the difference in the miles of line represented. Table III shows that the net earnings per revenue car mile for the United States as a whole have increased 7.81 per cent, while those of the Western District have increased but 1.80 per cent. Companies numbering 104 reported for Table II.

American Railways, Philadelphia, Pa.—Bioren & Company, Philadelphia, Pa., are offering at prices to yield 5 per cent and 5½ per cent $140,000 of car trust 5 per cent certificates Series C issued by the American Railways under the Philadelphia plan. The certificates are dated Aug. 1, 1916, and mature $11,000 on Aug. 1, 1917, to 1920, inclusive, and $12,000 on Aug. 1, 1821, to 1928, inclusive.

Brockton & Plymouth Street Railway, Brockton, Mass.—The directors of the Brockton & Plymouth Street Railway voted to defer the payment of the semi-annual dividend of $3 per share, normally payable on Sept. 15, on the cumulative preferred stock of the company.

Connecticut Company, New Haven, Conn.—Clark, Dodge & Company, New York, N. Y., and Hartford, Conn., are offering for subscription $460,000 of Connecticut Company 4½ per cent gold equipment notes, dated Sept. 15, 1916, and due $46,000 semi-annually March 15 and Sept. 15, 1917 to 1921. The trustee of the indenture securing the notes is the Security Trust Company, Hartford.

Kansas City (Mo.) Railways.—The directors of the Kansas City Railways have authorized the trustees of the company to pay 2½ per cent on the preferred beneficial certificates of the Kansas City Railways. The dividend will be paid on Oct. 1, which puts the preferred beneficial certificates on a 5 per cent basis, as it is expected that another 2½ per cent dividend will be declared in six months.

United Railways, St. Louis, Mo.—A committee of stock holders of the United Railways of St. Louis has created an independent proxy committee for the purpose of trying to get representation on the board of directors. The members of the proxy committee are August Heckscher, New York; Charles S. Farnum, Philadelphia, and Ephraim Caplan, St. Louis. The committee has sent letters to all stockholders of the company, asking them to sign proxies authorizing the committee to make such investigations and take such action as may be necessary.

Toledo Traction, Light & Power Company, Toledo, Ohio.—Assents representing more than 75 per cent of the $6,738,500 outstanding preferred and $7,821,900 outstanding common stocks of the Toledo Traction, Light & Power Company having been received by Henry L. Doherty & Company, depository, by Sept. 15, the plan for exchange into Cities Service Company stocks was duly declared operative. The first dividend on the Cities Service securities issued in the exchange will be the regular monthly one on Nov. 1.

Public Service Corporation of New Jersey, Newark, N. J.—Stockholders of the Public Service Corporation of New Jersey of record Oct. 2 will have the right to subscribe to $5,000,000 of new stock at par. Negotiable certificates of allotment, authorizing subscriptions to the extent of 20 per cent of present holdings, will be sent out to stockholders on Oct. 6. The stock taken may be paid for by Jan. 2, when the stock will become entitled to dividends, or by Nov. 1, in which event 5 per cent interest to Dec. 31 will be given. Recently stockholders ratified an increase of $25,000,000 in the company's capital stock and the issue about to be made, which will raise the amount outstanding to $30,000,000, is part of the enlargement.

Youngstown & Suburban Railway, Youngstown, Ohio.—The Youngstown & Suburban Railway has been authorized by the Ohio Public Utilities Commission to issue its common capital stock of the par value of $350,000, its 6 per cent cumulative preferred capital stock of the par value of $500,000 and its first mortgage 5 per cent twenty-year gold bonds of the principal sum of $700,000, the stock and bonds to be delivered to J. W. Blackburn, acting for and on behalf of the bondholders' protective committee of the Youngstown & Southern Railway. The securities are to be delivered in payment for the property heretofore owned and operated by the Youngstown & Southern Railway and purchased at judicial sale by Mr. Blackburn on behalf of the bondholders' protective committee, for the payment by Mr. Blackburn of the floating indebtedness of the Youngstown & Southern Railway, with interest to Oct. 1, 1916, $136,000; for the payment of the indebtedness to the International Trust Company, Boston, Mass., with interest to Oct. 1, 1916, $26,000; for expenses and allowances to the bondholders' protective committee, $10,000; and for additions, extensions and improvements costing approximately $30,000.

DIVIDENDS DECLARED

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1½ per cent, preferred Series A.

Eastern Power & Light Company, New York, N. Y., quarterly, 1¾ per cent, preferred.

Halifax (N. S.) Electric Tramways, quarterly, 2 per cent.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, quarterly, 2 per cent.

Houghton County Traction Company, Houghton, Mich., 3 per cent, preferred.

Illinois Traction Company, Peoria, Ill., quarterly, 1½ per cent, preferred.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1½ per cent.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, common and preferred.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., $1.50 on 6 per cent preferred; quarterly, 87½ cents, common.

Toronto (Ont.) Railway, quarterly, 2 per cent.

Washington, Baltimore & Annapolis Electric Railroad, Washington, D. C., quarterly, 1½ per cent, preferred.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July,		'16	$209,030	*$129,436	$79,594	$36,117	$43,477
1 "	"	'15	187,488	*120,725	66,763	36,531	30,232

BROCTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., July,		'16	$15,256	*$9,795	$5,461	$1,109	$4,352
1 "	"	'15	15,346	*8,457	6,889	1,185	5,704
12 "	"	'16	118,790	*102,389	16,401	13,244	3,157
12 "	"	'15	118,618	*98,264	20,354	13,585	6,769

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., July,		'16	$32,858	*$19,171	$13,687	$6,559	$7,128
1 "	"	'15	31,319	*17,666	13,653	6,602	7,051
12 "	"	'16	383,240	*224,907	158,333	78,568	79,765
12 "	"	'15	338,022	*206,228	131,794	78,803	52,991

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., July,		'16	$20,964	*$12,076	$8,888	$7,712	$1,176
1 "	"	'15	21,940	*12,626	9,314	7,123	2,191
12 "	"	'16	276,272	*153,426	122,846	89,311	33,535
12 "	"	'15	246,080	*150,518	95,562	86,948	8,614

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Aug.,		'16	$2,149,836	$1,223,473	$926,363	$815,011	$111,352
1 "	"	'15	1,897,763	1,086,744	811,019	815,941	†4,922
2 "	"	'16	4,364,765	2,444,948	1,919,817	1,630,279	289,538
2 "	"	'15	3,837,669	2,182,439	1,655,230	1,632,538	22,692

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m., Aug.,		'16	$335,578	*$183,147	$152,431	$72,436	‡$82,371
1 "	"	'15	260,792	*158,289	102,503	56,922	‡45,725
8 "	"	'16	2,596,204	*1,523,451	1,072,753	555,831	‡521,168
8 "	"	'15	1,968,618	*1,218,582	750,036	446,846	‡304,262

SAVANNAH (GA.) ELECTRIC COMPANY

1m., July,		'16	$69,445	*$45,193	$24,252	$23,705	$547
1 "	"	'15	67,284	*44,305	22,979	23,275	†296
12 "	"	'16	791,697	*532,425	259,272	280,073	†20,801
12 "	"	'15	806,732	*522,568	284,164	277,688	6,476

TAMPA (FLA.) ELECTRIC COMPANY

1m., July,		'16	$74,625	*$41,162	$33,463	$4,396	$29,067
1 "	"	'15	78,979	*41,456	37,523	4,364	33,159
12 "	"	'16	970,873	*519,362	451,511	52,287	399,224
12 "	"	'15	982,095	*504,183	477,912	52,744	425,168

*Includes taxes. †Deficit. ‡Includes non-operating income.

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Traffic and Transportation

INSURANCE FOR HUDSON TUBE EMPLOYEES

Hudson & Manhattan Railroad, Operating Under River Tunnels, Announces Terms of Group Insurance for Employees

In recognition of the faithful and loyal services of the officers and employees of the Hudson & Manhattan Railroad, New York, N. Y., and for the purpose of furthering the common interests of the company and its employees, the directors upon the recommendation of the president, have approved a plan of life insurance for the benefit of those employees who while in the company's service may die or become totally disabled. This life insurance supersedes the employees' death benefit fund, and became effective on Sept. 1, 1916. The general features of the life insurance plan are as follows:

1. The premium to be paid by the company, making the insurance without cost to the employees.

2. Every employee in the service on Sept. 1, 1916, is included in the plan.

3. All employees who on Sept. 1, 1916, have been continuously in the company's service three years or longer are included for full benefits as follows:

(a) Employees receiving rates of wages of $2.51 or over a day, are insured for the amount of $1,000.

(b) Employees receiving rates of wages of $2.01 to $2.50 a day, are insured for the amount of $750.

(c) Employees receiving rates of wages of $2 or less a day, are insured for the amount of $500.

4. All employees who on Sept. 1, 1916, have been continuously in the company's service less than three years are included for half benefits as follows:

(a) Employees receiving rates of wages of $2.51 or over a day, are insured for the amount of $500.

(b) Employees receiving rates of wages of $2.01 to $2.50 a day, are insured for the amount of $375.

(c) Employees receiving rates of wages of $2 or less a day, are insured for the amount of $250.

5. All employees who are now entitled to half benefits will automatically become entitled to full benefits as soon as their three years of service are completed.

6. New employees entering the company's service after Sept. 1, 1916, will be required to complete one year's full service before they become entitled to participate in this life insurance plan. After having served one full year, such employees will be entitled to half benefits during the next two years of service, and having completed three full years of service (one year without benefits plus two years with half benefits), such employees will automatically become entitled to full benefits under the insurance plan as it has been decided upon.

7. All employees in the service on Sept. 1, 1916, will be included in the life insurance plan whether for full benefits or for half benefits, without any medical examination. As to new employees entering the service after Sept. 1, 1916, the regular physical examination by the company's medical officer will be accepted as sufficient medical examination under the insurance plan.

8. With the approval of the company, and contingent upon loyal service, employees may take out additional insurance at their own expense equal to that for which they are insured by the company. This additional insurance will be granted without further medical examination and at the same group rates paid by the company. Upon favorable terms still larger amounts of insurance may be secured by any employee who may desire it.

9. If and when any employee for any cause leaves the company's service all insurance benefits cease and terminate; but with the approval of the company, and contingent upon loyal service, employees when leaving the service may convert their policies secured under this life insurance plan into regular life or endowment policies without further medical examination and at the customary rates for this class of insurance sick.

NEW JITNEY RULES FROM MARYLAND

The Public Service Commission of Maryland has drawn up a new set of rules for jitney buses, to become effective on Oct. 1, in place of the regulations issued on June 19, 1915. The new rules are designed not merely to control the jitney traffic, but to standardize it so far as possible. The rules provide that no motor car may be used in the public transportation of persons or freight until a permit shall have been obtained from the commission. Every permit, no matter when issued, shall terminate as of Dec. 31 following. The commission may specify in the permits the rates that are to be charged and may require the owners to post in the cars a schedule of such rates.

No motor car for which a fixed route or a fixed schedule has been made shall vary from it without the permission of the commission, except in emergency. All cars operating over fixed routes, or between fixed terminals, shall carry destination signs, which shall indicate the terminals or the streets which form the greater part of the route.

Cars operated for hire other than over a fixed route shall carry a sign designating them as "hiring cars." They may not operate over the fixed route of any other jitney or jitney concern, nor solicit passengers or freight along any fixed route without being required to obtain from the commission permits as buses engaged in traffic over fixed routes.

Not more than one person, in addition to the driver, shall be permitted to occupy the front seat; no passenger shall be permitted to ride on the steps or running board, and no person shall ride on the top unless it has been constructed for such use and is equipped properly with seats and rail protection.

Cars may not carry more than one passenger for each 16 in. of seating space, and that allowance per passenger is conditioned upon an average weight of not more than 140 lb. per passenger. The commission states in the rules the following as the greatest loads that may be carried:

Total length seats,	128	140	160	176	192	208	224	240
Pounds capacity	1,120	1,260	1,400	1,540	1,680	1,820	1,960	2,150
Number passengers.	8	9	10	11	12	13	14	15

The rules further provide that accidents and interruptions to service must be reported to the commission; that owners of jitneys may not withdraw them from service without at least ten days' notice to the commission; that sufficient reserve equipment must be kept to maintain service on fixed routes and schedules, and that jitneys must be kept in such condition that adequate service will be rendered and the public and passengers not endangered by avoidable breakdowns.

REASONS FOR FAVORABLE DECISION IN BRISTOL & NORFOLK CASE

In the ELECTRIC RAILWAY JOURNAL of Sept. 9, page 469, reference was made to the authorization of a proposed fare increase to 6 cents on the Bristol & Norfolk Street Railway by an order of the Massachusetts Public Service Commission dated Aug. 31. The decision of the board in this case was based upon a finding that the property is clearly a losing venture; that its physical condition is poor, and that the company is justly entitled to a larger revenue if it can be secured. In 1914 the road failed to earn operating expenses by $2,077, and in 1915 by $539. The commission finds that as the owners have abandoned the track formerly belonging to the Easton Street Railway, the former are not entitled to a return upon the capitalization representing the portion so abandoned, but allowance for this makes no difference in the company's being entitled to additional revenue. The company operates only 6.696 miles of single track, of which it owns 6.318 miles. Its capital stock totals $100,000, the funded debt being $70,000; unpaid interest totals $42,000, and there is a profit and loss deficit of $54,925. The road at present runs from Stoughton Square to Randolph, and the combined population served was only 12,223 in 1915. In the thirteen fiscal years from 1903 to 1915 inclusive the company failed to earn its fixed charges.

Practically the only objection raised by the remonstrants was to the elimination of a special arrangement under which a lower fare is granted to workingmen at certain hours of the day. The company proposed to increase this fare from

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5 cents to 12 cents, and the commission pointed out that this might lay a heavy burden upon certain families. The company showed that only seventy to seventy-five persons a day avail themselves of this special rate. The decision says:

"While the commission doubts its authority to require the company to maintain special reduced rates similar to those now in force, it feels that the company, in the exercise of sound discretion in management, ought to consider very carefully the change which is proposed. The result, if this policy is carried out, might well be to compel certain families to change their place of residence, so that the actual net gain for the company would be insignificant. We strongly urge the company to consider the desirability of a less radical change. An increase in the present rate during these hours from 5 to 7 cents would, we think, be likely to produce better results for the public and the company."

Hearing on Berkshire Operation. — The Massachusetts Public Service Commission has assigned Oct. 3 as the probable date for a hearing upon the petition of the towns of Westfield, Lee, Huntington and others, urging that the Berkshire Street Railway be compelled to inaugurate service over the entire line lately completed between Lee and Huntington. At present service is rendered from Lee to a point in Otis.

Get Passengers to Unfold Their Transfers.—The Portland Railway, Light & Power Company, Portland, Ore., has effected a notable saving of conductors' time by requesting passengers to unfold their transfers before presenting them on entering the prepayment type cars. The request has been made through *Watts Watt*, the company's weekly leaflet which conductors hand out to passengers. Evidence that passengers read and heed is given by the fact that conductors report much more attention to this detail, and in some instances passengers have commented on the notices which appeared requesting it.

Jitney Men Comply with Wilkes-Barre Ordinance.—Convinced that the only way jitneys can operate in Wilkes-Barre, Pa., is to meet full requirements of the jitney ordinance, eleven men who have been engaged in the business since the strike of the employees of the Wilkes-Barre Railway, filed the required $2500 bond on Sept. 13, had their cars inspected and underwent physical examinations as the first step in restoring jitney travel. Other jitney men are expected to comply with the ordinance, now that it has been definitely determined that Council will not revise or repeal the ordinance in part or in whole.

Owl Traffic Falls Off When State Goes Dry.—On fourteen lines of the Portland Railway, Light & Power Company, Portland, Ore., which serve residence districts of the city, there has been a material decrease of owl traffic since the prohibition law went into effect. This decrease has ranged from 24 to 31 per cent, according to the class of district involved, the average being 28 per cent. This has been accompanied by a slight increase of traffic in the late evening hours. One explanation offered is that the 28 per cent of owl car patronage was saloon attendants and patrons who have left the dry town or who now go home early.

Accident in Pennsylvania Railroad Tube.—Fourteen persons were injured when two trains tried to enter the single-track westbound tube of the Hudson River tunnel system beyond the Pennsylvania Station in New York at the same time on Sept. 16. It was the first accident to happen at the Pennsylvania Station since it was opened six years ago, and the first serious mishap the Pennsylvania has ever had with its tube operation. The Washington Express started out at 10.08 o'clock. It consisted of an electric locomotive and six cars. Two minutes later electric locomotive No. 27 struck the Washington train just between the diner and the first day coach.

New Traffic Ordinance in Portland, Ore.—By unanimous vote of the Council of Portland, Ore., a new traffic ordinance has been passed and will go into effect by Oct. 1. The ordinance provides that street cars shall stop at the near instead of far crossing on all paved streets; that no vehicle shall pass either to the right or left of a street car which is standing at an intersection to take on or discharge passengers; that no transparency or sign larger than 36-in. square shall be carried or moved in the downtown streets; that the speed of automobiles within the congested district shall be not more than 15 m.p.h. and outside this district 20 miles; that fire apparatus and all other emergency vehicles shall be limited in speed to 25 m.p.h.

Blanket Jitney Grant Wanted.—S. Chaimov recently petitioned the City Council of Portland, Ore., for a blanket franchise covering the entire city for the operation of jitneys, for a period of twenty-five years. For the first year he is willing to pay the same amount of revenue the city is now receiving from the jitneys; for the second, third, fourth and fifth years, he will increase the amount $500 a year, and $1,000 a year for each year up to the tenth. For the next seven and one-half years he agrees to pay $10 000 and for the rest of the time $12,000. It is probable that the City Council will consider the application along with the application of the Jitney Drivers' Union, which recently applied for a term franchise.

Prize Stock Handled at Louisville.—The Louisville & Interurban Railroad, Louisville, Ky., has closed a considerable amount of desirable business in the way of transportation of high bred live stock from stock farms in Shelby County, some 30 miles out, to the State Fair grounds in Louisville, Ky. A year ago the company transported the show herd of Jerseys from one of the breeding farms near Shelbyville, terminus of one of the country lines. These were all valuable animals and the trip is always dreaded by the owner. Three hours after being loaded, they had been led from the car, and were safe in the show pens. The same time was made on the return trip. This year, without solicitation, the company increased this kind of business on the strength of the Jersey breeder's recommendation, giving a service with which the steam roads could not compete. The shippers did not think it necessary to take out any insurance on the animals handled by electric cars. The usual baggage cars were used for this work, bedded in straw, and a portable chute was used in unloading at the fair grounds.

Safety Zones Opposed in Buffalo.—Thomas Penney, general counsel of the International Railway, Buffalo, N. Y., appeared in opposition to the establishment of safety zones in the down-town streets of the city at a hearing before the Commissioner of Public Works. The Automobile Club is fostering a movement to abolish the ordinance which requires all automobiles to stop to the rear of street cars when passengers are boarding or alighting and is urging the establishment of safety zones where passengers may wait for cars. Mr. Penney said that the only question was whether safety zones would facilitate the movement of automobiles or street car traffic. If it was proposed to abolish the present ordinance requiring automobiles to stop to the rear of standing street cars, he objected to the proposed plan. Not a person has been killed in the down-town section since the present ordinance has been effective. Mr. Penney also pointed out that 90 per cent of the traffic on the Buffalo city lines came into the down-town center during the rush hour period because of the peculiar lay-out of the district and that automobile drivers must be checked from fast driving.

Decision Reserved in Point Shirley Fare Case.—The Public Service Commission of Massachusetts has issued a memorandum withholding decision in the petition of patrons of the Boston, Revere Beach & Lynn Railroad for the establishment of a 5-cent fare via the Narrow Gauge line and Point Shirley Street Railway, between Rowes Wharf, Boston, and Point Shirley. The Revere Beach company owns the stock of the street railway and a motor-car service is operated over the track of the latter in connection with the through train service on the former. The petitioners urged that the service be improved and the rates reduced. The commission notes that the company has given assurances that track defects will be remedied and more reliable service rendered in the coming winter and places this part of the case on file. In view of the fact that the petitioners and the Selectmen of Winthrop were not in agreement at the hearing as to the expediency of reducing the fares on the street railway, the commission has laid the petition upon the table. At the hearing, the Selectmen contended that a reduction in fares would result in a depreciation of real estate value in the territory served.

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CHANGES IN BOSTON PERSONNEL

Matthew C. Brush Elected President of the Boston Elevated Railway, General Bancroft Becomes Chairman of the Board of Directors

The directors of the Boston (Mass.) Elevated Railway elected Matthew C. Brush president and a director of the company at a special meeting on Sept. 15. Maj.-Gen. William A. Bancroft, retired, who has been president of the road since 1899, was elected chairman of the board. The change went into effect immediately. Both men have had distinguished careers in the transportation industry. Mr. Brush becomes executive head of the company at the age of thirty-eight, and is one of the most widely-known operating officers in the country. General Bancroft's name has been synonymous with the development of the Boston system from that of horse car days to its present magnitude, and his able administration of the property has earned widespread commendation.

Matthew Chauncey Brush was born in Stillwater, Minn., in 1877. He was graduated from the Armour Institute of Chicago in 1897 and in 1901 from the Massachusetts Institute of Technology. His early work included a broad steam railroad and steamship experience in the Middle West and Great Lakes districts. Mr. Brush served as machinist, foreman and roundhouse foreman for the Union Pacific Railroad at Omaha, Neb.; as purser on Great Lakes steamers, and then as general foreman in charge of shops and roundhouses on the Chicago, Rock Island & Pacific Railroad. Thirteen years ago he entered the street railway field as assistant to the president of the Boston Suburban Electric Companies, with headquarters at Newtonville, soon becoming general manager and vice-president. While connected with this property Mr. Brush was directly in charge of the campaign for the substitution of the present 6-cent fare unit for the 5-cent rate formerly standard on the road, and the success of the general program was important in relation to later developments in this field under the regulative authority of the Massachusetts Public Service Commission.

In 1909 Mr. Brush resigned to become general manager of the Buffalo & Lake Erie Traction Company, the Jamestown, Chautauqua & Lake Erie Railroad, and the Jamestown & Chautauqua Steamship Company, operating 200 miles of electric lines, 50 miles of steam railroad and a fleet of steamboats on Lake Chautauqua, N. Y. In 1910 he entered

MATTHEW C. BRUSH

the service of the Boston Elevated Railway as assistant to the vice-president. In 1911 he became chairman of the company's efficiency committee, and in 1912 was made second vice-president, later being appointed vice-president, in direct charge of the bureau of transportation. Mr. Brush's success in the field of public relations has been fully equalled in the difficult sphere of labor negotiations, and he is an exponent of the policy of entire frankness in dealing with the public, officials and employees. He has to an unusual degree the capacity for stimulating enthusiastic and loyal service among his subordinates. Mr. Brush takes office at a time when the burdens laid upon the company by the public and by increased costs of operation have become so heavy as to necessitate an inquiry into its financial problems by a special legislative committee, and he has been closely associated with the preparation of the company's case from the standpoint of securing additional net revenue for presentation at forthcoming hearings. Mr. Brush is unmarried. He resides with his mother in Allston. He is a past-president of the New England Street Railway Club and of the American Electric Railway Transportation & Traffic Association; is a member of the Engineers' Club of Boston, the University and City Clubs of Boston, and other organizations.

MAJ.-GEN. W. A. BANCROFT

Chairman Bancroft was born at Groton, Mass., in 1855, and was graduated from Harvard College in 1878. In college he was captain and stroke of the victorious Harvard crews of 1877, 1878 and 1879, and later coached various crews for about five years. After a course at the Harvard Law School he was admitted to the bar and practised law until 1885, when he became superintendent of the Cambridge Horse Railroad, which later absorbed the Charles River Street Railway. In 1887 a strike occurred on the road, which had 600 employees, and with 1600 horses to care for and a staff of only eight persons, he achieved distinction by keeping the cars running except for three days. Later nearly all the striking employees individually admitted that their course was ill-advised. When the West End Street Railway absorbed the street railways of Boston, General Bancroft was appointed roadmaster of the system and superintended the construction of the first electric lines, under the presidency of Henry M. Whitney.

In 1890 General Bancroft resumed the practice of law, and beginning in 1892 served four successive terms as Mayor of Cambridge. At the organization of the Boston Elevated Railway he was made counsel and then vice-president and a director of the company, and upon the retirement of President William A. Gaston he became chief executive, He has been chairman of the executive committee of the board of directors for many years. Under his presidency the system has developed until it has a present investment of about $116,000,000, 9,000 employees and 520 miles of track. The investment at the beginning of operation was approximately $26,000,000. The retiring president has long realized the difficulty of meeting the increasing financial burdens imposed upon the company by the public in the shape of investments in new subways and rapid transit lines and has constantly encouraged the use of more efficient operating methods. His appearances before legislative committees and on occasion at commission hearings have been most illuminating to students of the problems of urban transportation. Few executives have given more unstintedly of their time to the properties under their charge. General Bancroft's interest in the physical condition of the system and in the actual handling of its operating problems has been proverbial, and for many years he has devoted virtually seven days a week to the duties of his office, including frequent and comprehensive inspection trips. In the course of his presidency General Bancroft visited numerous cities in Europe and America in the interest of comparing methods on both sides of the Atlantic.

General Bancroft was the only man in the United States at the outbreak of the Spanish-American War to receive a brigadier-general's commission, with the exception of officers of the regular army, active or retired, and of Civil War veterans. His military career began in 1875 as a private in the Fifth Massachusetts Volunteer Infantry, and after passing through the intermediate grades he became Brigadier-Gen-

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eral in 1897. In 1898 he was in command of a brigade of volunteer regiments from Illinois, Wisconsin and Iowa, with headquarters at Jacksonville, Fla., and resigned his commission at the cessation of hostilities. He was retired with the rank of Major-General of the Massachusetts Volunteer Militia in 1901.

General Bancroft was chairman of the Republican State Committee in 1893. He is a member of the Order of Cincinnati, Order of Foreign Wars, and Order of the Spanish War. He has been a director of the Boston Chamber of Commerce, and is vice-president of the Chelsea Trust Company, being a director in that organization and also in the Puritan and the United States Trust Companies, Boston. He resides in Cambridge.

In referring to the election of President Brush, the Boston *Herald* said, editorially:

"Other street railway systems have often tried to lure Matthew C. Brush away from the Boston Elevated Railway, with offers of higher salaries. His advance to the presidency of that great company thus comes in fitting recognition, not only of brilliant and faithful work, but of a certain loyalty to Boston and the company with which he has been pleasantly associated since 1909. Congratulations to him and to the public."

Personal Mention

H. C. Walters, who has been secretary and treasurer of the Nashville Railway & Light Company, Nashville, Tenn., for the last eight or nine years, has resigned to enter the newspaper business.

J. G. Phillips, assistant general superintendent of the Michigan Railway, Jackson, Mich., has resigned. He is succeeded by Horace E. Allen, as mentioned in the ELECTRIC RAILWAY JOURNAL Sept. 9.

D. T. Nixon, assistant general manager of the Wisconsin Public Service Company, at Green Bay, has been promoted to the position of general manager of the same company for the properties at La Crosse.

J. R. Empey, superintendent of the Elmira, Corning & Waverly Railroad, Corning, N. Y., has been appointed general manager of that company and of the Corning & Painted Post Street Railway to succeed E. W. Underwood, resigned.

E. W. Underwood, general manager of the Corning & Painted Post Railway and the Elmira, Corning & Waverly Railroad, Corning, N. Y., has resigned to accept the position of superintendent and manager of the Buffalo division of the Erie Railroad at Buffalo, N. Y.

J. A. Wilcox, who has been superintendent and master mechanic of the Corning & Painted Post Street Railway, Corning, N. Y., has been appointed superintendent of power stations and equipment of the Corning & Painted Post Street Railway and the Elmira, Corning & Waverly Railroad at Corning, N. Y.

Ernest Asher has been appointed supervisor of the sixth division of the United Railways, St. Louis, Mo. Mr. Asher was born near Salem, Mo., on July 30, 1886, and worked on his father's farm until March, 1911, when he went to St. Louis and obtained employment with the United Railways as a motorman on the Wellston line. He was frequently appointed to do relief work as a supervisor during the vacation period.

George K. Weeks has resigned from the presidency of the San Francisco-Oakland Terminal Railways, Oakland, Cal., to accept the position of president of the National City Company of California, organized to succeed N. W. Halsey & Company, investment bankers, in California. Mr. Weeks will remain on the directorate of the railways company and on the executive committee of the board. His successor as president of the railway has not yet been named.

C. E. Lenhart has been appointed master mechanic of the London & Port Stanley Railway, London, Ont. Mr. Lenhart has been engaged in electric railway work since 1888. Among the electric railways with which he has been connected are the Fitchburg & Leominster Street Railway, Fitchburg, Mass.; Mahoning & Shenango Railway & Light Company, Youngstown, Ohio; Buffalo & Lake Erie Traction Company, Buffalo, N. Y., and the Lehigh Valley Transit Company.

John P. Rice has been appointed superintendent of the fourth division of the United Railways, St. Louis, Mo. Mr. Rice was born in St. Louis on Feb. 5, 1867. He entered the service of the United Railways as a conductor on the Cherokee line in 1897. After five years on this run he was appointed foreman of the Jefferson and Geyer carhouse. Two years later, desiring to be outdoors more of the time, he obtained a transfer, being appointed a supervisor. At first he was stationed on his old line, the Cherokee, later on the Bellefontaine, and in 1901 he went to the Wellston, where he remained until his appointment to succeed Superintendent Leslie, deceased, of the Broadway. After his elevation to supervisor, Mr. Rice, during his spare time, "broke in" as a motorman.

Roy Clark, formerly general foreman of the shops of the Terre Haute, Indianapolis & Eastern Traction Company at Lebanon, Ind., has been appointed master mechanic at the shops of the Michigan Railway at Kalamazoo, Mich. Mr. Clark began work in the electric railway field in 1901 as division master mechanic in the shops of the Union Traction Company of Indiana at Tipton. He continued in this company's employ for four and a half years, and since that time has held similar positions with the Chicago & Milwaukee Electric Railroad; Indianapolis, Columbus & Southern Traction Company; Indianapolis, Crawfordsville & Western Railway; Chicago, South Bend & Northern Indiana Traction Company, and the Terre Haute, Indianapolis & Eastern Traction Company where he served for five years.

Charles S. Thrasher has been elected president of the Youngstown & Ohio River Railroad, Leetonia, Ohio, to succeed Will Christy, deceased. Mr. Thrasher has been connected, for a number of years, in an official capacity with the Cleveland Construction Company, founded by Mr. Christy in the early nineties. The company so formed was a pioneer in the engineering and construction of interurban electric railroads and designed, built and equipped several hundred miles of electric railway throughout the country. Mr. Thrasher was connected with the construction of the Richmond & Petersburg Electric Railroad, the Western Ohio Railroad, the Springfield & Xenia Railway and the Mesaba Railway, and had full charge of the construction of the electric properties on Long Island, known as the New York & Long Island Traction System. After completion of the construction of the Long Island properties, he had charge of the operation of the lines as vice-president and general manager, until they were sold to the Pennsylvania Railroad interests. On his return to Ohio from Long Island, Mr. Thrasher took charge of the construction of the Youngstown & Ohio River Railroad, and since its completion, as secretary and treasurer of the company has directed its operation under Will Christy, the president, whom he now succeeds. Mr. Thrasher was appointed receiver of the properties of the Interurban Railway & Terminal Company, Cincinnati, on Oct. 1, 1914, and has reconstructed the property, under receivership, and directed its operation since that date. In addition he is an officer and director of the Springfield & Xenia Railway and in charge of operation, and is an officer and director of the Warren Bicknell Company, Cleveland, Ohio, operating managers of several interurban electric properties in various States.

OBITUARY

Charles E. Thomas, master mechanic for the Connecticut Company at Waterbury, Conn., died at the Waterbury Hospital on Sept. 12 after an illness of several weeks. Mr. Thomas was forty-seven years of age. He was a native of Maryland. He had long been engaged in electric railway work and for a number of years was connected with the street railway systems in New York City. In 1905 he entered the employ of the Connecticut Company and was assigned to lines of that company at Pittsfield, Mass. He remained in Pittsfield two years and in 1907 was transferred to Waterbury as master mechanic of the lines centering in that city. Mr. Thomas is survived by his widow and three children, the oldest of whom is fifteen years of age.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

St. Cloud, Fla.—The citizens of St. Cloud have voted to grant a franchise in St. Cloud to the Central Florida Interurban Railway. William Hall, St. Cloud, secretary. [Aug. 26, '16.]

Cumberland, Md.—The Cumberland Electric Railway has received a franchise from the Council to extend its line to the western end of the city limits, reaching a new residential section.

New Lebanon, N. Y.—The Albany Southern Railroad has received a franchise from the Council to supply electricity to the town of Lebanon. This extension will carry the company's system to the Massachusetts line.

Amanda, Ohio.—The Scioto Valley Traction Company has asked the Council for a twenty-five year franchise to supply electricity in Amanda. The company also proposes to furnish electricity to farmers residing along the line.

Honey Brook, Pa.—Application to the City Council for a franchise in Honey Brook has been made by the promoters of the proposed line from Modena to Coatesville. A franchise has been granted by the Council of Coatesville. H. G. Rambo, Coatesville, is interested. [July 29, '16.]

TRACK AND ROADWAY

Montgomery Light & Traction Company, Montgomery, Ala.—It is reported that this company will construct a line from Montgomery to Wetumpka if a bridge is built across the Tallapoosa River near Hughes' Ferry and a trolley line is permitted to be run across it. The line would connect with the Pickett Springs line and extend ten miles from Pickett Springs. The proposed line would cost about $100,000.

Municipal Railway of San Francisco, San Francisco, Cal.—Plans are being considered by the Board of Supervisors for the construction of an extension along Army Street from Church to Third Street, thence over a street yet to be laid to Hunter's Point.

Vincennes (Ind.) Traction Company.—The Indiana Public Service Commission has entered an order dismissing the petition of the Vincennes Traction Company in which the company asked for permission to change its track on Seventh Street, Vincennes, from double track to single track. Charles A. Edwards, a member of the commission, stated that the situation is one for the courts to decide, as it hinges on the interpretation of the contract between the city and the company.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—Surveys are being made by the engineers of the Kansas City, Kaw Valley & Western Railway for its proposed extension to Topeka.

Bay State Street Railway, Boston, Mass.—An order has been issued by the Public Service Commission of Massachusetts directing the Bay State Street Railway to extend its line along Varnum Avenue as far as Totman Street. The company will reconstruct its tracks on Prospect Street, Methuen, and heavy 8-in. rails will replace those now being used.

Kansas City (Mo.) Railways.—An ordinance requiring the Kansas City Railways to build and operate a single-track line on East Twenty-fifth Street from Grand Avenue to Troost Avenue has been signed by Mayor Edwards. The construction of this line is a franchise obligation and it is expected that it will be built immediately.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Work will be begun this fall by the Omaha & Council Bluffs Street Railway on the construction of a line from Twenty-fourth and O Streets to Nineteenth and W Streets. The line will probably be extended to Mandan Park later.

New York Municipal Railway, Brooklyn, N. Y.—Bids were opened on Sept. 18 by the Public Service Commission for the First District of New York for the installation of tracks for the new Culver line in Brooklyn. Kaufman & Gorcey, New York, were the lowest bidders at $103,680.

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company on Sept. 11, placed in service the new connection between the Grand Central subway station, the Grand Central Railroad station and the Queensboro subway. This connection makes it possible for passengers to transfer between the two lines without going into the street. The new connection has been made possible by the extension of the platform of the Queensboro station some 500 ft. to the west to a point underneath the junction of Park Avenue and Forty-second Street. The Public Service Commission for the First District of New York has approved the award of the contract for the installation of the third-rail on the Queens rapid transit lines by the Interborough Rapid Transit Company to the Thomas Crimmins Contracting Company, New York. The cost of the work will be about $22,300. The commission has also approved the award of the contract for the installation of the tracks on the Seventh Avenue branch of the Lexington Avenue line to Engel & Hevenor, New York, at $229,440.

New York (N. Y.) Connecting Railroad.—Plans are being prepared by the engineering department of the Pennsylvania Railroad for the installation of an electric switch and signal system for the New York Connecting Railroad. The signal work, it is understood, will be installed by the Pennsylvania Railroad and the New York, New Haven & Hartford Railroad jointly.

***Goldsboro, N. C.**—It is reported that plans are being considered for the construction of a line from Goldsboro to Seven Springs, about 14 miles. George Norwood, Goldsboro, is interested.

Ohio Electric Railway, Springfield, Ohio.—Under a decision issued by Judge Evans of the Franklin County Common Pleas Court on Sept. 15, the Ohio Electric Railway must cease the use of the wooden trestle over the Norfolk & Western Railroad at Mound Street and use the subway at Main Street. This will necessitate track changes and other construction to cost about $82,000. The court ruled that the Norfolk & Western Railroad should pay $53,439 of this amount and the Ohio Electric Railway, $28,561.

Youngstown & Southern Railway, Youngstown, Ohio.—It is reported that a number of improvements will be made by the new owners of the Youngstown & Southern Railway, which was recently sold at public auction to W. J. Blackburn, Youngstown, representing the bondholders.

Dunville, Ont.—Announcement has been made that plans for the proposed hydro-radial line from Dunville to Fort Erie are now ready. This proposed line will extend along the lake shore from Danville to Port Colborne, thence to Bridgeburg, via Fort Erie. The municipalities touched by this line will be asked to send each a representative to Toronto shortly when the plans and surveys will be presented, and arrangements made for a series of public meetings, after which the by-laws will be submitted in the various municipalities, probably on the same date as the usual January elections.

Sudbury, Copper Cliff & Suburban Electric Railway, Sudbury, Ont.—A report from the Sudbury, Copper Cliff & Suburban Electric Railway states that, owing to war conditions, the extensions contemplated will be postponed.

Portland & Oregon City Railway, Portland, Ore.—According to recent reports, work on the Portland end of the Portland & Oregon City Railway, known as the Carver Line, between East Twenty-second and Powell Streets and East Third and Clay Streets, in Portland, is progressing rapidly. The track has been laid from the latter intersection to East Ninth Street and is moving south on East Ninth to Division Street. It is expected that the track will be completed to East Third and Clay Streets by the end of September. This will be the temporary end of the line. At present cars are operated to East Twenty-second and Powell Streets, where connection with the west side is made by auto bus. Condemnation proceedings have been started in the Circuit

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Court by the company to secure possession of a lot located at the southwest corner of East Twenty-second and Division Streets, Portland, belonging to E. M. Lueders and Alfred Lueders. The city of Portland, which is represented to have certain liens on the property as a result of sidewalks, street and sewer assessments, is also made a party to the suit. The company wishes to lay its tracks from the city of Portland southeast into the county of Clackamas, north on East Twenty-second Street, and thence west on Division Street. The lot in question is necessary for tracks.

Portland Railway, Light & Power Company, Portland, Ore.—The Interstate Bridge Commission and the Portland Railway, Light & Power Company have reached an agreement whereby the company will be permitted to install a connection with the interstate bridge across the Columbia River, between Vancouver, Wash., and Portland, Ore., from the end of its present Vancouver line, utilizing its old right-of-way and trestle up to the bridge, which is nearing completion. The proposed franchise submitted provides for the construction of new double tracks down the embankment approach to the bridge, a distance of approximately 2 miles. Under the law the franchise must contain a common user clause.

Coatesville, Pa.—Rights-of-way are now being secured for the proposed railway to connect Modena and Coatesville. H. G. Rambo, Coatesville, is interested. [July 29, '16.]

Schuylkill Railway, Girardville, Pa.—Plans are being made by this company for the reconstruction of its line in Girardville.

York (Pa.) Railways.—Application has been made to the Public Service Commission of Pennsylvania for the approval of the construction, alteration, or re-location of the crossing at the grade of tracks on the Pennsylvania Railroad at West York Avenue. The commission referred the application to the engineering committee of the State. Although West York Avenue, from Philadelphia Street to Linden Avenue, has been double-tracked for several years, there is but one crossing over the railroad tracks. This has often resulted in a tie-up of traffic. The improvements will cost approximately $7,000.

Houston, Richmond & Western Traction Company, Houston, Tex.—It is reported that this company has been reorganized under the name of the San Antonio, Gonzales & Houston Interurban Company. Plans are being made to survey a new route for the proposed line to be built between San Antonio and Houston, about 225 miles. Steeve Holmes, Leesville, Tex., has been elected president to succeed C. C. Godman, Kansas City, Mo. [July 1, '16.]

San Antonio (Tex.) Traction Company.—Plans are being made by this company to double-track its line on South Flores Street and to construct 800 ft. of additional spur tracks.

Virginia Railway & Power Company, Richmond, Va.—Work will soon be begun by this company on the reconstruction of its track on First Street, from Broad Street to the Northside bridge, and on Floyd Avenue west from the Boulevard.

***Portage, Wis.**—Citizens of Portage and Baraboo are interested in the proposed construction of an electric railway to connect Portage and Baraboo. S. H. Peck, Portage, may give further information.

SHOPS AND BUILDINGS

Detroit (Mich.) United Railway.—Plans are under way by the Detroit United Railway for the construction of a freight terminal to occupy three city blocks between Dequinder and Chene Streets and Monroe Avenue and Macomb Street to take the place of the terminal at Congress and Fifth Streets. The estimated cost of the station, including the site, is $1,000,000.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has set Oct. 6 as the date for the receipt of bids for the construction of station finish for six stations on the rapid transit railroads now being constructed under the dual contracts. One of the stations is the new diagonal station on the Lexington Avenue line underneath Forty-second Street beneath Park and Lexington Avenues and which must be completed or substantially completed before the Lexington Avenue line is placed in operation. The other five stations are located on the upper portion of the Seventh Avenue line, as follows: Forty-second Street and Times Square, Pennsylvania Station (Thirty-third Street), Twenty-eighth Street, Twenty-third Street and Eighteenth Street.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—Plans and specifications have been drawn by the Buffalo & Lake Erie Traction Company for the construction of a brick carhouse in Lackawanna. The proposed structure will replace the one now used at East Eagle and Jefferson Streets, Buffalo. The Buffalo carhouse was abandoned by the International Railway Company after the completion of its new Broadway carhouses near the east city line. By using the Buffalo carhouse the Buffalo & Lake Erie Traction Company is forced to operate over International Railway tracks causing considerable delay because of the circuitous route to its Buffalo terminal at Ellicott and Clinton Streets.

International Railway, Buffalo, N. Y.—Bids have been asked by the International Railway for the construction of a new concrete and steel passenger terminal in Lockport, to cost approximately $30,000. The new structure will replace the frame building and will be used by the Buffalo & Lockport, Lockport & Olcott and Buffalo, Lockport & Rochester lines.

Philadelphia (Pa.) Rapid Transit Company.—Part of this company's carhouse at Fifty-ninth Street, near Vine Street, was destroyed by fire on Sept. 18. Ten pay-as-you-enter cars were destroyed. The loss is estimated at about $30,000.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Company, Los Angeles, Cal.—The power house of the Pacific Electric Company at Upland, which was recently destroyed by fire, is being reconstructed. The new plant will be modern in every particular.

Madison Light & Railway Company, Madison, Ind.—This company has entered into a contract with J. C. Reed, representing the Kent Light & Power Company, to supply energy for lamps and motors for the village of Kent and to farmers along the Kent Road. The Madison Light & Railway Company will erect the transmission line.

Manchester Traction, Light & Power Company, Manchester, N. H.—Plans are being prepared by this company for the construction of a power plant. French & Hubbard, 88 Pearl Street, Boston, are the engineers.

Cleveland (Ohio) Railway.—Fielder Sanders, municipal traction commissioner, has recommended to the City Council that the Cleveland Railway be permitted to contract with the Cleveland Electric Illuminating Company for power. This will result in the abandonment of the Cedar Avenue powerhouse and the construction of a substation, costing $250,000.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—A contract has been awarded by the Mahoning & Shenango Railway & Light Company to Stone & Webster Engineering Corporation, Boston, for the erection of a high-tension transmission line from the generating station at Lowellville to Sharon, a distance of 14 miles. The wires will be carried on steel towers.

San Antonio, Gonzales & Houston Interurban Company, Houston, Tex.—This company, which proposes to construct an electric railway between San Antonio and Houston, will construct an electric power plant. Steeve Holmes, Leesville, president.

Roanoke Railway & Electric Company, Roanoke, Va.—This company is preparing to double the output of its plant. The plans provide for the installation of 500-kw. generating units, four new boilers, coal-conveying and handling system, condensers, pumps, etc., the construction of a substation and erection of two 11,000-volt transmission lines to the Viscose Company's plant; also another line when the Viscose Company's plant is completed. The principal contracts have been awarded. The cost of the work is estimated at $250,000.

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Manufactures and Supplies

CONDITIONS IN ELECTRICAL MANUFACTURING

Messrs. Rice and Tripp Outline Situation at Edison Illuminating Companies' Convention

At the recent convention of the Edison Illuminating Companies at Hot Springs, Va., E. W. Rice, Jr., president of the General Electric Company, and Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, made addresses describing in an interesting way the situation of those two companies as regards their manufacturing.

According to Mr. Rice, while the volume of business during recent months done by the General Electric Company has shown some recession, orders are still being placed at a rate in excess of anything in the company's previous experience. Promises made by producers of raw material and machinery and tools of every description have been found to be extremely unreliable, and this naturally interferes with the company's schedules of manufacture of finished goods. In Mr. Rice's opinion, there is little if any evidence of any change in the situation in the immediate future, and the company anticipates continued difficulties in obtaining raw materials.

After quoting some of the advances in prices since August, 1914, which the company has had to pay for copper, steel and other materials used in the manufacture of its products, he said that the fundamental difficulty has been the inability to get the materials either on time or in sufficient quantities. Referring to the machine tool market Mr. Rice said prices were constantly raised and deliveries lengthened until some six months ago the most reputable manufacturers began to quote merely nominal current prices subject to an advance not to exceed 20 per cent at the time of shipment. They also informed us that these prices, named for prompt acceptance only, were subject to change without notice.

The increase in prices has not been permitted to directly affect production unfavorably, as these prices have been met. The fundamental difficulty has been the inability to get machinery and materials either on time or in sufficient quantities. In some instances materials and machinery employed heretofore have been unobtainable. New materials, machinery and methods have been substituted, involving delay in production. Even after the company had succeeded in purchasing raw materials, and shipments had actually taken place, Mr. Rice said, there was no assurance that the materials would arrive on time.

The labor situation has also been very unsatisfactory, especially with regard to high-grade skilled employees and low-grade common laborers. There does not seem to be a sufficiency of either class to meet demands. The scale of wages for such employees is abnormally high, and this condition has been intensified by competition for labor among manufacturers. Coincidentally, there is every evidence that efficiency has, temporarily at least, declined, and the output of a man is lower than heretofore.

To a relatively limited extent only have contracts taken for munitions interfered with the company's regular business. If it had anticipated the prompt revival of business it would never have undertaken the manufacture of any munitions. None of the space normally devoted by the company to the manufacture of turbines, induction motors or similar apparatus has been occupied at any time for munitions, and the total space occupied in munition work of all character to-day is but 3 per cent of the company's total manufacturing space, much less than the proportion in value of the munition orders to orders for regular products. The last important order for munitions was taken over a year ago and the company does not now expect to take any further orders of this nature.

In Mr. Rice's opinion, "It would almost seem that the high watermark with respect to prices of raw materials and labor has been reached, and, if so, continuance of such conditions, future prices of raw materials would naturally remain substantially unchanged."

The conditions discussed by Mr. Rice in regard to the difficulties of getting raw materials have also been found by the Westinghouse Company, according to Mr. Tripp. Mr. Tripp said that on Aug. 1, 1914, when the war began, his company had unfilled orders on its books of about $8,000,000, representing only about two months theoretical full output of its shops. Business continued to dwindle, and on Sept. 28, 1915, which was the lowest point reached, the company had on its books approximately $5,600,000 of unfilled orders. The real upward movement did not begin until about Nov. 1, 1915, and at the present time, although the company has increased its forces to nearly 30,000, it has on hand to-day unfilled orders for electrical goods amounting to considerably in excess of $30,000,000.

These figures take no account whatever of orders for war munitions. In June, 1915, the company entered into a contract with the English Government to make rifles for Russia but undertook that work in a plant at Springfield, Mass., and not at its electrical works at Pittsburgh. The company has also undertaken contracts for machining high explosive shells, but while most of this work has been done in the Pittsburgh district it was performed for the greater part in buildings which were not then in use and had not been in use for a long time for electrical manufacture. As other orders were received, the regular workmen of the company who had been engaged on this work were returned to their former employment, and in Mr. Tripp's opinion the labor conditions of the company would have been just as serious as if it had never taken a war order.

Summing up the present problems of the company, he said:

"Our greatest task is to find a sufficient supply of the two extremes, viz., highly-skilled and the common laborer. The first is practically unobtainable and the latter is becoming scarcer, more expensive and less efficient.

"The great source of delay and curtailment of output has for some time been raw material. In July, 1915, our promise of delivery on steel was thirty to sixty days after placing of orders. In September and October these dates were lengthened, and in November promises were three months minimum and four months maximum. At that time we placed orders based on business in hand or in prospect; on Jan. 26, 1916, we received notice that deliveries would be six months, and on Feb. 18, 1916, another notification was received extending delivery to ten months.

"It has only been by constant pressure that we have been able to get material ordered as long ago as October and November, 1915; some of it was received in July this year and some has not yet been shipped. It has been necessary for our purchasing department to put a force of men in the field who live at the mills and endeavor to have our material put through. We have also had a corps of men scouring the country picking up steel wherever they could find it.

"Rubber-covered wire and cable are among some of the other articles the procuring of which has taxed the ingenuity of everybody from the president down."

Mr. Tripp also presented a statement of some of the more important raw materials used by his company and the time required to get them:

Aluminum, sheet meter disks, and meter covers	6 mo.
Asbestos cloth	16 to 20 wk.
Brass rods, tubing and sheets	5 to 6 mo.
Copper rods, sheet and tubing	5 to 6 mo.
Copper wire, bare	5 to 6 mo.
Cotton-covered magnet	5 mo.
Silk-covered magnet	5 mo.
Rubber-covered wire and cords	5 mo.
Drills, high speed	5 to 6 mo.
Drills, standard, carbon	4 to 5 mo.
Drills, special	4 to 6 mo.
Emery wheels	5 to 7 mo.
German silver, sheet, bare wire, and insulated wire	5 to 6 mo.
Lamp cord	5 mo.
Linen, 0.012 in.	60 to 90 days
Porcelain, on wet process, high-tension pieces	8 to 12 wk.
Porcelain, on dry-process, high-tension pieces	8 to 12 wk.
Porcelain, some large and difficult pieces	8 to 12 wk.
Steel drop forgings	120 dys.
Steel shafts, specification No. 1476	4 to 16 wk.
Steel shafts, specification No. 1478	4 to 16 wk.
Steel, bare	10 mo.
Steel plates	10 mo.
Steel sheets, Bessemer and O. H.	120 dys.
Steel, cold-rolled strip	6 mo.
Steel, tool	4 to 6 mo.
Steel castings	8 wk.
Tapes, asbestos	60 to 90 dys.
Tapes, bias friction	30 dys.
Tapes, grey webbing	120 dys.
Tapes, linen, 0.007 in.	120 dys.
Tapes, surgical, 0.020	120 dys.
Tapes, taffeta	120 dys.
Tools, small	12 to 20 wk.

Mr. Tripp said that his company spent more than $1,000,000 in research and development work next year.

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IMPROVED CAR LIGHTING

Mazda Lamps in Large Units Have Proved to Be Most Efficient

Most all of the cars, both street and interurban, ordered during the last two years, have been equipped with lighting fixtures arranged in accordance with the better standards for interior illumination. The National Lamp Works of the General Electric Company, Cleveland, have done a vast amount of experimenting and have made many engineering investigations tending toward improvements in lamps suitable for car lighting and toward establishing better standards for car illumination. Compared with the old style methods the greatest improvements are now evidenced by the quite general use of shades and larger wattage Mazda lamps. Practically every road now uses the tungsten lamp in wattages ranging somewhere from 25 to 100 per lamp. Engineers versed in the science of interior illumination point out that it is economy to use shades in car lighting, particularly with high efficiency lamps. By the use of shades a better distribution of the light from large lamps is obtained, and thus in turn power consumption requirements are decreased. Many of the later types of cars are wired for illumination by few large units rather than from a multiplicity of small outlets so commonly used in the older type of cars. The cost of rewiring old cars, however, has been found to be so great that it has prevented the use of large lamps on the old cars of many roads even though the illumination efficiency is higher. Engineers of the National Electric Lamp Works point out that the modern electric railway car has a better installed wiring system and thus with the heavy fittings and shade holders and fewer number of circuits the car lighting circuits give far less trouble and the illumination has a far better effect on the public than the old-style car wiring with its multiplicity of outlets and small carbon lamps.

PRODUCTION OF STEEL SKELP

As supplementary to the graph showing the increase in production of steel pipe during the last twenty-nine years, published on page 519 last week, the table given below will be of interest. It is from a statistical bulletin issued by the Iron & Steel Institute and shows that the production of wrought iron skelp in this country has decreased not only relatively but actually, while that of steel has increased. Skelp, it may be added, is plate from which pipe is made by bending and welding the edges together and drawing the thick tube thus formed.

PRODUCTION OF IRON AND STEEL SKELP IN THE UNITED STATES FROM 1905-1915. GROSS TONS

Year	Iron	Steel	Total	Per Cent Iron	Per Cent Steel
1905	452,797	938,198	1,435,995	31.5	68.5
1906	391,517	1,137,068	1,528,585	25.7	74.3
1907	444,536	1,358,091	1,802,627	24.6	75.4
1908	297,049	853,534	1,150,583	25.8	74.2
1909	370,151	1,663,230	2,033,381	18.2	81.8
1910	350,578	1,477,616	1,828,194	19.2	80.8
1911	322,397	1,658,276	1,980,673	16.3	83.7
1912	327,012	2,119,804	2,446,816	13.3	86.7
1913	312,746	2,189,218	2,501,964	12.5	87.5
1914	264,340	1,718,091	1,982,431	13.3	86.7
1915	262,198	2,037,266	2,299,464	11.4	88.6

ROLLING STOCK

Mahoning & Shenango Railway & Light Company has ordered ten city cars from the St. Louis Car Company.

Lehigh Valley Transit Company, Allentown, Pa., is reported to be considering the purchase of fifteen cars.

Philadelphia Rapid Transit Company, Philadelphia, Pa., lost ten pay-as-you-enter trolley cars in a fire which damaged part of the Fifty-ninth Street carhouse.

London & Port Stanley Railway, London, Ontario, Can., is reported to be considering the purchase of two cars, which are to be 10 ft. longer than the present equipment.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has ordered from the Russell Car & Snow Plow Company, through Wendell & MacDuffie, one combination ballast car and snow plow.

TRADE NOTES

National Tube Company, Pittsburgh, Pa., whose plans for a new plant at Gary, Ind., were mentioned in this column recently, reports that the plant will have a capacity of 500,000 tons per year.

The Wendell & MacDuffie Company, New York, which for the past five years has acted as Eastern agents for the St. Louis Car Company, severed its connection with that company on Sept. 15.

Bound Brook Oil-Less Bearing Company, Bound Brook, N. J., is erecting a reinforced-concrete building, 50 by 100, at their plant No. 2, to take care of the rapidly growing business in its Nigrum impregnated wood bearings.

B. J. Carney & Company, Grinnell, Iowa, reports that William Mueller & Company, 1729 McCormick Building, Chicago, have been appointed sales representatives for Western red cedar poles. Mr. Mueller for a number of years has been connected with the Western Electric Company as manager of the pole department.

McQuay-Norris Manufacturing Company, St. Louis, Mo., reports that Frank J. Stanley, who has been traveling on the Pacific Coast for the company, has been transferred to Cincinnati, Ohio, as manager of its branch there. The company has also added to its sales force by securing the services of John Frier and Max S. Jones, mechanical engineers. They will travel out of the home office.

Ohio Brass Company, Mansfield, Ohio, recently sold to the Boston Elevated Railway, 200 coupler equipments, which will be installed on 100 new center-entrance motor cars to be operated in the East Boston tunnel. These couplers are of the air-connected type and are furnished in addition with an electrical connecting feature, carrying fifteen points for the accommodation of the train line circuits, electro-pneumatic brakes and the train signal lines. With this coupler equipment it will be possible in one operation to couple the cars, connect the air, and all electrical circuits between cars. The operation is entirely automatic, all connections being made by impact, as with ordinary couplers.

ADVERTISING LITERATURE

Chicago Pneumatic Tool Company, Chicago, Ill., has issued bulletin E-43 describing and illustrating the Duntley universal electric hammer drill.

John F. Byers Machine Company, Ravenna, Ohio, has issued a circular describing, illustrating and giving the principal dimensions of its improved Model C auto-crane.

Carbic Manufacturing Company, Duluth, Minn., has issued a booklet on the Carbic light. The booklet illustrates the various types and describes the construction, operation and other points of excellence of this apparatus.

Jewett Car Company, Newark, Ohio, has issued a circular on its one-ton truck attachment for the Ford chassis. It describes and illustrates the method of substituting the attachment for the rear axle and drive, at the same time reinforcing the frame. Pictures of a number of bodies are given.

Esterline & Angus, Indianapolis, Ind., have prepared a booklet entitled "An Unique Service by an Unique Organization." This book sets forth the functions performed by this organization and illustrates its capacity and resourcefulness for the successful solution of difficult problems in engineering design. The organization confines itself strictly to that portion of the engineering work of its clients, which by reason of its nature does not come within the scope and experience of their regularly employed engineers. The efforts of this concern are devoted largely to the development of the electrical and mechanical ideas requiring detailed engineering study. Work done includes the design and construction of power-stations, development of a steam turbine rotating element, design of magnetic system for handling sheet metal plates and the development of a regulating device for correcting voltage condition and making possible the successful use of incandescent headlights on interurban cars. This organization serves a number of important manufacturers in the capacity of expert engineer, performing the duties of an engineering development department.

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Electric Railway Journal

September 30, 1916

The Development of the Electric Railway Car

Annual Convention Section

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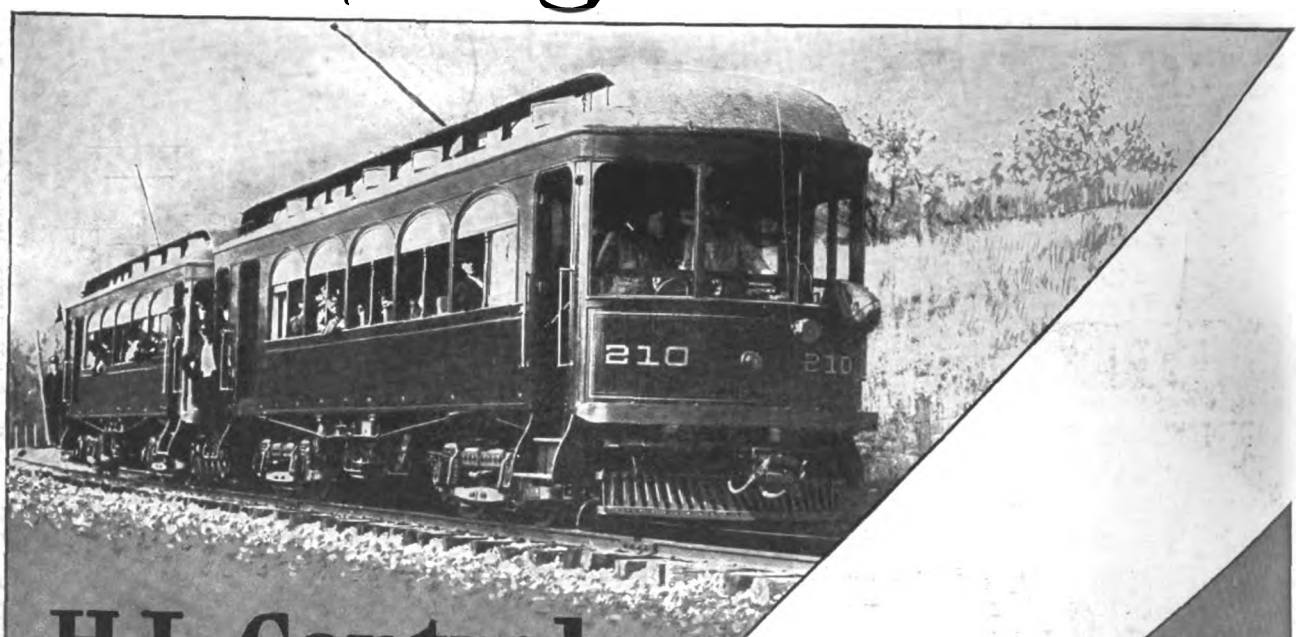
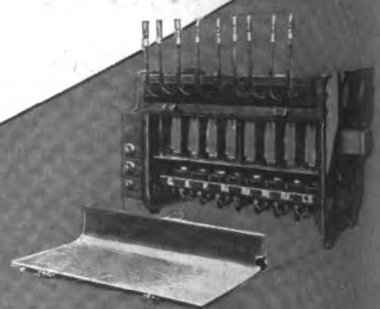
The Selection Insuring the Greatest



H L Control

—has distinct and characteristic advantages over other forms of multiple unit control.



For all classes of Service,
City, Suburban, Interurban, Elevated or Subway, Light or Heavy Duty Locomotives

Westinghouse Railway

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# of Equipment Reliability and Economy Always Narrows down to—

W
WESTINGHOUSE ELECTRIC

Standard Railway Motors

506—25 H. P. 600 Volts

Westinghouse Electric—developed and built the first 24" wheel motors—now a common standard.

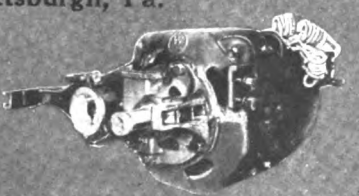
Westinghouse Electric's—most recent achievement in Railway Motor Design is the WEE Motor,—now in general use.

514—40 H. P. 600 Volts

Westinghouse Electric's line of modern Railway Motors successfully handle every operating Requirement.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

548—95 H. P. 600 Volts



306 CV—65 H. P. 600 Volts

532—50 H. P. 600 Volts

Motors & H L Control

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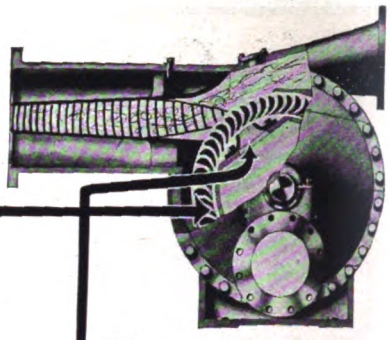
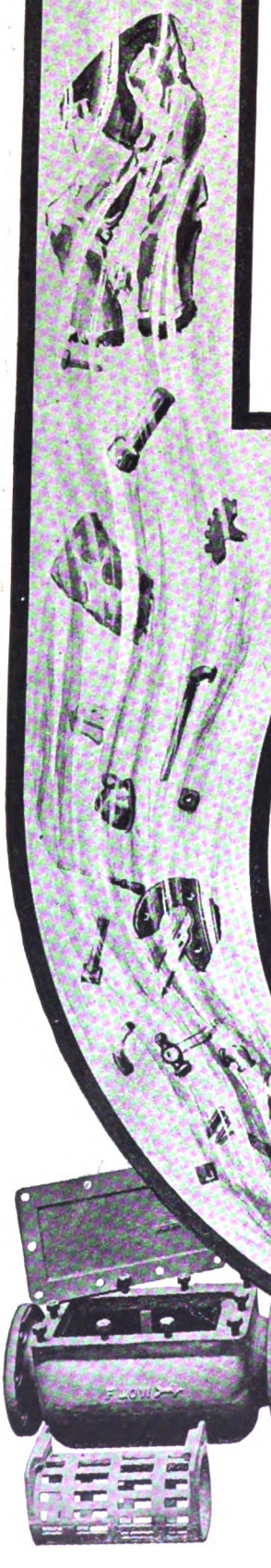
The Pump Runner is very rugged.



The opening admitting water to the runner is large.

The Westinghouse Leblanc Air Pump



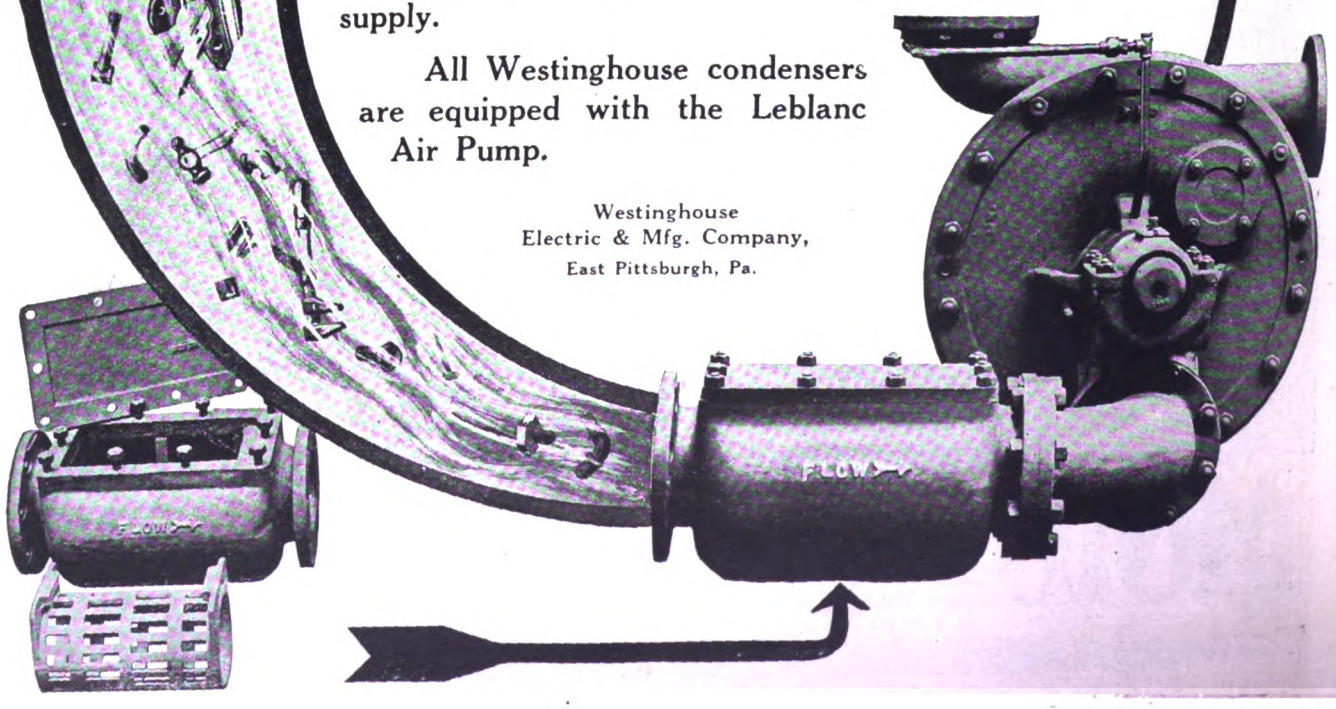
The construction of The Westinghouse Leblanc Air Pump is so simple and rugged that it is not damaged by the small debris that may pass through it with the raw condensing water. Therefore the water strainer used is intended simply to catch and hold—

THE BIG THINGS

—that may, by accident find their way into the water supply.

All Westinghouse condensers are equipped with the Leblanc Air Pump.

Westinghouse
Electric & Mfg. Company,
East Pittsburgh, Pa.



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Westinghouse

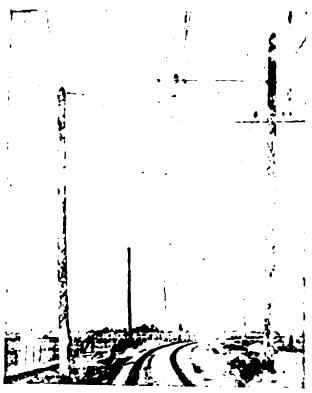
Line Material

Indianapolis & Cincinnati Trac. Co.

Grand Trunk Railway

Ogden, Logan & Idaho Railway

Boston & Maine Railroad
Hoosac Tunnel

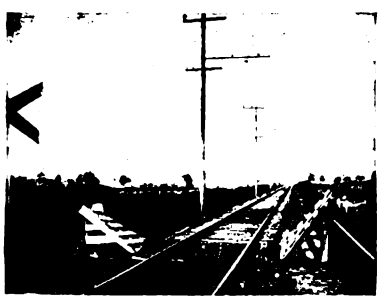


Salt Lake & Utah R. R.

Erie Railroad

Kansas City, Clay County & St. Joseph Railway

New York, Westchester & Boston Ry.



Southern Illinois Railway & Power Co.

Southern Pacific Railway

A few typical installations of Westinghouse Overhead Construction on Steam and High-Speed Interurban Electric Railroads

Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

Atlanta, Ga.
Baltimore, Md.
Birmingham, Ala.
Bluefield, W. Va.
Boston, Mass.
Buffalo, N. Y.
Butte, Mont.
Charleston, W. Va.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
*Dallas, Tex.
Dayton, Ohio
Denver, Colo.
Des Moines, Ia.
Detroit, Mich.
*El Paso, Tex.
*Houston, Tex.
Indianapolis, Ind.
Joplin, Mo.
Kansas City, Mo.
Louisville, Ky.
Los Angeles, Cal.
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
New Orleans, La.
New York, N. Y.
Omaha, Neb.
Philadelphia, Pa.
Pittsburgh, Pa.
Portland, Ore.
Rochester, N. Y.
St. Louis, Mo.
Salt Lake City, Utah
San Francisco, Cal.
Seattle, Wash.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.

*W. E. & M. Co. of Texas

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Specialization

Produces Highest Efficiency

Air Brake building is a business in itself—and one of the most important, because of the lives and property the Air Brake protects. It is necessarily an intensive, concentrated business. It is a specialist's business, and to obtain best results should be conducted by specialists.

A co-ordination of the various departments of our carefully arranged organization fits us for this work. Our inspectors and engineers, who are daily on the firing line of railroad work, learn all the details of local conditions, then make definite recommendations to the designers, who design and test out the recommended apparatus, after which a specially equipped factory, manned by experienced mechanics, produces a device perfectly fitted to the requirements of each particular railroad. We have thus solved many problems, and invite you to permit us to solve yours.

Our line of products is broad and covers the entire field of electric railroad braking, from the simple Straight Air Brake for single cars to the Variable Load Brake for multiple unit electric trains. We recommend Westinghouse Straight Air Brake with Emergency Feature for slow moving city cars; Westinghouse Automatic, Quick Action, for two or more suburban cars; Westinghouse Universal Equipment with either electric or pneumatic control for interurban or electrified steam road service; and Westinghouse Variable Load Equipment, electrically controlled, for elevated, subway and surface trains.

We build air brakes of all kinds to suit each and every class of service. We manufacture but one product—Air Brakes—and we're Specialists in that.

Westinghouse Traction Brake Company

General Offices: Wilmerding, Pa.

PITTSBURGH:
Westinghouse Building

CHICAGO:
Railway Exchange Building

NEW YORK:
City Investing Building

ST. LOUIS:
Boatmen's Bank Building

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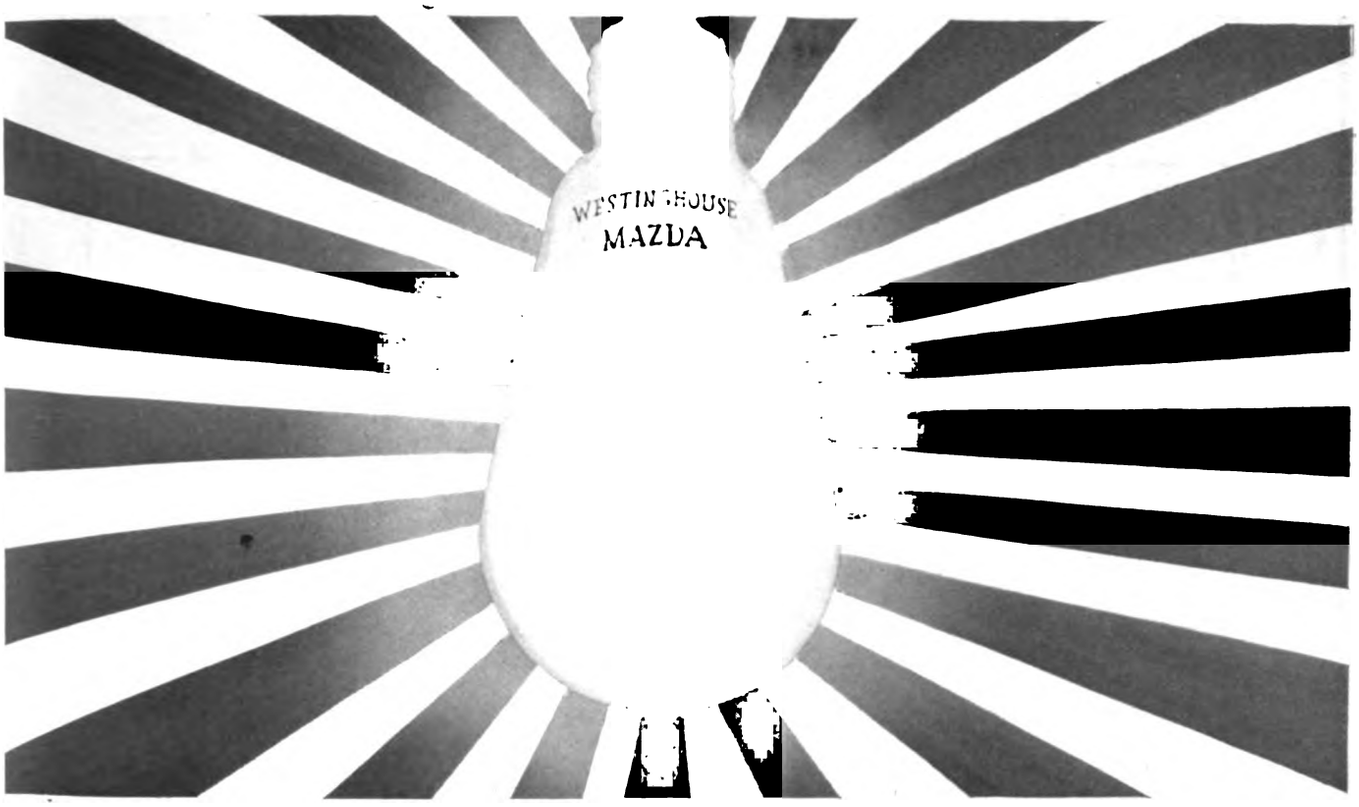

Viewed from any angle

—from production facilities

—from convenient stock supply

—from engineering service

—from quality of product

—the use of Westinghouse Mazda Lamps is not only desirable —it is essential for convenience and efficiency in buying, with economy and satisfaction in operation.

Guaranteed by the Name

Westinghouse Lamp Company

Atlanta
Baltimore
Boston
Buffalo
Chicago
Cincinnati
Cleveland
*Dallas
Denver
Detroit
Kansas City
Los Angeles
Milwaukee
New Orleans
New York
Philadelphia
Pittsburgh
Portland
St. Louis
Salt Lake City
San Francisco
Seattle
Syracuse

*Westinghouse Lamp Corporation

Export Sales Dept., 165 Broadway, N. Y. C.

For Canada—Canadian Westinghouse Co., Limited, Hamilton, Ont.

Member Society for Electrical Development

"Do It Electrically"

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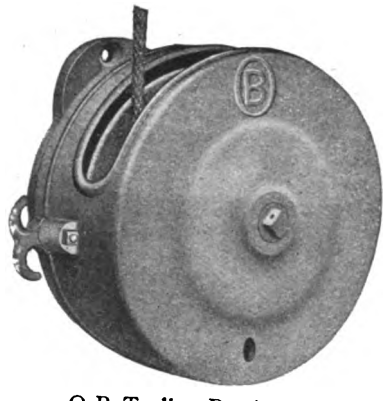
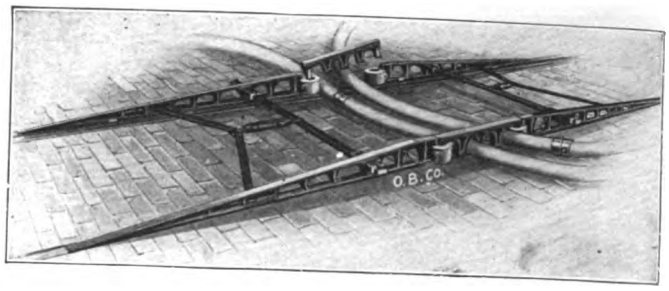


O-B Trolley Retriever



O-B Hose Bridge

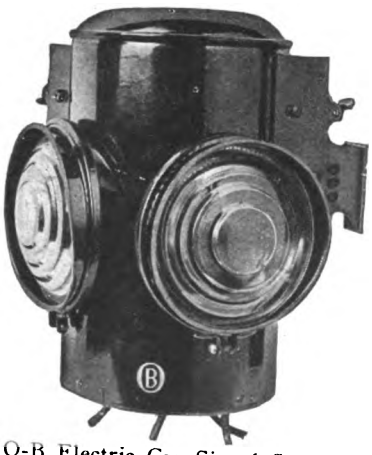
O-B Trolley Catcher

O-B Car

Has been developed to fulfill definite needs in a way which will increase the return from the cars on which it is used.

The O-B Engineers have investigated carefully the requirements of the trade in designing each device. Their own ideas and the ideas and suggestions of railway men have been combined in the various designs.

Never was a design considered complete

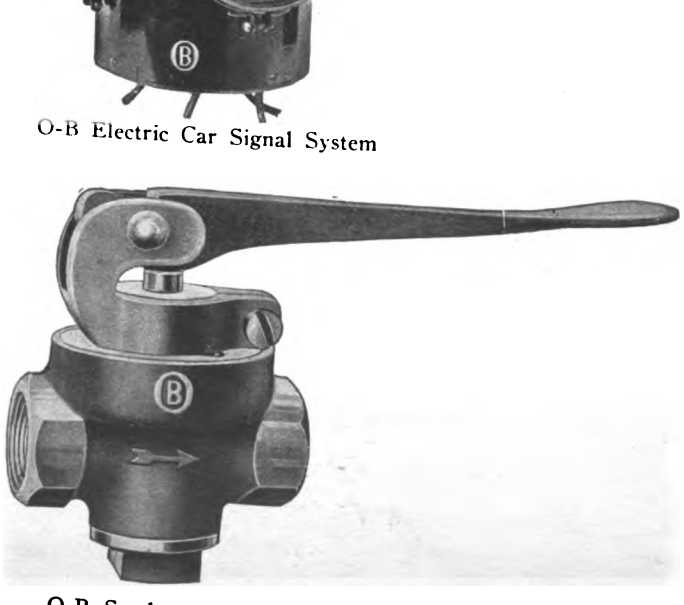


O-B Electric Car Signal System

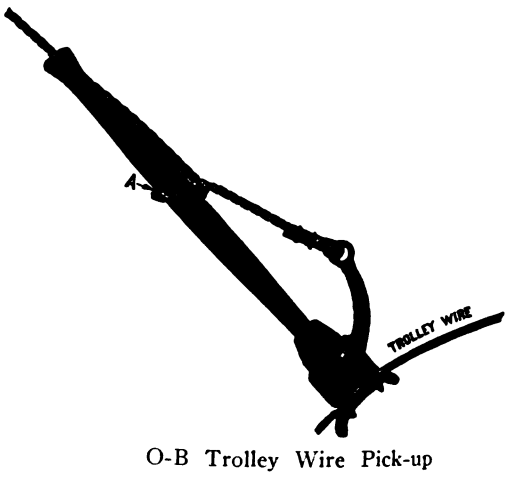
The Ohio

Mansfield,

Manufacturers of Line Material, Ca
General Sales Agents in United State



O-B Sander Valve



O-B Trolley Wire Pick-up

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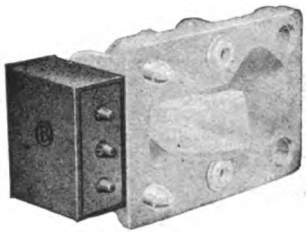
O-B Tomlinson Form 8 Air Connecting Coupler



O-B Electric Coupler for Mounting on Tomlinson Coupler

Equipment

and the device ready for sale until it was proved clearly that a real need existed and that the design as it stood met that need in every way.

Any one of the O-B devices installed on your cars will either lower maintenance costs, increase the factor of safety or add to the comfort and convenience of your cars—perhaps all three.

Furthermore, O-B equipped cars spend less time in the repair shop than others.

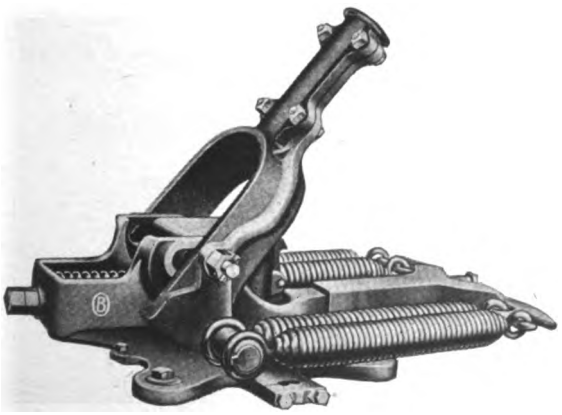
Crouse-Hinds Imperial Luminous Arc Headlights

Crouse-Hinds Imperial Incandescent Headlights

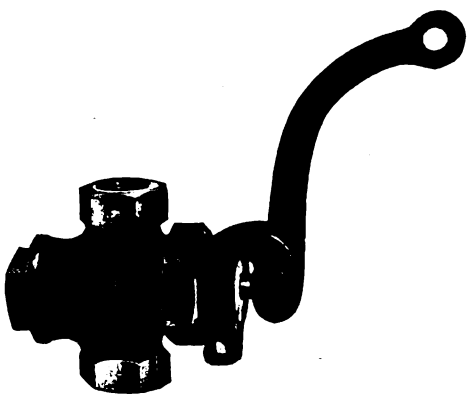
Brass Co.

Ohio, U. S. A.

Equipment, Rail Bonds and Insulators.
or Crouse-Hinds Imperial Headlights



O-B Trolley Base



O-B Whistle Valve

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Whenever You Think of Light Projectio

Type DLS Projector for flood lighting

Remember This—

That "Golden Glow"—the name behind these famous headlights and flood lights—stands for a powerful beam of golden-yellow light which is non-blinding and fog and dust penetrating. A beam of light which can be produced only by the famous "Golden Glow" mirrored glass reflectors.

"Golden Glow" Reflectors are the result of much scientific research and perfection. They are moulded from a greenish-yellow glass, ground by special patented machinery to a true parabola and polished and silvered as would be the finest French plate mirrors.

When projecting the light from an incandescent lamp they absorb the violet, ultra-violet and other high-frequency rays, thus projecting a beam of golden-yellow light which is non-blinding and wonderfully penetrating.

For Construction Work—

"Golden Glow" Projectors are used for flood-lighting large spaces where construction work is carried on at night. They offer many advantages over the various methods now used, being more practical, more efficient and more economical. They are equipped with the famous "Golden Glow" Reflectors, thus producing a powerful light which is non-blinding and wonderfully penetrating. These features of "Golden Glow" light make it particularly adapted to flood lighting.

There Is No Other "Golden Glow" Reflector — Our Patented Process Fixes That

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

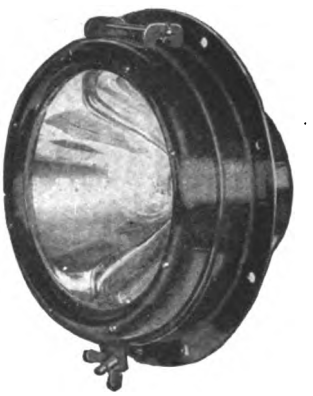
CHICAGO
Monadnock Bldg.

Digitized by Google

Think of the Famous "Golden Glow"

For City and Suburban Service—

"Golden Glow" Headlights for city and suburban service are well known for their efficiency and economy. Their famous reflectors project maximum light, which means that a lamp of minimum capacity may be used. And while in the city streets the headlights may be dimmed by our standard dimming resistance unit.



Type SR-95 for
City and Suburban Service

For Interurban Service—

"Golden Glow" Headlights have many times been proved the most practical for interurban service, offering, as they do, a powerful beam of non-blinding, fog and dust penetrating light, which compares favorably in volume with the high powered arc headlights. And the cost of operation of "Golden Glow" Headlights is insignificant as compared to arc headlight maintenance.

See Them at the Convention—

Whenever you think of light projection think of the "Golden Glow." At the Convention you will find all types of "Golden Glow" Headlights and Projectors on display in our space No. 414. You are cordially invited to look them over.

Type T-128 for
Interurban Service

"Golden Glow"—That Powerful, Non-Blinding, Fog and Dust Penetrating Beam of Light

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

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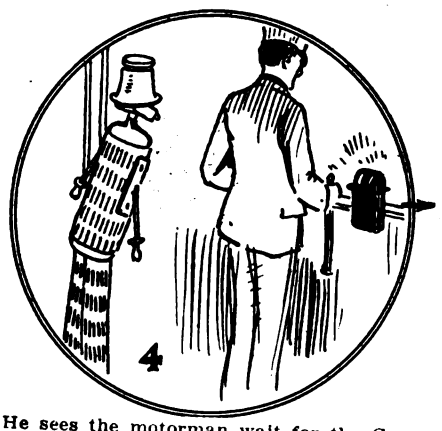
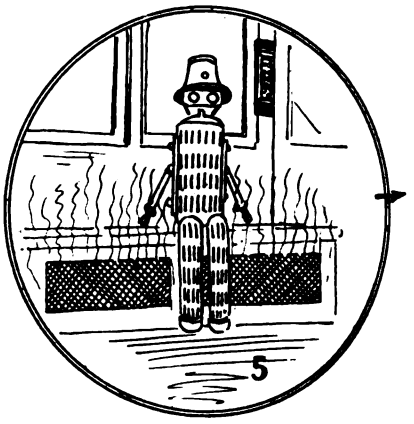


He sees the motorman wait for the Consolidated signal light before starting the car—this means that the doors have been shut and that therefore the platform accident has been entirely eliminated.

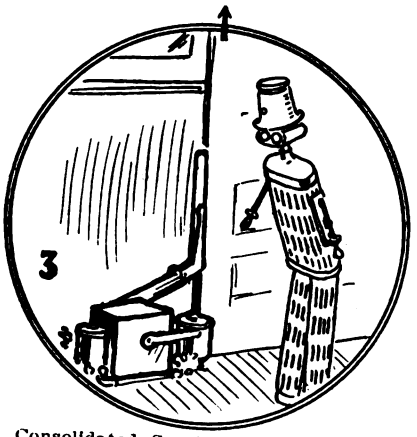
He sees the Consolidated New Electro-Pneumatic geared type door engine close the door with a smooth, gliding motion without slamming—and knows that the door is held shut with a positive lock and that the air is turned off to prevent any leakage.

He sits down and the grateful warmth, mild and uniformly distributed from the Consolidated heater, keeps him comfortable during his journey—the thermostat keeps the heater under perfect control.



For Highest Ope

The CONSOLI



Consolidated Specialty-Man is always at your service whether you need Heaters, Door Devices, Buzzers, Single Stroke Bells, Signal Lights, Relays or Resistances.

The Consolidated Signal Light

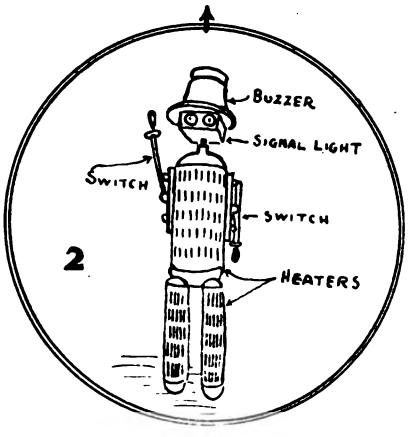
was the first and original motorman's signal light—and 90 per cent. of such installations are still Consolidated. There must be a reason. It has a green and white light. The green is the normal starting signal—the white being provided only for additional safety.

The Consolidated Heater

"The Heater That Set the Pace for Others."

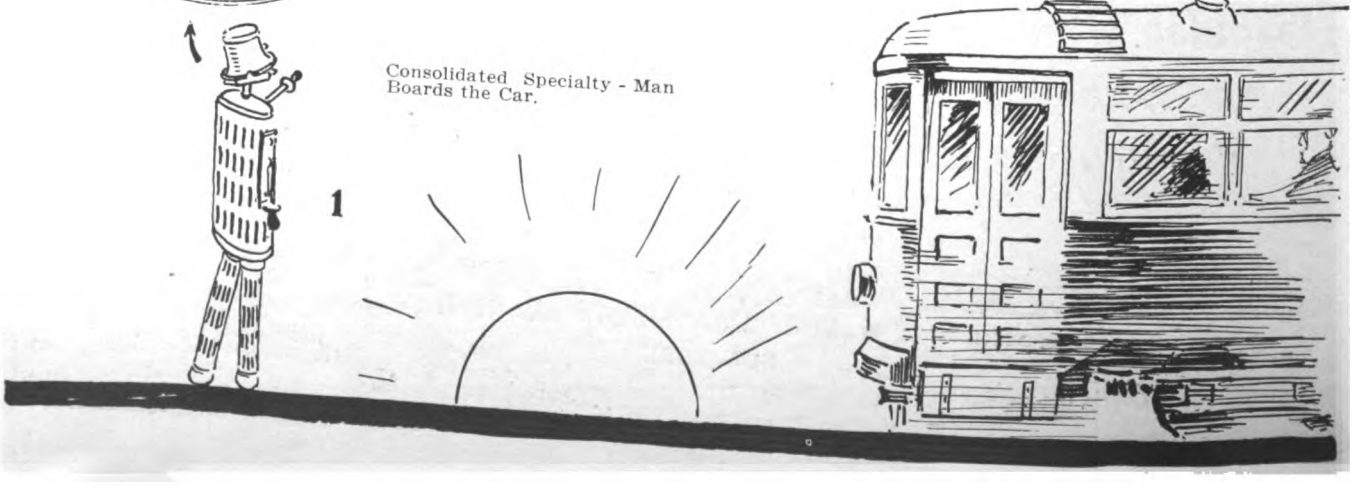
Has patented ventilated glazed porcelain core.
Has patented return lead.
Has patented double back. All the heat inside the car.

70,000 out of 90,000 Cars in the U. S.



Consolidated Car

New York **Albany**



Consolidated Specialty - Man Boards the Car.

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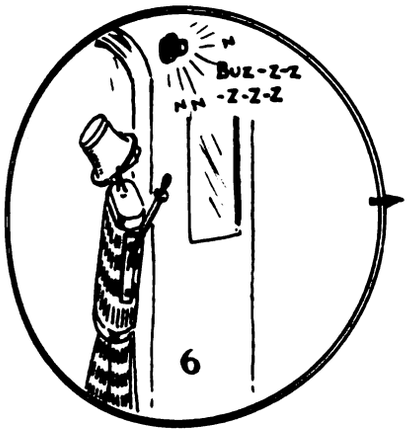
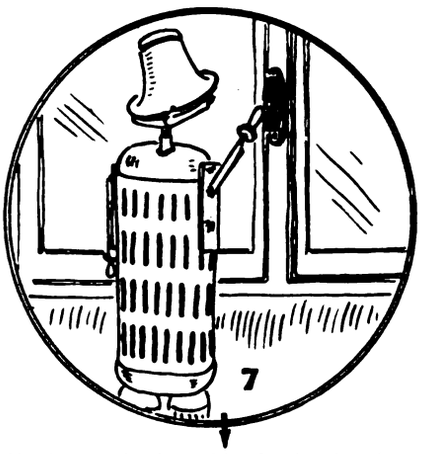


He notices that the motorman stops when the Consolidated Buzzer is operated by the passenger and . . .



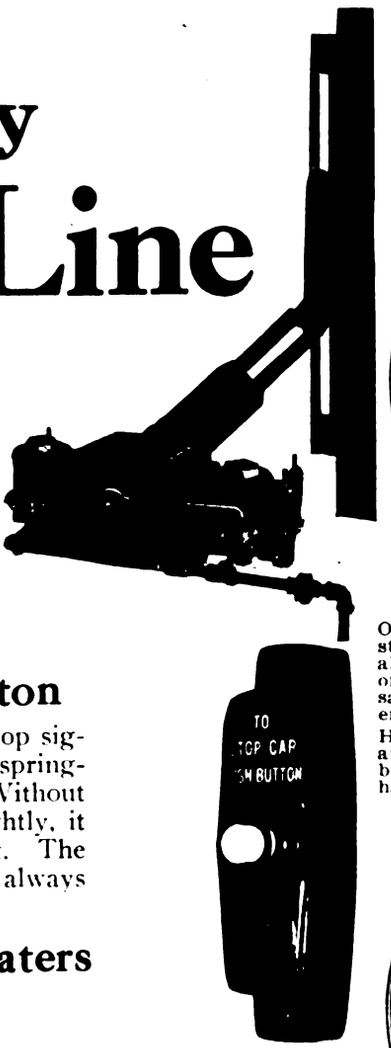
Having arrived at his destination he pushes the new Consolidated all-moulded type push button, signalling the motorman and conductor of his intention to alight.

ting Efficiency
DATED Line

The Consolidated Door Engine

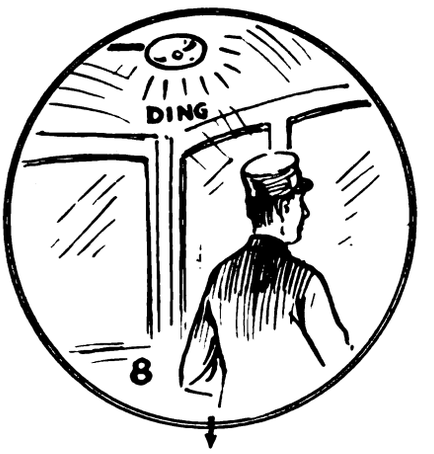
closes the door smoothly—quietly—without slamming—closes it with a positive lock. It *thinks* for the passengers' safety—cannot pinch.

There is no air-pressure on the piston leathers between stops, because the air is always "off" when the door is not in operation. The highest present-day development of electro-pneumatic door control.



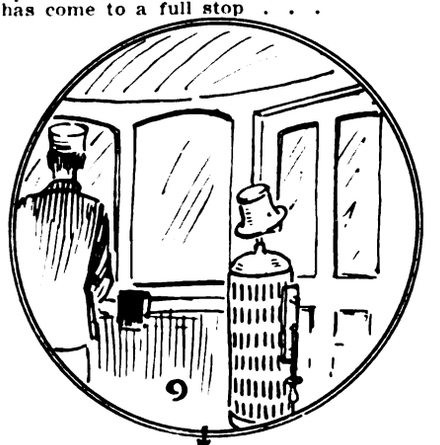
The Consolidated Push-Button

is the simplest and ruggedest passengers' car-stop signal on the market. Equipped with Fahnestock spring-clip connectors instead of binding screws. Without being unnecessarily bulky or in the least unsightly, it projects just the right distance from the post. The passenger never has to fumble for it—it is always ready at finger's end.



On some roads a Consolidated single stroke bell is used by which the conductor also signals the motorman without the use of Bell Cords—this bell rings from the same resistance that the Buzzer system employs.

He waits by the door for the car to stop and the door is prevented from opening by the Consolidated Relay until the car has come to a full stop . . .

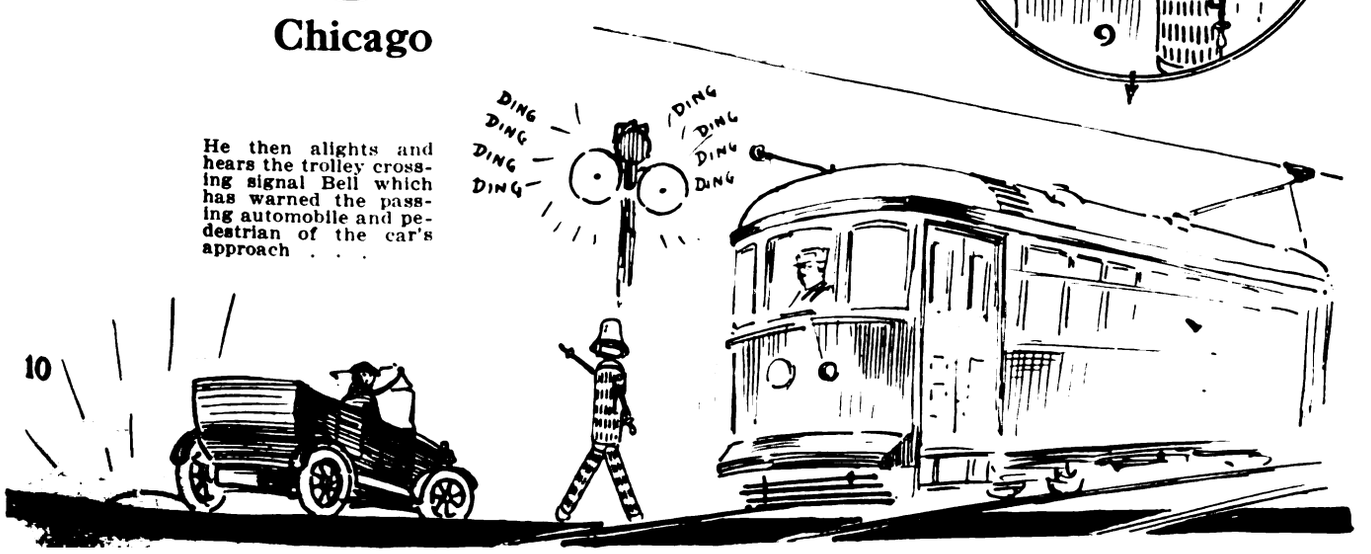


re Heated by Consolidated Heaters

Heating Co.

Chicago

He then alights and hears the trolley crossing signal Bell which has warned the passing automobile and pedestrian of the car's approach . . .



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Lord Railway Ca

HORNE DOUBLE ACTING BRAKE

The Latest Advance in Car Brake Design

A pressure on the hand brake rod of 3000 pounds in a few seconds by virtue of the new double acting feature.

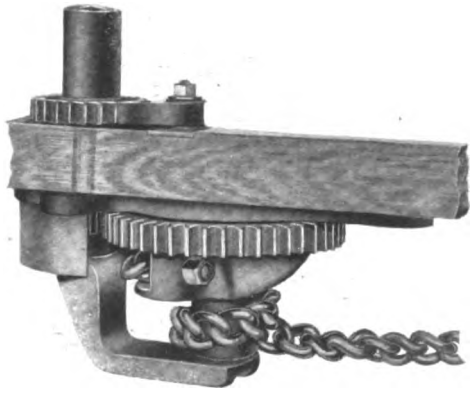
Weight 68 lb.—the lightest weight hand brake now manufactured.

No Slack Chain
No Lost Motion
No "Stuck Brakes"
No Rusted and Mud Coated Gears
No Flying Handles or Wheels
No Clearance Problems

A complete hand brake requiring no accessory parts.

"The Double Ratchet Does It"

GIANT GEARED BRAKE



A simple device designed for attachment to any type of equipment. Just square the end of the brake staff and drop it in place.

Manufactured in three power ratios, the highest developing a hand brake pressure of 2800 lb.

For light weight equipment and "One Man" cars the **"Midget"** Brake has been designed along the general lines of the Giant Brake.

While the complete weight of the Midget Brake is only 23 lbs. it develops hand brake pressures from 800 lb. to 1250 lb.

LORD MANUFACT

General Offices: 105

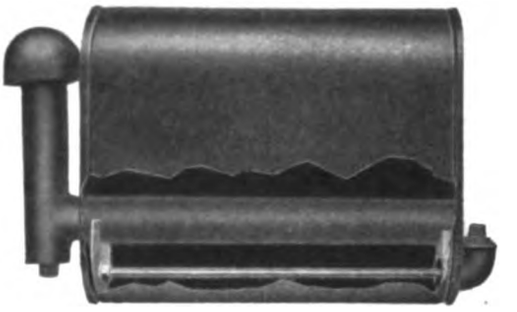
Digitized by Google

Equipment Devices

LORD SCREENLESS AIR CLEANER

Prevents injurious foreign substances from entering the air compressor.

One of the great advantages of this system is found in the fact that the foreign substances are collected in the oil well of the cleaner, thus keeping the intake passage clear and affording at all times an unrestricted flow of air.



It's so good that the big air-brake makers recommend it as part of the outfit. Let this simple device keep your compressors out of trouble.

Q-P TROLLEY CATCHER

3 moving parts

(1) the spring; (2) ratchet teeth, rope reel and square centrifugal hub in one piece; (3) the pawl. All ruggedly built.

Results achieved by this simple method of constructing Q-P Trolley Catchers are absolute reliability, light weight and the reduction of maintenance expense to a point seldom reached by any other device containing springs and ratchets.

In fact, the first cost of Q-P Trolley Catchers is virtually the final expense.

Buy the sensible device.

To reduce maintenance cost install the Q-P.

JRING COMPANY

West 40th St., New York

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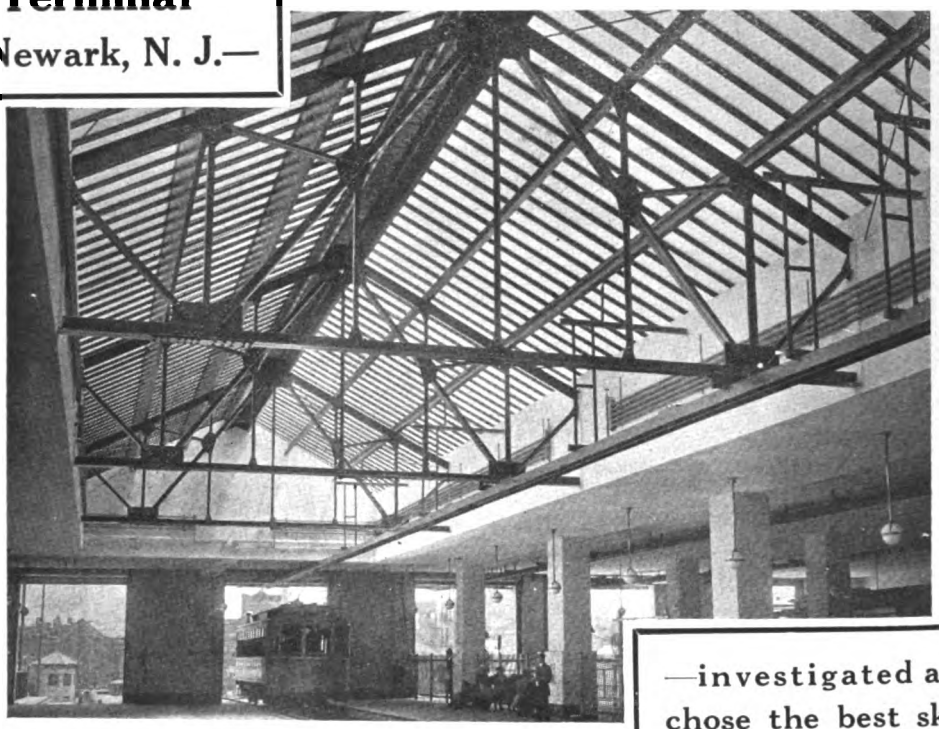
The New
Public Service Terminal
at Newark, N. J.—

ANTI-PLUVIUS
(Trade Mark)
Puttyless Skylights
Patented



—investigated and chose the best skylight for Public Service Terminals and Carhouses.

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Sunlight! The one absolute need of all men who work! The one absolute need of every electric railway shop! The health giver, the production raiser of your shops—is the Sun. The Sun prevents accidents, insures healthy, happy workers and increases output. You *must* have the Sun in your shops and carhouses.

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ANNUAL CONVENTION SECTION

ELECTRIC RAILWAY JOURNAL

New York, September 30, 1916

Volume XLVIII

Pages 561 to 662

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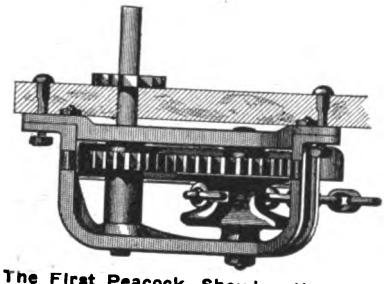
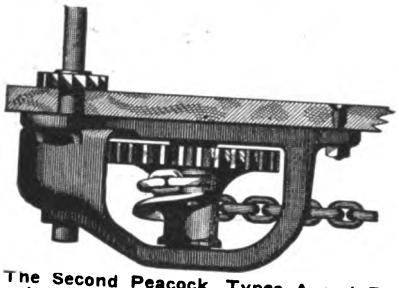
Peacock

How Peacock Brakes Have Develope Cars While Retaining Their Func Ratio; the Quick-Winding Eccentri



The First Peacock, Showing the Symmetrical Drum



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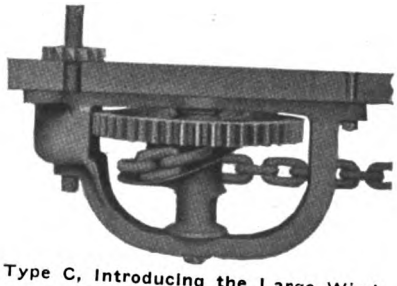
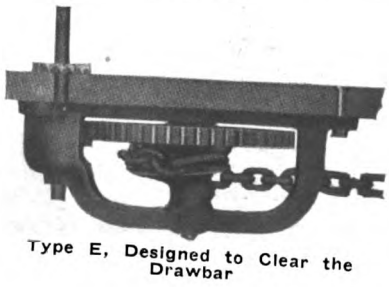


Type C, Introducing the Large Winding Drum



Type E, Designed to Clear the Drawbar

From Light to Heavy Cars

In this Car Development Number of the Electric Railway Journal it is fitting that we should present a little history to show you why the Peacock Brake was the best brake yesterday, why it is the best brake today and why it is likely to be the best brake tomorrow.

First, there was the "Peacock" of more than a decade ago. It was designed for and made good on small cars with simple brake rigging, and the little additional power required was readily furnished by comparatively small gears.

Second, ere the pioneer "Peacock" had been used less than two years, a new design was brought out for heavier cars with brake rigging which was more complex and harder to release. The eccentric drum, coupled with the roller bearing, gave the desired means for quickly winding the increased slack in the chain and rigging and for providing a smooth release.

Third, with the adoption of heavy cars and four-motor equipments came the Peacock Type C with its 12:48 gear ratio and large winding drum. The power and slack absorbing qualities of this Peacock made it the standard for the heavy Chicago city cars of 1907 and for interurban service.

Fourth, to meet changes in drawbar requirements, came the Peacock Type E, which demanded less space under the platform.

National Bra

Ellicott Square,

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ck Progress

Dev with the Evolution of Electric Railway
eir I mental Features of the Balanced Gear
Ecce and the Easy-Turning Roller Bearing

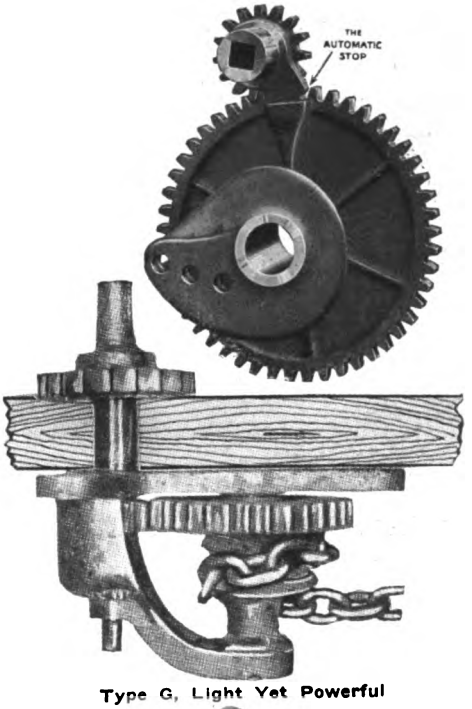
C From Heavy to Light Cars

And then came the great reversal in car weight and design—the return to the light car and the small one-man car. But, of course, the new cars were different in many ways, as in providing low floors and calling for more compact equipment, especially on platforms. Hence, we introduced

Fifth, the Peacock Type G, which, devised originally for and now used on all the storage battery cars of New York's congested streets, is equally efficient for one-man cars. Think of it—a brake weighing only 25 lb., which gives a chain tension of more than 1200 lb.

Sixth, returning to the Peacock for large cars, we found it possible not only to produce a lighter frame and one which required less fitting, but also to add the now-famous automatic stop. In this brake the amount of winding has been reduced to the minimum.

Seventh, to provide adequate braking facilities on cars with limited platform space the Peacock staffless brake was designed with a pressed steel case projecting into the vestibule only 3¼ in., a brake which occupies an insignificant amount of space, and ready to deliver all the power that can be used to advantage on a car.



Type G, Light Yet Powerful

Although the changes in both cars and brakes have been many, the test of years has shown that the combination of the balanced gear ratio, the quick-winding eccentric and the easy-turning roller bearing is essential to obtain efficiency in braking. We call this combination the "Peacock Brake." Change in the design of application may be necessary for your cars, but the brake you should have will be a *Peacock Brake*, because the combination described is to be had under no other name.

The Peacock Staffless

ke Company

Buffalo, N. Y.

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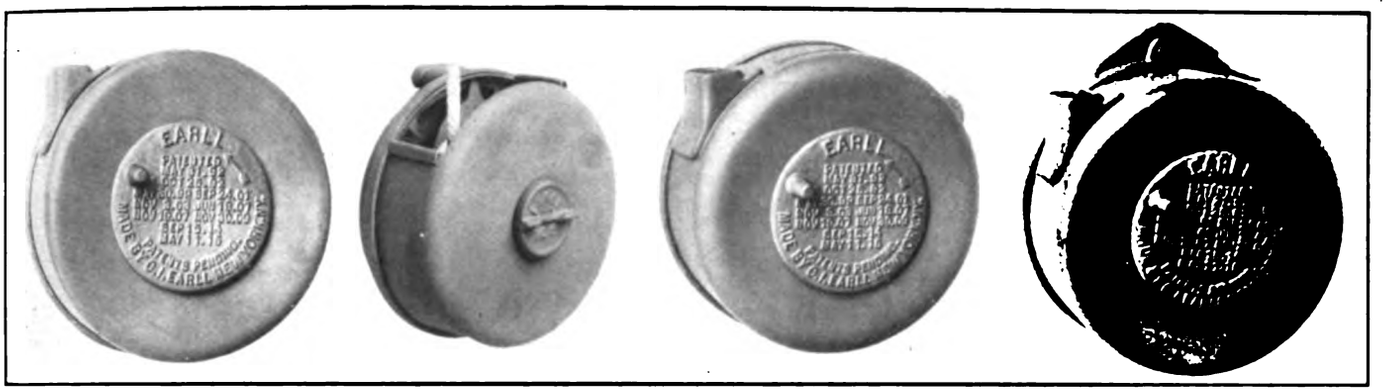

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Has Ratchet Winding of the retrieving spring, adjustability of the retrieving action, extreme simplicity and lightness, large rope space and the Free-Winding tension spring, all exclusive Earll features.

No. 5-A Retriever

Is identical with the No. 4-A and contains in addition the Emergency Release, another exclusive Earll feature.

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Ready-Reference Index

to products manufactured by advertisers in this issue of Electric Railway Journal

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For page numbers of advertisements appearing in the Current News Section, see alphabetical index in that Section.

AS far as possible advertisements are classified in Sections, so that those relating to the same kind of equipment or apparatus will be found together.

If you do not find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

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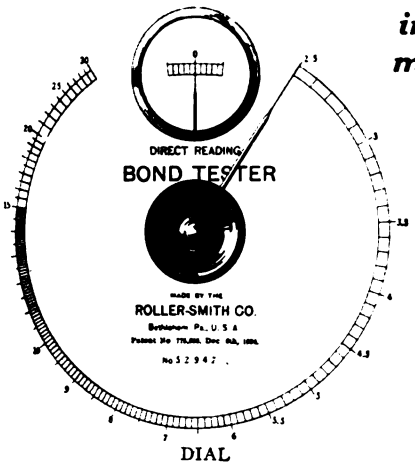

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The American Coin-Ticket Registering Fare Box

Size—9½ in. x 6½ in. x 17½ in.
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Is a combination fare box and register which receives and separates mixed coins and paper tickets in the same receiving box.

Displays coins and tickets separately for visual examination.

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Segregates pennies and mutilated coins from full fare coins and delivers them into a locked box.

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Registers transfers and all other fares collected "over the box."

Registers full passenger load on trip—passenger counter and the total registrations on total-passenger counter.

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Registers each fare immediately as paid.

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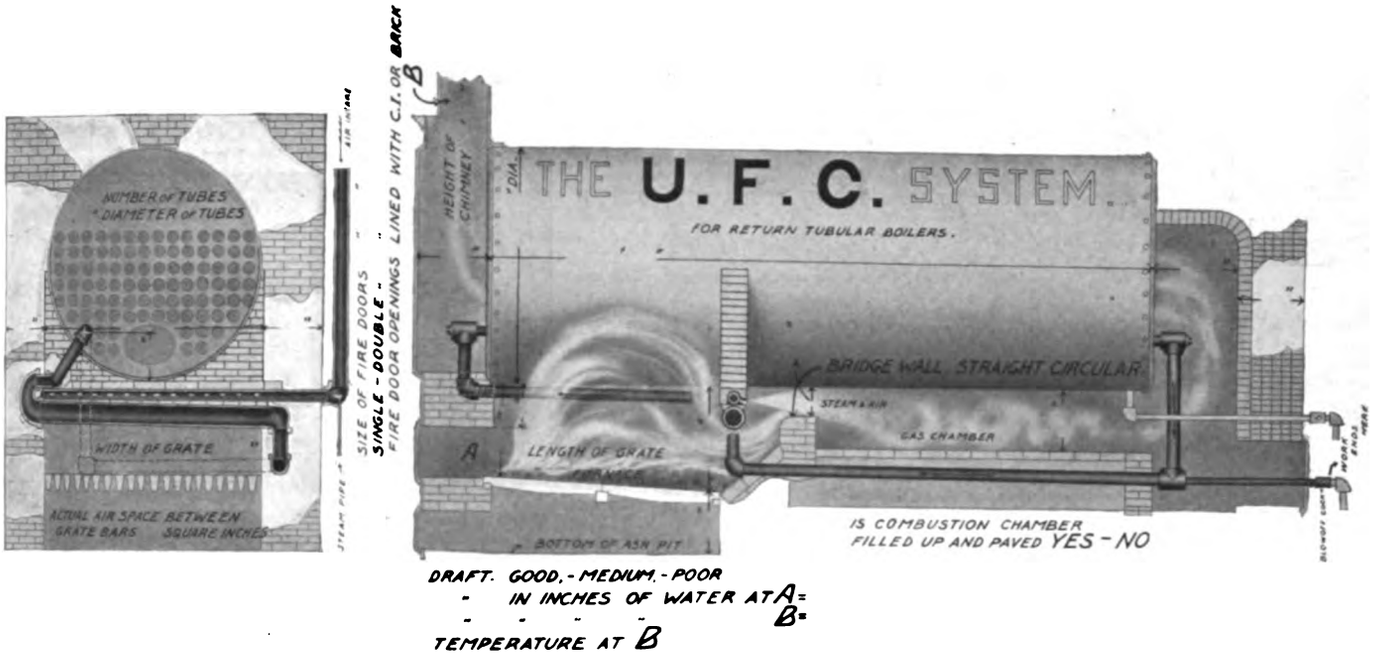

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Trolley Shoes
Holden & White.
Miller Trolley Shoe Co.

Trolleys and Trolley Systems.
Curtis & Co., Mfg. Co.
Ford Chain Block & Mfg. Co.

Trolley Switches.
Railway Materials Co.

Trucks, Car.
American Steel Foundries.
Baldwin Locomotive Works.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Laconia Car Co.
Long Co., E. G.
Philadelphia Holding Co.
St. Louis Car Co.
Taylor Elec. Truck Co.

Turbines, Steam.
Allis-Chalmers Mfg. Co.
*Belliss & Morcom, Ltd.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & M. Co.

Turbines, Water.
Allis-Chalmers Mfg. Co.

Vacuum Drying & Impregnating Apparatus.
Allis-Chalmers Mfg. Co.

Valves.
*Babcock & Wilcox, Ltd.
Edwards Co., Inc., The O. M.
Golden, Anderson Valve Specialty Co.
*Hopkins & Co., Ltd., J.
Ohio Brass Co.

Varnishes. (See Paints, etc.)

Ventilators, Building.
Drouvé Co., The G.

Ventilators, Car.
Automatic Ventilator Co.
Brill Co., The J. G.
Cincinnati Car Co.
Holden & White.
Perry Ventilator Co.
Railway Utility Co.
St. Louis Car Co.
Smith Heater Co., Peter.

Vestibules, Portable.
Brill Co., The J. G.

Volt Meter. (See Instruments.)

Washers.
Bound Brook Oil-less Bearing Co.
Diamond State Fibre Co.

Waste Boxes.
Garton Co., W. R.

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Hamilton Watch Co.

Water Softening and Purifiers.
*Babcock & Wilcox, Ltd.

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Weed Killer.
Atlas Preservative Co. of America.

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Welding Processes and Apparatus.
Davis-Bournonville Co.
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General Electric Co.
Goldschmidt-Thermit Co.
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Oxweld Acetylene Co.
Prest-O-Lite Co., Inc., The.
U. S. Metal & Mfg. Co.
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Wheels, Car, Cast Iron.
Bemis Car Truck Co.
Griffin Wheel Co.
Long Co., E. G.

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Southern Wheel Co.
Standard Steel Works Co.

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Fleming, Birkby & Goodall, Ltd.
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General Electric Co.
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Are You Getting Ahead?

THE men who advance most rapidly in any industry are the men who keep closely in touch with every new development in their line.

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All through the electric railway industry, men who are *growing fastest*—the men who are wringing the *most success* out of their life-work—are consistently interested readers of the Electric Railway Journal. Most of them are not satisfied with hurried reading at the office—and have the Journal sent to them at their homes for careful, thoughtful perusal.

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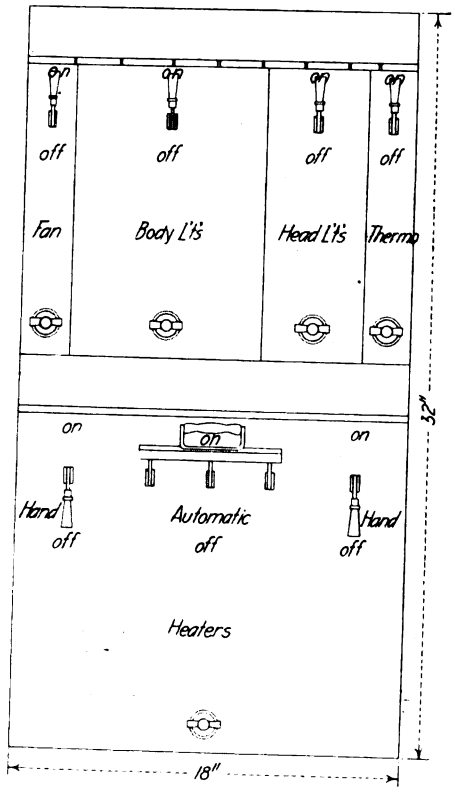

Krantz Safety Switch Panel
for High-speed Car.
Note Its Modest Dimensions.

Specify Krantz Safety Switch Panels

Safety **Compactness** **Service**

Krantz Safety Switch panels for railway voltages, already installed in hundreds by the New York Municipal Railway Corporation, Interborough Rapid Transit Company and others for station service, are also available for

MODERN CAR PANEL BOARDS

Don't scatter auxiliary circuit switches throughout the car when you can concentrate them at the most convenient place, using a fireproof panel box and **Krantz Safety Car Switches** instead of exposed knife switches.

Krantz Safety Car Switches are not only more compact and more reliable than knife switches, but are also 100 per cent efficient and safe no matter how careless and inexperienced the operator may be.

KRANTZ SAFETY SWITCH FEATURES

These switches are installed as isolated units.
They have perfect scraping brush contact.
They leave no live parts exposed when taken out of the compartment.
They act with a snap, due to their toggle-joint construction.
The fuses cannot blow while exposed.
The fuses cannot be removed while current is on.
The switches have magnetic blow-outs for capacities exceeding 10 amp. and are also isolated from the adjacent switches.

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"We brag about the SERVICE we give"

This is to announce that Carney Service has been extended to cover personal representation in the Great Central Market. Wm. Mueller and Co., 1729 McCormick Bldg., Chicago, are acting as our sales representative in the Chicago territory. William Mueller needs no introduction to the buyers of poles. For many years he has been manager of the pole department for Western Electric Co. He will take care of your needs for

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Commit us to memory

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By A. MORRIS BUCK, M. E., Assistant Professor of Railway Electrical Engineering, University of Illinois. 390 *pages*, 6 x 9, 193 *illustrations*, $3.00 *net, postpaid.*
It covers thoroughly the underlying principles of electric railway design and operation.

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A book of practical methods. It gives hundreds of short cuts, labor-saving methods and careful suggestions for shop men.

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A pocket encyclopedia of practical information for every man in electric railway work.

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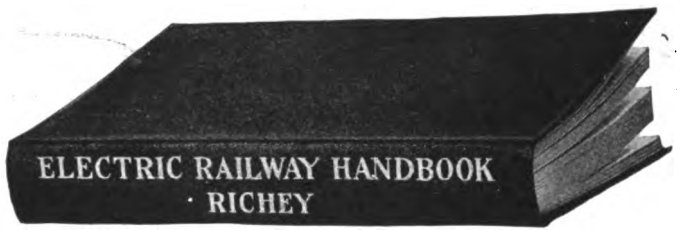

No matter what phase of electric railway work you are engaged in, Richey's Handbook is the key to the solution of your problems. It is endorsed by electric railway men in all parts of the world. These extracts are typical:

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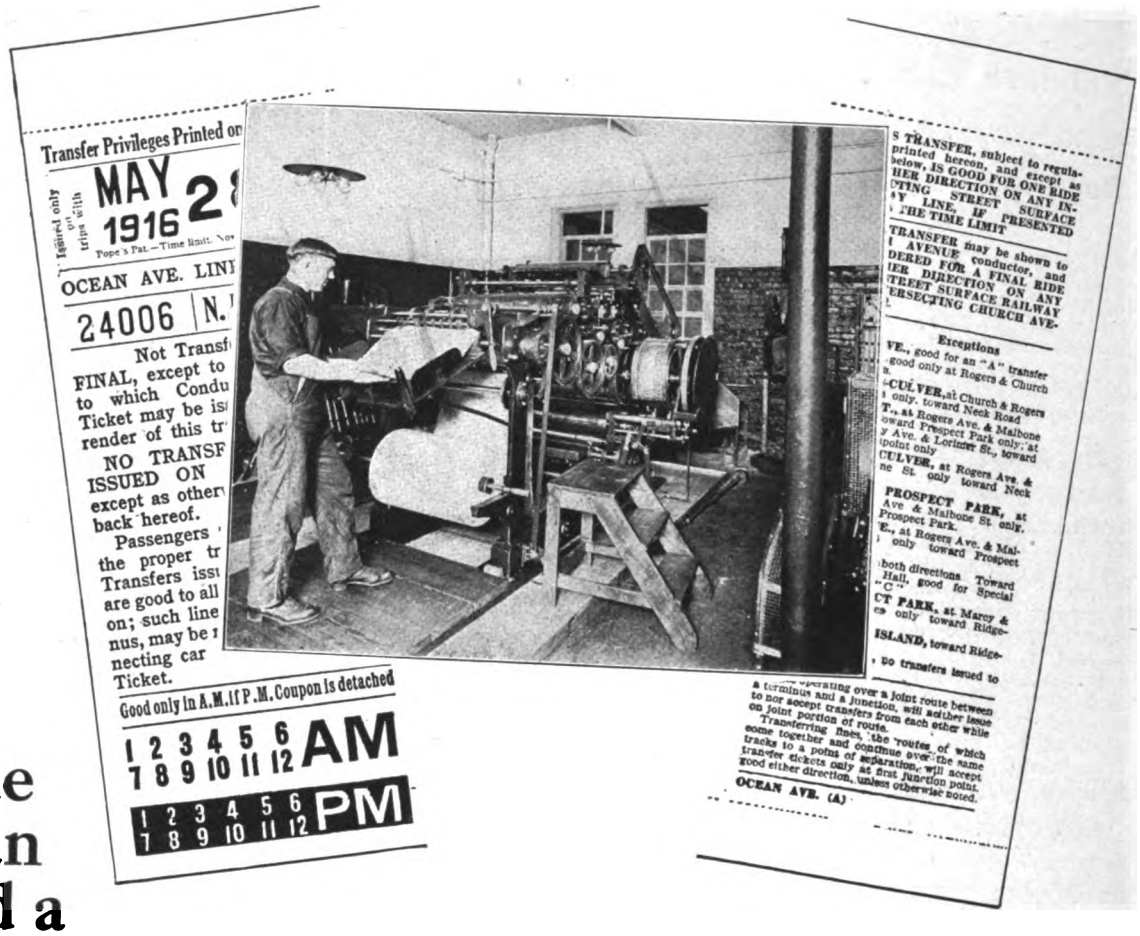

One Man and a Meisel Rotary Press

Can Print 3,000,000 Transfers a Day

The Brooklyn Rapid Transit System prints its own transfers on a Meisel rotary press. The average output of the plant is in excess of 2,000,000 transfers in a nine-hour day, but as many as 3,200,000 have been turned out in one day.

These figures are not remarkable when you consider the efficiency of the Meisel press. One operation on the Meisel press does all the printing necessary on the two-color, front and back printed transfer of the Brooklyn Rapid Transit System. The press has a capacity of 12,000 impressions per hour and each impression turns out 33 transfers.

The best part of it all is that the mechanism requires practically no attention. One man is all that is necessary and his main duty consists in taking the printed sheets of transfers away from the collector in which they are deposited by the machine.

One system whose output is much less than Brooklyn's is printing transfers at a total cost of 8 cents per 1000.

Better let us show you how **you** can save money by printing your own transfers on a Meisel press.

MEISEL PRESS MANUFACTURING CO.

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Time is the Essence of Railroading

The Rico Coasting Recorder is the only device that measures the time elements which control efficient car operation

Railway Improvement Co.

Chicago, Los Angeles, London

Executive Offices: 61 Broadway, New York

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No. 1A

No. 2

No. 3

No. 4

No. 5

No. 6

Rico Sanitary Straps

Used in hundreds of thousands to promote sanitation, satisfaction and service. A style for every class of service. A small investment that produces great satisfaction.

Car Equipped with RICO Anti-Climbers

Rico Anti-Climbers

Standard on more than half the electric railways of North America for providing protection against the effects of collisions. They are an inevitable feature of safety against the worst form of accidents.

RAILWAY IMPROVEMENT CO.

Executive Offices, 61 Broadway, New York

CHICAGO LOS ANGELES LONDON

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Section 1

Track

THIS section is devoted to advertisements of the essentials of the complete roadbed, both city and interurban—

The Purified Rail
The Steel Tie
The Steel Crossing Foundation
Culverts
Joints and Bonds in Various Forms
Every Class of Special Work
Switch Stands and Various Details

And a line of construction and maintenance tools such as

Shovels
Grinders
Welders and
Pneumatic Tampers

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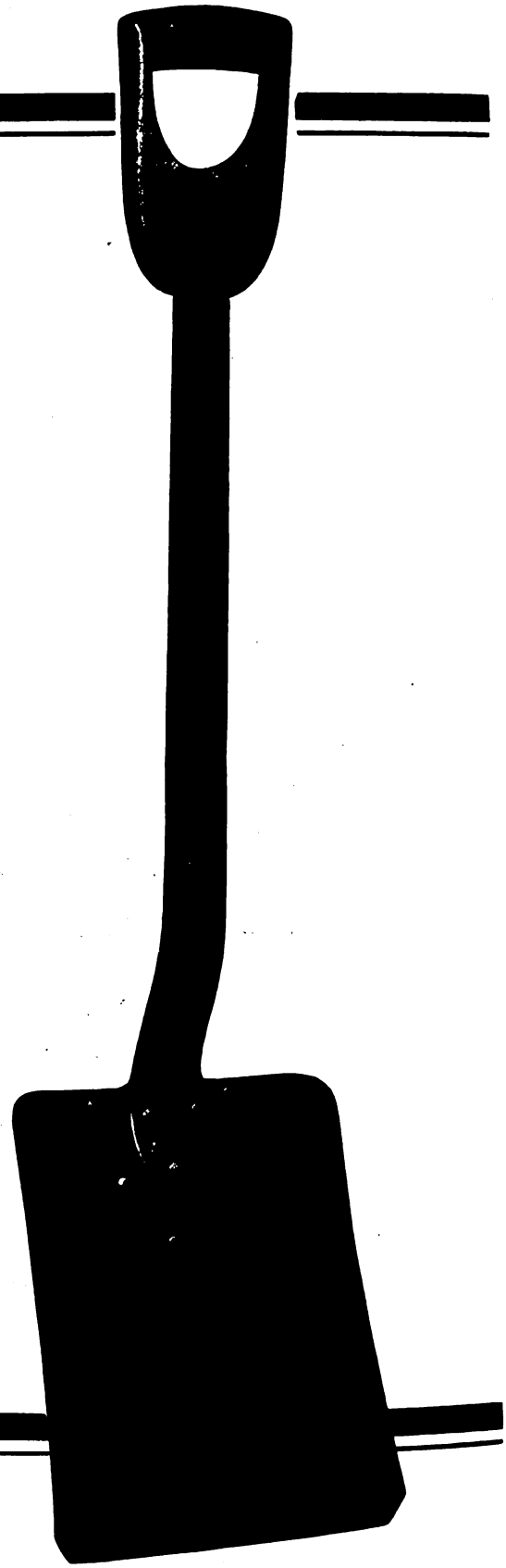
Wyoming
Mayari Red Edge
Shovels



THE Electric Railways of the Country have responded more whole-heartedly perhaps to this common sense development than any other industry—or at least they responded a little quicker.

Why?

Because the Traction Field has undergone so many changes—it has developed so rapidly that unless its engineers have the vision to see ***at once*** the possibilities or otherwise of new devices, they are left far behind by the Progressive.

It has surely been a race of the Sure and Swift. That is why the practically Country-wide adoption of Wyoming Mayari Red Edge Shovels by the Electric Railways is particularly gratifying to us.

We have had to earn it and have enjoyed earning it—but we were given the chance, and superiority was recognized and rewarded.

Wyoming Mayari Red Edge Shovels will produce Economy and Efficiency. These two results are guaranteed.

We have some interesting figures for distribution; also a new Red Edge Catalog.

The Wyoming Shovel Works, *Wyoming, Pa.*

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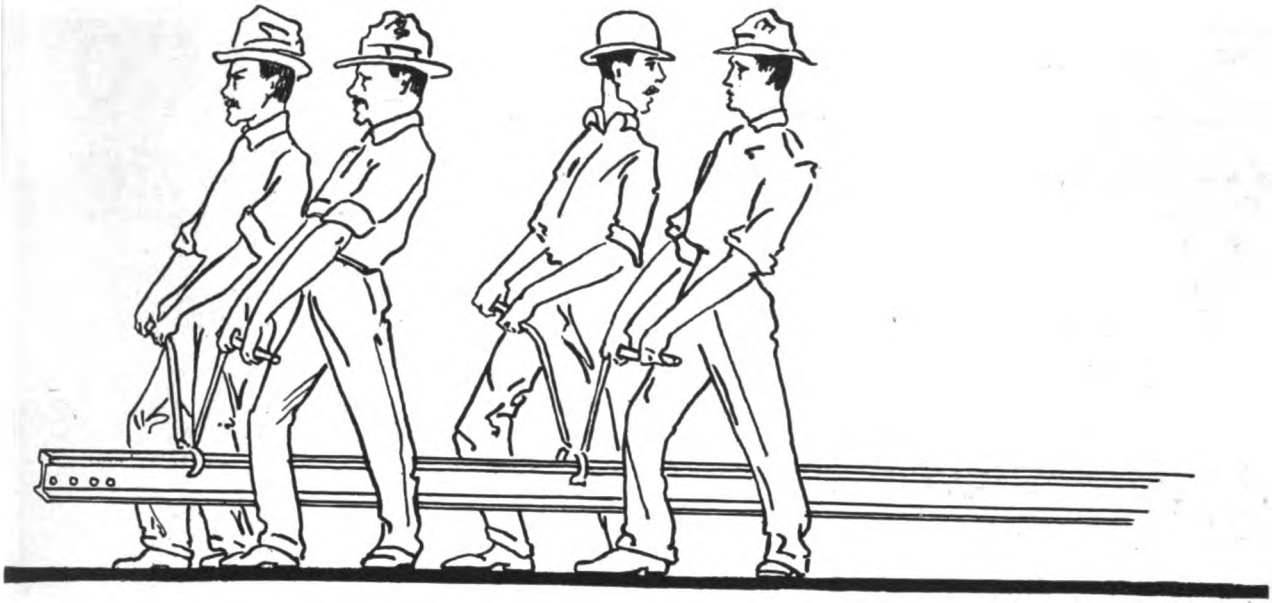

The Car Is Important But Consider the Track

The car is your revenue producer and it is right that it should be as the apple of your eye.

But consider how much more your car can do for you if you give it the chance to earn maximum revenue.

Maximum revenue is possible only if your rails give smooth service and long service.

You spend so much to tear up and replace outworn track, and you lose so much in fares during its reconstruction—

That you will be compensated many times over if you minimize such losses by specifying

Titanium-treated Rails for Your Standard Sections

TITANIUM ALLOY MANUFACTURING COMPANY

Operating Under Rossi Patents — Processes and Products Patented

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Pittsburgh Office: Oliver Building

Chicago Office: Peoples Gas Building

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AGENTS:

Pacific Coast: ECCLES & SMITH CO., Los Angeles, San Francisco, Portland

Great Britain and Europe: T. ROWLANDS & CO., Sheffield, England

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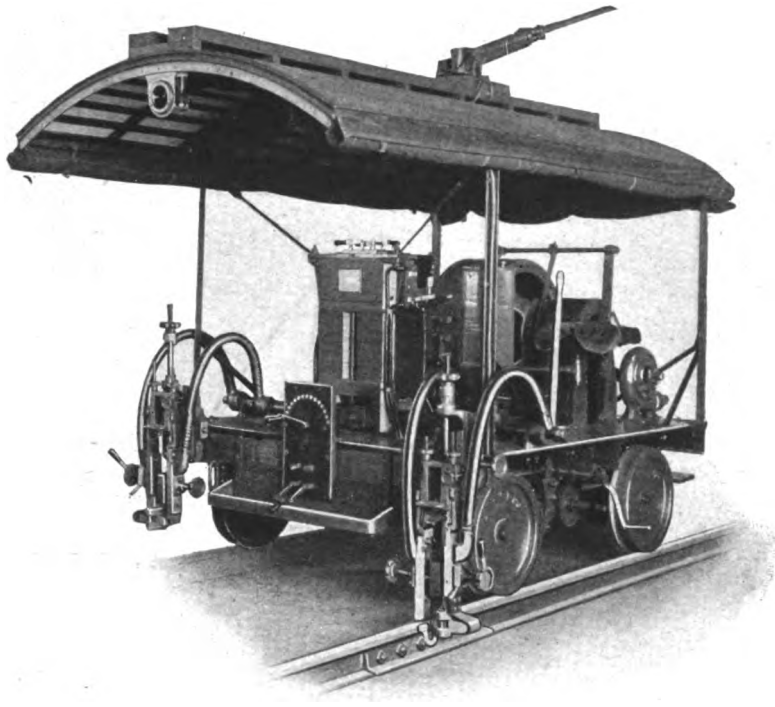

ERICO Bonding Car for General Use

See exhibit at space 558 to 564 at Atlantic City Convention

This car is self propelled and goes anywhere on your track for general bonding work. It is a complete bonding unit, carrying tools, supplies and men. It can be readily removed from the track to allow passage of cars.

Erico Welded Bonds
Do not corrode at the terminals
Give full 8 to 1 ratio copper to steel

The Electric Railway Improvement Co.
Cleveland, Ohio

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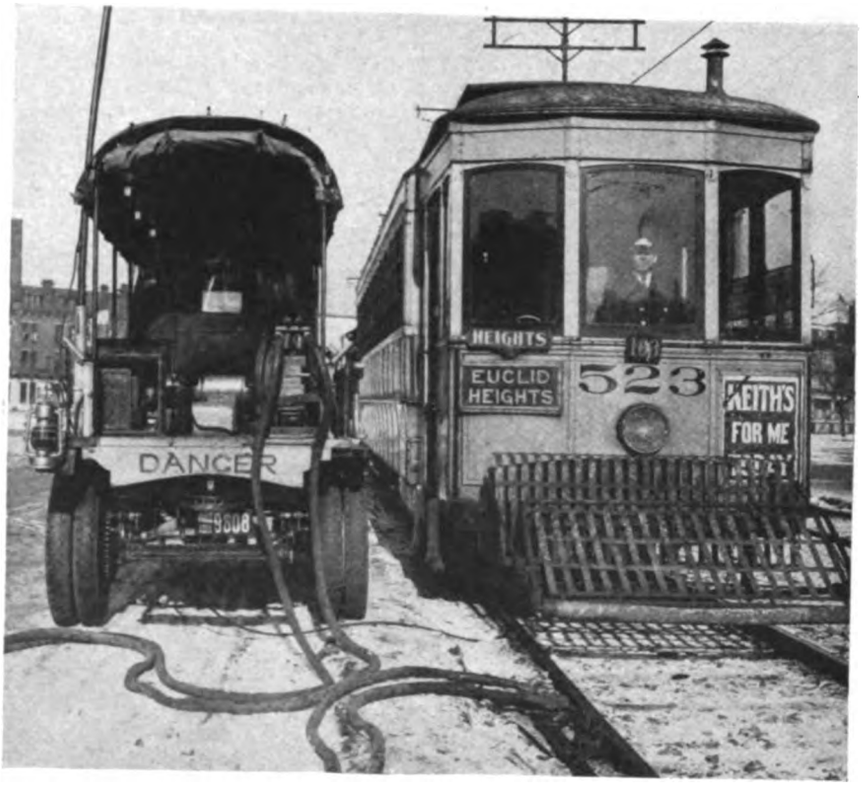
CHAMPION Bonding Truck for City Work



See exhibit at space 558 to 564 at Atlantic City Convention

This motor truck is specially designed for bonding in city streets without interrupting traffic. It carries a complete set of tools and supplies as well as the bonding gang. Bonds can be installed while cars are passing.

Champion Brazed Bonds

Applied with low melting silver alloy

The Electric Railway Improvement Co.

Cleveland, Ohio

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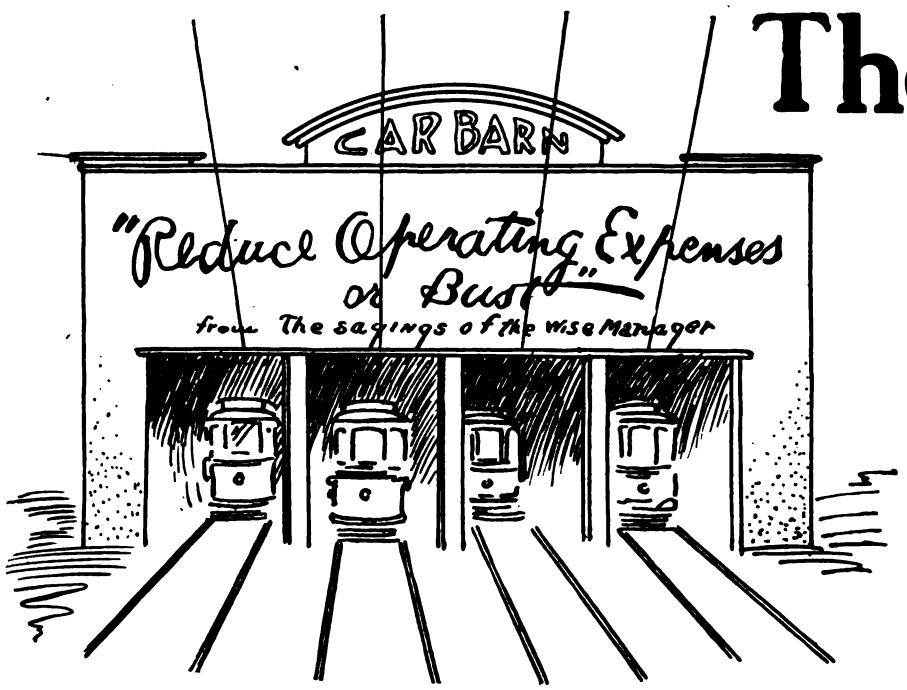

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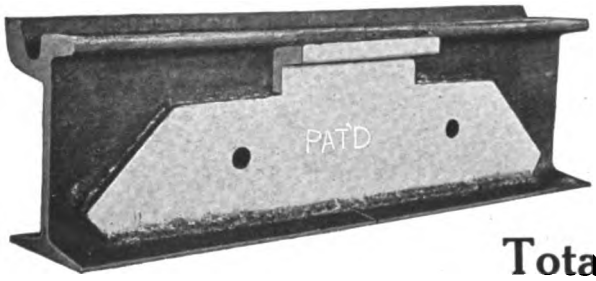
The Indianapolis Por



The "Apex" Joint

Total Cost Installed $4 to $5 per Joint

FROGS=SWI

Manganese and Built-Up C

IN STOCK for IM

Indianapolis Switc

New York **Sprin**

Comparative Sales of Indianapolis Electrically Welded Joints

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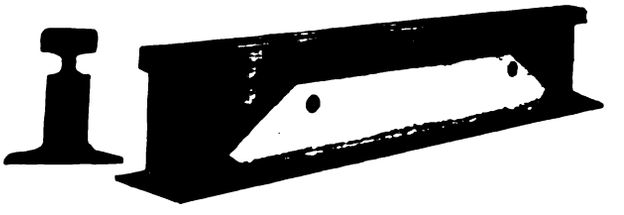
on the Wall Answer

able Electric Welder

The "Simplex" Joint



Total Cost Installed $3 to $4 per Joint

HES=CROSSINGS

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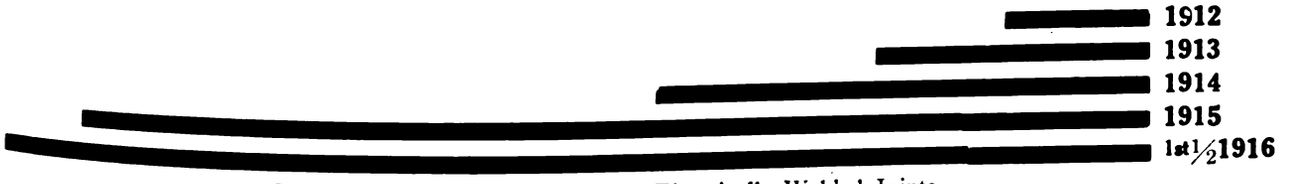
DIATE SHIPMENT

& Frog Company

ld, Ohio — Chicago



Comparative Sales of Indianapolis Electrically Welded Joints

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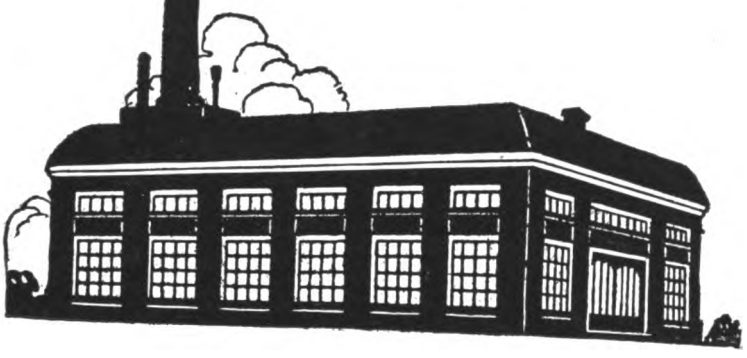
American Steel & Twin Terminal Rail Bonds

GET THE MOST OUT OF YOUR POWER HOUSE



No Bond on the Market Has as Large an Area For Electric Contact

For All-Around Service American Twin Terminal Bonds are Unsurpassed

One man — a light drill and a few Twin Terminal Bonds complete the outfit for pick-up work.

The joint need not be disturbed. The Bonds are in plain sight and can be inspected easily.

The Horseshoe Shape has proven to have the longest mechanical life under heavy and continuous vibration

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Wire Company's Wires and Cables

For Station Wiring, Arc Light and Signal Service and High Voltage Power Transmission Lines, A. S. & W. Co.'s rubber-covered wires and cables will insure long life and low ultimate cost.

Made to the most exacting specifications, they are furnished in any size or finish for all services and voltages.

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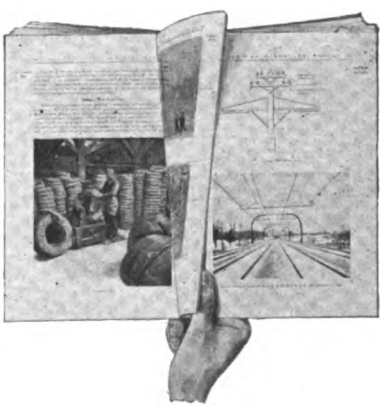
Of decidedly practical and technical value to engineers and operators



American Steel & Wire Company

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PITTSBURGH	Frick Building
BUFFALO	337 Washington Street
DETROIT	Foot of First Street
CINCINNATI	Union Trust Building
CLEVELAND	Western Reserve Building
BALTIMORE	32 So. Charles Street
WILKES-BARRE, PA	Miners Bank Building
ST. LOUIS	3d National Bank Building
ST. PAUL-MINNEAPOLIS	Pioneer Building, St. Paul
OKLAHOMA CITY	State National Bank Building
BIRMINGHAM, ALA	Brown-Marx Building
DENVER	1st National Bank Building
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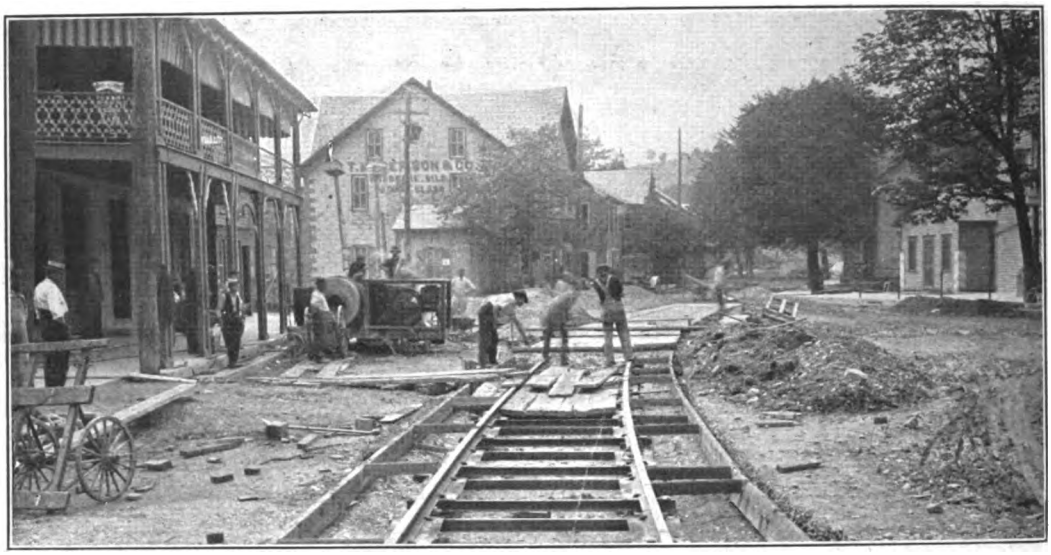


Track in Bath, Pa., Built by Allen Street Railway Co., Nazareth, Pa.

Steel Twin Ties

Not substitutes for wooden ties—but successors to wooden ties. They have the bearing, resiliency and holding power of wood while combining tie-rod and rail chair advantages.

This design is simplicity itself—two 3-in. transverse channels spaced 3 ft. apart, and at each end a 13-in. x 5/16-in. plate 3 ft. long, riveted to the top of the channel and lying lengthwise under the rail.

The bent down edges of the plate cause a truss action between the channels which strengthens the whole tie, and they assure maximum bearing surface because they retain the stone or concrete which has been tamped under them from either side of the rail. The plate lies directly under the rail and transmits all stresses from the rail to the foundation. The clip holds the rail base so firmly that the rails keep to gage as readily as with tie rods or chairs, and they are brought to gage during construction by the accurate punching of the holes in the plates.

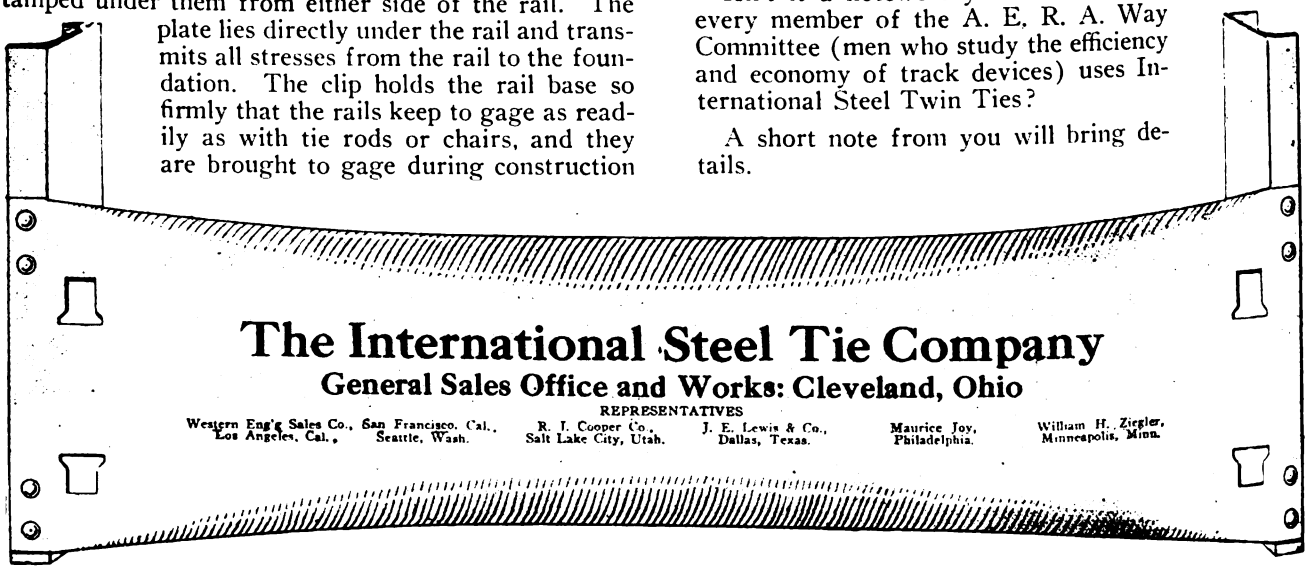
International Steel Twin Ties effect big savings in pavement and excavation due to the shallower type of construction compared to wooden tie track.

The maintenance and ultimate costs of these ties are also less than wood because of their very slow deterioration and ability to withstand mechanical injury.

And don't forget in reconstructing track that International Steel Twin Ties can be laid on the undisturbed concrete foundation from which worn-out wooden tie track has been removed.

Isn't it a noteworthy fact that with one exception every member of the A. E. R. A. Way Committee (men who study the efficiency and economy of track devices) uses International Steel Twin Ties?

A short note from you will bring details.



The International Steel Tie Company

General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES

Western Eng'g Sales Co., Los Angeles, Cal., San Francisco, Cal., Seattle, Wash. R. J. Cooper Co., Salt Lake City, Utah. J. E. Lewis & Co., Dallas, Texas. Maurice Joy, Philadelphia. William H. Zirgler, Minneapolis, Minn.

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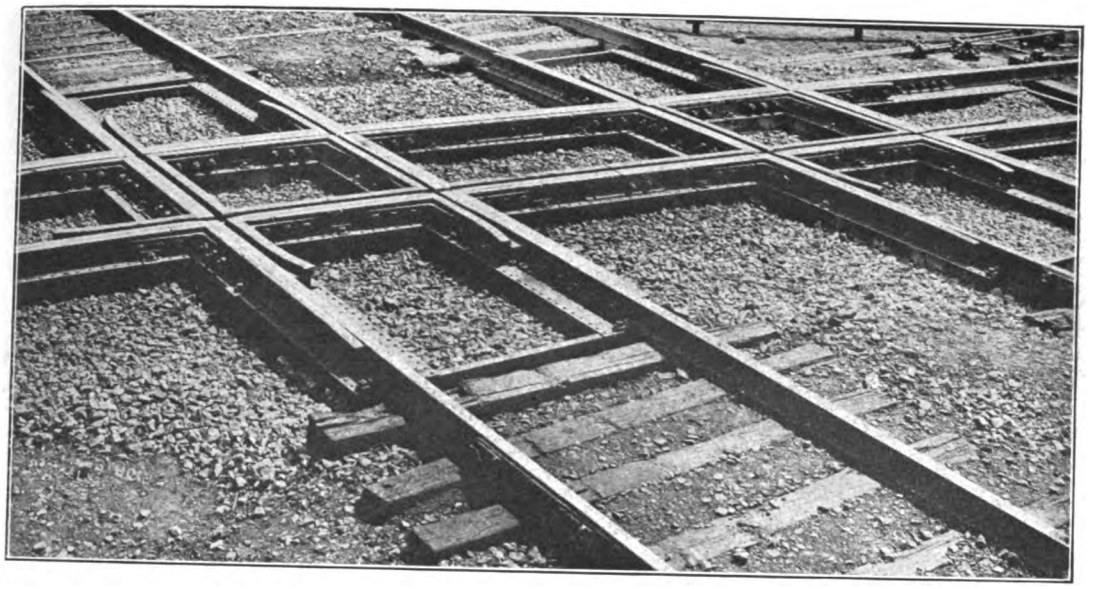


C. C. C. & St. L. R.R. and Wheeling & Lake Erie Crossing Laid on International Steel Crossing Foundations

Steel Crossing Foundations

under new crossings will more than double their life and greatly decrease maintenance costs,

under old, worn and loose built-up crossings will greatly extend their life and quickly save the foundation's cost in maintenance charges.

The two intersection built-up crossing illustrated was badly worn and could be kept in service only by constant attention at the time our steel foundation was placed under it early this year.

It is now so well supported that heavy high-speed steam traffic on both roads passes smoothly, quietly and with perfect safety. The crossings themselves are wearing into better surface than they have been since they were new and there has been no maintenance cost.

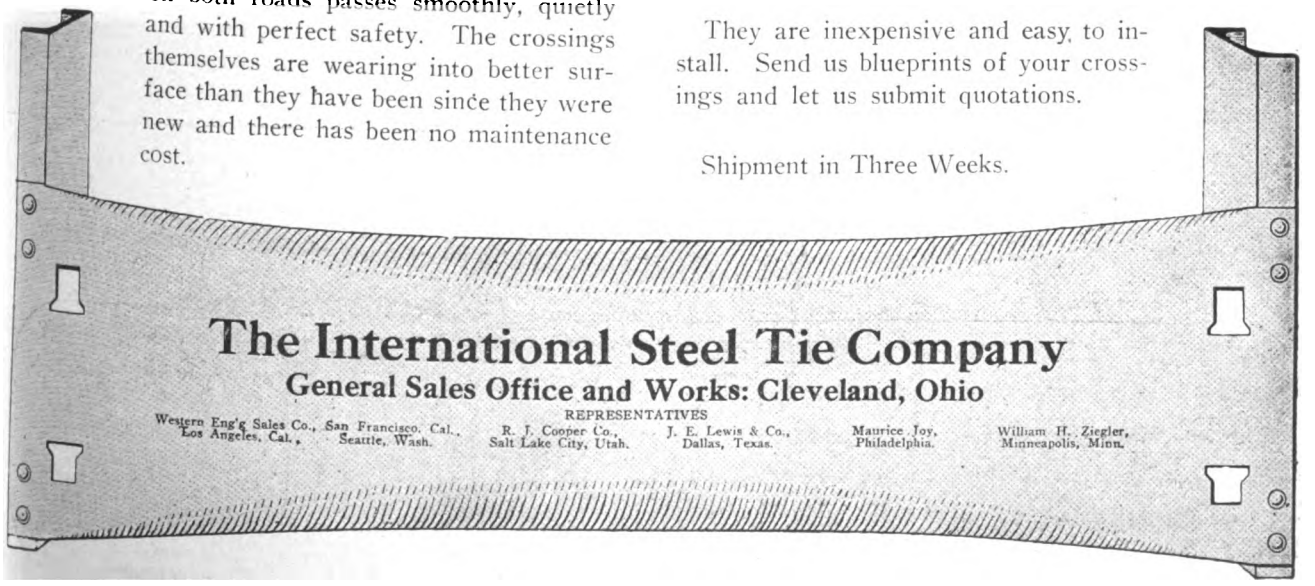
These foundation sections are closed steel box girders with six-inch channel sides and five-sixteenths-inch plates top and bottom, with the box filled with tightly fitted creosoted wooden blocks placed crosswise.

The severest traffic conditions cannot injure this steel box girder or its wood block filler.

Support your crossings, new or old, on INTERNATIONAL STEEL CROSSING FOUNDATIONS, and save money.

They are inexpensive and easy to install. Send us blueprints of your crossings and let us submit quotations.

Shipment in Three Weeks.



The International Steel Tie Company

General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES

Western Eng'g Sales Co., San Francisco, Cal., Los Angeles, Cal., Seattle, Wash. — R. J. Cooper Co., Salt Lake City, Utah. — J. E. Lewis & Co., Dallas, Texas. — Maurice Joy, Philadelphia. — William H. Ziegler, Minneapolis, Minn.

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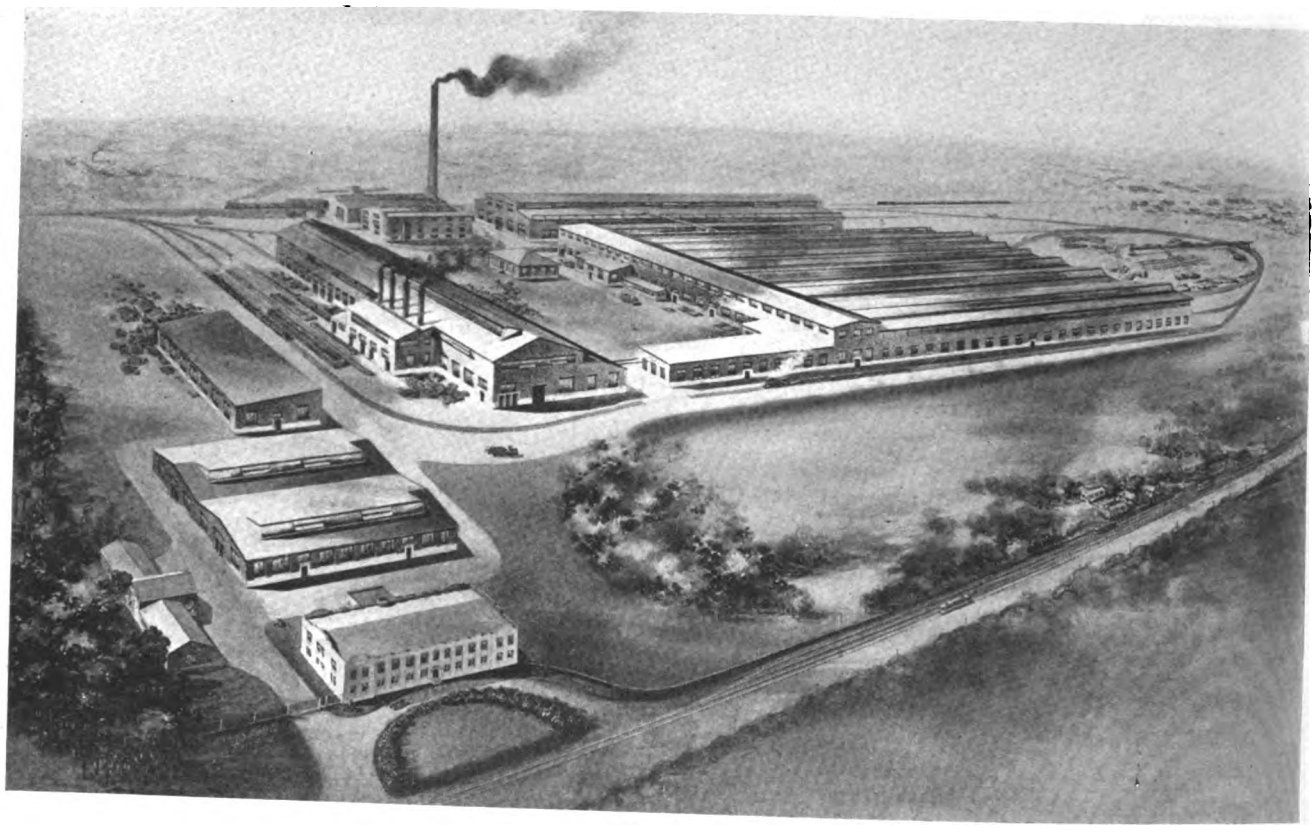
WHARTON SPECIAL TRACK WORK
OF SUPERIOR DESIGNS
FOR ALL CLASSES OF SERVICE



NEW WORKS AT EASTON, PENNA.

The most modern and fully equipped
plant in this country for the
production of

SPECIAL TRACK WORK

For Electric and Steam Railways.

TISCO MANGANESE STEEL TRACK WORK IS OUR SPECIALTY

WM. WHARTON JR. & CO.
INCORPORATED
EASTON, PENNA.

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Bethlehem Steel Company

South Bethlehem, Pa.

Has Purchased all the Properties of

The Pennsylvania Steel Company

THE FROG AND SWITCH DEPARTMENT
STEELTON, PA.

will be enlarged and improved.
This department will continue
the largest manufacturer of

Special Track Work and Frogs, Switches and Crossings

GENERAL OFFICES:
South Bethlehem, Pa.

DISTRICT SALES OFFICES:

Boston, Mass.....Oliver Building
New York, N. Y.....111 Broadway
Philadelphia, Pa.....Morris Building
Baltimore, Md.....Continental Building
Pittsburgh, Pa.....1st Nat'l Bank Bldg.
Cleveland, O.....New Guardian Bldg.
Detroit, Mich.....Penobscot Bldg.
Chicago, Ill.....Peoples Gas Building
St. Louis, Mo.....Boatmen's Bank Bldg.
San Francisco, Cal.....Crocker Bldg.

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Barbour, Stockwell Co.

Established 1858

205 Broadway, Cambridge, Mass.

Manufacturers of

High Grade Special Work for Street Railways

Superior

Switches, Mates, Frogs and Crossings

Turnouts and Cross Connections

Kerwin Portable Crossovers

Estimates promptly furnished

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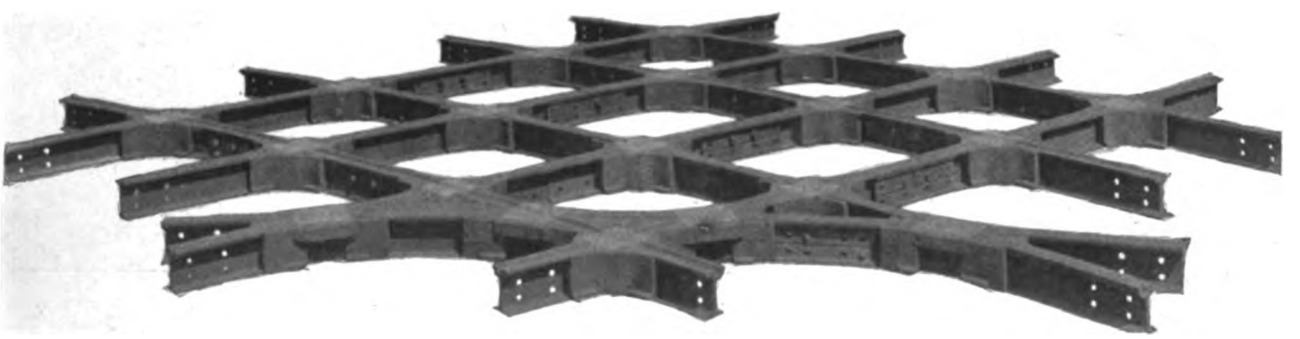
SPECIAL TRACK WORK

Switches Mates Frogs Crossings and Complete Layouts

Hard Center—Manganese Insert—and Solid Manganese Construction



Note that six of the frogs in the above crossing were cast in one piece

Improved Anti-Straddle Tongue Switch

Pinless Tongue—Heavily Reinforced—100% bearing efficiency

Held positively by beveled end in Solid Manganese pocket.
Wear between tongue and bed is reduced to a minimum.
Avoid Accidents by using this Switch—Car cannot straddle Tongue.

NEW YORK SWITCH AND CROSSING CO.

Hoboken, N. J.

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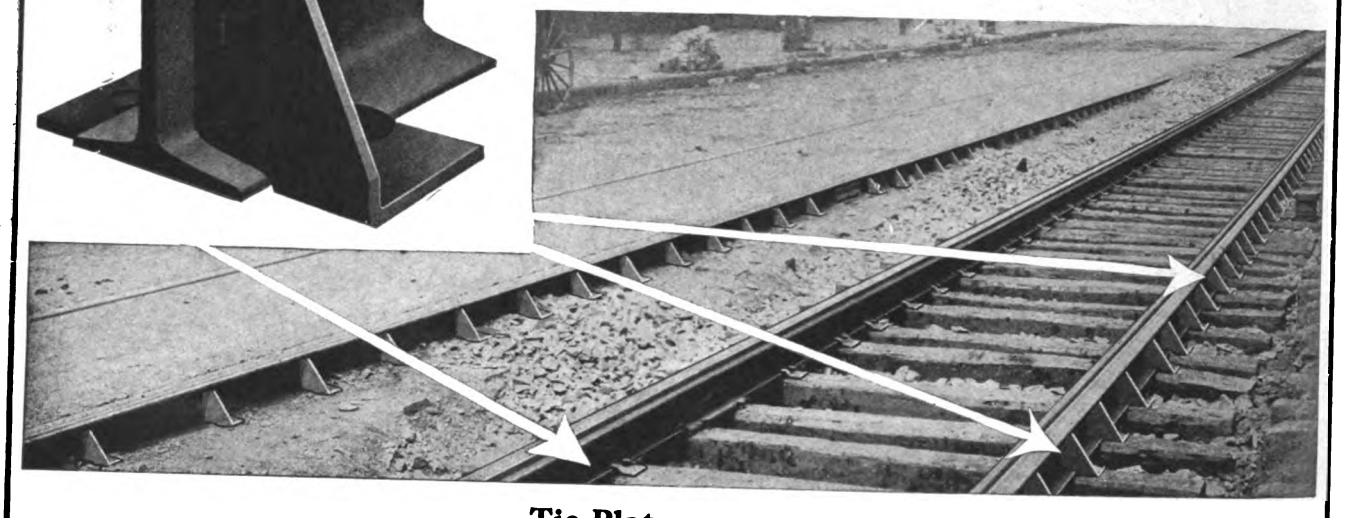
A Big Saving In Track Paving



Tie Plate **Rail Brace**

At least 30% of the total expenditure affecting street railway maintenance is due to pavement in the tracks. You can realize what this means when upward of $40,000,000 is spent annually in the United States alone in maintaining track.

We believe you will agree with W. M. Archibald, Engineer of Way, Houston (Tex.) Electric Company, when he says, "The more nearly the entire paving approaches the condition of a solid block, the better will it wear and the less maintenance work will be necessary on it."

The Combination Rail Brace and Tie-Plate

makes paving most nearly "approach the condition of a solid block" by eliminating the trouble-making tie-rod, and holding the track rigid to gage.

It means big savings in track laying, track paving and maintenance.

Ask Us How Much It Will Save and Why

Steel Car Forge Company

Pittsburgh **New York** **Chicago**

Works: Ellwood City, Pa., and Hammond, Ind.

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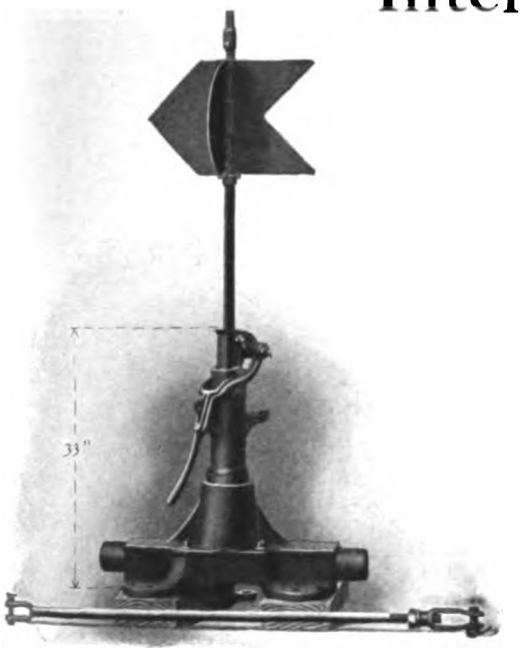
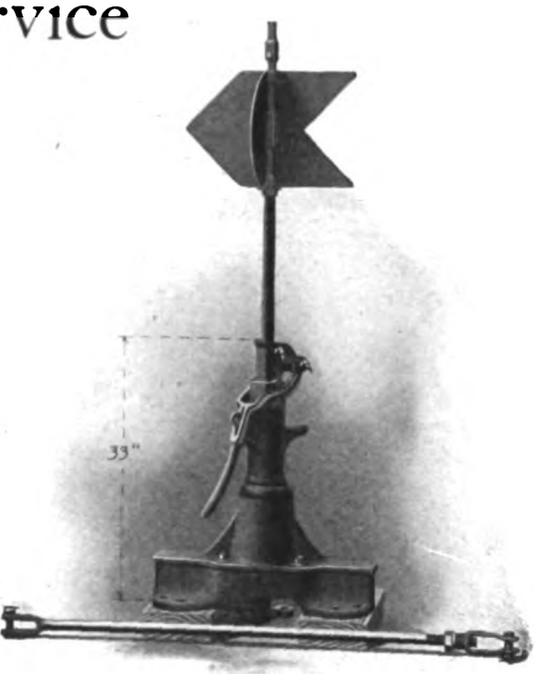
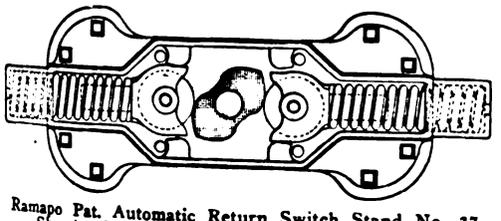
Ramapo

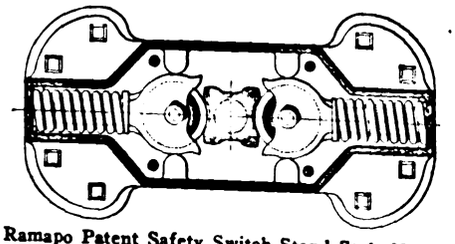
Automatic Patent Safety Switch Stands for Interurban Service







Ramapo Pat. Automatic Return Switch Stand No. 37, Showing Mechanism Half-Thrown Automatically



Ramapo Patent Safety Switch Stand Style No. 17, Showing Automatic Mechanism

These Switch Stands Also Furnished in Medium Heights and Dwarf Styles

T-RAIL SPECIAL WORK

FOR

Private Rights-of-way and Interurban Lines
Manganese Construction—All Styles
Street and Steam Crossings a Specialty
Write for catalogue and details

Ramapo Iron Works, Hillburn, N. Y.

Main Office, Hillburn, N. Y.

New York: 30 Church St.

Plants: Hillburn and Niagara Falls

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The Lincoln Rail Bonder

Has No Peer

At the A. E. R. A. Convention— Look for us on the Pier

Ask us about Costs of welding the Lincoln way.

Ask us about the ease of handling Lincoln Apparatus.

Ask us about the Efficiency of the Lincoln bond.

Let us prove at our Demonstration on the pier all we say about our system of bonding.

Let us show you the bonder that weighs but 400 lb. and measures but 16 in. in outside diameter and 24 in. in length. The bonder that is in a class by itself in such advantages as portability, compactness and lightness. Let us show you with what rapidity even unskilled operators can install the U shaped, laminated Lincoln Bond without drilling the rail or affecting its crystalline structure.

Jot down the questions you want to ask us on the pier.

The Lincoln Bonding Company
636 Huron Road
CLEVELAND, OHIO

AGENTS:
LEWIS & ROTH COMPANY
311 Denckla Bldg., Philadelphia, Pa.
114 Liberty Street, New York City, N. Y.
CHARLES N. WOOD COMPANY
79 Milk Street, Boston, Mass.

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Here's One Proof!

Here at San Antonio, a system of 81.5 single-track miles and more than 5000 Thermit Insert Welds, the ideal in track maintenance has been attained.

That ideal is not to keep the way department pottering permanently at the rail joint repairs, but to eliminate the joint so that

An Uninterrupted Rail Will Give Uninterrupted Service

The first Thermit Insert Welds of San Antonio were made in October 1913, and additional welds are being installed now.

Can you realize fully the importance of the fact that only two Thermit Insert Welds have been reported as broken—one in special work and one on a bridge approach?

San Antonio knows no costly repairing or troublesome rerouting for

The Thermit Insert Weld Has Practically Ended Broken Joints!

GOLDSCHMIDT THERMIT CO.
120 BROADWAY, NEW YORK
329-333 Folsom St., San Francisco
7300 So. Chicago Ave., Chicago
103 Richmond St., W., Toronto, Ont.

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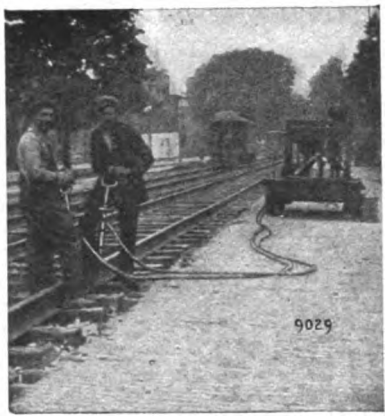


An "Imperial" Tamping Outfit at work on the United Traction Co., Albany, N. Y.

Greater Permanence of Road Bed

— EASIER RIDING TRACK —

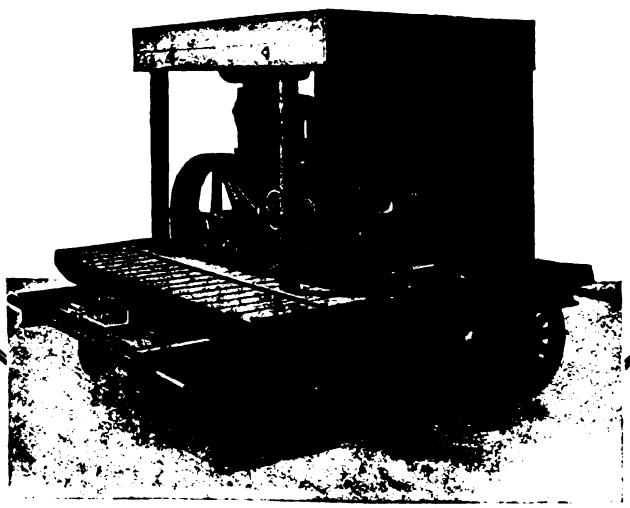
AT A LOWER COST PER MILE

These are the problems for which the electric railway master mechanic has long sought a solution.

"IMPERIAL" TIE TAMPERS

have demonstrated their ability to effect these improvements.

They have been made a part of the permanent track maintenance equipment of many of the large electric railway lines of the country.



"Imperial" Tie Tampers will work effectively with any kind of ballast—on straight track, curves, switches, crossovers, etc.

"Imperial" Tie Tampers are pneumatically operated by air from a special Compressor Car. This ordinarily takes its power from the trolley circuit, but a gasoline motor driven outfit can be supplied when wanted.

BULLETIN 9023 contains interesting data on the subject of pneumatic track tamping.

We will be glad to send a copy on request.

On the Twin City Lines at Minneapolis, Minn., it has been demonstrated that the "Imperial" Tie Tamper can be efficiently operated by one who is handicapped by the loss of an arm.

INGERSOLL-RAND COMPANY

11 Broadway
NEW YORK

Offices the World Over

165 Q. Victoria St.
LONDON

28 TT

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EFFICIENT TRACK GRINDING Cuts Car Repair Costs

Every railway man knows of course that uneven track caused by cupped joints or rail corrugations is detrimental to cars.

It is doubtful, however, if many railways have any definite data as to the extent to which this is true.

It is our belief that the compilation of such data would clearly show that from this standpoint *alone* the use of the

Reciprocating Track Grinder

means a direct saving.

Whether or not our judgment on this point is correct, it is certainly true that the savings in wear and tear on cars *plus* the savings made by insuring long life of rails, *plus* the satisfaction of the public in quiet, smooth-running cars, makes the use of Reciprocating Track Grinders a mighty profitable investment.

This is definitely proven by the unanimous verdict of electric railway companies who are regularly using Reciprocating Grinders and who are placing repeat orders for these machines *after* having completely demonstrated their efficiency, economy and thoroughly reliable service.

Roads using these machines regard them as *standard* equipment because they do the work *right*—and because on account of their simplicity and power they require no skilled superintendence and do the work cheaply.

We are always willing to put a machine on the tracks of any company for trial *at our risk*. And they never come back.

Railway Track-work Co.

30th and Walnut Sts., Philadelphia, U. S. A.

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THE BUDA CO.

Factory—HARVEY, ILL.

Manufacturers of

Highest Grade Railway Track Work.
Switches—Mates—Frogs—Crossings
and Complete Layouts, Spring
Boxes, Derails, etc.

Solid Manganese,
Manganese Centre and
Bolted Construction in all standard
sections of Girder and Tee Rails.

SALES OFFICES:

CHICAGO—The Buda Co., Railway Exchange Bldg.
NEW YORK—The Buda Co., Hudson Terminal Bldg.
PHILADELPHIA — Maurice Joy, Franklin Bank Bldg.
SAN FRANCISCO—F. F. Bodler, Monadnock Bldg.
LOS ANGELES—S. I. Wailes, Trust & Savings Bldg.
PORTLAND — W. F. McKenney, 54 First St.
SALT LAKE CITY—C. H. Jones, Kearns Bldg.
KANSAS CITY—George T. Cook, Finance Bldg.

Kilby Manganese Special Work

Crossings, Frogs, Switches, Switch Stands, Rail Braces, Special Work, Built Up, Hardened Center or Solid Manganese Construction.

Catalogue upon application

Kilby Frog & Switch Co., Birmingham, Alabama

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The Engineers of Great Railroads Specify "Armco" Iron Culverts

An "Armco" Iron Corrugated Culvert under a heavy fill on the Western Pacific

The Convenience, Strength, Adaptability and Lasting Quality of

"ARMCO" IRON CULVERTS

have caused their adoption by hundreds of well-equipped engineers in highway and railroad work. High-purity "Armco" (American Ingot) Iron has raised the corrugated culvert from the position of a temporary makeshift to that of a reliable and lasting installation.

Write the nearest Manufacturer for particulars and prices on "Armco" Iron Culverts, Flumes, Plates, Sheets, Roofing and Formed Products

AMERICAN ARMCO INGOT IRON

Resists Rust

Arkansas, Little Rock
Dixie Culvert & Metal Co.
California, Los Angeles
California Cor. Culvert Co.
California, West Berkeley
California Cor. Culvert Co.
Colorado, Denver
R. Hardesty Mfg. Co.
Delaware, Clayton
Delaware Metal Culvert Co.
Florida, Jacksonville
Dixie Culvert & Metal Co.
Georgia, Atlanta
Dixie Culvert & Metal Co.
Illinois, Springfield
Illinois Corrugated Metal Co.
Indiana, Crawfordsville
W. Q. O'Neall Co.
Iowa, Des Moines
Iowa Pure Iron Culvert Co.
Iowa, Independence
Independence Culvert Co.
Kansas, Topeka
The Road Supply & Metal Co.
Kentucky, Louisville
The Kentucky Culv. Mfg. Co.
Louisiana, New Orleans
Dixie Culvert & Metal Co.
Maryland, Baltimore
Wm. M. Baker, Munsey Bldg.
Massachusetts, Palmer
New England Metal Cul. Co.
Michigan, Bark River
Bark River Bridge & Cul. Co.
Michigan, Lansing
Michigan Bridge & Pipe Co.
Minnesota, Minneapolis
Lyle Corrugated Culvert Co.
Minnesota, Lyle
Lyle Corrugated Culvert Co.
Missouri, Moberly
Corrugated Culvert Co.
Montana, Missoula
Montana Culvert & Flume Co.
Nebraska, Lincoln
Lee-Arnett Co.
Nebraska, Wahoo
Nebraska Culvert & Mfg. Co.
Nevada, Reno
Nevada Metal Mfg. Co.
New Hampshire, Nashua
North East Metal Culvert Co.
New Jersey, Flemington
Pennsylvania Metal Cul. Co.
New York, Auburn
Pennsylvania Metal Cul. Co.
North Dakota, Wahpeton
No'western Sheet & Iron Wks.
Ohio, Middletown
American Rolling Mill Co.
The Ohio Corrugated Culvert Co.
Oklahoma, Shawnee
Dixie Culvert & Metal Co.
Oregon, Portland
Coast Culvert & Flume Co.
Pennsylvania, Warren
Pennsylvania Metal Cul. Co.
South Dakota, Sioux Falls
Sioux Falls Metal Culvert Co.
Tennessee, Nashville
Tennessee Metal Culvert Co.
Texas, Dallas
Wyatt Mfg. Co.
Texas, El Paso
Western Metal Mfg. Co.
Texas, Houston
Lone Star Culvert Co.
Utah, Woods Cross
Utah Corrugated Culvert & Flume Co.
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Virginia Metal Culvert Co.
Washington, Spokane
Spokane Cor. Cul. & Tank Co.
Wisconsin, Eat Claire
Bark River Bridge & Cul. Co.

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If you are—

An Executive, an Editor,
or connected with a Business Paper in any capacity;
an Advertiser in a Business Paper;
an Advertising Agency or Service Man;
a Teacher of Advertising,
or an "Advertising Man"—

You are invited

to attend the annual convention of the ASSOCIATED BUSINESS PAPERS which will be held at

THE HOTEL ASTOR, NEW YORK

October 26, 27 and 28

(Better mark these dates on your calendar now)

We use the word "convention" because we must, but, in this instance, it is far from having the conventional meaning. This gathering of the men who control and use the great highways of business news and thought will mark the opening of a new epoch, not alone in the progress of business journalism, but in advertising itself. (And this is not a mere figure of speech.)

For publishers, there will be open forum sessions for the free discussion of problems relating to every phase of the making of good business newspapers.

For advertisers, there will be an exhibit of successful advertising campaigns, including the plan, the copy, the supplementary work, the results. Ideas that have produced thousands of dollars, that have cut the cost of selling, will be shown in complete detail.

Advertising agents and service men will hear real experts tell how to produce resultful business paper copy, and will get many valuable ideas on the practical use of the trade and technical press.

The far-seeing, progressive agency man will also be not a little interested in the helpful spirit of co-operation that is being developed between this type of agency and the business press. To such this will be an unusual opportunity:

For all, there will be an upward urge, new inspirations, a freshened enthusiasm, and three days in the world's metropolis at the most delightful season of all the year.

Better make up your mind to come

THE ASSOCIATED BUSINESS PAPERS

(Succeeding the Federation of Trade Press Associations)

A. A. GRAY, President
608 So. Dearborn Street
Chicago

JESSE H. NEAL, Executive Secy.
231 W. 39th Street, New York City
(Temporary Address)

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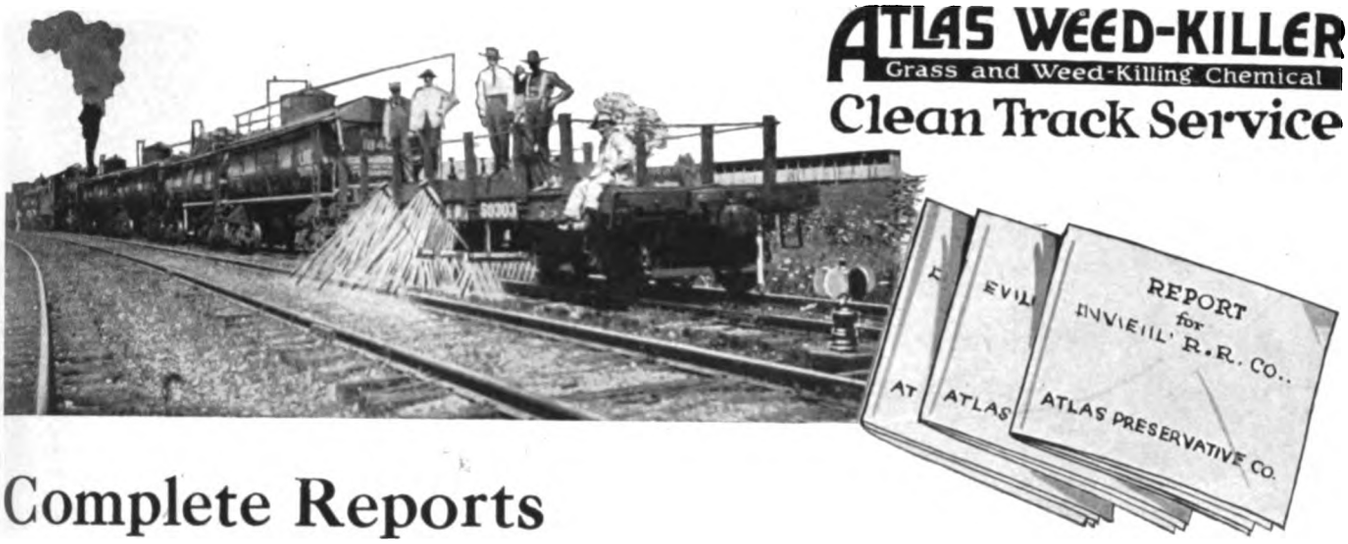

Complete Reports are Now Being Issued to Our Clients

During June, July and August our service trains have been busy killing weeds by the Atlas Chemical method.

Operating at speeds as high as 20 miles an hour, Atlas sprinkling trains have cleared up thousands of miles of steam and electric railway track—leaving a broad, clean, weed-free swathe on railroad right of way.

This has been accomplished without interfering with railroad traffic. Atlas Service is complete in itself, from producing the chemical down to the actual application.

Atlas Service goes further than filling the Contract

Now, in the Fall, our men are busy going over every foot of treated track—inspecting conditions and interviewing division officials so that we may be sure results are satisfactory.

Written reports, including comparative photographs taken before and after application, will be submitted within a month to every official interested.

Not until these reports are in the proper hands is our service complete.

Atlas Weed Killer must sell itself upon results

Every man in the Atlas organization is either a weed-killing expert or an operative. You will have no salesmen call upon you, except upon request, and then the man we send will be a weed-killing expert, not a salesman. He will go over your track, study the vegetation and give an intelligent estimate of the cost of cleaning your right of way.

This—together with the recommendation of other roads which use Atlas year after year—enables you to consider Atlas on a basis of facts.

If you are interested in cutting the cost of your track policing, as regards eliminating vegetation, write for booklet entitled "Clean Tracks." If you seriously want more definite information, we will gladly have a weed expert call upon you by appointment.

Atlas Preservative Company of America, (Inc.)

95 Liberty Street, New York City

BEFORE APPLICATION

TWO WEEKS LATER

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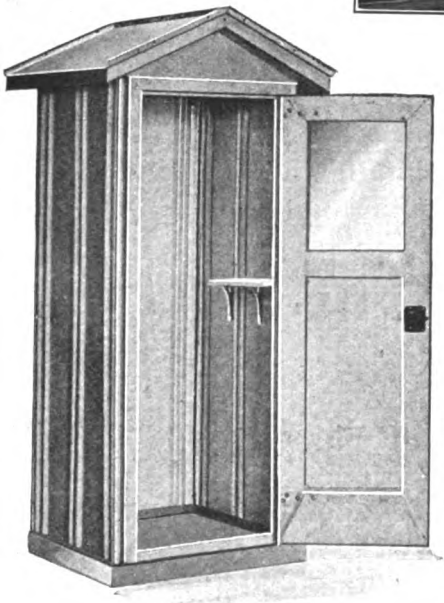
"PRUDENTIAL"
GALVANIZED
STEEL
BUILDINGS
PORTABLE
FIREPROOF
7-8-9-10-12 FT. WALLS

OFFICE AND FREIGHT SHED

"PRUDENTIAL"
GALVANIZED
STEEL
BUILDINGS
PORTABLE
FIREPROOF
7-8-9-10-12 FT. WALLS



PHONE BOOTH NO. 8

REMEMBER

WE CAN ADJUST OUR UNIT PARTS TO MEET YOUR STANDARD PLANS FOR ALL ONE STORY BUILDINGS

EVERYTHING THAT ENTERS THE CONSTRUCTION ABOVE THE FLOOR LINE IS INCLUDED: HARDWARE, GLASS, ETC., PLANS, DETAILS AND ERECTION INSTRUCTIONS—

TIME AND MONEY ARE SAVED IN "PRUDENTIAL" FIREPROOF BUILDINGS.

ORDER A PRUDENTIAL SHIPPED TO STATION—AND YOUR ERECTING CREW DOES THE REST.

MANUFACTURED BY

C. D. PRUDEN CO.
BALTIMORE, MD.

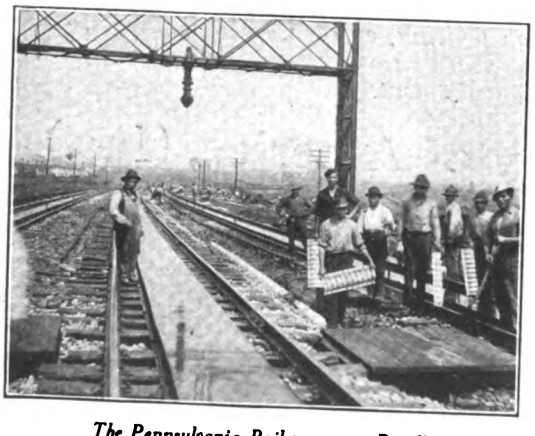
FLAG STATION NO. 61

DRAIN THE ROADBED

If the drainage isn't thorough and constant, Electric or Steam Railway tracks sag. Then they have to be "pumped up."

It's much cheaper to put down *good drains* that will be dependable and permanent— (*not* fragile) such as

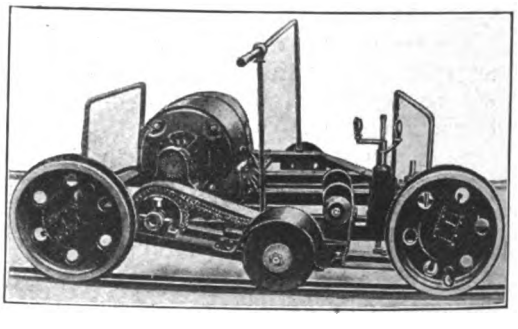
"DURO" Railway Drains
(Nestable—Patented) Corrugated and Perforated



The Pennsylvania Railway uses "Duro" Drains alongside these "water pans"

Last as long as the roadbed. "DURO" drains are anti-corrosive, made of NO-CO-RO METAL. They are re-galvanized after being perforated. No raw edges. Shipped knock-down and nested—they can not be damaged in transit. Any required diameter from 6" to 36"—either round or flat bottom. WRITE FOR CATALOG G3.

THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.



Portable Rail Grinder

Is practical and efficient
Is portable, fast and simple to operate
Is easily placed on and removed from track
Is adjustable to all conditions of grinding
Is high grade, low in cost and in maintenance
Is now in use on the largest railways in America
Is needed on every railway
Is the machine you will eventually buy

See It at the Convention
One Demonstration Will Convince You

E. P. Seymour Portable Rail Grinder Co.
Waltham, Mass.

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Section 2

Line

THIS section is devoted chiefly to advertisements of equipment for transmission, distribution and signaling, such as—

Wood Poles

Steel Poles and Steel Towers

Cross-arms and Other Fittings for Both Poles and Towers

Aerial and Underground Cables and Wire

Trolley Wire

Insulators, Connectors, Terminals

Splicers, Clamps, Etc.

Motor Trucks in Forms Especially Adapted to Electric Railway Service

Trolley-Contact Signals and Time-Inspection Systems

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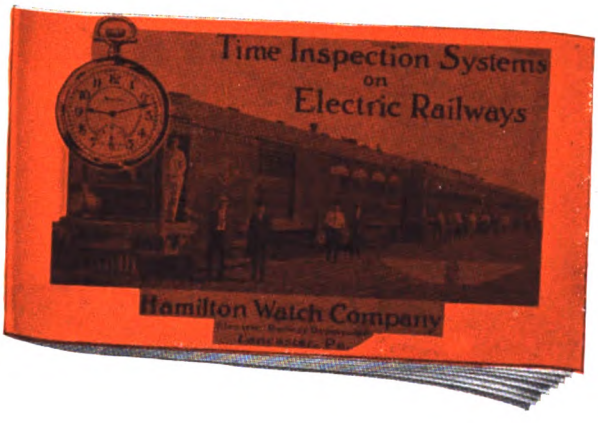
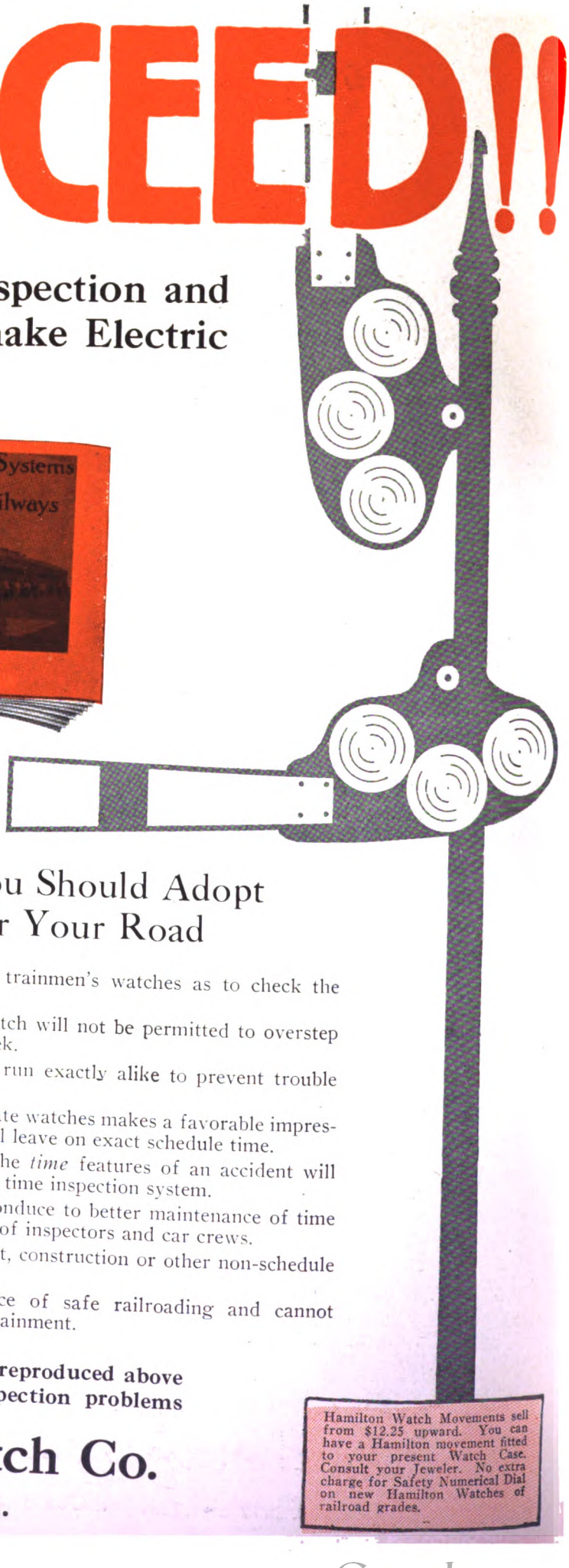
PROCEED!!

Block Signals, Time Inspection and the Hamilton Watch make Electric Railway Service Safe





Eight Reasons Why You Should Adopt Time Inspection for Your Road

Because it is just as important to check your trainmen's watches as to check the wear of a bearing.

Because every trainman must know that his watch will not be permitted to overstep the danger mark of 30 seconds variation per week.

Because the watches of opposing crews must run exactly alike to prevent trouble in making turnouts.

Because the possession by trainmen of accurate watches makes a favorable impression upon passengers who know that the train will leave on exact schedule time.

Because your testimony before a jury as to the *time* features of an accident will gain immeasurably when backed by your use of a time inspection system.

Because, in city operation, accurate watches conduce to better maintenance of time points and closer agreement between the reports of inspectors and car crews.

Because the chances of collision between freight, construction or other non-schedule trains will be greatly reduced.

Because, and chiefly, exact time is the essence of safe railroading and cannot properly be left to the individual employee for attainment.

We want to send you the booklet reproduced above and help you on your time inspection problems

Hamilton Watch Co.

Lancaster, Pa.

Hamilton Watch Movements sell from $12.25 upward. You can have a Hamilton movement fitted to your present Watch Case. Consult your Jeweler. No extra charge for Safety Numerical Dial on new Hamilton Watches of railroad grades.

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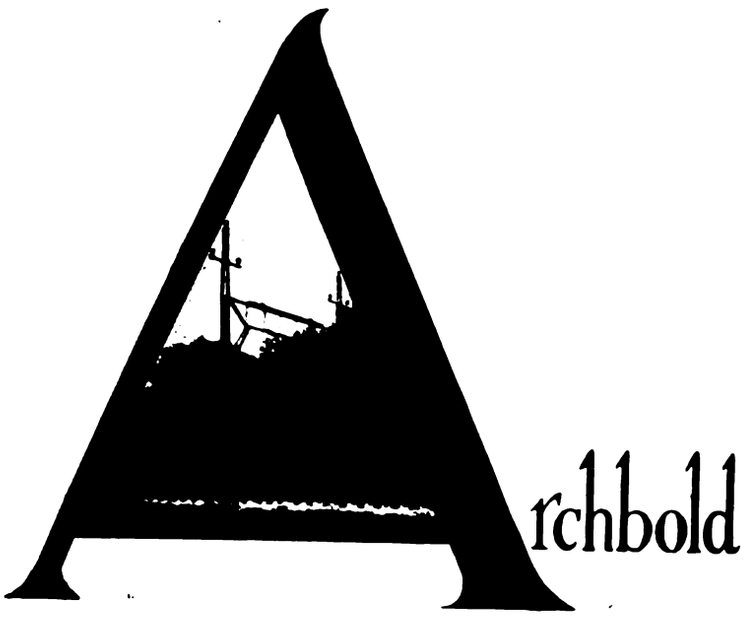
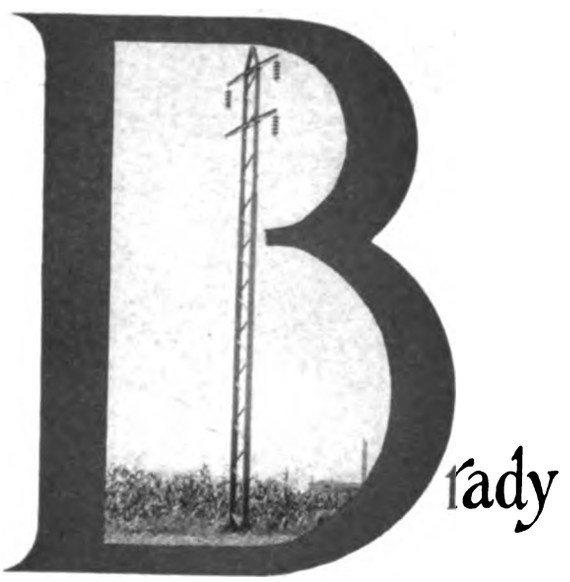


Archbold

The A-B-C of Steel Transmission Structures and Catenary Bridges



Brady

Archbold-Brady Company

SYRACUSE, N. Y.

Design and manufacture of Wire-Supporting Structures exclusively.

Company

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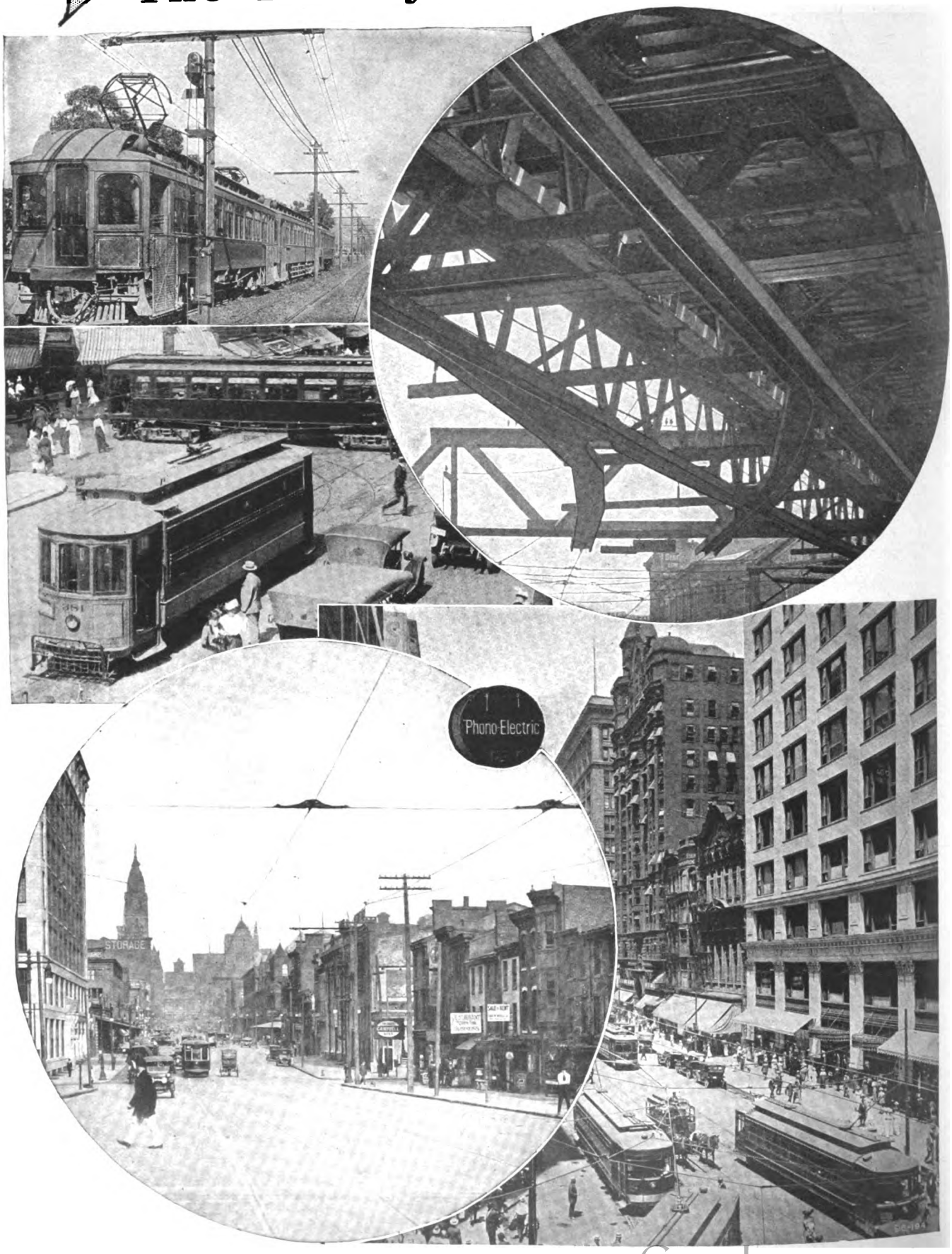
Phono-Electric

The Trolley Wire of Long Life



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Phono-Electric is Worth Its Price

(An advertisement based on an interview with the line engineer of a large city company)

It costs more to make Phono-Electric Trolley Wire than other kinds.

Its *first* selling price is therefore higher, but you can be sure that its *ultimate* selling price is not higher.

Have you determined the line of demarcation between Phono-Electric and copper on each of your lines?

Here are some places where Phono-Electric Trolley Wire is always the lowest-priced in the end.

On heavy lines where wire is worn rapidly.

On curves and turnouts where wheel-hammer and side wear are common.

On grades where abnormal currents must be collected.

On narrow streets where replacements are difficult.

Opposite are shown views of Phono-Electric installations in Oakland, Philadelphia, Brooklyn, Chicago and Rochester—only a few of the cities wherein Phono-Electric has proven "The Trolley Wire of Long Life."

As Phono-Electric is good for at least three times the wear of ordinary wire and with astonishingly fewer breaks, it will often pay to put it up even in comparatively light service.

BRIDGEPORT BRASS COMPANY
BRIDGEPORT CONNECTICUT

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DREW

DREW Motorman's Safety Mirror

Obviates platform accidents — reduces running time safely.

Shows motorman clear view of steps—on open or closed cars.

Costs little—never wears out. Easy to attach.

Special literature on request.

YOU will find in Drew Overhead Materials that every phase of operation has been anticipated. "Lowest cost per car mile" is the basis on which they are made and sold.

So, naturally, wherever operating costs are considered when purchasing, you find Drew materials specified.

Special Electrical Castings to Order

The Drew Foundry has sufficient extra capacity to care for a limited amount of special casting in bronze, brass and other non-ferrous metals. When in the market for special designs—it will pay you to have *Drew Quotations.*

SAMSON Splicers

Prove lowest cost per car mile. This is the reason no wise road ever changes from Samson's. They are non-arcing, stay upright in the span, do not form hard spots, and are stronger than new wire. The last word in splicer efficiency.

Samsons are supplied in all sizes for round, grooved and figure 8 wire. Send for details.

Drew Electri

1016 E. Michigan St

District Representatives

Holden & White, Inc.
1508 Fisher Building.
Chicago, Ill.

Brown & Hall Sup. Co.,
1124 Pine St.,
St. Louis, Mo.

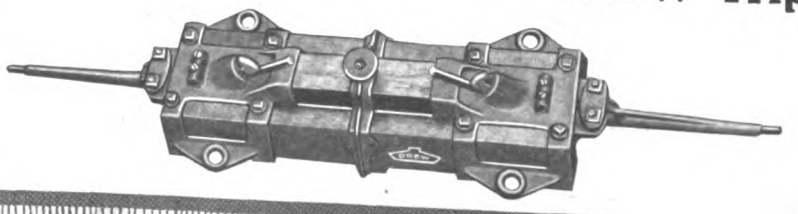
Railroad Signal Sup. Co.,
Hackney Building,
St. Paul, Minnesota.

Wm. F. McKenney,
54 First Street,
Portland, Oregon.

Frank F. Bodler,
903 Monadnock Bldg.,
San Francisco, Calif.

S. I. Wailes,
Trust & Savings Bldg.,
Los Angeles, Cal.

DREW Triple Beam Insulator



On account of the great strength, light weight, smooth operation and lasting service efficiency, this has come into very high favor wherever operating cost records are consulted when purchasing. Ask for details.

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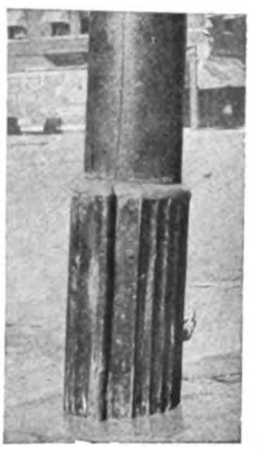
RAILWAY SPECIALTIES

Proven designs, carefully made from tested materials mean longer life in service, greater ease in installation and utmost efficiency in operation.

In every case, it will pay you to have *Drew Quotations.*



DREW Pole Sleeves

Wherever there's a steel pole—there is need for a Drew Pole Sleeve. Gives great additional life at small cost. Makes reclaimed poles stronger than new. Send for special literature every line superintendent should have.

Ask for Complete DREW Catalogue

The Drew Catalogue is a handbook of dependable electric railway, light and power materials. It also contains such other valuable data that makes it a handy book for every purchasing agent and superintendent of overhead to have. Sent free—ask for it.

& Mfg. Co.

ianapolis, Indiana

District Representatives

Alfred Connor,
Majestic Building,
Denver, Colo.

R. S. Wakefield,
1312 Busch Building,
Dallas, Texas.

A. P. Kelley,
661 Calvert Building,
Baltimore, Maryland.

Schoen & Jordan,
1312 Healey Building,
Atlanta, Georgia.

C. E. A. Carr,
2 Toronto Street,
Toronto, Ont., Canada.

H. S. Salt (Export Agent),
114 Liberty Street,
New York, N. Y.

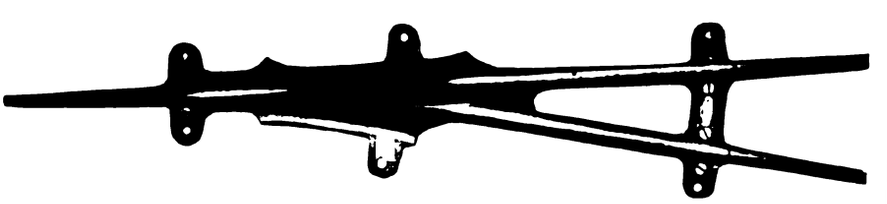
DREW Clinch Ears

The design of Drew Clinch Ears is the result of close study of all actual operating conditions. As a result Drew Ears are standard. Every feature that makes for lasting life in service and ease in installation is included.

Especial attention to the composition of the bronze used and care in casting mean additional "Service Efficiency."

DREW Trolley Frogs

The right basic design, modified to meet every operating condition. Easy to install. Saves trolley wheel and wire wear, because of smooth "take" and "leave"—obviates "trolley off." Bronze or malleable. Send for informative literature.



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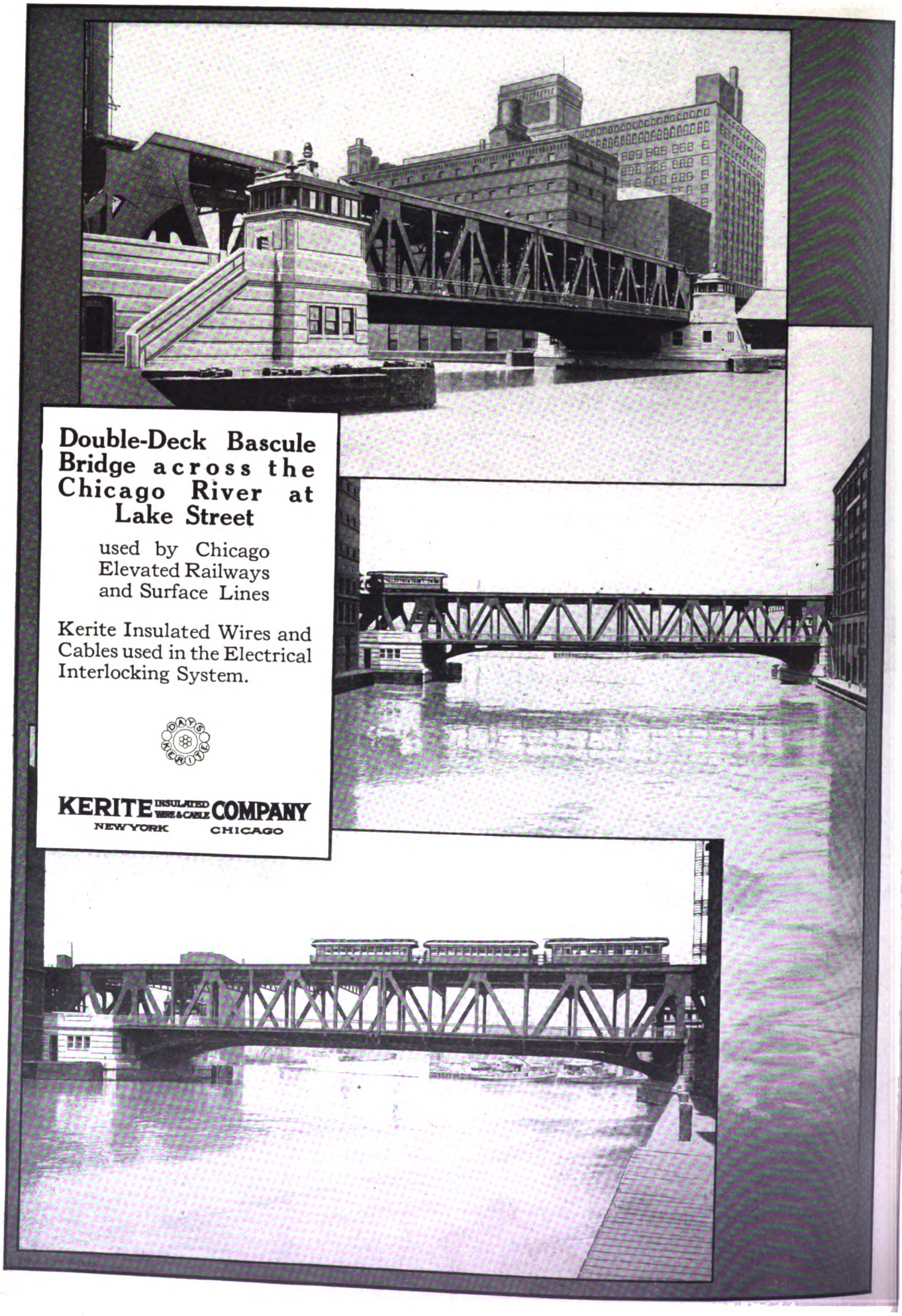

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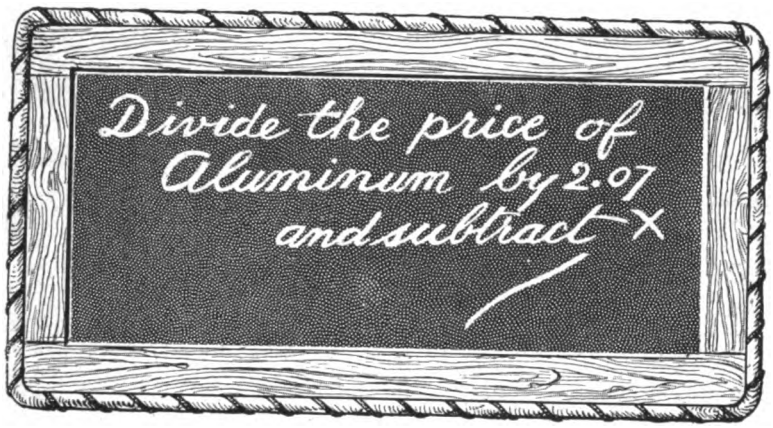

The Answer Is
Aluminum Electrical Conductors

The weight of a thousand feet of copper wire is 2.07 times the weight of the same length of aluminum of the same conductivity. Therefore, divide the price per lb. of aluminum by 2.07 and you get the price reduced to copper equivalent. But what about X?

That little X stands for big savings in first cost and maintenance of towers or poles, insulators, pins, splices, etc., due to the light weight and shorter span advantages of aluminum over copper.

When you realize what X means to you, ask us for the Y of "Aluminum Electrical Conductors." It is a real handbook of technical matter which shows the practical idealism of aluminum for feeder and transmission lines.

ALUMINUM COMPANY OF AMERICA
PITTSBURGH, PA.

New York Boston Chicago San Francisco

CUT THE COUPON

Aluminum Company of America
Pittsburgh, Pa.

Gentlemen: Kindly mail me your new book on "Aluminum Electrical Conductors."

Name .....
(Full name and title.)

Address .....
(City and Street.)

Occupation .....

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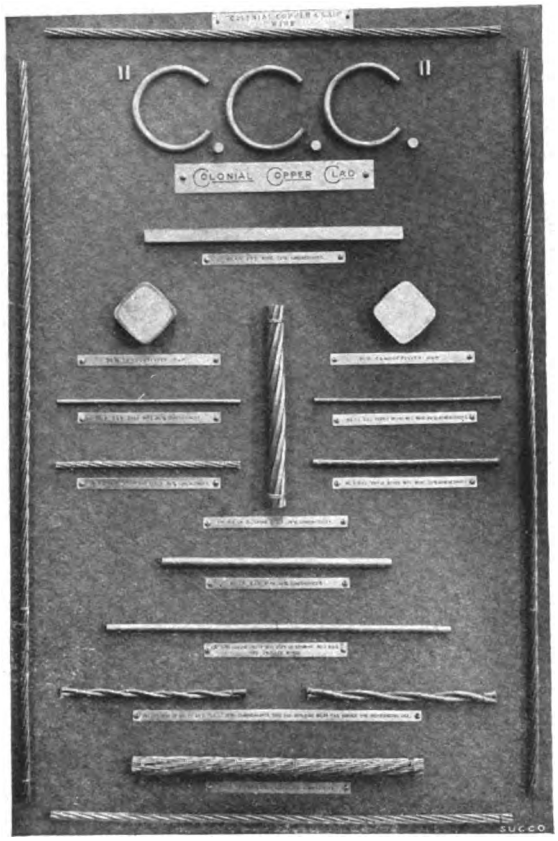


Reproduction of one of the sample boards, 19 by 29 inches in size, forming part of our A. E. R. A. Convention Exhibit. This board shows Colonial Copper Clad Steel wire and sections of wire-bars and rods from which they are rolled and drawn.

For Your Inspection

we have on exhibition at Booth 388 a representative display of samples of bare and insulated electric wires and cables and cable accessories which we believe will interest every purchaser and user of such products. The display consists in part of sample boards (one of which is reproduced above) containing a wide variety of samples of the following products:

Bare Copper Wire
Brass and Bronze Wire
Colonial Copper Clad Wire
Magnet and Weatherproof Wire
Varnished Cambric Insulated Cable
Paper Insulated Power Cable

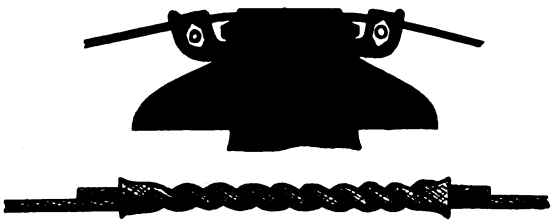
This is a portion of our exhibit at the Panama-Pacific Exposition which was awarded a gold medal —the highest specific award for products of this class, and the eighth award of this degree which STANDARD Products have received at as many different expositions.

We invite inspection of these products and you will be cordially welcomed at our booth.

Standard Underground Cable Co.
Pittsburgh, Pa.

Boston, New York, Philadelphia, Washington, Atlanta, Pittsburgh, Cleveland, Minneapolis, Chicago, Detroit, St. Louis, San Francisco, Seattle, Los Angeles, Salt Lake City

For Canada—Standard Underground Cable Co. of Canada, Limited, Hamilton, Canada.



INSULATOR CLAMPS, new types, that are adjustable. Better and different from anything heretofore. Not costly; the logical way to attach wires to insulators and especially adapted for Electric Railway service.

OVERHEAD PROTECTIVE CROSSING CLAMPS, approved by the Telephone, Electric Railway Companies, etc.; an essential safety device where electric lines cross above telephone, telegraph or other power lines. Why not assure your safety at these points?

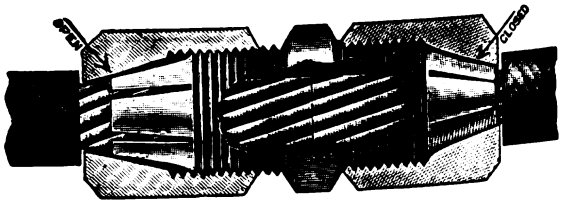
SEAMLESS COPPER SPLICING SLEEVES for "splicing" your transmission or ground lines, selected and used on their merits by the Chicago, Milwaukee & St. Paul Ry. Co., Southern Power Co., Mississippi Power Co., etc.; an easy joint to make without heat or solder.

SPLIT TINNED COPPER CONNECTORS, LIGHTNING ARRESTERS, CASTINGS, STEEL.

Your inquiry is solicited now for future if not present requirements.

"Hatch Specialties"
120 Broadway **New York**

FREE



—a handbook on economical connections—and a sample Frankel Solderless Connector

FRANKEL CONNECTOR CO. INC.

Factory:
177-179 Hudson St.,
New York

Sales Rooms:
733-735 Broadway

The man on your road responsible for economical and proper electrical connections will appreciate the story that this book and sample connector will tell.

Both represent new ideas—both point the way to better splices.

You incur no obligation in writing for them. Do it now.

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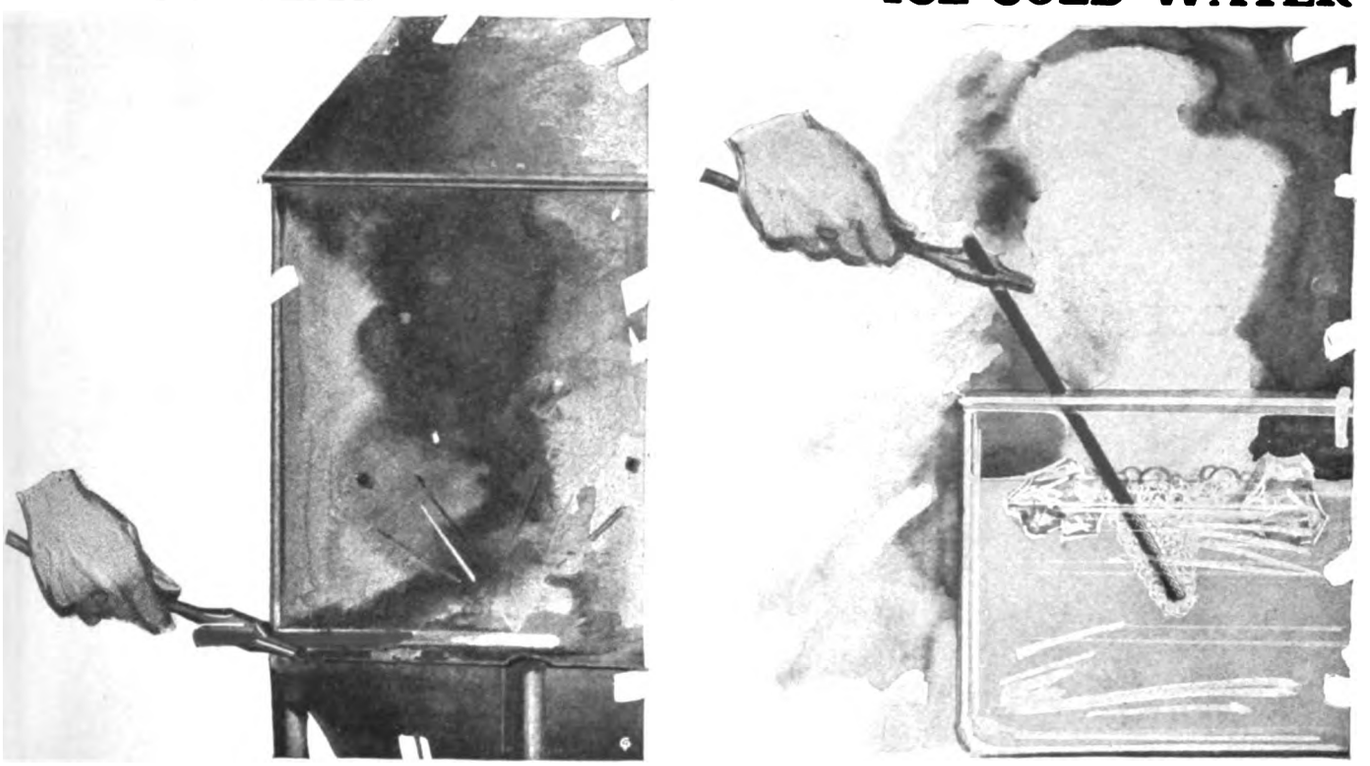
ARISTOS "COPPERWELD"

COPPER CLAD STEEL WIRE

From INTENSE HEAT **Instantly** → **To ICE-COLD WATER**



HAS NO EFFECT ON THE PERFECT WELD

—hence electrolysis can never take place

Made in 40%, 30% and Mechanical Grade.

Aristos "Copperweld" Wire costs less per pound than copper wire, is 7 per cent lighter (size for size), is 60 per cent stronger, and therefore can be used in smaller sizes, giving better service; averages 126 per cent greater elastic limit, and does not reach a "yield point" under extremely heavy snow and ice storms; costs less to maintain—therefore, for all these reasons, is cheaper for the following purposes:

Trolley Wire; Strand; Tie Wires, Bare and Weatherproof; Telephone and Signal Lines; Ground Rods; Guy Wires; Heavy Screen Mesh; Nails and Staples.

Western Sales Office:
Steel Sales Corporation
Chicago, Illinois

COPPER CLAD STEEL CO. PITTSBURGH PA. PAGE WOVEN WIRE FENCE CO. MONESSEN PA.

Eastern Sales Office:
Page Woven Wire Fence Co.,
30 Church St., New York

Made from the product of COPPER CLAD STEEL CO., Pittsburgh, Pa.

Drawn and Sold Exclusively by

PAGE WOVEN WIRE FENCE COMPANY

MONESSEN, PA.

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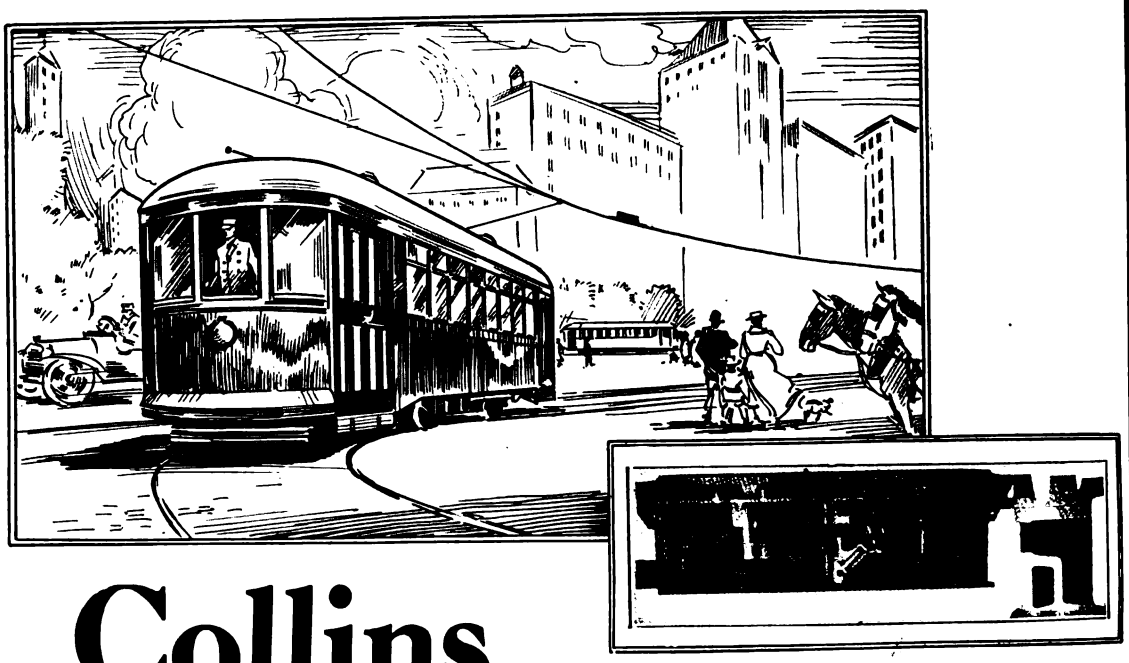

Collins

Electric Track Switches

Think for the motorman

Everybody knows there is nothing like an electric switch for maintaining schedules. But it must be a good switch—one that is really automatic and doesn't get out of order easily.

The Collins Electric Track Switch is that kind of a switch. Firstly, because it is made right. Secondly, because its ability to stay right does not call for the motorman to do any thinking.

The motorman has enough to do to watch his track and use his head and hands to work his brakes and control apparatus. If you give him a track switch that calls for thinking on his part for proper operation, you will either be disappointed in the switch or the motorman. We are talking about average motormen because those who are above the average don't remain motormen long—they become general managers.

Collins Non-Splashing Electric Track Switches think for the motorman. A car can stand directly under the contactor for an indefinite period without damaging the equipment.

Then, too, the switch cannot be thrown between the trucks of a car by a following movement under the contactor.

These features alone make the Collins worth while. There are other good reasons why the Collins is the best electric track switch on the market.

THE HITS BUNCHED

It does not splash mud and water; the switch cannot be thrown between the trucks of a car by a following movement under the contactor; the street box is automatically sealed and without dependence on the proper making up of pipe joints or gaskets; a most positive anti-straddling device is provided; only 110 volts is sent into the street box; the entire mechanism can be lifted out of the street box without making any disconnections; the contactors are exceedingly small and simply mounted on standard ears; standing under the contactor for an indefinite period has no damaging effect on any part of the mechanism.

United States Electric Signal Company

West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Chicago, Warren Moore Osborn, McCormick Bldg.
Foreign: Forest City Electric Services Supply Co., Salford, England

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New Contactor Signal

The Attainments

1. High Speed Standard Aspects

Registers safely without the motorman being obliged to watch the signal for a momentary change in the aspect as he operates it. Aspects same as standards on steam railroads for forty years.

2. All Light Signal

Red means stop. Green means go. Yellow means go, another car ahead, no confusion, just three plain colors, always the same whether for registering, non-registering, spacing, terminal or other signal equipment.

3. Lights Are Safe and Dependable

Because of our patented current regulator the lamps remain at constant candle power. This makes a light signal practicable even though operated from trolley current.

4. Full Operating Flexibility

Cars may enter or leave the block at any of the four points and register correctly and in a safe manner. Simultaneous entry at opposite ends gives one car the proceed and the other the stop. Overrunning the stop aspect and backing out provided for. Cars may enter one end and leave the other at the same time.

5. Line Wire Troubles

A feed crossed with registering out contactor wire will not register a car out. No cross, break, ground nor feed on either contactor or signal wires affects safety. No condition permits proceed aspects at both ends at the same time.

6. Accessibility

Mechanism is mounted on shelves which can be pulled out without making any disconnections. Contacts automatically made up when shelf is in place.

7. A. E. R. A. Signal Committee Recommendations

Complies with the 1916 recommendations of the A. E. R. A. Signal Committee and is the only system that does this.

8. High Speed Contactor

A contactor with nothing in the path of the trolley wheel, very light and mounted on one standard ear.

And Other Perfections

Come to Space No. 401 and see this Signal

United States Electric Signal Company

West Newton, Mass.

Representatives

Western: Frank F. Bodler, Monadnock Bldg., San Francisco
Chicago: Warren Moore Osborn, McCormick Bldg.
Foreign: Forest City Electric Service Supply Company, Salford, Eng.

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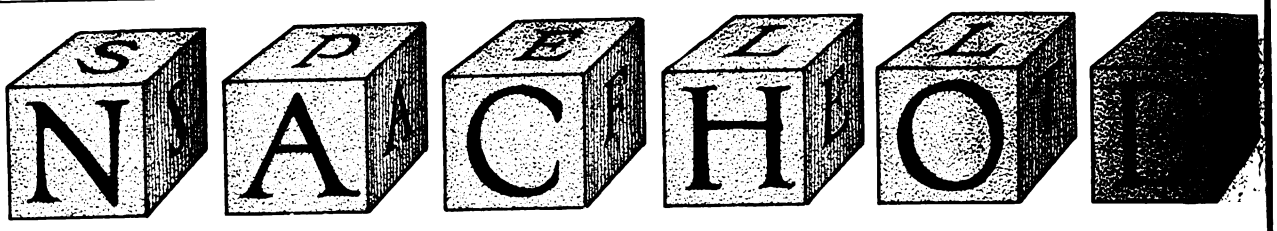
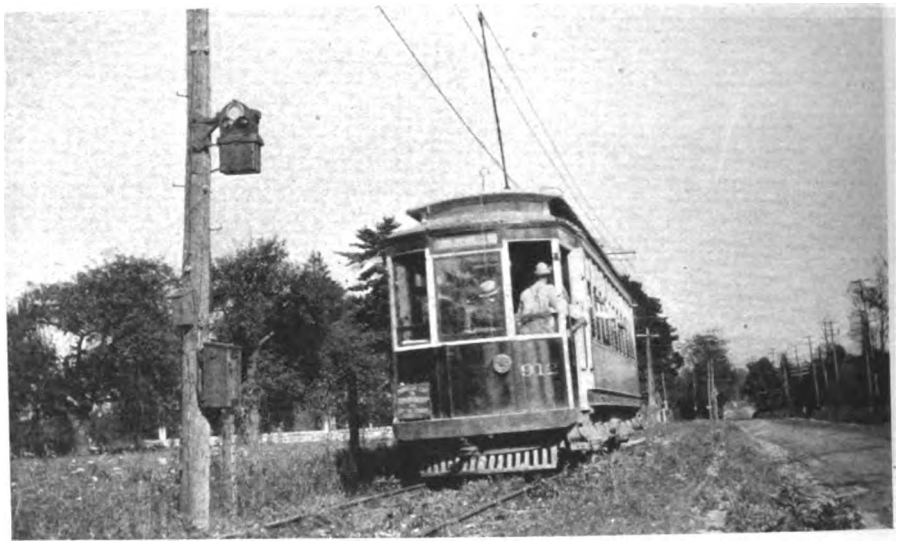


NACHOD SIGNALS
give high protection at a small ultimate cost. Made for single-track opposing movements, absolute or permissive, and for double-track following movements.

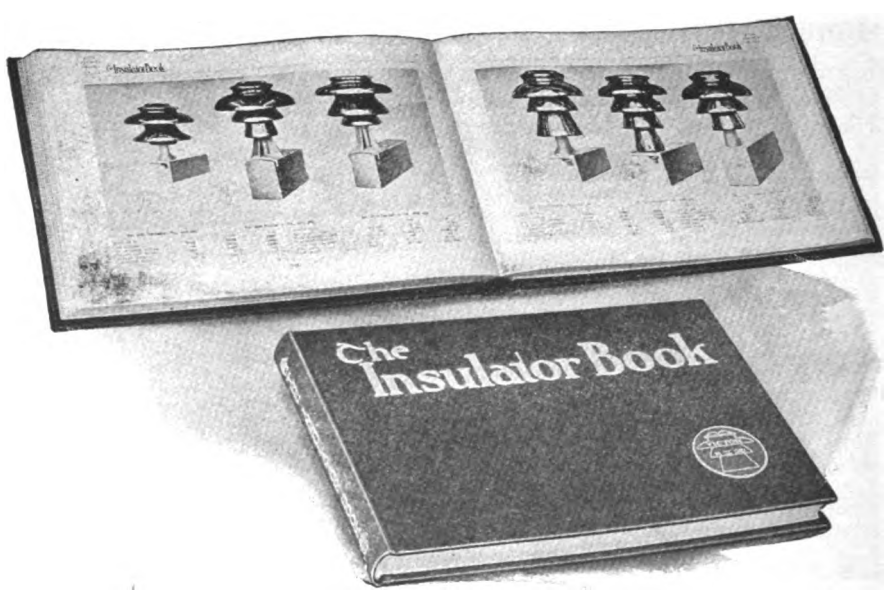
NACHOD CROSSING BELLS
warn the public of danger from approaching cars, and advertise to the public progressive railway operation.

NACHOD HEADWAY RECORDERS
give an accurate record at the end of the day of the entire car operation at a given point.



Better write us for details. For safety's sake—do it now.

NACHOD SIGNAL COMPANY, INC., 4773 Louisville Avenue, LOUISVILLE, KY.



The New Insulator Book—The most complete and comprehensive edition ever issued. Write for a copy.

THE LOCKE INSULATOR MFG. CO., Victor, N. Y.
New York City Office, 50 Church Street

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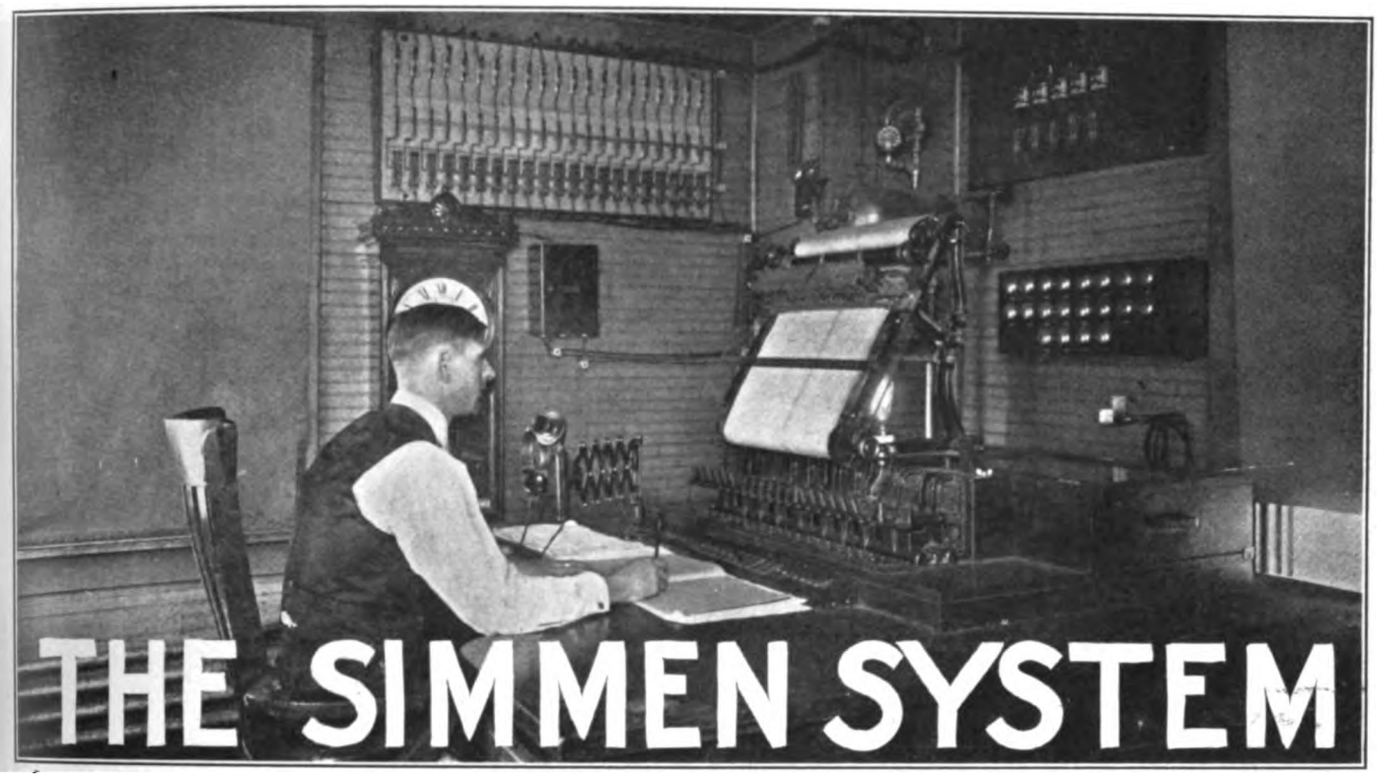

A Remarkable System of Railway Signaling

For your own advantage, for the interests of your company, and for the benefit of the traveling public, you should be fully informed regarding the merits and technical operation of the Simmen System of Continuous Cab Signals. A brief summary of a few of its features should convince you that it is well worth careful investigation.

CONTROL By means of interlocking control switches the dispatcher can give "stop" or "proceed" signals to the motorman directly in his cab, without intermediate operators or messages.

RECORDS The system provides for an automatic record in graphic form of train movements. This gives the dispatcher full knowledge of the whereabouts of all trains, enables him to direct their movements perfectly, and serves as a permanent record of schedules maintained, speeds, etc.

FACILITY The system facilitates quicker and more frequent train movements, with absolute safety, greatly increasing the capacity of a single-track road. The dispatcher can change a meeting or passing point instantly without the least risk, simply by changing the interlocking control switches in his office. In this way, in case of delay to one train, opposing trains will not waste time waiting for a "meet" and extra trains and other unexpected train movements may be directed with as great facility as the movements of regular trains.

SIMPLICITY Line wire and short contact rails at intervals are the only part of the system installed along the roadway. All apparatus is installed in the dispatcher's office and in the cab under constant experienced supervision.

SAFETY Its operation has proved it wonderfully successful. One of the virtues of the system is the fact that if any part becomes deranged or inoperative, the signal displayed is always that of "danger" or "stop." The dispatcher's signaling switches interlock, so as to make "lap orders" impossible.

COST The first cost is far less than that of the automatic block system, and is in proportion to the amount of traffic.

SIMMEN AUTOMATIC RAILWAY SIGNAL CO.

1575 Niagara Street, Buffalo, N. Y.

Pacific Coast Representative: W. H. Crawford, 609 Spalding Bldg., Portland, Ore.

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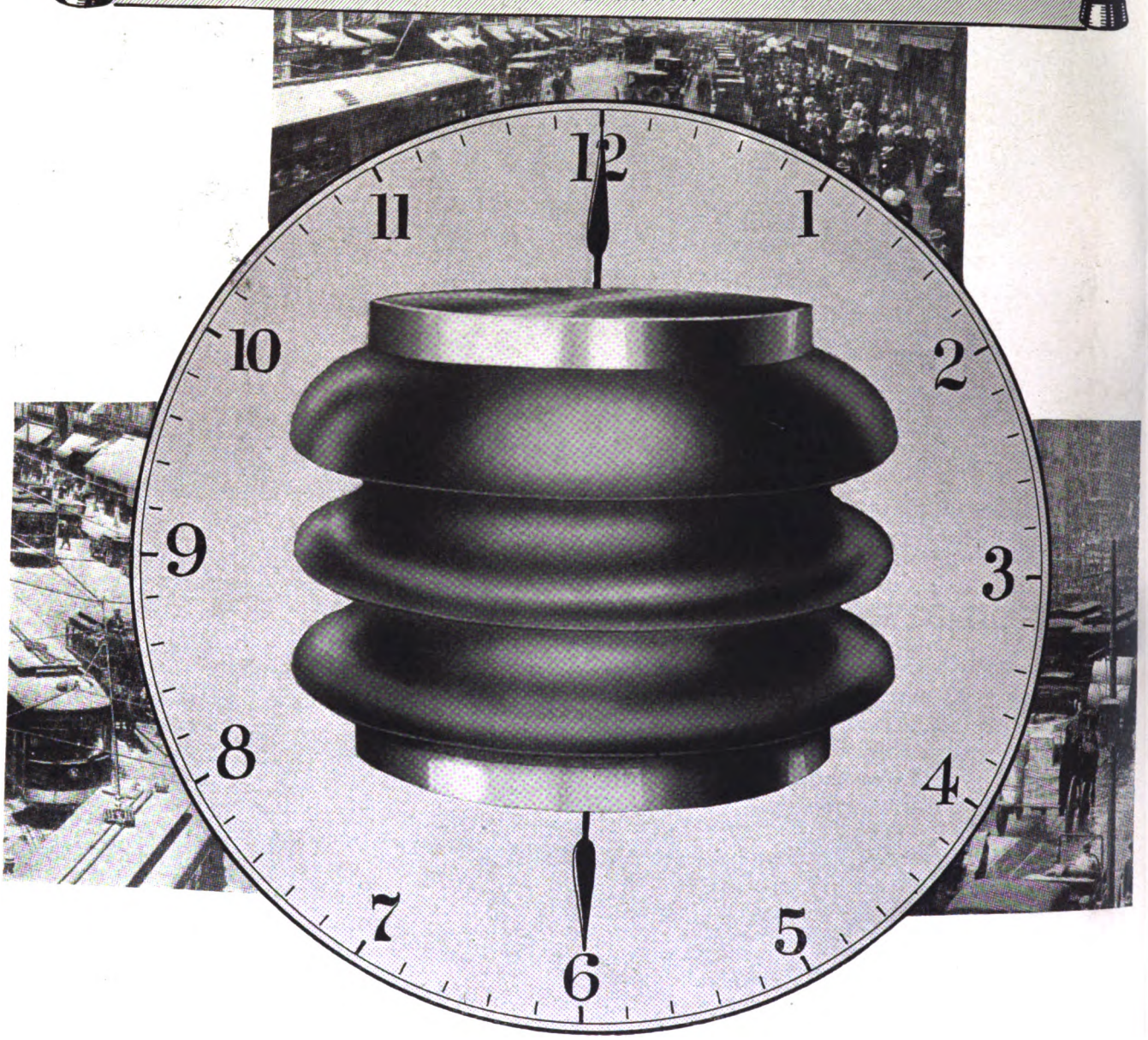
INSULATORS "Pittsburg" INSULATORS
TRADE MARK



Never fail at the critical moment

The maximum factor of safety of Pittsburg Insulators, determined by the most rigid tests under the supervision of trained engineers assures you of that dependence in insulators which is so important in railway line or transmission service.

We carry Standard Insulators in stock for every requirement. Put your Insulator Problems up to us

The Pittsburg High Voltage Insulator Co.

Main Office and Factory, DERRY, PA.

Westinghouse Electric & Mfg. Company, East Pittsburgh, sole agent for United States.
Canadian General Electric Company, Toronto, Canada, sole agent for Dominion of Canada.
Harmon S. Salt, 114 Liberty Street, New York, Export Agent.

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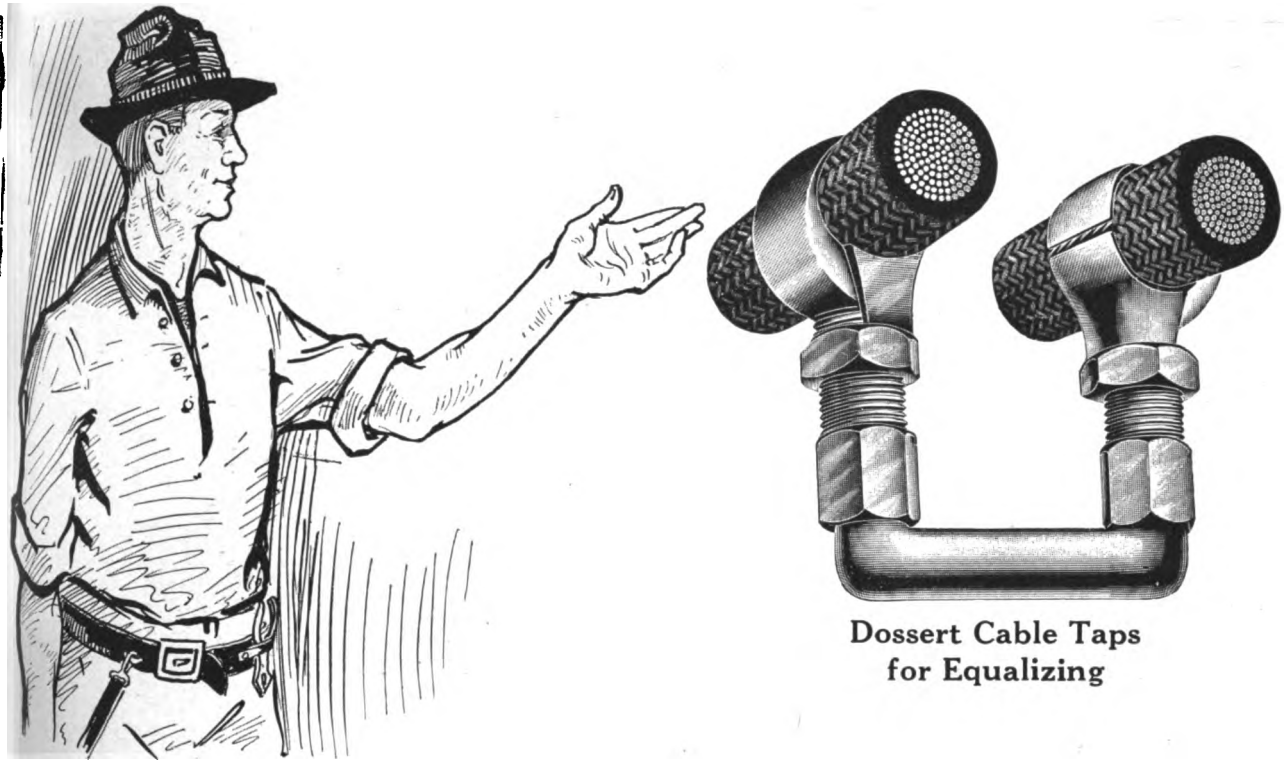

Dossert Cable Taps
for Equalizing

DOSSERT CONNECTORS AND TERMINALS

"They're What I Want"

says the expert wireman or cable splicer. "Cut out those flossy soldering tools.

"I can do more work in less time with Dossert Connectors and a wrench than two men can do with those fancy things you're trying to hand me."

The **good** workman knows that he can do better, quicker work with Dosserts. And it's money in **your** pocket to see that **all** your wiremen use them.

Using Dosserts throughout power houses and substations, for car wiring systems and junction boxes, and sectionalizing cases of Signal Control circuits, is a heap cheaper than paying extra labor.

One Man—One Tool—One Minute

That's what Dossert efficiency means. Our catalog is yours when you want it.

DOSSERT & COMPANY

H. B. LOGAN, President **242 West 41st Street, New York**

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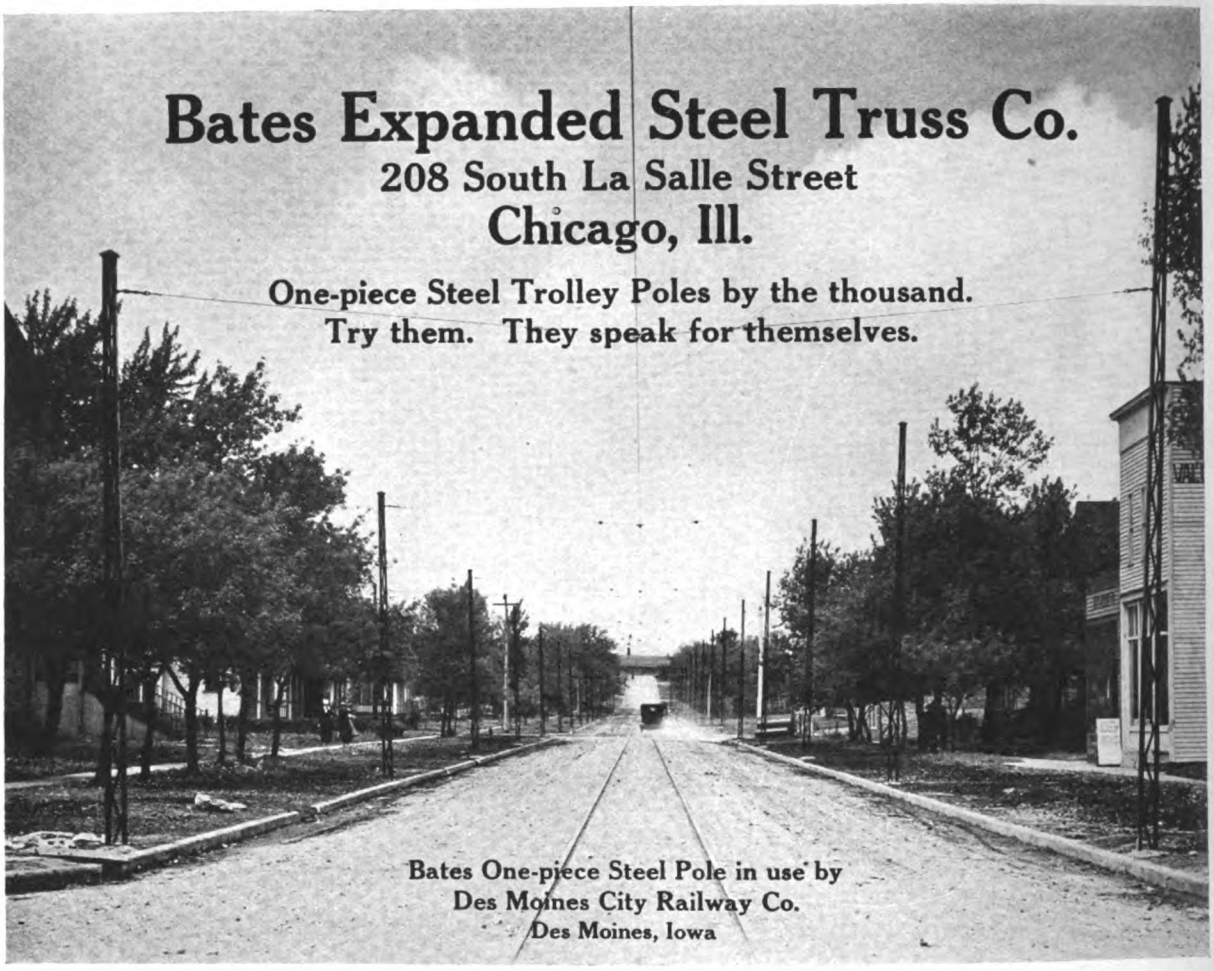
Bates Expanded Steel Truss Co.

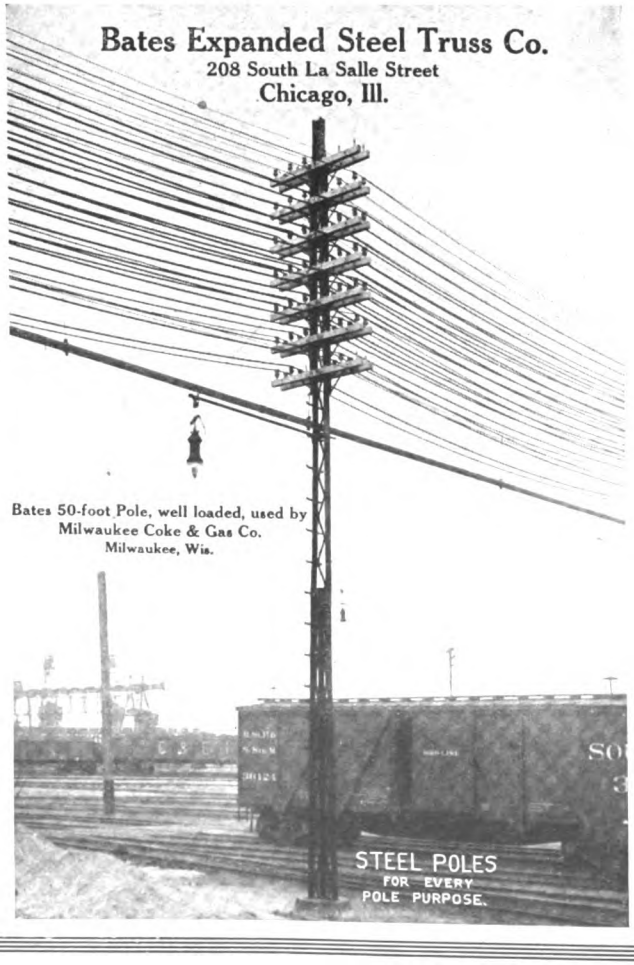
208 South La Salle Street
Chicago, Ill.

One-piece Steel Trolley Poles by the thousand.
Try them. They speak for themselves.



Bates One-piece Steel Pole in use by
Des Moines City Railway Co.
Des Moines, Iowa

Bates Expanded Steel Truss Co.
208 South La Salle Street
Chicago, Ill.



Bates 50-foot Pole, well loaded, used by
Milwaukee Coke & Gas Co.
Milwaukee, Wis.

Just Out!

BATES
Steel Pole Treatise

is not merely a catalog. It's a worth-while collection of data and information that should be on the desk of every man who is interested in pole line construction and manufacture.

Send for your copy and keep it for future reference.

See Our Exhibit At the Convention

It will afford a wonderful opportunity to study the design and construction of Bates Expanded Steel Poles. We'll be there to answer your questions.

Exhibit No. 218

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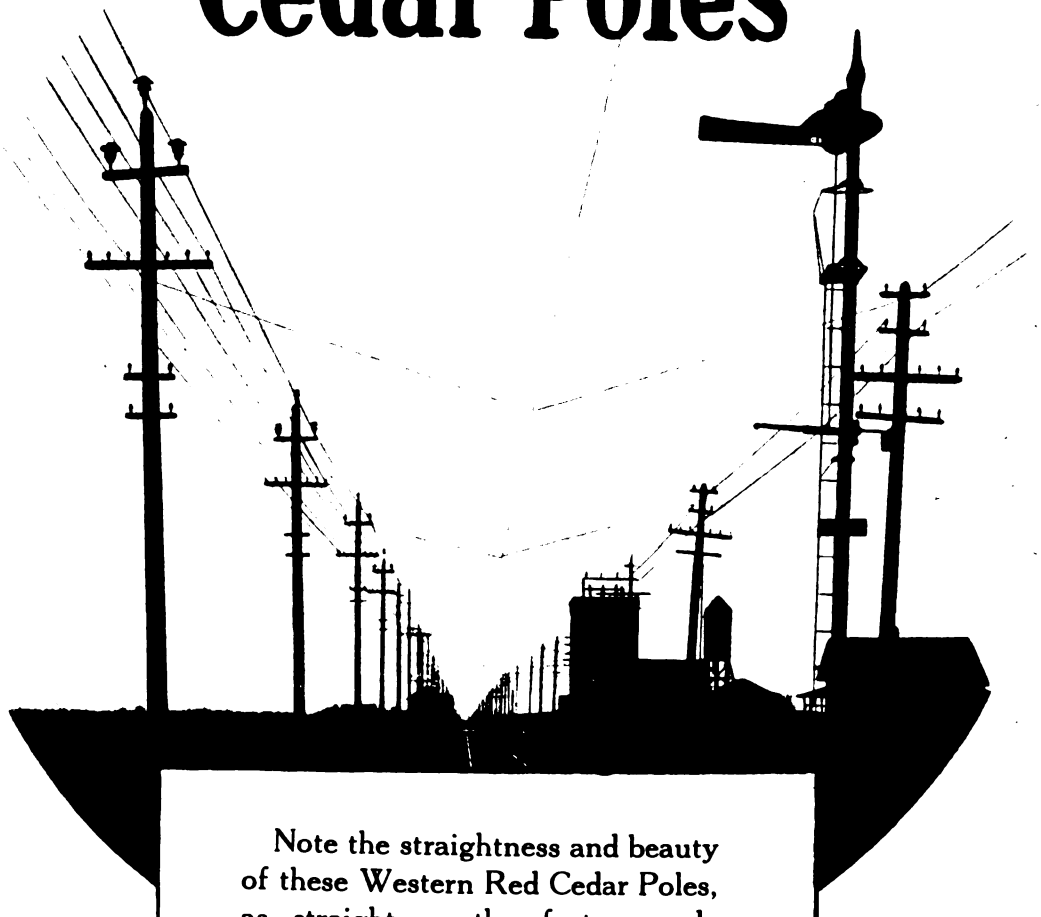
Western Red Cedar Poles



Note the straightness and beauty of these Western Red Cedar Poles, as straight as the factory-made semaphore mast.

The Universal Poles for Universal Service

Western Red Cedar are the most beautiful of all poles. They have great strength. Their average Modulus of Rupture as shown by Project L-31A of the U. S. Forestry Service is 6910 lbs. to the square inch, which is greater than that of any other specie of pole timber in general use throughout the country.

Western Red Cedar Pole lines set 15, 16 and 17 years ago in widely separated sections of the country are shown by recent investigation to be in good condition and good for many years more of hard service. Both first cost and maintenance are low. Their light weight reduces cost of transportation and erection.

Western Red Cedar Association

Peyton Building, Spokane, Washington

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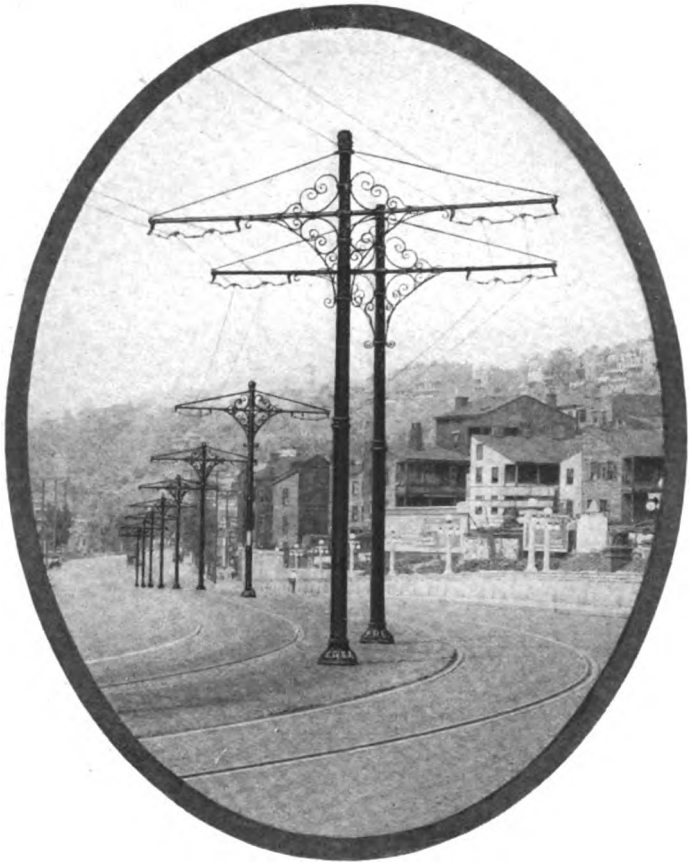

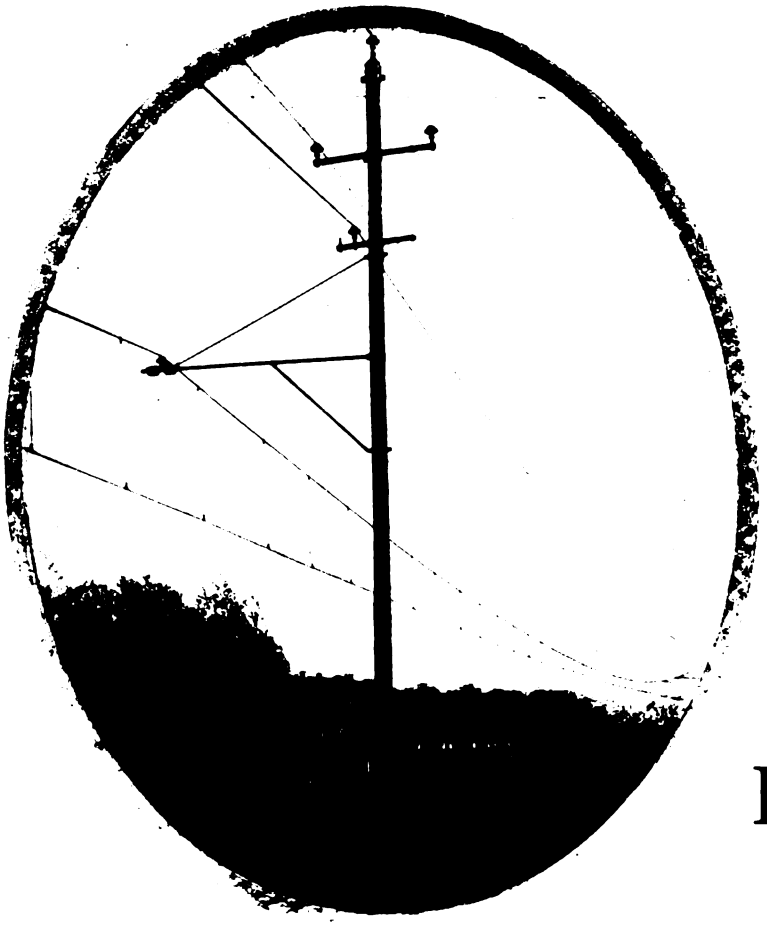

ELR
Tubular
Con

Lowest Cost
Lightest Weight

Do you know there are more than 50,000 Elreco Poles in service in Chicago—more than 27,000 in Cincinnati—hundreds of thousands in service in other cities throughout the world?

Mere claims wouldn't sell such quantities of poles, but their behavior in service does. Here are some Elreco truths:

Elreco Poles surpass every other form and shape of pole in uniformity and in ability to withstand strains in **all** directions.

They require less base room than any other pole.

They are least affected by corrosion.

They offer only slight oppor-

Electric Railway
Cincinnati
30 Church Street

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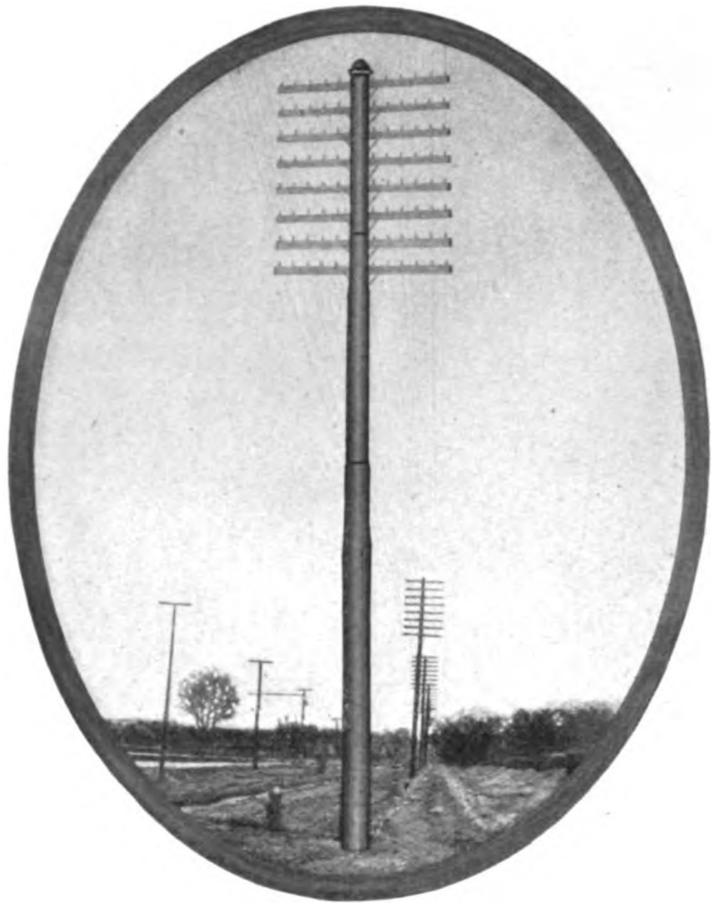
ECO Poles

ine

Least Maintenance
Greatest Adaptability



tunity for hubs of vehicles to engage them in passing.

They offer unexcelled ease in painting.

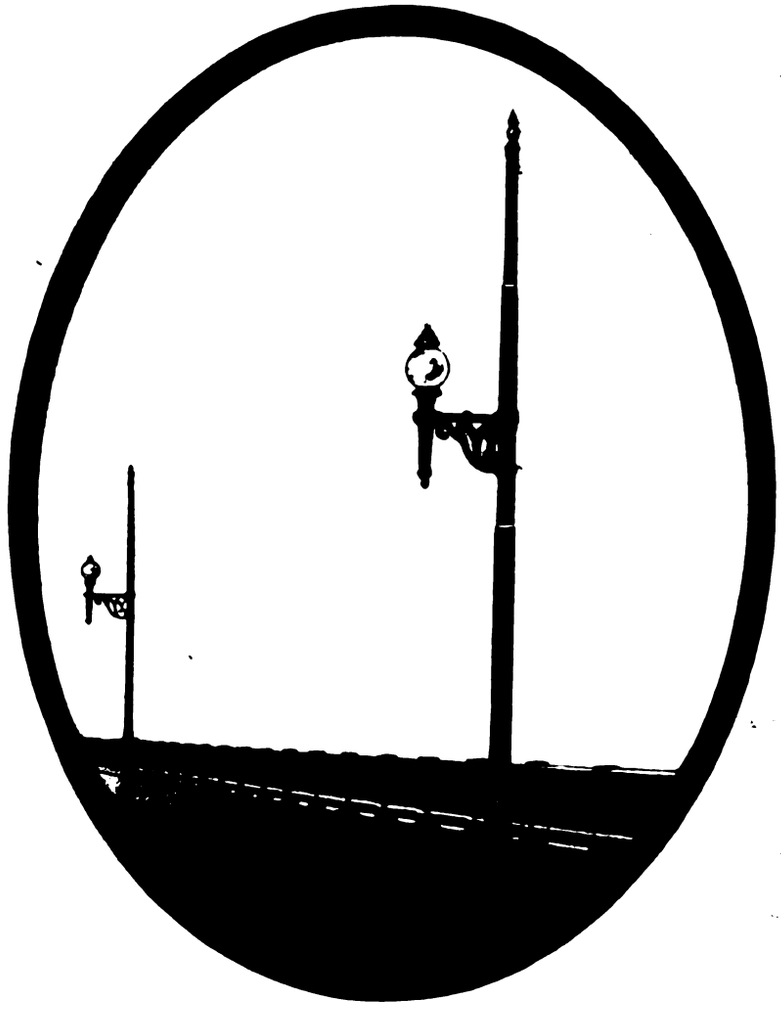
Elreco poles cannot be climbed by children.

They are most adaptable for joint railway and lighting use.

A 30 ft. Elreco pole will weigh about 50 lb. less and cost about $2.00 less than any other form of metal pole of the same all-around strength.

The Elreco pole is the only steel pole ever recommended by the Committee on Power Distribution of the A. E. R. A.

Write today for Catalog No. 16 on "Pole Engineering" and what the "Wire Lock" means.



Equipment Co.

Ohio

New York City

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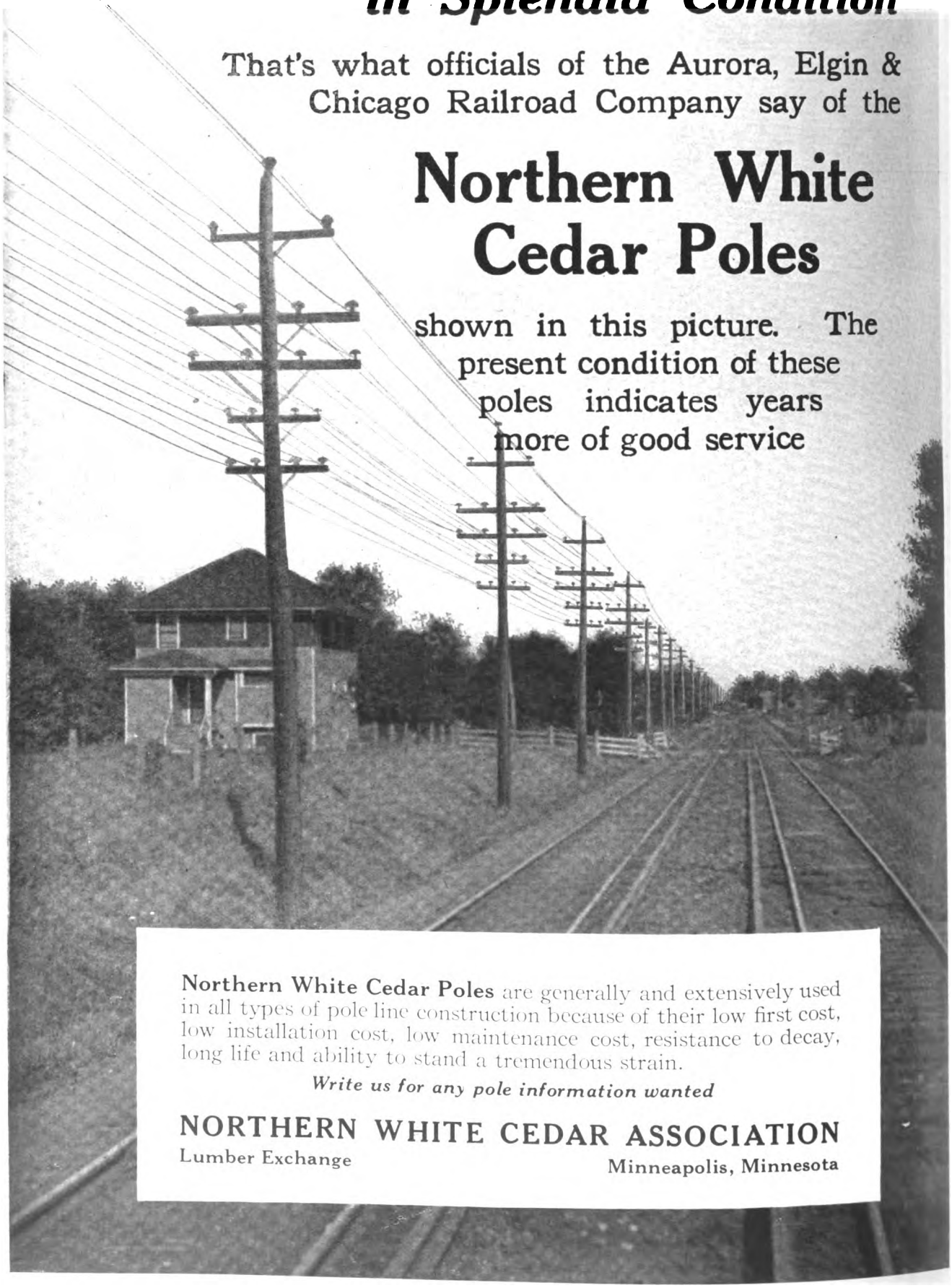
"15 Years of Service and Still in Splendid Condition"

That's what officials of the Aurora, Elgin & Chicago Railroad Company say of the

Northern White Cedar Poles

shown in this picture. The present condition of these poles indicates years more of good service



Northern White Cedar Poles are generally and extensively used in all types of pole line construction because of their low first cost, low installation cost, low maintenance cost, resistance to decay, long life and ability to stand a tremendous strain.

Write us for any pole information wanted

NORTHERN WHITE CEDAR ASSOCIATION

Lumber Exchange Minneapolis, Minnesota

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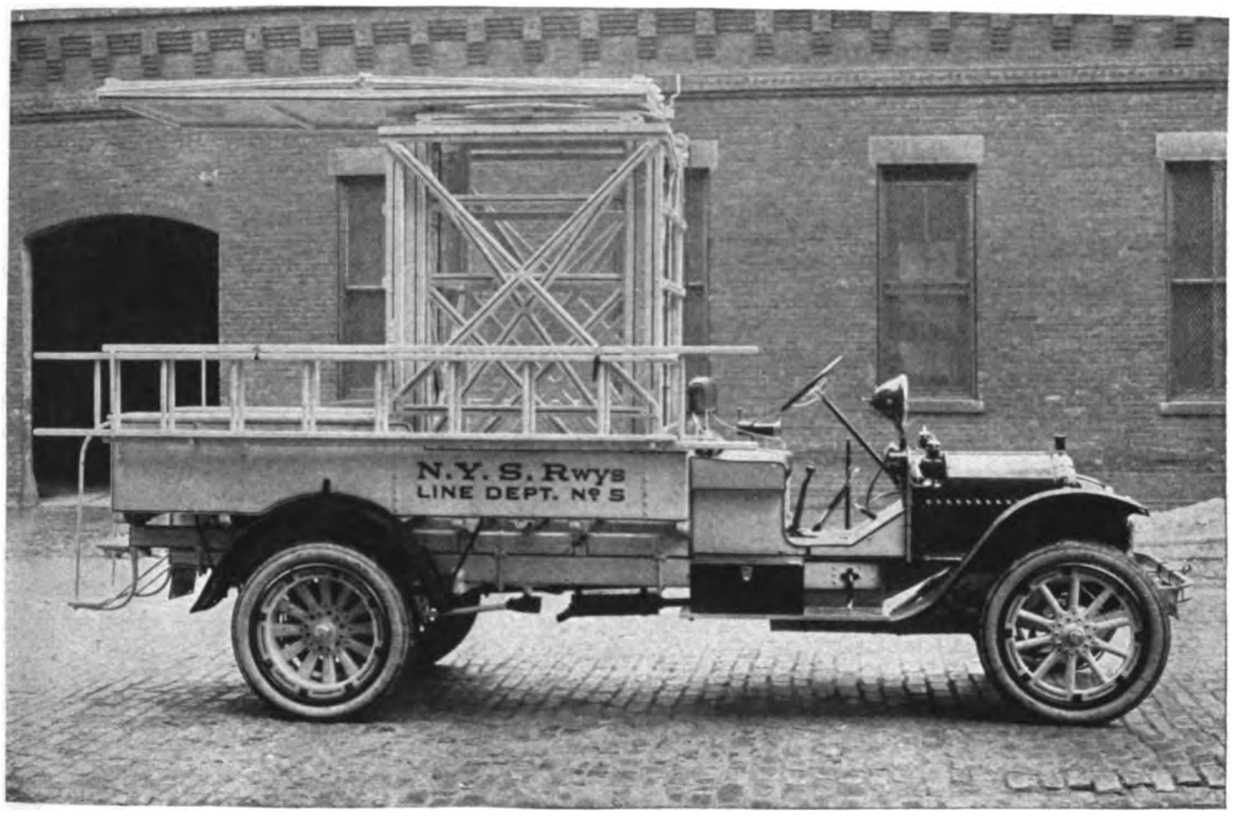
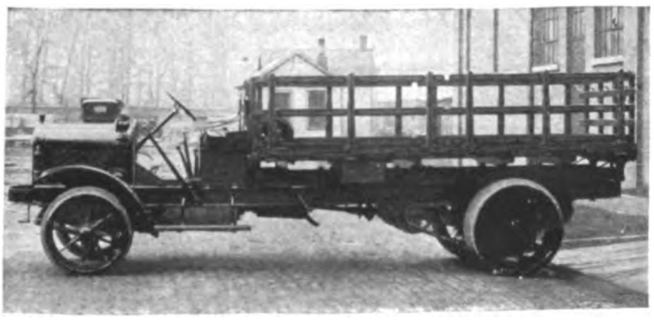


WHITE TRUCKS
for
Electric Railway Service

THE White 1½-2-ton tower truck and the 3-ton platform truck fitted with power winch and niggerheads, are two of the several types of motor apparatus designed and built by The White Company especially for Electric Railway service.

These trucks will be exhibited at the annual convention of the American Electric Railway Association, Million Dollar Pier, Atlantic City, October 9 to 13.

SPACE 211



THE WHITE COMPANY
CLEVELAND

Members of the American Electric Railway Association

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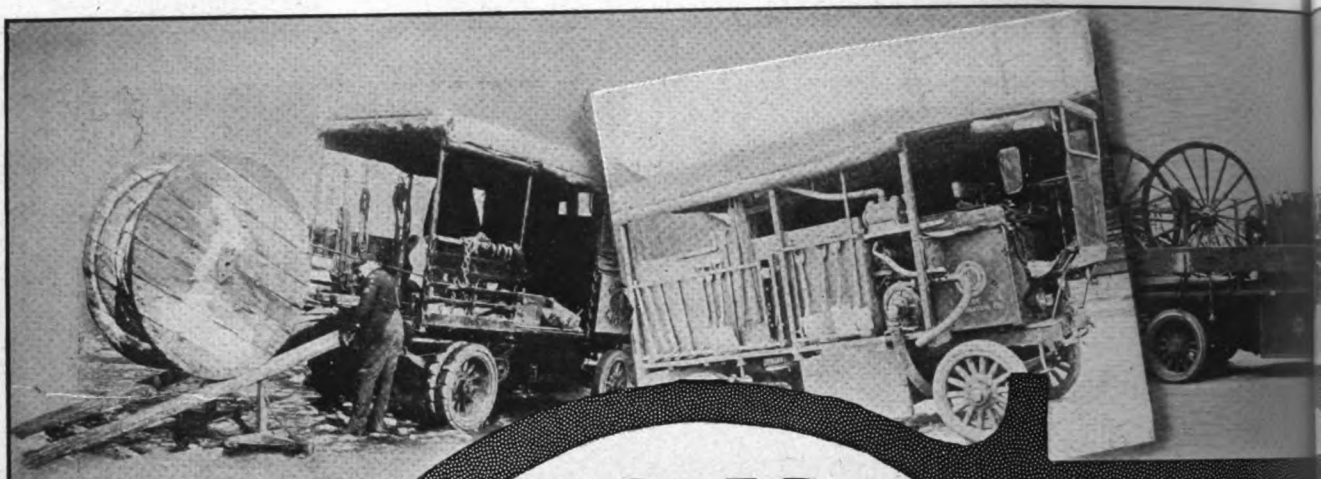
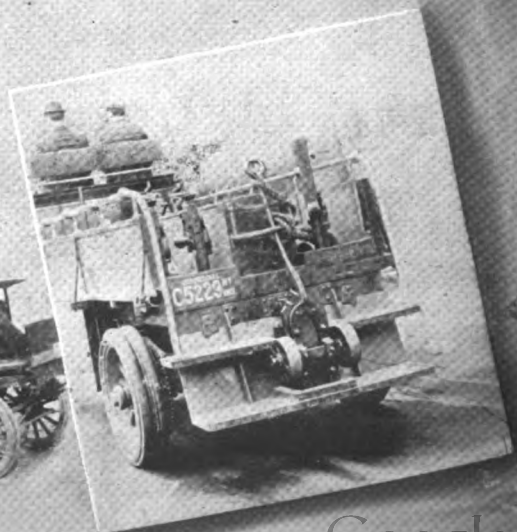


G V
Electric Trucks
for
Traction and Utility Service

Engineering Wagons, Tower Wagons, Crane Trucks, Tractors, Winch-Equipped Trucks, Hoist-Equipped Trucks, etc., in addition to our Regular Models.



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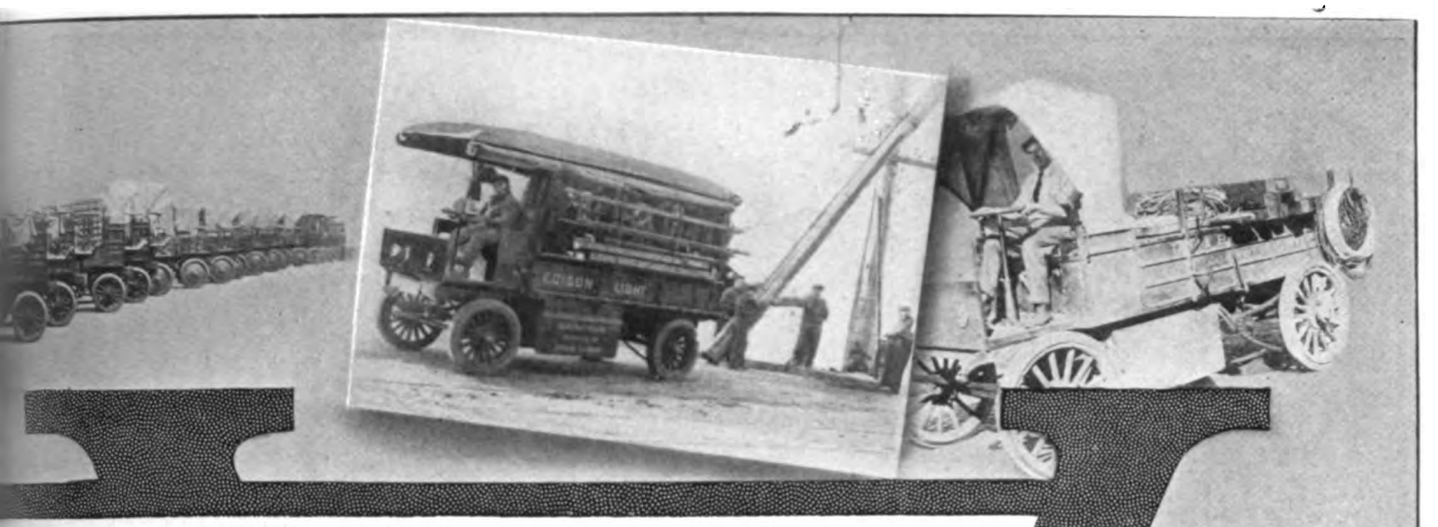

More than one hundred public utility companies are using this cheap and rapid method of trucking—getting **more** work done in **less** time at **reduced** cost, everything considered. Twenty-five big firms now use a total of 1137 General Vehicle Trucks—and the number is growing steadily as service tests prove out the efficiency and economy of these vehicles.

There is no vehicle need of the electric railway field that cannot be met quickly and exactly by General Vehicle Transportation Engineers. We offer the service of specialists in these matters and guarantee satisfaction. Don't get just "an electric truck." Get a G V Truck designed and constructed to meet the requirements of service on **your** road. Write today for a copy of Catalog J-28.

General Vehicle Company, Inc.

General Office and Factory
Long Island City, N. Y.

NEW YORK
BOSTON
CHICAGO
PHILADELPHIA

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White's Porcelain Trolley Hanger

is more easily installed and more satisfactory in service.

The insulator, stud and yoke are separable, yet they assemble as a unit. When the trolley ear is attached and screwed up firmly on the stud, it can be twisted around at right angles to the span wire without loosening the ear on the stud.

The head of the stud is countersunk into insulator so it can't turn after the ear is set in proper alignment.

The insulator is made of durable glazed porcelain. The yoke is galvanized iron. The stud is sherardized steel, or bronze bolts can be used instead of steel.

White's Porcelain Hanger is extremely durable, safe and low in cost, and WE CAN SHIP AT ONCE.

T. C. WHITE ELECTRICAL SUPPLY CO.

1122 PINE STREET, ST. LOUIS, MO.

Make YOUR Brains Pay Bigger Dividends

—just as thousands of other fellows in the electric railway field are doing.

They are probably not a bit brighter than you—but they are getting ahead faster—

Because they are studying developments in the whole field of electric transportation—they are not satisfied with their own individual share in the big work—they are getting a grasp on the broad principles underlying the industry.

They are forging ahead—and so can you, if you will spend a few hours each week in concentrated study of the

Electric Railway Journal

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Johns—Manville

JOHNS-MANVILLE SERVICE

COVERS THE CONTINENT ©

Serves More People in More Ways than Any other Institution of its kind in the world.

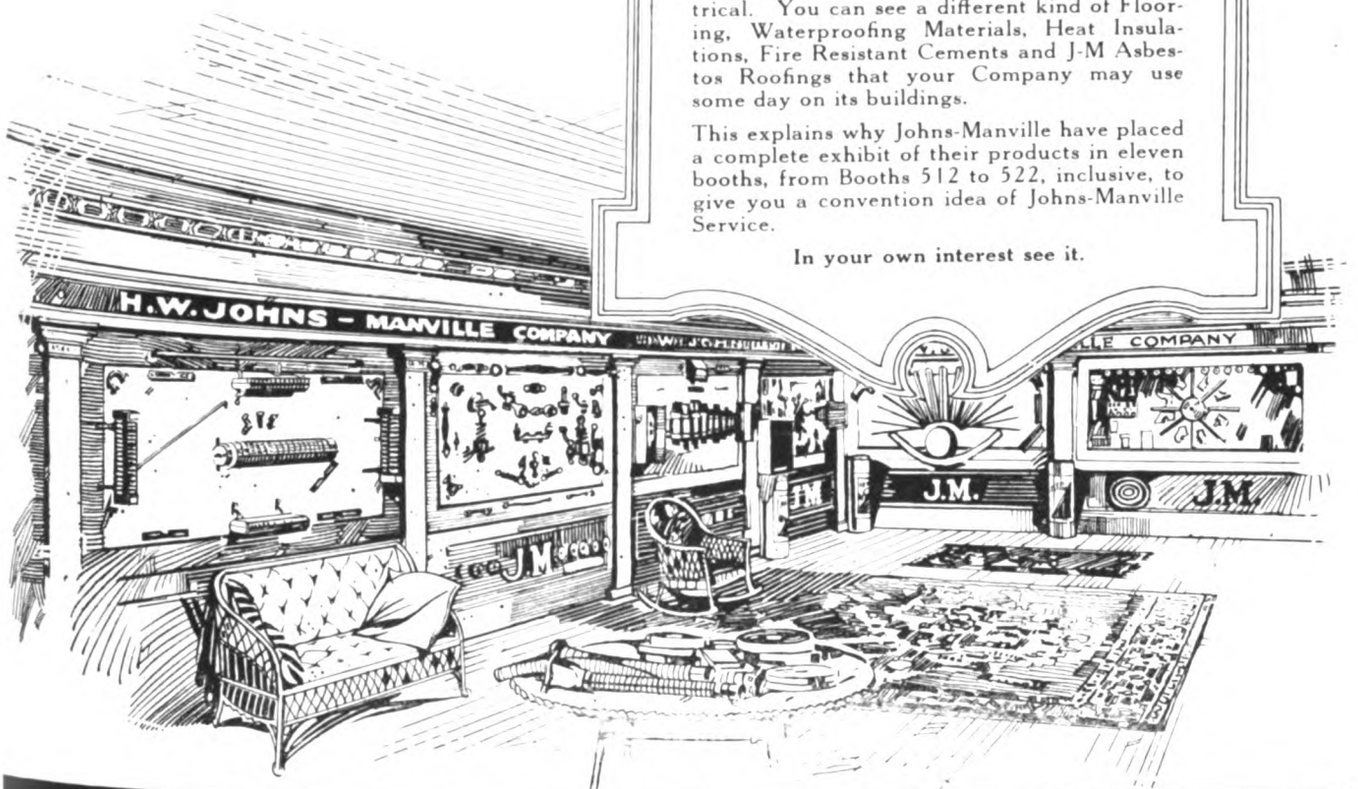
TO miss the manufacturer's side of the convention is to rob your visit of a useful and interesting experience. In the technical field things move fast, changes in construction follow new ideas and new ideas develop almost overnight.

You, for example, may know Underground Distribution as an important Electric Railway topic, or that inclosed fuses are being used more extensively and studied more intensively than ever. But how much more intimate would your knowledge be if you actually examined Noark Distribution Material—if you saw samples of J-M Fibre Conduit or heard it talked by a specialist. You would be interested in the new 2500 volt glass stemmed Noark Fuse.

And this does not apply alone to things Electrical. You can see a different kind of Flooring, Waterproofing Materials, Heat Insulations, Fire Resistant Cements and J-M Asbestos Roofings that your Company may use some day on its buildings.

This explains why Johns-Manville have placed a complete exhibit of their products in eleven booths, from Booths 512 to 522, inclusive, to give you a convention idea of Johns-Manville Service.

In your own interest see it.



Service and Responsibility

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The Lineman Says:

"K-I" SPLICING SLEEVES

Save Time for Me—and Money for the Road

When I make a splice with a "K-I" (Kisinger-Ison) Splicing Sleeve, I know it's there to stay—I know that if that particular wire ever comes down again, it will be because of a break somewhere besides where I've spliced it.

I don't have to unlimber the old torch-and-solder battery, either. Just slip the two ends of the wire into the sleeve, see that the two sliding wedges have a good grip, and there you are—the "K-I" will stand a heavier strain than the wire itself. There's no tinkering with set-screws—no hammering—no bending of wires.

It's the simplest, strongest, most efficient splicer I've ever used. Yes, you can get it in all sizes and lengths, for all types of trolley wire. You owe it to yourself to find out more about them; better write to

Standard Railway Supply Co. **4229 Fergus St., Cincinnati, Ohio**

DIRECT READING OHMMETERS FOR ALL CONDITIONS OF SERVICE—PORTABLE OR LABORATORY TYPES

Write Us Your Requirements

Thompson-Levering Co., Philadelphia, Pa., U. S. A.

If this isn't your personal copy of the Electric Railway Journal fill out this form and mail it at once before that good resolution cools.

Send subscription details to

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Position and Company

Address

Electric Railway Journal, 239 W. 39th St., New York

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Section 3

Power Plant

THIS section is devoted to features characteristic of the modern power plant and substation. Among these features are—

Improved Fuel-Handling Apparatus

Stokers

Superheaters

Washing and Cooling Equipment for Turbines

Pipe Coverings and Valves

Circuit-Breakers

Lubrication

And, finally

The Outdoor Substation

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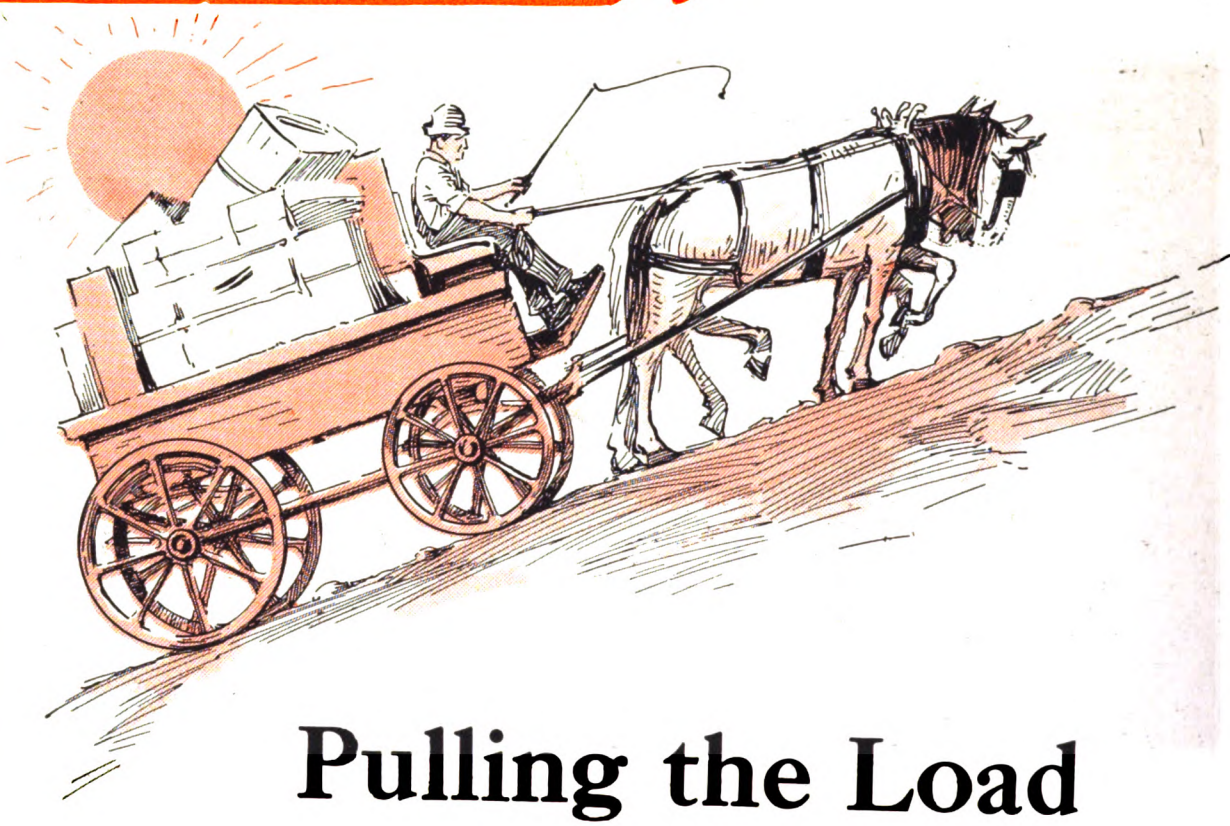

Pulling the Load

Down hill and on the level, a load moves easily; but up a grade it is a hard pull. You wouldn't try to move a load up hill with the brakes set. But that is the practice in many powerhouses. Any ordinary oil answers the purpose fairly well when the engines are running light, but when the load comes on and the pull is up hill, then every bearing should turn with the minimum of friction —you need the best oil you can buy.

Specially compounded of the finest materials to meet the severest service, Galena Oils are unequalled for powerhouse lubrication. They are so exceptionally good that we stand back of them with a guarantee of service and cost.

Galena-Signal Oil Co.

Franklin, Pa.

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Your Plant Needs These Valves

It isn't safe to operate your boilers unless they are equipped with

Golden-Anderson Automatic Double-Cushioned Triple-Acting and Non-Return Valves

Work Both Ways Protecting the Boilers and the Steam Lines

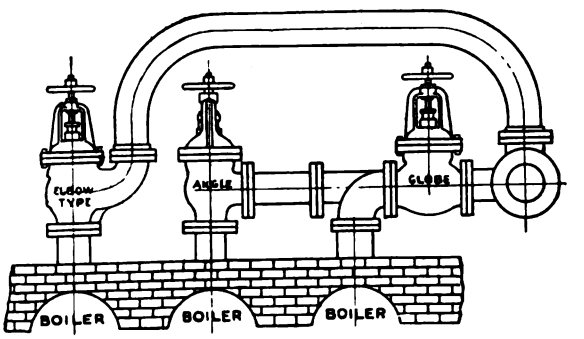
"Life and Property Insurance Value"

1. Automatically protect the boilers in case of accident, due to bursted boiler tubes or other rupture.
2. Equalize the pressure between a battery of two or more boilers.
3. Automatically cut in and out the boilers and prevent such accidents of cutting in a boiler too soon due to inaccurate steam gauges. Also prevent steam being turned into a cold boiler, which is a safeguard while men are working inside of same.
4. Act as a regular hand-stop valve, as they can be closed by the hand-wheel, but not opened by same unless so desired.
5. The only Non-Return valves that can be automatically tested in service.

The Triple-Acting Type, besides containing the above features, also operate in case of accident to the main steam line or branches, cutting off the flow of steam from the boilers, thus insuring protection to the power station throughout.

Make your power plant safe. Keep the boilers working at a uniform pressure and at increased efficiency. Your workmen can be made safe when repairing the inside of a cold boiler—no danger of steam being turned in to scald them to death—by equipping your boilers with Golden-Anderson Automatic Double-Cushioned Triple-Acting or plain Non-Return valves.

THE U. S. STEEL CORPORATION ORDERS 1255 GOLDEN-ANDERSON Triple-Acting and Non-Return Valves



Be Sure of Safety

Provide all engines in your plants with **Golden-Anderson** Safety First Safety First

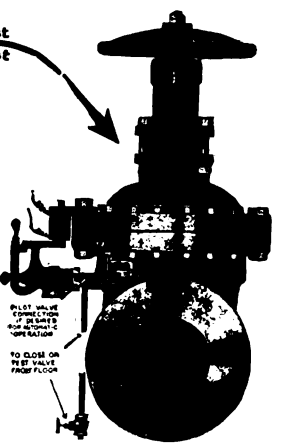
Double Cushioned Quick Closing Emergency Trip Valves

They close automatically the instant that you press an electric button or open a small valve which may be located in the office, engine room or down in the mine.

They **cannot** open again until the pilot valve is reset by hand. This feature is very important. You can also close them by hand like any stop valve.

Fitted with double Corliss Dashpot which provides a positive cushion in closing, making it **impossible** for the valve to pound itself to pieces.

The H. C. Frick Coke Co. have 150 in service for the protection of their Power Stations.



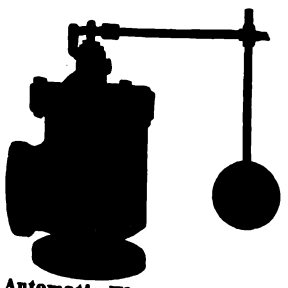
Golden-Anderson Automatic Cushioned Steam Pressure Reducing Valves

XX EXTRA HEAVY "For High or Low Pressure Service"

Embody the elements of simplicity, strength and reliability. Positive in action and always ready for service. Set valve to deliver high steam or other pressure at any reduced pressure and its action thereafter is entirely automatic. Nothing to break, stick or require attention. Perfectly cushioned when opening and closing and operates without noise. Will stand the wear and tear of years without repairs.

The very simple, correct, mechanical construction and operation insures a constant terminal pressure regardless of any fluctuation in the initial pressure.

Valves furnished cast iron, semi steel or cast steel for all pressures



Automatic Float Valve "Angle or Globe"

The Golden-Anderson Float Valves

are instantly adjusted to operate Quickly or Slowly as desired. Indestructible. They are absolutely the Only Satisfactory Float Valve known for High or Low Pressure.

"Angle or Globe" ½" to 24"

Patented Cushioned Automatic Controlling Altitude Valves

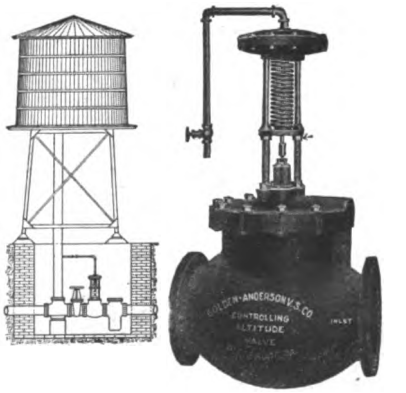
For Automatically Maintaining Uniform Stage of Water in Tank, Reservoir or Standpipes. Doing Away with the Annoyance of Floats or Fixtures, Inside or Outside. Especially Adapted for Water Works and Railroads.

"For High and Low Pressure"

"Works Both Ways"

"Most Satisfactory Valves Known"

Sizes to 24"



Standard Altitude Valve

Golden-Anderson Valve Specialty Co.

1231 Fulton Building, Pittsburg, Penna.

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17 Reorders from the N.Y.N.H.&H.R.R.

The Taylor Stoker

Brooklyn Rapid Transit Company orders 66 more TAYLOR STOKERS

First order in December, 1914. Repeat order for sixty-six stokers for Kent Ave. Station in December, 1915.

In September, 1909, the N. Y., N. H. & H. R. R. placed with us their first order for TAYLOR Stokers. Since then we have received from them seventeen repeat orders—the latest in April, 1916.

The efficiency, economy, flexibility and dependability in stokering service—the reduction of fuel, labor and maintenance costs effected—that earned these reorders has been duplicated in the experience of scores of electric railways the country over. Write for data.

It pays to install the TAYLOR STOKER in the first place

American Engineering Company

Philadelphia

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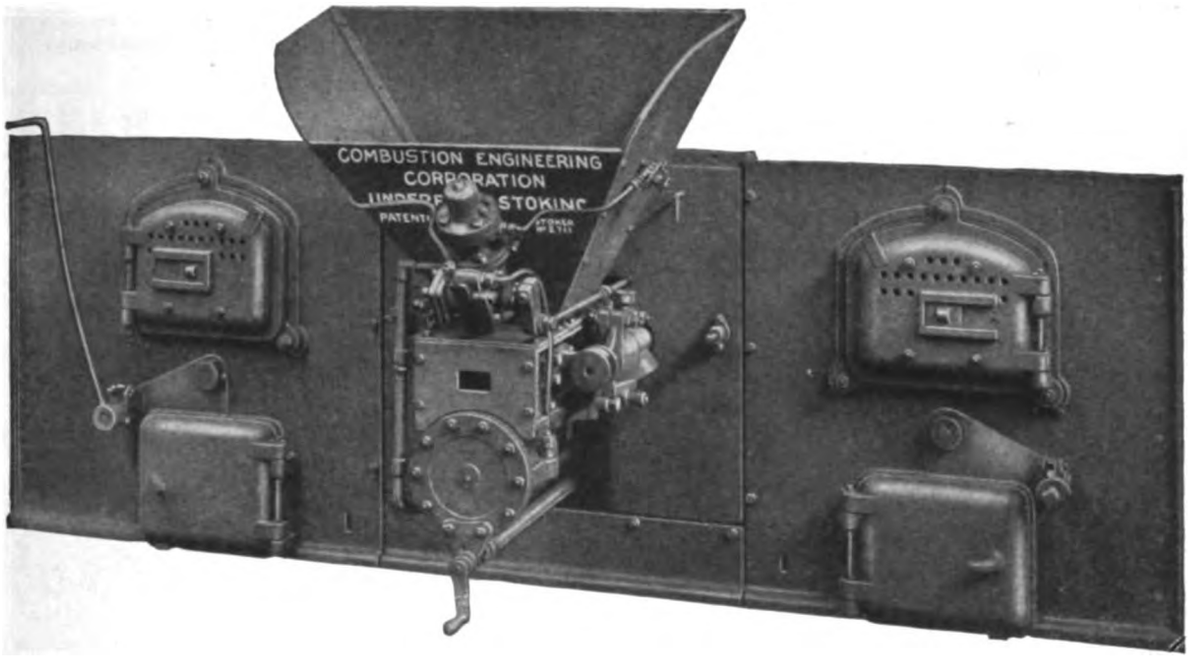

Your Problem

How to reduce the cost of making steam.
The price of coal has gone up.
What are you doing to offset it?
Our business is to supply you with the equipment that will do it.

Type "E" Stokers

Under-Feed—Self-Cleaning for bituminous coal

Coxe Stokers

The Anthracite Stoker. Coke Breeze

Combustion Engineering Corporation

Owners and manufacturers of

Type "E" Stoker—For Bituminous Coal
The Grieve Grate—For All Hand-Fired Fuels

Sole Representatives

Coxe Traveling Grate Co.—
The Automatic Anthracite Stoker

NEW YORK CITY
11 Broadway

PHILADELPHIA, PA.
718 Lincoln Bldg.

HAZLETON, PA.
Markle Bank Bldg.

BOSTON, MASS.
Schumaker-Santry Co.

SALT LAKE CITY
American Stoker Co.

BIRMINGHAM, ALA.
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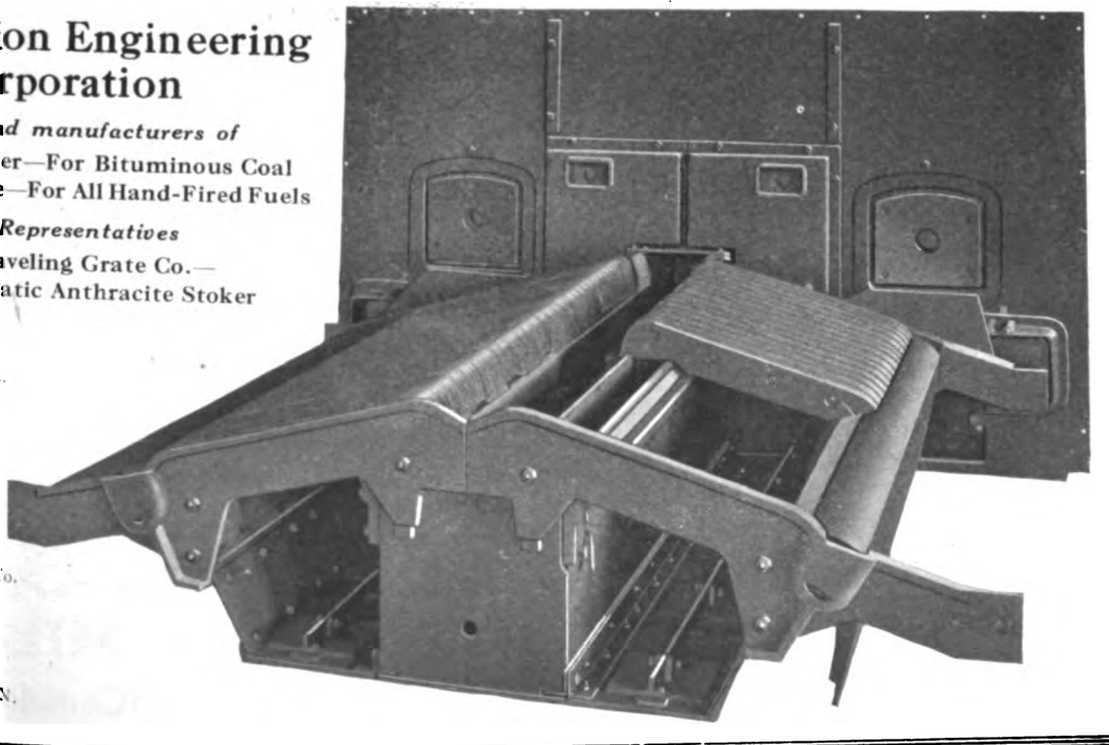
CHICAGO
Fisher Bldg.

MINNEAPOLIS, MINN.
Pocock & Pollard Co.



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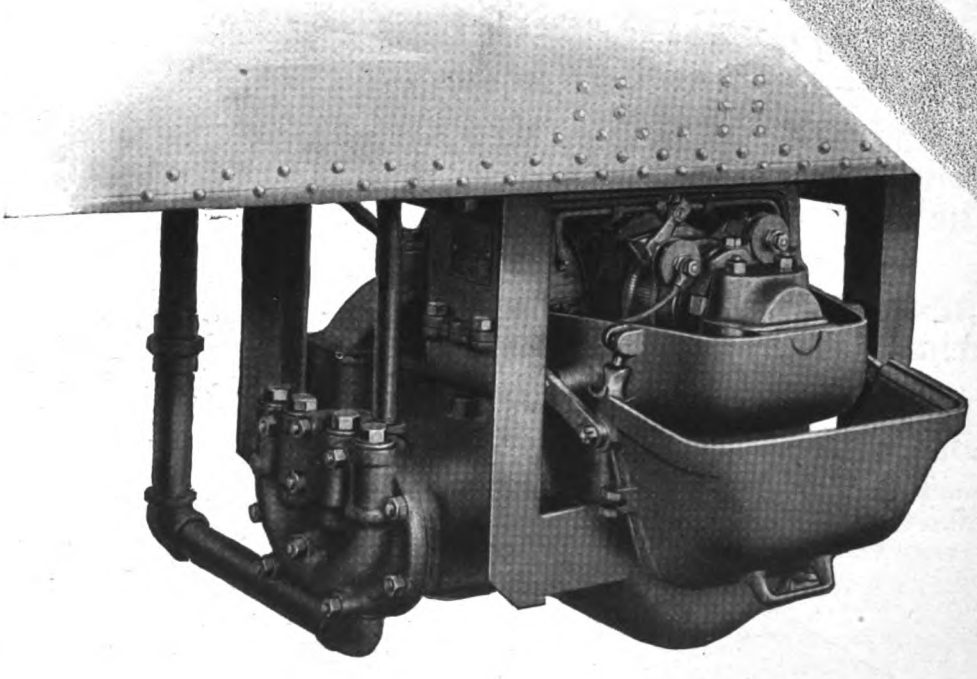
Allis-Chalme

Air Compressors, Governors Valves and Whistles Generating Units with any type of prime mover, Transformers, Switchboards and other Auxiliaries. Bulletins sent on request.



ALLIS-CHALMERS MANU

MILWAUKEE,

For Canada: Canadian Allis-

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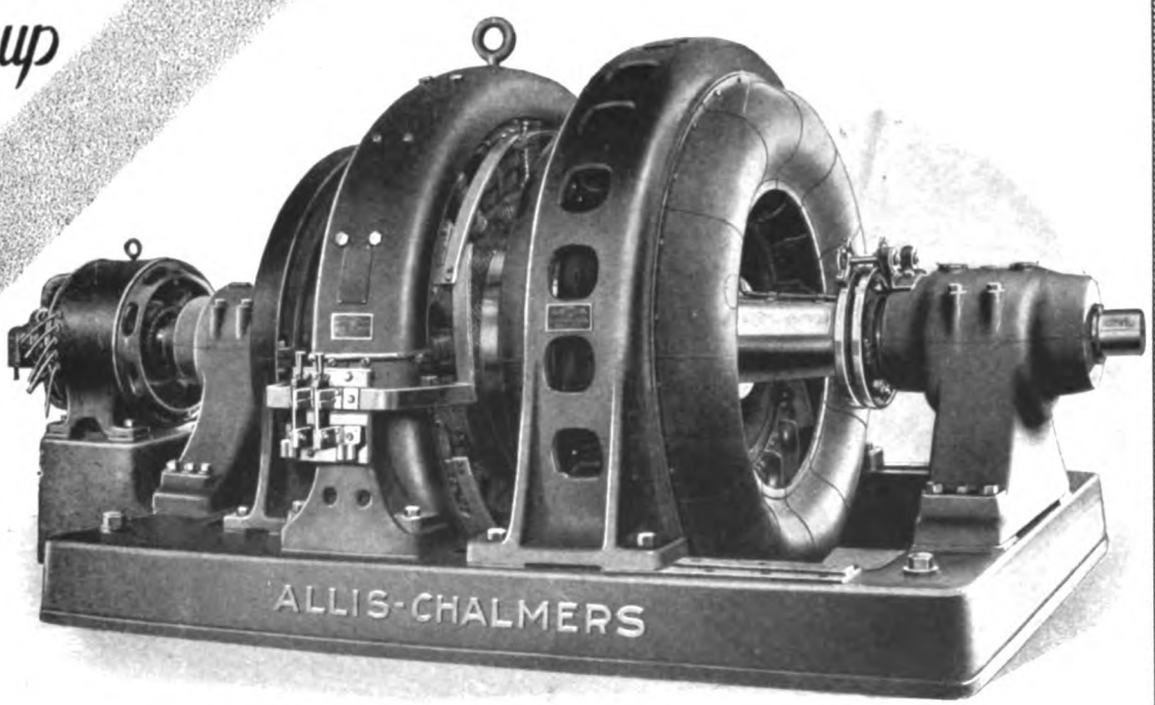
rs Equipment

Motor Generators for all purposes with Direct Current Voltage up to 1500 Rotaries 25 and 60 Cycles 3 and 6 phase Voltage up to 1500



FACTURING COMPANY
WISCONSIN
halmers, Ltd., Toronto, Ont.

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FOSTER SUPERHEATERS
FOR ELECTRIC RAILWAY SERVICE

After a thorough investigation of the merits of the different superheaters the following companies decided that the Foster was superior. Most of them have supplemented their first decision with additional orders.

These companies have had low repair costs, constant service and uniform superheat. If your engineering department makes a like investigation it will be well repaid.

Berkshire Street Railway Company
Bay State Street Railway Company
The Connecticut Company
Cleveland, Southwestern & Columbus Railway Co.
Charleston Consolidated Railway & Lighting Co.
The Cleveland Railways Company
El Paso Electric Railway Company
Fort Dodge, Des Moines & Southern Railway Co.
Galesburg Railway, Light & Power Company
Havana Electric Railway, Light & Power Company
Iowa Railway & Light Company
Illinois Traction Company
Ithaca Traction Corporation
Jamestown Street Railway Company
Kentucky Traction and Terminal Company
Lackawanna & Wyoming Valley Railway Co.
Milwaukee Electric Railway & Light Co.
Mesaba Railway Company
Metropolitan Street Railway Company (Kansas City, Mo.)
New York State Railways
New York, New Haven & Hartford R. R. Company
Philadelphia & Western Railway Co.
Philadelphia & Westchester Traction Co.
The Rhode Island Company
Rome Railway & Light Company (Georgia)
Republic Railway & Light Company
Reading Transit & Light Company
Stone & Webster Engineering Corp.
Shore Line Electric Railway Co.
Terre Haute Traction & Light Company
Toledo Railways & Light Company
Virginia Railway & Power Company
Wisconsin Traction, Light, Heat & Power Co.
Worcester Consolidated Street Railway Co.
Winnipeg Electric Railway Co.
Wilmington & Philadelphia Traction Co.
Waterloo, Cedar Falls & Northern Railway Co.

POWER SPECIALTY CO.
111 Broadway, NEW YORK
Boston Philadelphia Pittsburg Chicago San Francisco

SKIP HOIST FOR ASHES

Cheapest to install, operate and maintain.

Not affected by heat, grit or water.

Can be operated by a common laborer.

This machine saves the Eastern Pennsylvania Railways $12 per day, or over $4000 per year.

High Capacity—High Lift
Low Power Consumption

We design and build all modern systems for handling coal and ashes in boiler houses. Write us for prices and information relative to the skip hoist shown above, or any other device. Plans and prices gladly submitted on request. Write for catalog No. 20 showing all systems.

R. H. BEAUMONT CO., 111 So. 5th St., PHILADELPHIA

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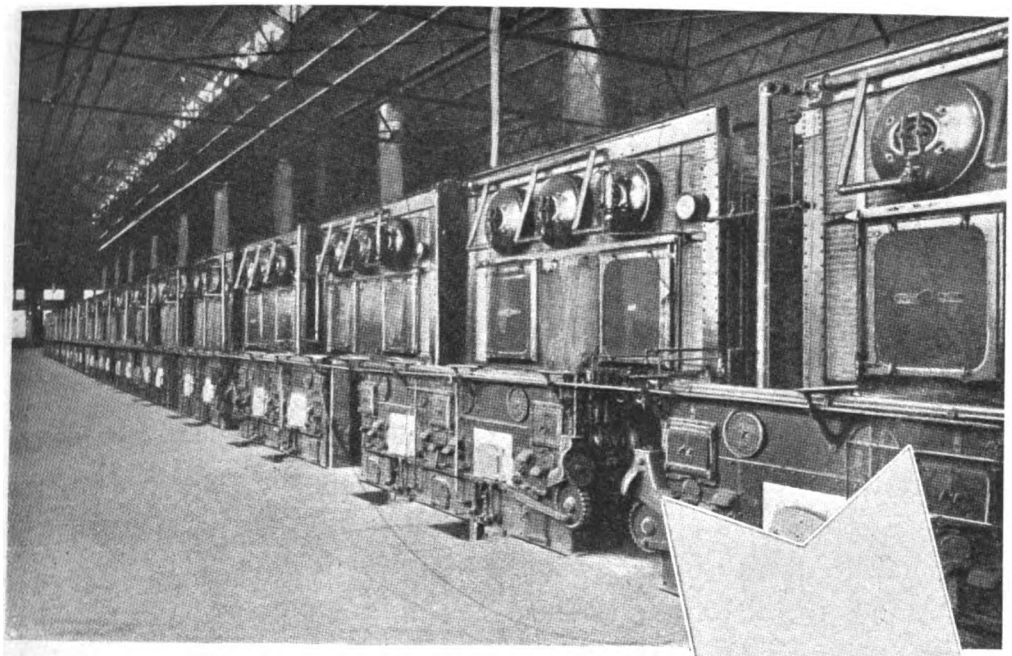

Brunot Island Power House Pittsburgh Railways Co.
Pittsburgh, Pa.

Murphy Automatic Furnaces, applied to 13,924 H.P. Babcock & Wilcox Boilers

Get Every Possible Kilowatt Out of *Every* Ton of Coal

That's the power plant engineering problem facing every electric railway system—particularly in handling the rush-hour load.

The Pittsburgh Railways have met and solved this phase of their total operating problem with the

Murphy Automatic Furnace

Distributed as follows through their various stations:

Manchester Power House

First order	8 furnaces	1600 H.P.
Second order	4 furnaces	800 H.P.
Third order	4 furnaces	800 H.P.

Glenwood Power House

First order	6 furnaces	900 H.P.
Second order	2 furnaces	300 H.P.
Third order	4 furnaces	600 H.P.
Fourth order	8 furnaces	1600 H.P.

Brunot Island Power House

First order	32 furnaces	8000 H.P.
Second order	8 furnaces	4000 H.P.
Third order	4 furnaces	1924 H.P.

Homewood Car House

First order	3 furnaces	375 H.P.
Second order	3 furnaces	300 H.P.

West End Power House

First order	4 furnaces	400 H.P.
Second order	4 furnaces	400 H.P.

Duquesne Light Company

First order	2 furnaces	1370 H.P.

Let us outline a plan for promoting efficiency and economy in your boiler room.

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MURPHY IRON WORKS
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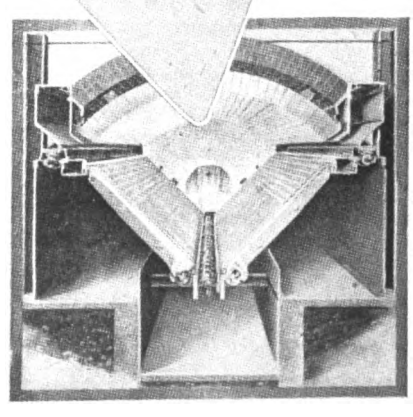

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The Ideal Material for Fire-proof Isolation of Electrical Apparatus

Practically anything that can be made of wooden boards can be made of Ambler Asbestos. It can be cut with an ordinary saw to any desired shape, and can be drilled, screwed or nailed. The natural gray color is pleasing and permanent; painting as a preservative is unnecessary, but when desired it can be painted and grained and takes a good finish. It is completely non-combustible and will not carry or communicate fire through short circuits, electric flashes, oil explosions, etc. It withstands the direct application of the high temperature electric arc without disintegration, is an excellent heat insulator and a fair electric insulator.

Ambler Asbestos Building Products

COMPRISES:

Ambler Asbestos Fire-proof Building Lumber

Ambler Asbestos Corrugated Roofing and Siding

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Ambler Asbestos Fire-proof Sheathing, Fire-proof Millboards, Fire-proof Paper and Fire-proof Coverings of every description.

Ambler Asbestos Building Products are made of Portland Cement, reinforced with Asbestos Fibre, built up layer on layer and then pressed free of air holes and surface irregularities. After setting of the cement and proper aging it forms a dense, tough structure that is virtually time, weather and fire-proof. Ambler Asbestos Corrugated Roofing and Ambler Asbestos Shingles "Century Brand" are the ideal roof for any building, never taking fire from without or permitting interior fires to spread to adjacent structures.

Ambler Asbestos Lumber is extensively used for the following purposes: Compartments and compartment doors for oil switches; switching gear; circuit-breakers; transformers, etc.; separating walls between high tension, heavily loaded conductors, bus bars, etc.; bus bar and wiring ducts; ceilings of oil switch and switching gear rooms and galleries: fireproof boxes and cabinets; third rail guards; fireproof floors or floor linings in electric traction cars and in electric stoves and heaters.

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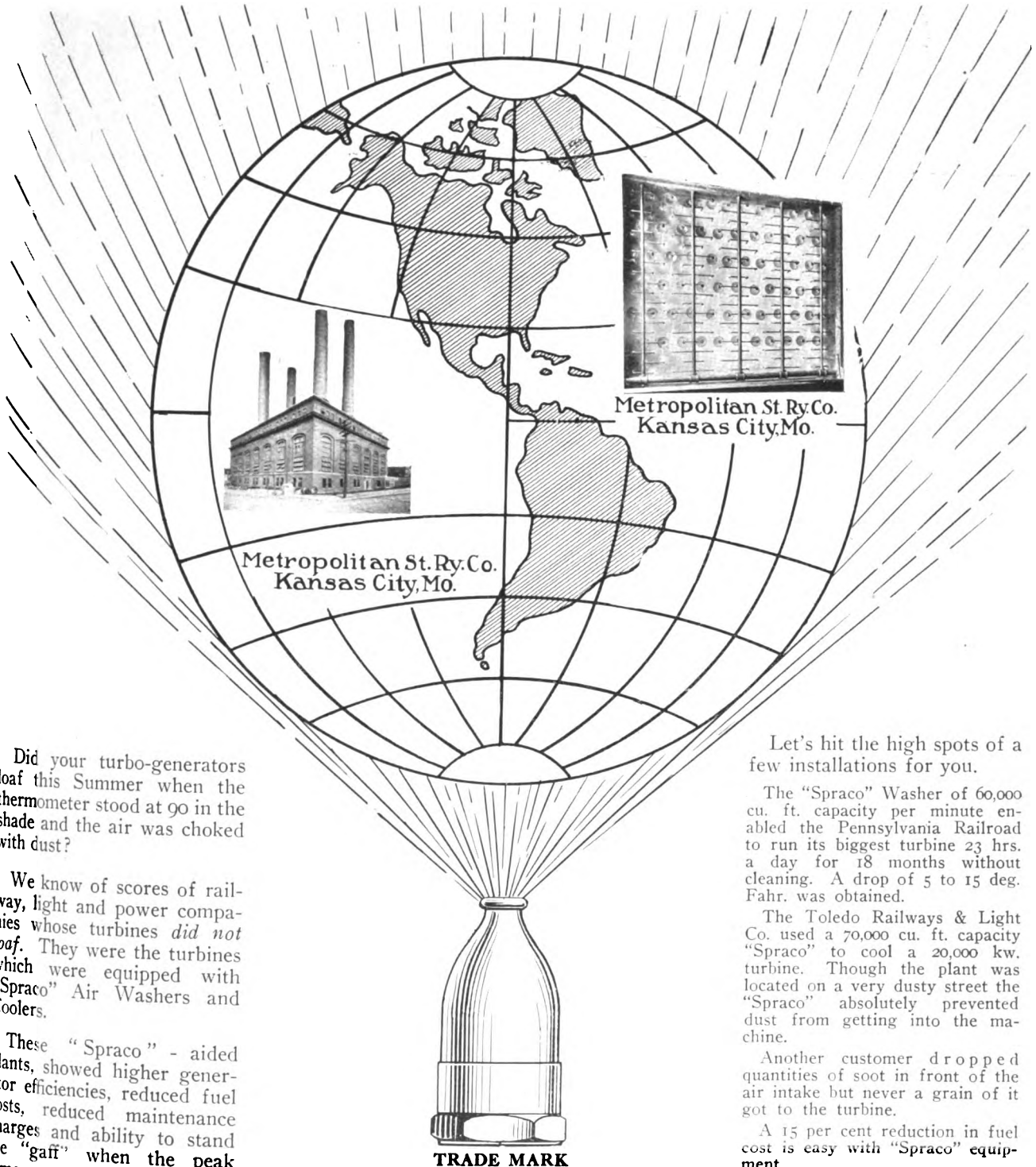
"SPRACO" COOLING SYSTEMS



Did your turbo-generators loaf this Summer when the thermometer stood at 90 in the shade and the air was choked with dust?

We know of scores of railway, light and power companies whose turbines *did not loaf*. They were the turbines which were equipped with "Spraco" Air Washers and Coolers.

These "Spraco"-aided plants, showed higher generator efficiencies, reduced fuel costs, reduced maintenance charges and ability to stand the "gaff" when the peak came on.

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Let's hit the high spots of a few installations for you.

The "Spraco" Washer of 60,000 cu. ft. capacity per minute enabled the Pennsylvania Railroad to run its biggest turbine 23 hrs. a day for 18 months without cleaning. A drop of 5 to 15 deg. Fahr. was obtained.

The Toledo Railways & Light Co. used a 70,000 cu. ft. capacity "Spraco" to cool a 20,000 kw. turbine. Though the plant was located on a very dusty street the "Spraco" absolutely prevented dust from getting into the machine.

Another customer dropped quantities of soot in front of the air intake but never a grain of it got to the turbine.

A 15 per cent reduction in fuel cost is easy with "Spraco" equipment.

We can prove it. Will you write?

SPRAY ENGINEERING COMPANY

Engineers for
Spray Cooling Ponds, Irrigation Systems, Air Conditioning, Aerating Reservoirs, Odor Condensers, Gas Washing, Installations.

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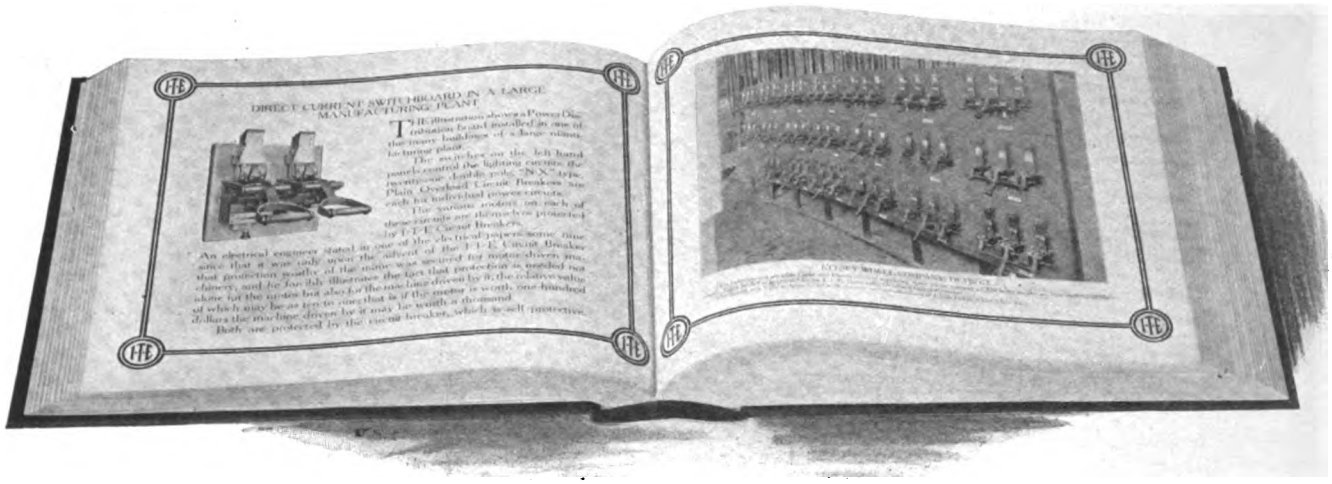

TYPICAL I-T-E CIRCUIT BREAKER INSTALLATIONS

Every consulting and operating engineer should secure a copy of this book.

Quite aside from its general interest, the number of important interurban and street railway switchboards shown and described can not fail to be of interest, while the descriptions of the circuit breakers for special purposes will be stimulating and suggestive to those responsible for the successful operation of large installations.

The number available for free distribution is limited. Application, therefore, should be made at once.

THE CUTTER COMPANY, Philadelphia

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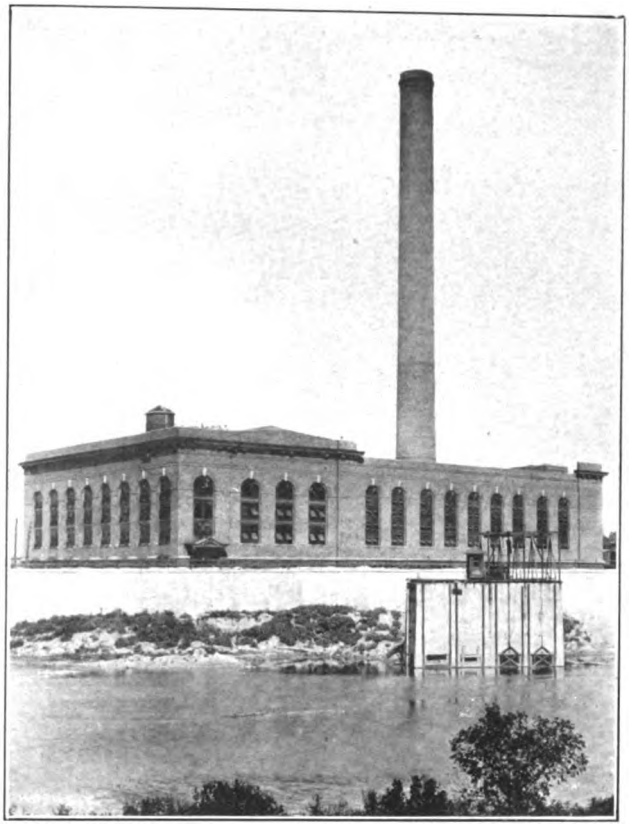
Standardization Begins at the Power House

The logical place to begin standardization is at the beginning of the line—the power house. Standardization of this or that part of a car which will lead to a 2 or 3 per cent saving in power consumption is all right, but should not come before the standardization of fuel and ash handling equipment, which will effect savings in some cases as great as 85 per cent of the previous handling costs, at the power house.



Tenth Street Power Plant of the T. H. I. & E. Traction Company, Indianapolis, Ind. Practically all of the important power houses of this company are equipped with Hunt Coal and Ash Handling Machinery.

Hunt double skip hoist and cable railway at Mahoning and Shenango Railway and Light Co., Youngstown, Ohio.

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should be your first thought when considering economy in handling fuel, reliability in service, and minimum maintenance.

Hunt Equipment has an enviable reputation for increasing the capacity or reducing the expense of getting coal under and away from the boilers of railway, light or power plants.

It is the standard where standard exists

Write for our catalogs embracing every conceivable fuel or ash handling device.

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Speaking of Tendencies

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— from Electrical World

Electrical Transmission and the Widening Use of Electric Service

BY DR. LOUIS BELL
Consulting Engineer

THE year's work in electrical power transmission may be described as intensive rather than extensive, involving a building up of load, extension of growth of networks, and the working out of ...ntinuity of service. There has been ... transmission voltages, and, ... already raised to the ... immediate oc- ... pressures ... ten.

... systems. ... has been adopted for the ... and smaller plants in connection with ... systems.

Another tendency which has been strong in the last year or so is the very extensive use of outdoor substations with the simplest sort of air-break switches, at first put into use in Southern and Western plants where climatic conditions are not severe. They are now being unhesitatingly used in Northern climates and have shown capability of so good service that the practice will undoubtedly grow. Occasionally a shelter roof is used in connection with such stations sufficient to protect somewhat against rain and snow, but more often it is merely a case of putting big transformers in the open, just as always is done with those on the distribution lines. There is really no more serious difficulty in keeping a 100-kw. unit with its necessary protective devices in the open air than in keeping a 10-kw. transformer of the same make on a pole in front of a factory and save where special provisions for regulation or lightning protection have to be made, the walled-in substation seems to be decreasing in popularity.

The general practice seems to be to attempt to make ...ribution system as simple and as nearly auto- ...peration as is practicable. These same ... only to the hydroelectric systems ...tions of distributing lines ... particularly through ... being put in ...tic ap-

— then read this

— from one of our ads:

$1,000,000 SAVED

¶ Five years ago a 2000 Kva. 66,000 Volt Substation cost complete $12,000.

¶ **Today we can build you one, using our Outdoor Switching and Protective Apparatus, at a cost of only $6000.**

¶ The Public Utilities Companies of America have already saved over a million dollars in initial expenditure by using our type of construction, instead of costly brick or concrete buildings.

¶ **We are the Pioneers in the Development of Outdoor Switching and Protective Apparatus for High Voltage Transmission Lines and Outdoor Substations.**

¶ We feel justly proud of our record in establishing the outdoor type of steel substation construction in America.

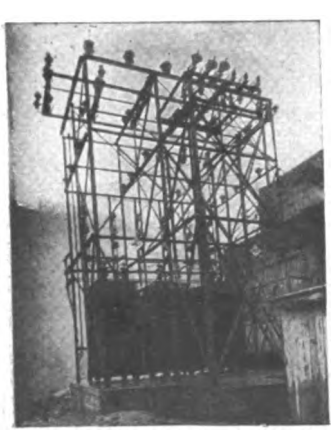
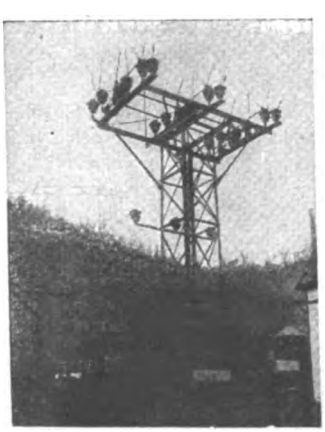
¶ **Today our Apparatus is Standard in all Sections of this Country and in many Foreign Lands.**

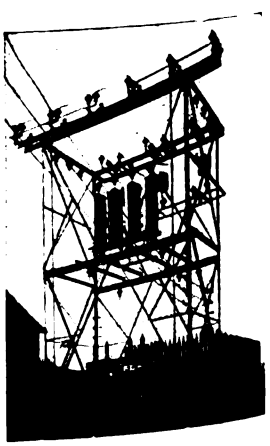
¶ Write us—we'll send you some mighty interesting facts on our Burke Substation Equipments.

Experienced Engineers Head Our Design—Manufacture—Sales

Railway and Industrial Engineering Company

PITTSBURGH, PA.



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The GENERAL ELECTRIC COMPANY and the promotion of BETTER CAR SERVICE

The development of modern car service has been contingent upon the ability of the electrical manufacturer to embody ever-better qualities in motor, control and brake equipment.

For example, in the development of General Electric motors, the commutating pole, the self-ventilation, the tap field, the higher speed and the lower weight must not be regarded in the light of mere technical improvements, but as our response to the modern service needs of the electric railway industry.

GE

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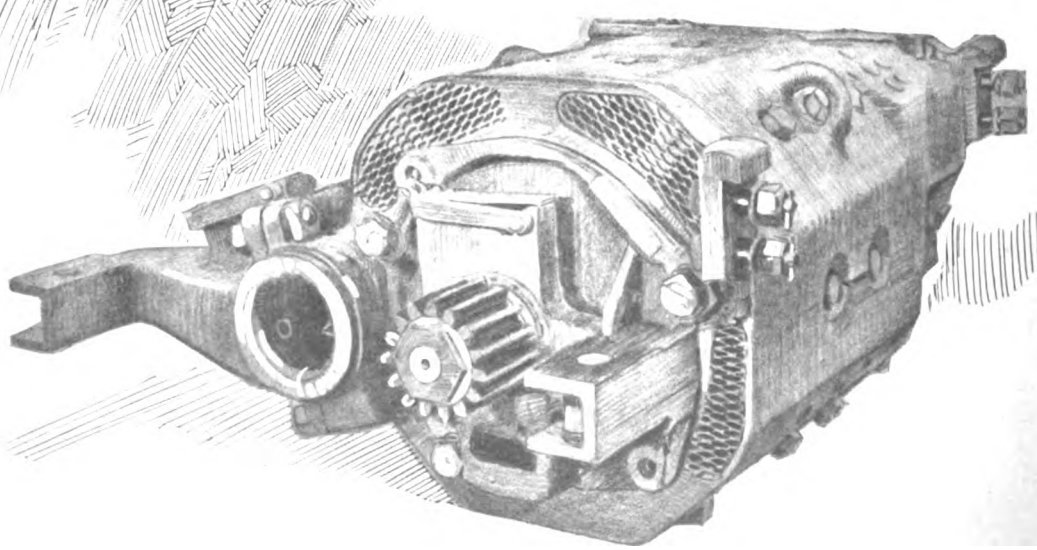
The High Car Step Abolished

For years the high steps of electric railway cars were a source of annoyance to the public and of delay and accident expense to the railway.

The introduction in 1913 of the GE-247 motor made it possible to use a 24-in. wheel and moderate weight trucks under a car body of standard construction.

Thus were obtained the advantages of easy access and faster schedules in the simplest conceivable way—by producing a more compact, minimum depth motor.

The G-E 247 Ventilated Railway Motor



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Profitable Car Service for Small Towns

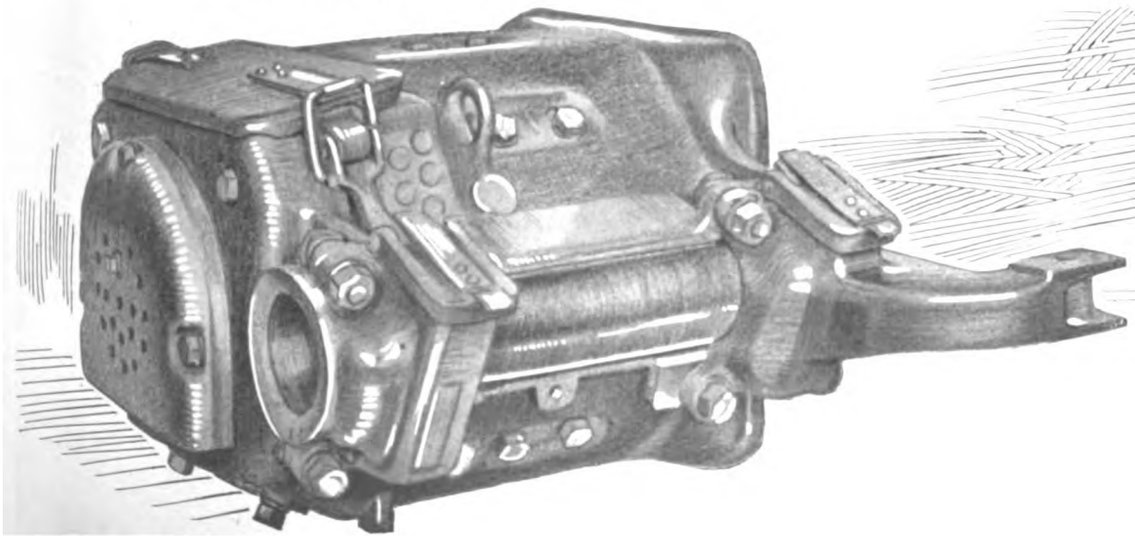
The General Electric Company has contributed in no small degree to make one-man operation successful.

The complete motor and control equipment furnished for one-man cars in 1914 (two GE-200 motors per car) weighed 5480 lbs.

Yet within two years each of the new Stone & Webster one-man cars was furnished with a pair of GE-258 motors and accompanying control weighing only 2333 lbs.

The General Electric Company has appreciated a need of the industry and fulfilled it.

The G-E 258 Ventilated Railway Motor



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Cutting a Railway's Power Bill

Economical use of current plus flexibility in speed control finds its highest expression in General Electric motors.

The Interborough Rapid Transit Company has recently ordered 342 GE-260 motors of 195 hp. capacity each for subway service and 472 GE-259 motors of 115 hp. capacity each for elevated service. The New York Municipal Railway Corporation has 1000 GE-248 A 160-hp. motors in use or on order.

The flexibility of the GE-248 A is illustrated by the fact that it can be used on full field to give local service at a schedule speed of 15 m.p.h., and on tap field to give express service at 25 m.p.h.

The G-E 260 Ventilated Railway Motor

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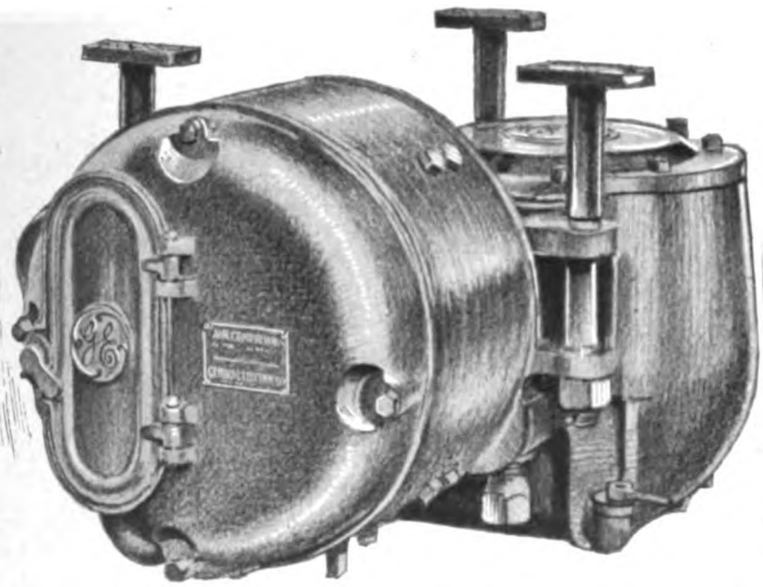


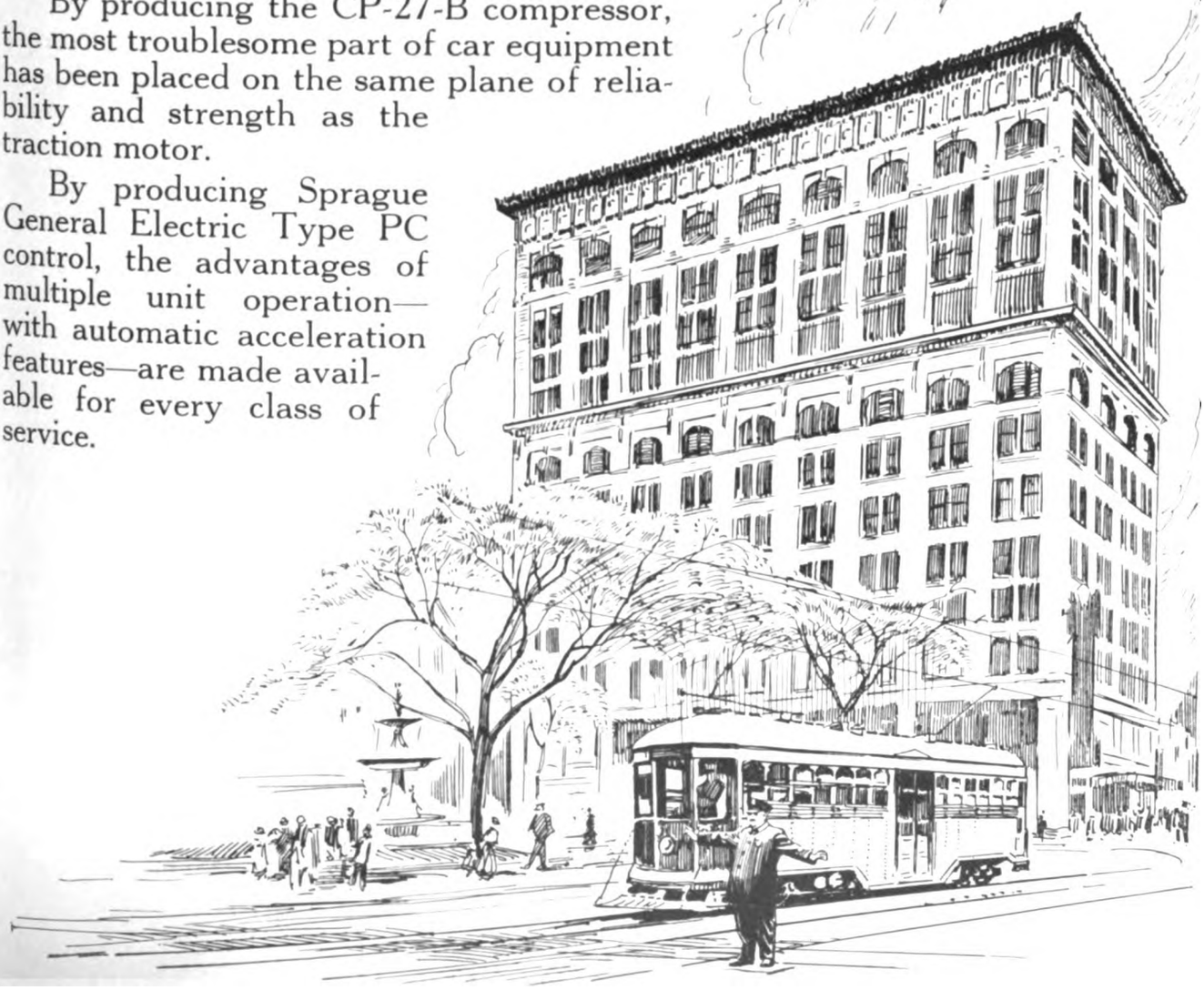
The CP-27-B Compressor

Ever-Higher Standards in Brakes and Control

General Electric air brakes and General Electric control are the logical companions of General Electric motors.

By producing the CP-27-B compressor, the most troublesome part of car equipment has been placed on the same plane of reliability and strength as the traction motor.

By producing Sprague General Electric Type PC control, the advantages of multiple unit operation—with automatic acceleration features—are made available for every class of service.



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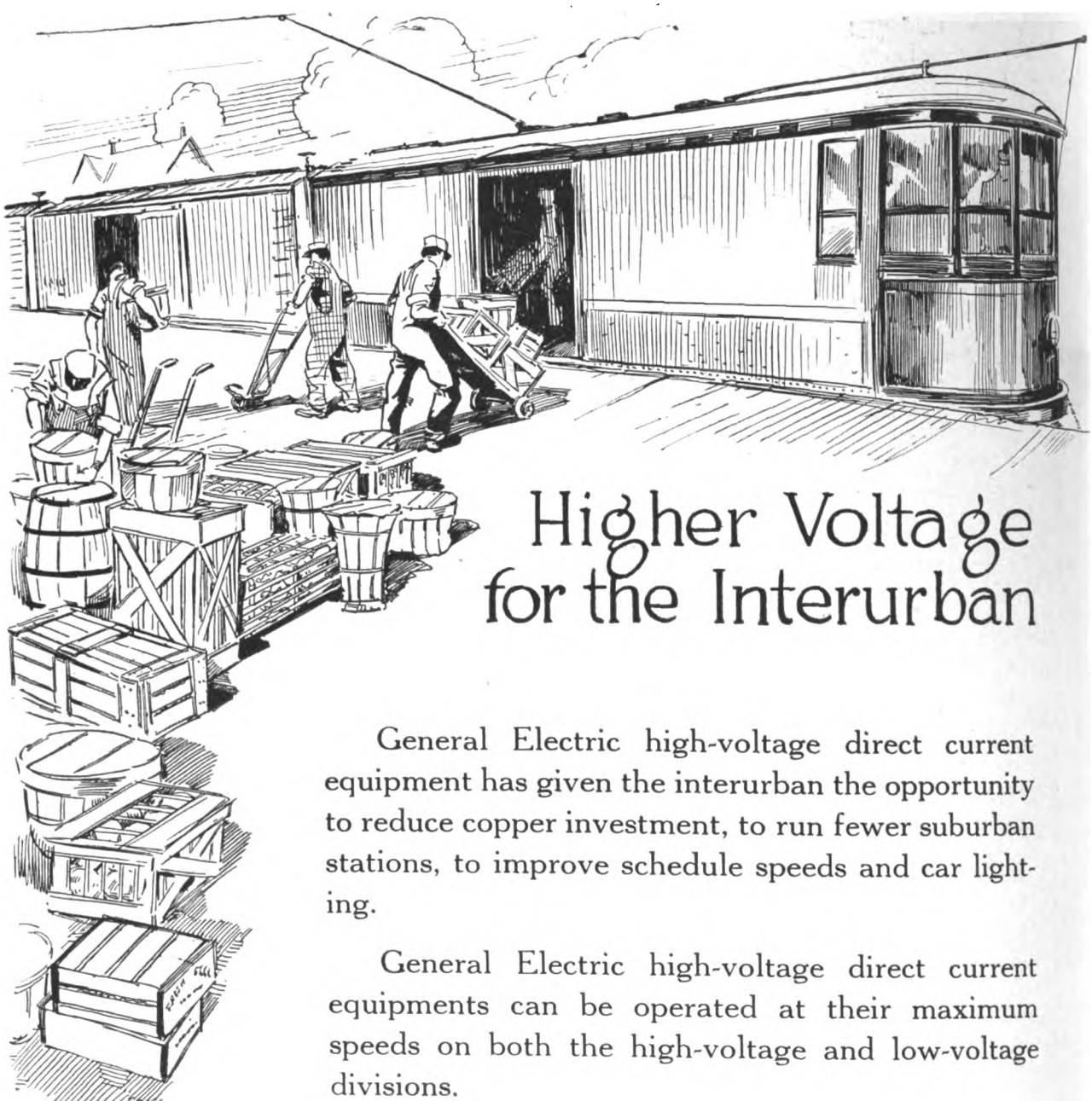
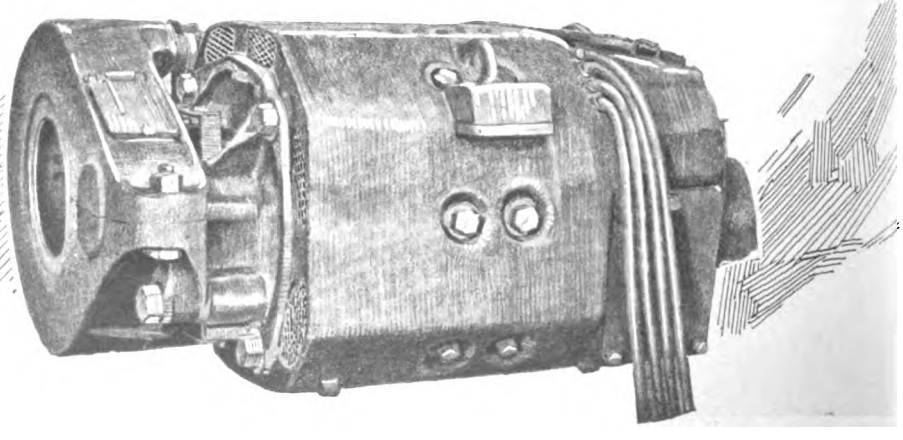


Higher Voltage for the Interurban

General Electric high-voltage direct current equipment has given the interurban the opportunity to reduce copper investment, to run fewer suburban stations, to improve schedule speeds and car lighting.

General Electric high-voltage direct current equipments can be operated at their maximum speeds on both the high-voltage and low-voltage divisions.

The G-E 259 Ventilated Railway Motor



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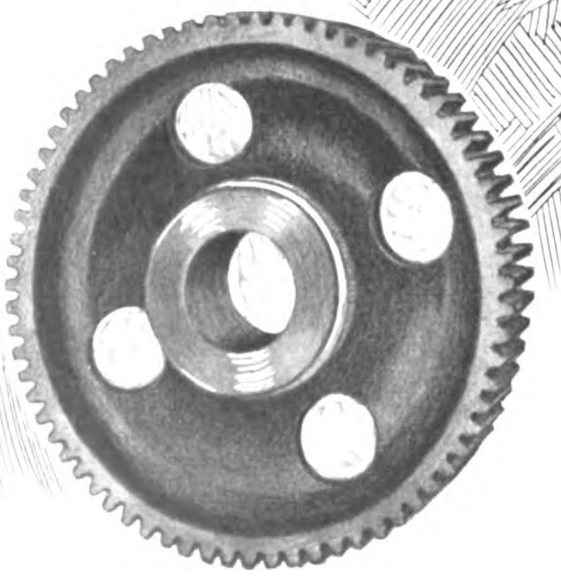
The Grade M Gear—the Universal Gear

Gears are too important a link in reliable car service to be bought merely on a price basis.

Broken gears are not only a source of costly traffic blockades but also of real danger.

In the Grade M gear, the General Electric Company has succeeded in producing a **universal homogeneous gear**—one that is equally serviceable, economical and safe on surface, city rapid transit and interurban railways.



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Permanent Benefit from GENERAL ELECTRIC Improvements

To retain permanently and to the full the advantages of the General Electric equipments illustrated on the previous pages, a judicious purchase of supplies is essential.

An inferior coil, a poor brush, a badly-gaged brush-holder will cripple the best of motors. And so with the details of brake or control apparatus.

To use General Electric "Original Equipment Quality" maintenance and repair parts exclusively is fair to your equipment and most profitable to you.

6515

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Electric Railway Journal

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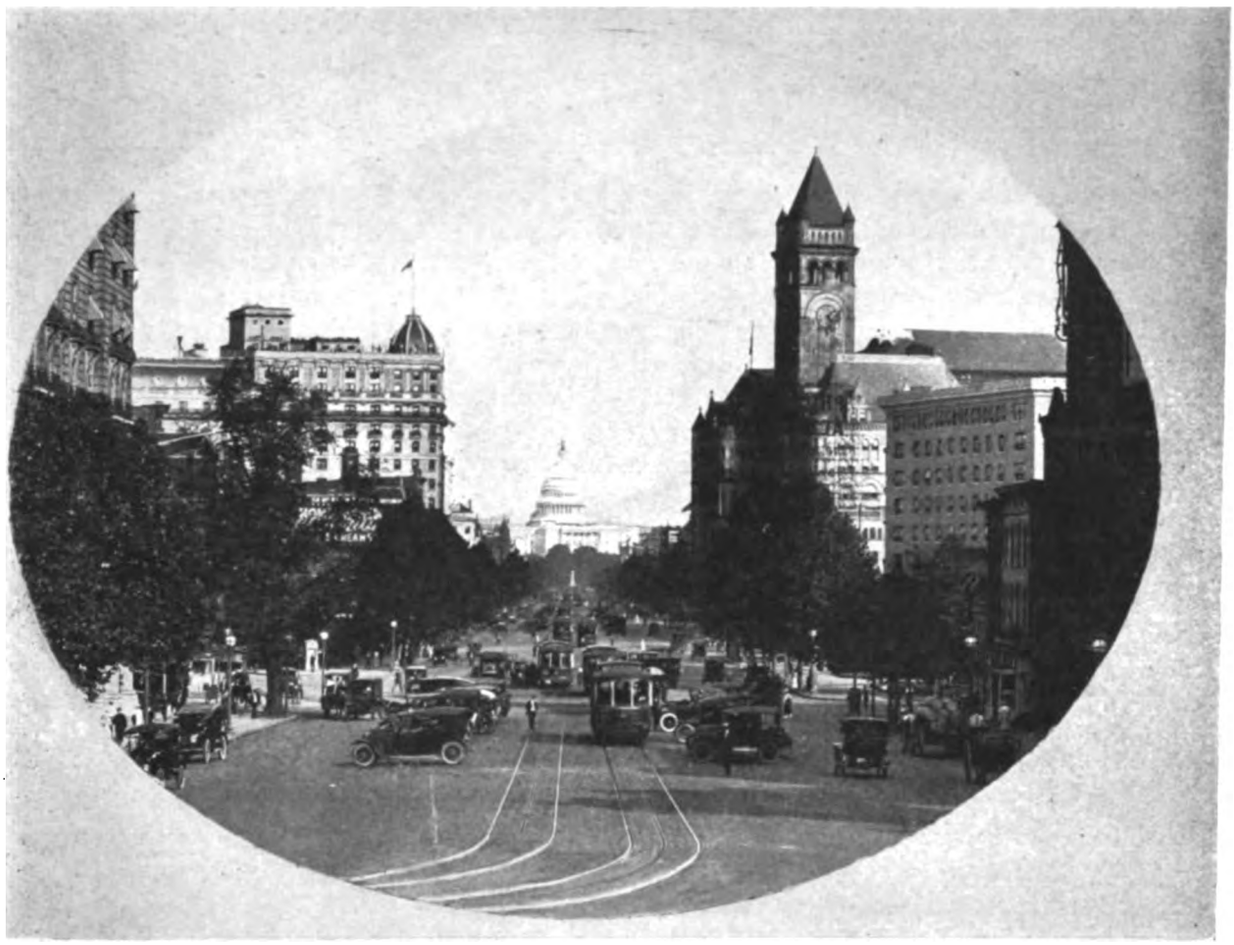

The Development of the Electric Railway Car

GREATER changes have been introduced in the design and equipment of electric railway passenger cars during the last five years than in any other similar period in electric railway history. Many radical experiments have been made—especially in 1912, which saw the first extended attempts to break away from the till-then standard car body with a high floor and end platforms—and the influence of these innovations appears in the practical revolution in car design that is under way at the present time. So great a variety in apparatus and arrangement has, in fact, been set before the industry that there is obvious need to summarize recent developments in the art and, by taking stock of the existing situation, to select those things which give the most promise of permanent improvement in efficiency and sufficiency in operation.

In the subsequent paragraphs, therefore, there have been collected data covering the major features of cars that may be considered as representative of the present trend in construction. The illustrations that accompany the text have been arranged to show in most cases dimension drawings as well as photographic reproductions, and when the two are shown for any particular car both appear upon the same page over a single title. A comparison of these various cars will, no doubt, display to good advantage the great divergence in ideas that has been a feature of recent practice in design and equipment.

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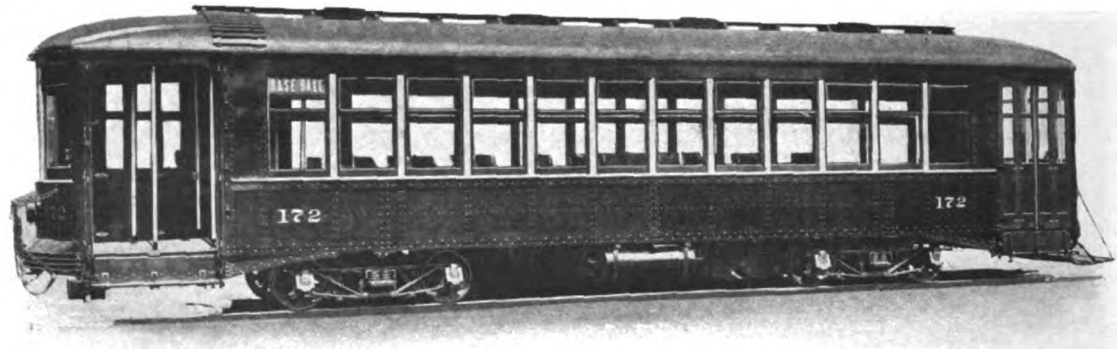


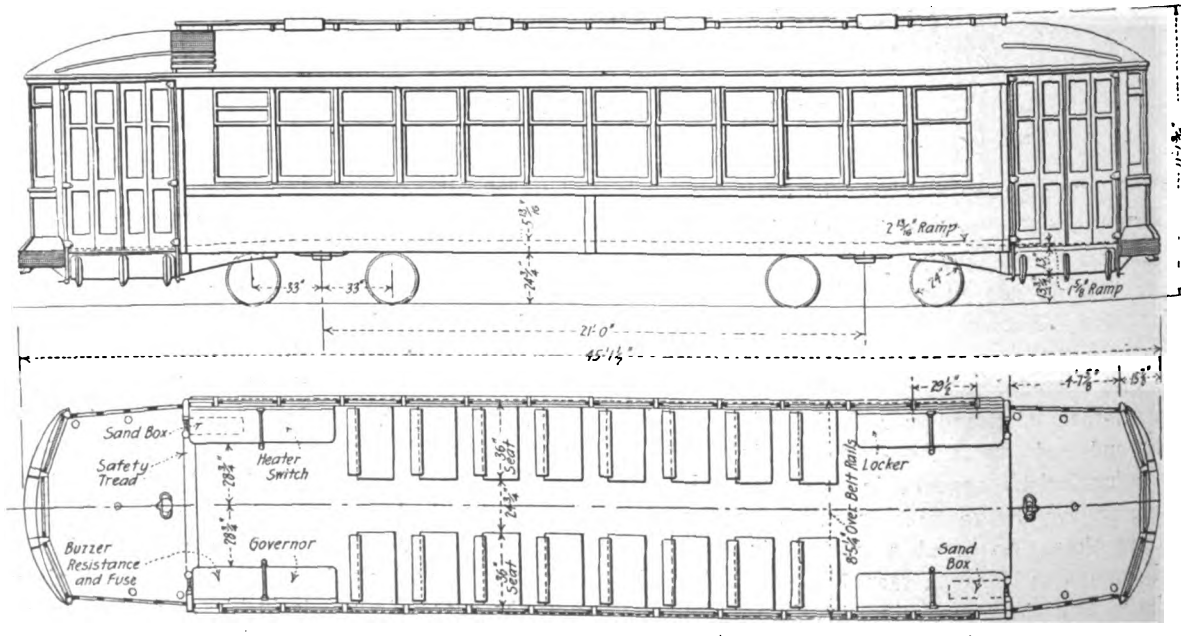
Among these developments, however, there stand forth three general characteristics which constitute very definite tendencies in modern car design and which, therefore, must receive primary consideration. These apply not only to cars for city service, but to those used under high-speed operating conditions as well. They are, first, provision for the greatest possible convenience to the riding public; second, light weight, and third, steel construction.

PUBLIC CONVENIENCE

The first of these general characteristics appears most prominently in the remarkable access of popularity that has been granted within the past year to the "low-floor" principle for city cars. During 1915, the representative orders for cars with low floors totaled actually greater than those for city cars with floors at the originally common height. Here the underlying idea has been to relieve entering passengers of the labor of mounting excessively high steps, thus decreasing passenger interchange time, but it might well be noted that the low-floor designs also offer very distinct advantages in weight reduction.

The feature of providing for public convenience appears also in the growth of the center-door idea, or of modifications of it, that has taken place since 1912, this being exemplified by the fact that in the total number of cars built during 1915 for representative interurban and city services, roughly one-third made use of the center door in some form. Each one of the center-door designs has been based inherently on greater public convenience, the aim having been in all cases to provide easy access to the car body, greater seating capacity and shorter average distances between the entrance and exit and the seats. These qualities were realized with the plain center entrance as originally brought out, but in city service, unforeseen difficulties have since made their appearance, and here, again, the problem of public convenience has impelled designers to make changes, resulting in modifications of the plain center entrance which have been common to practically all recent motor cars of this type.

In interurban service the plain center entrance does not suffer from the same handicaps that it carries in city service, and its development has been along lines that are quite similar to those originally suggested. For rapid transit equipments a modification of the center-entrance principle, which con-



Flush-Platform, All-Steel, Low-Floor Car of Buffalo & Erie Traction Company

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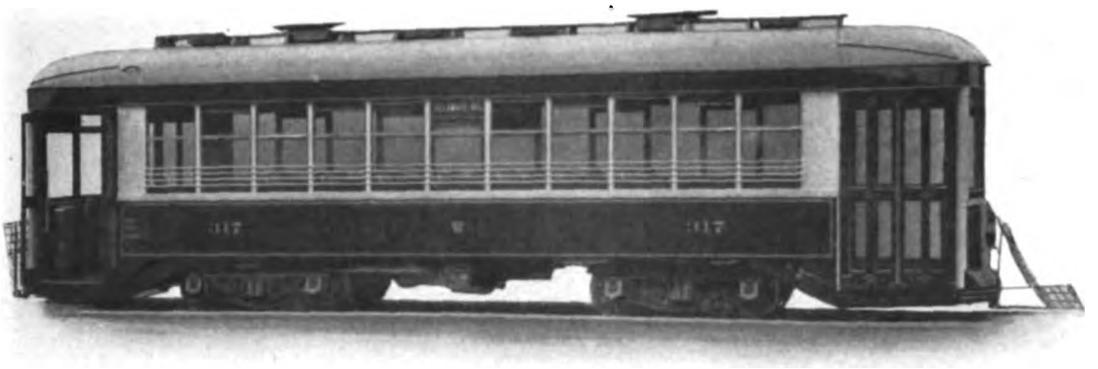


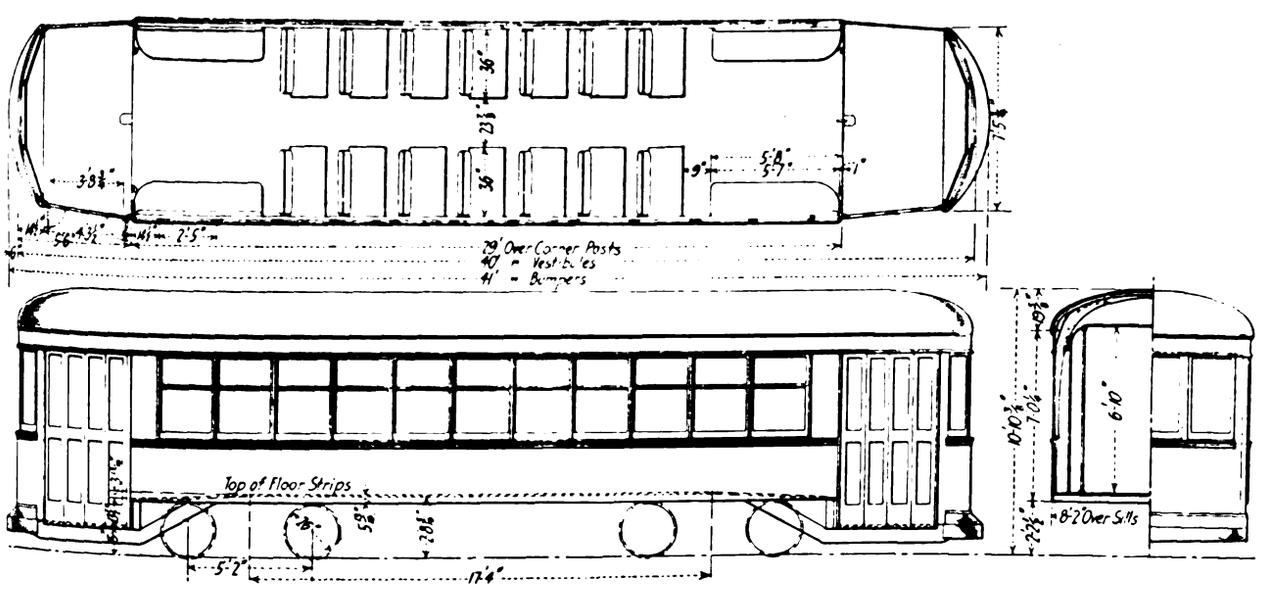
sists in having three doors in each side of the car and which has definitely become standard practice in such service, has been developed solely to provide greater ease and rapidity in loading and unloading.

To the same end has been the practically universal adoption of the prepayment system of fare collection in city service. With this has come the fully-inclosed platform having folding doors and steps to eliminate boarding and alighting accidents —a most important development. At the same time, but for converse reasons, the open car has become moribund. This may be said, as well, of the fully-convertible car, although the reasons for its demise are structural rather than operating, and hence the semi-convertible designs, or those in which the sash may be removed or raised completely out of the way to leave a clear opening above the belt rail, serve as the only examples of equipment that has been constructed especially for summer service within the last two or three years. To public convenience, also, the trail car has been sacrificed in so far as regular city service is considered, the riding public being unwilling to put up with the decreased schedule speeds necessitated by the increased number of stops made by the double units of a two-car train. However, the skip-stop has made the trailer commercially possible in several cities, and for this reason it is not to be expected that the field for the trail car is altogether closed.

Similarly, the double-deck car, which was revived in 1913 with the expectation that it might aid in solving the service problem in congested districts, has been found to be too susceptible of dragging schedules, and at the present time its direct antithesis, the one-man car, has developed popularity to a certain degree. Judging by the existing indications, however, there is little reason for supposing that, in the majority of localities, the public may be better served by cars having capacities widely different from those now common in city service. But in any event, as may be seen from the foregoing brief résumé of the status of development during the last five years, the factor of public convenience is going to dominate absolutely the success or failure of any general type of car.

LIGHT WEIGHT A UNIVERSAL TENDENCY

Next to convenience for the riding public, the characteristic of most importance that is common to modern electric railway cars is light weight, the extent of this tendency being shown by the weight reduction of at least 20 per cent that has taken



Low-Floor, Drop-Platform Design Adopted by Wilmington & Philadelphia Railway

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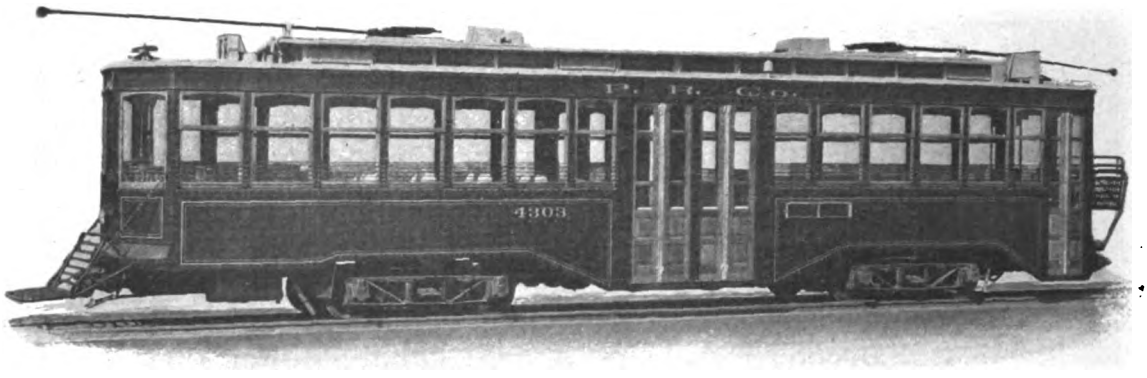
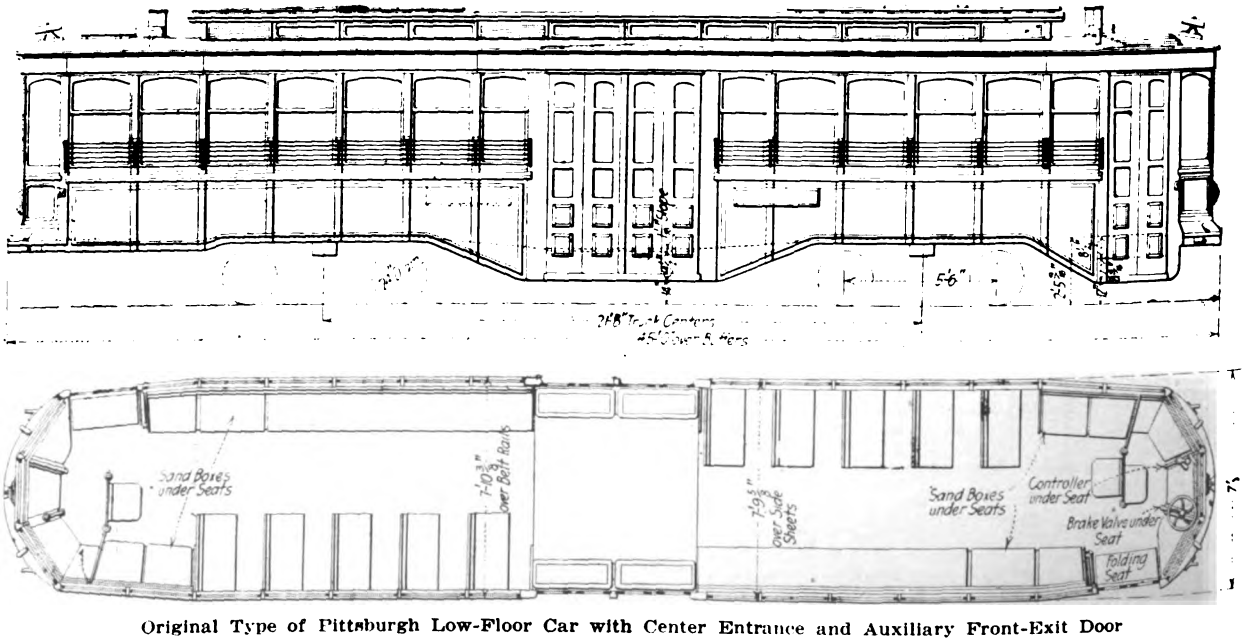


place during this same five-year period in the case of city cars of customary size, or say, 45 ft. long. The agitation in favor of light cars, of course, antedates this period by several years, and recognition has long been given generally to the savings effected in energy consumption, maintenance and (in the case of steel construction) first cost. Yet the definite establishment of the light car as a practical accomplishment was almost coincident with the inauguration of the several radical new designs of the year 1912, all of the original low-level cars being characterized by weights which were then considered extraordinarily low. The Brooklyn center-entrance car, for example, weighed about 38,000 lb., and the New York "stepless" design about 36,000 lb., while the modified Pittsburgh "low-floor" car, in its final form with center-entrance and end-exit doors, weighed 35,600 lb. The end-entrance Chicago Railways car of the following year weighed 35,350 lb. Subsequently there were brought out the end-entrance New Orleans car weighing 35,580 lb., the low-floor, California-type car of the United Railroads of San Francisco, weighing 33,500 lb., the Des Moines front-and-center-door, single-end car weighing 33,000 lb., all of these being listed in Table I. Among the still more recent equipments appear the Buffalo & Erie flush-platform, two-motor, 45-ft. car which has a scale weight, when equipped for double-end operation, of 31,750 lb., and even this figure has been passed by both the four-motor, 41-ft., double-end car of the Wilmington & Philadelphia Traction Company, which has a scale weight of 30,540 lb., and the four-motor, 50-ft. single-end, Rochester car weighing 30,570 lb.

Some of this rather remarkable saving in weight has been effected by improvements in the design of body and by the increasing use of steel construction. However, the major part has come through the use of small wheels with trucks and motors of correspondingly reduced size. The five last-mentioned cars, for example, are all equipped with wheels of either 24-in. or 26-in. diameter. Three of them have the 30-35-hp. "low-floor" motor that was brought out originally on the Pittsburgh Railways in 1912, and the Rochester and Wilmington-Philadelphia cars have a new type of small motor rating 21-25 hp. and weighing only 840 lb.

The double-truck car is, of course, so much more



Original Type of Pittsburgh Low-Floor Car with Center Entrance and Auxiliary Front-Exit Door

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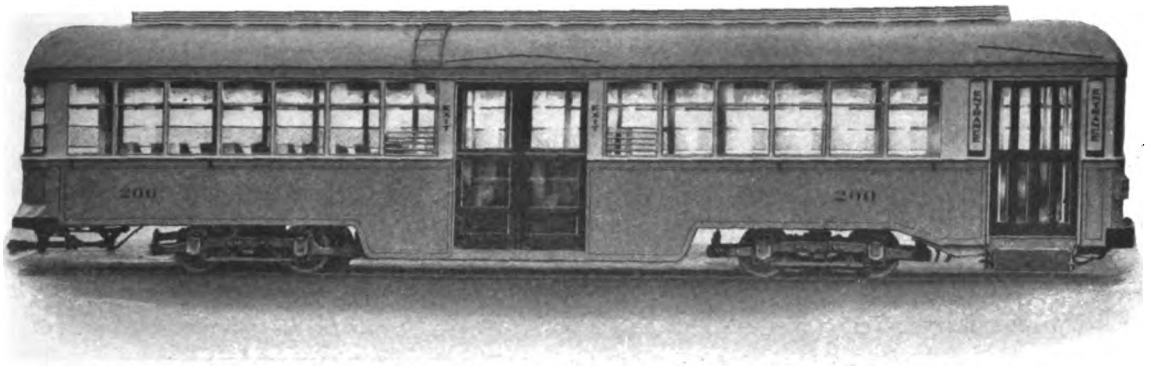


numerous in city service than single-truck designs that its trend of development may fairly be said to represent the tendencies of the industry. Nevertheless, the modern single-truck car has acquired, of late, a material increase in popularity, and to make the record complete Tables II and III have been prepared, these showing the major features of a number of recent single-truck cars and of several of the ultra-light designs that have come into prominence in connection with one-man operation.

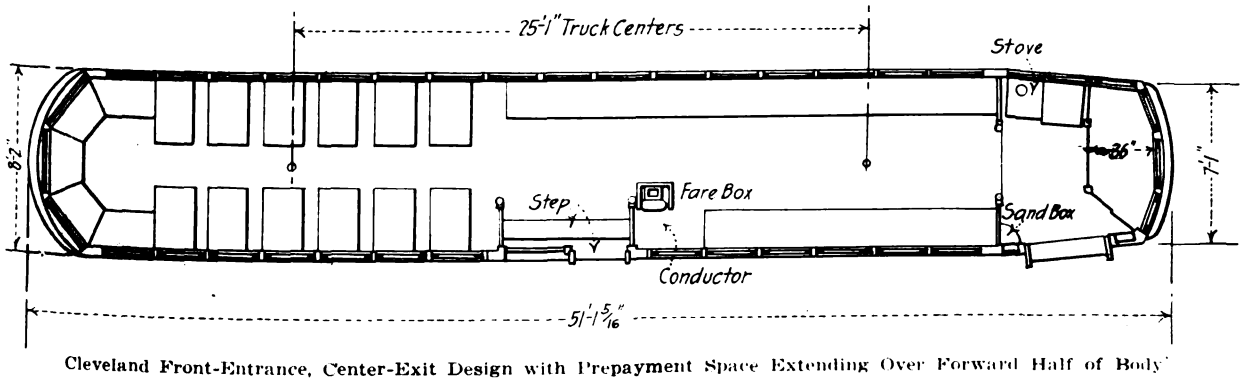
For cars in interurban service the opportunity for such direct weight comparisons as the foregoing is very limited. This is largely due to material variations in width of car body and in motor equipment, and also because of the practical impossibility of drawing any definite line of demarkation between interurban operation and suburban runs on the one hand and electrified steam railroad service on the other. Suburban equipment may be said to include cars up to about 50 ft. in length which are capable of operation up to 50 m.p.h. and which have, generally speaking, no compartments or divisions of the car body. Good modern examples appear in the 51-ft., center-entrance cars of the Washington & Virginia Railway and the Cleveland & Erie Railway, although the latter has a two-compartment body. These cars weigh respectively 58,000 lb. and 56,130 lb., and while the figures are considerably greater than would be expected for city cars, they are also much below those that would be considered possible for normal interurban service, one reason for the latter difference being the use of four 50-hp. motors on each of the cars in question and a definite limitation of maximum speed. On the border line of interurban service may be cited the Cleveland & Eastern, 54-ft., end-

TABLE I—WEIGHTS AND DIMENSIONS OF RECENT DOUBLE-TRUCK CARS FOR CITY SERVICE

	Weight, pounds	Length over bumpers, ft.-in.	Seating capacity, body	Wheel diameter, in.	Motors	Remarks
Wilmington & Philadelphia	30,540	41-0	44	26	Four 21-25 hp.	Drop platforms.
Rochester	30,570	50-0	52	26	Four 21-25 hp.	Front-entrance, Center-exit.
Buffalo & Erie	31,750	45-1½	48	24	Two 30-35 hp.	Flush platforms.
Des Moines	33,000	45-0	51	24	Four 30-35 hp.	Front and center doors, Single-end.
San Francisco	34,180	47-0	50	24	Four 30-35 hp.	California type, End-entrance.
Chicago Railways	35,358	48-5	53	32	Two 50-60 hp.	Drop platforms.
New Orleans	35,580	47-8	52	30	Two 55-65 hp.	Drop platforms.
Pittsburgh	35,600	45-0	60	24	Four 30-35 hp.	Center-entrance, Front-exit.

TABLE II—WEIGHTS AND DIMENSIONS OF TYPICAL SINGLE-TRUCK CARS

	Weight, pounds	Length over bumpers, ft.-in.	Seating capacity, body	Wheel diameter, in.	Motor horsepower, hp	Wheelbase, ft.	Trucks
Union Ry., New York City	24,000	35-0	37	24	30-37	10	Non-Parallel-Axle.
Bangor, Me. Cent. Ent.	26,000	33-0	42	28	33-40	15	Single-Radial-Axle.
Toronto Civic Railway	29,400	34-8½	32	33	40-50	8	Rigid-Axle.
Albany	22,000	33-4	32	30	33-40	8	Rigid-Axle.
Marshall, Texas	23,900	33-5	32	33	40-50	8½	Rigid-Axle.
Newport News Cent. Ent.	20,850	35-0	44	26	30-35	15	Single-Radial-Axle.
Austin, Texas	24,000	35-1	36	33	25-30	9	Non-Parallel-Axle.
Reading	22,000	31-7	32	33	30-35	8	Rigid-Axle.



Cleveland Front-Entrance, Center-Exit Design with Prepayment Space Extending Over Forward Half of Body

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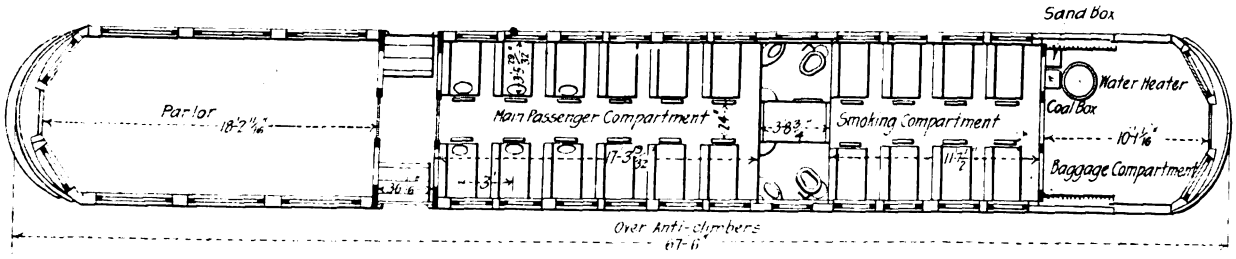


Four-Compartment Car of Michigan Railway Designed for Fast Limited Service Over Long Runs

entrance, two compartment car which weighs 59,400 lb. when fully equipped with four 65-hp. motors, and following this is the Cleveland, Fostoria & Findlay three-compartment car, which is 56 ft. long and weighs 68,000 lb., the equipment being four 75-hp. motors.

Modern cars that may be definitely classed as interurban are grouped in accordance with their weights in Table IV which, at first sight, gives the impression that the weight of modern interurban equipment lies within the close range of between 80,000 lb. and 85,000 lb. To the extent that this table demonstrates the passing of the day of the 50-ton and 60-ton interurban car, the impression that it conveys may be considered as correct. In general, however, the close agreement of these car weights must be ascribed largely to chance. The motors on the various cars, for example, range in capacity from 75 hp. to 160 hp., making a difference on this score alone of about 6500 lb., and although the heaviest car is also the longest and the widest one, the car next to it in the list is the narrowest, the reduced width making a difference equivalent to about 4000 lb. in weight. The sum of these two figures makes a possible variation that is considerably in excess of the entire range of weights appearing in the table, and if consideration should be given to these variables and to the other factors that might influence a comparison, the arrangement of the list would be completely changed. Judged on the basis of weights of older interurban cars, however, the table shows very definitely that there is a trend toward lighter equipment in the case of interurban railways.

However, modern cars that weigh more than 50 tons are being built, the field for them appearing in heavy electric traction, or electrified steam rail-

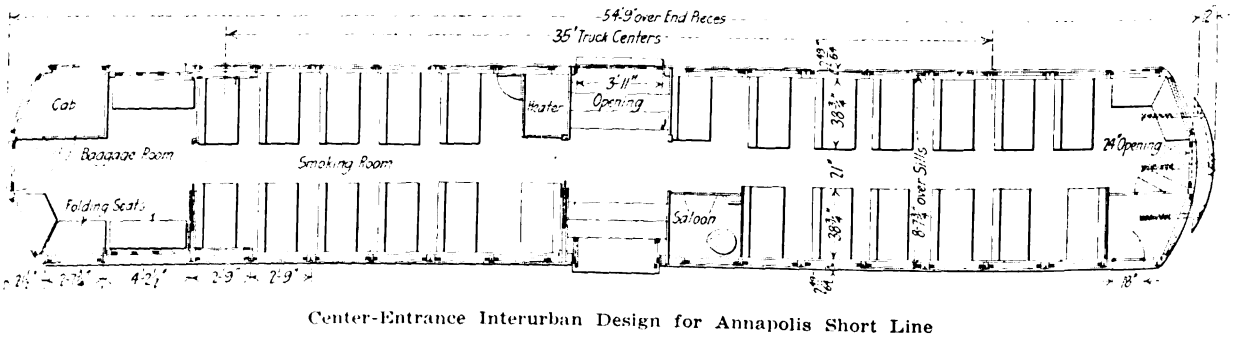
TABLE III—WEIGHTS AND DIMENSIONS OF ULTRA-LIGHT CARS FOR ONE-MAN OPERATION

	Weight, pounds	Length over bumpers, ft.-in.	Seating capacity body	Wheel diameter, in.	Motors	Rigid wheel-base, ft.	Remarks
Puget Sound	10,000	22-10	29	24	Two 21-25 hp.	8	Single-End.
Tucson, Ariz.	11,000	27-6	28	26	Four 7 hp.	8	Trackless, Loose wheels.
New York Railways	12,200	28-9	34	21	Two 8 hp.	7½	Center-entrance, Storage battery.
Sedalia, Mo.	13,900	30-1	28	24	Two 21-25 hp.	9	End Platforms.
Austin, Texas	14,300	30-1	28	24	Two 21-25 hp.	8½	End Platforms.

road service. As mentioned previously, there is no definite line to be drawn between this service and the true interurban, and, as a matter of fact, the Lake Erie & Northern car appearing in the list of interurban equipments is really operating over an old steam line. Generally speaking, the difference between the two classes of equipment is one of length, width and buffing strength. While interurban cars seldom are much more than 60 ft. in length and 9 ft. in width, the steam railroad standards call for lengths between 65 ft. and 70 ft. and

TABLE IV—WEIGHTS AND DIMENSIONS OF TYPICAL INTERURBAN CARS

	Weight, pounds	Length over bumpers, ft.-in.	Width over belt rails, ft.-in.	Seating capacity	Rating of motors.	Type of entrance
Lake Erie & Northern	80,125	59-7	9-4	70	85 hp.	End
Annapolis Short Line	80,300	55-0	8-9	52	75 hp.	Center
K. C. C. C. & St. J.	81,000	58-0	9-0	66	125 hp.	Center
Wilkes-Barre & Hazleton	81,900	54-3½	9-6	56	160 hp.	End
Union Traction of Indiana	85,600	61-0	8-9	56	110 hp.	End
Salt Lake & Utah	85,890	61-8	9-6	66	115 hp.	End



Center-Entrance Interurban Design for Annapolis Short Line

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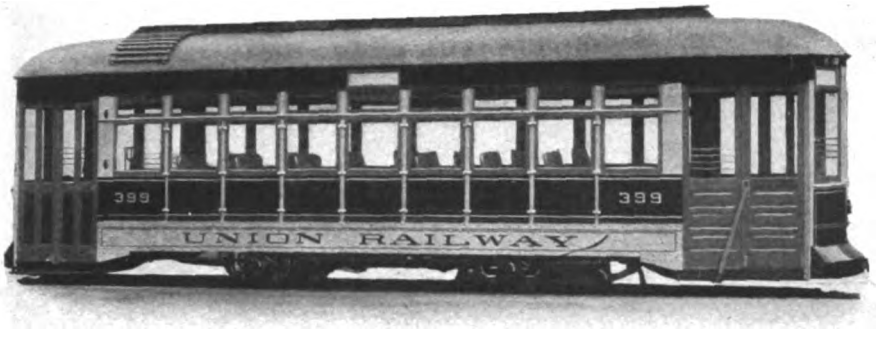
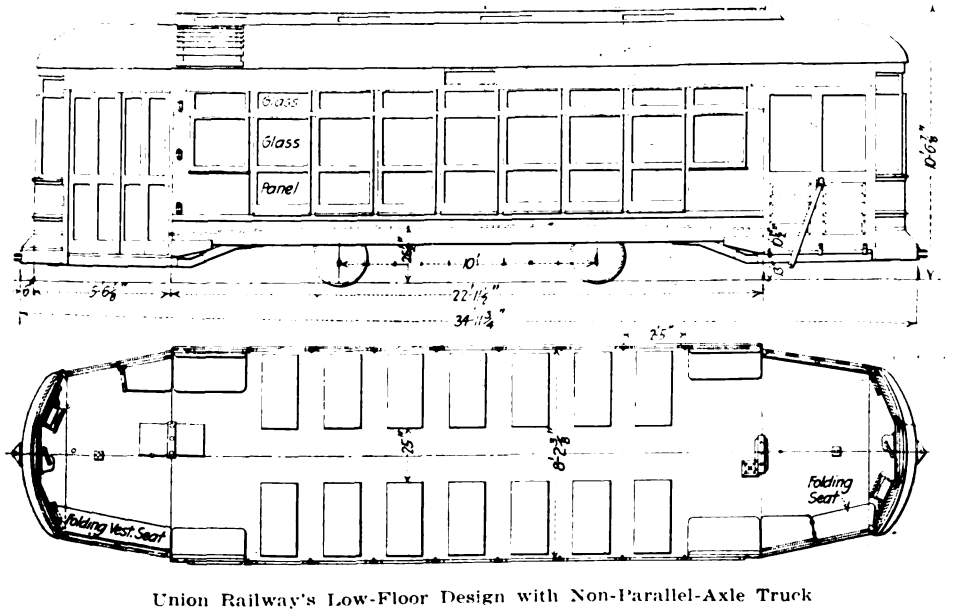


for over-all widths that are in the vicinity of 9 ft. 6 in.

In consequence, the modern cars in services that may properly be classed as heavy electric traction are markedly heavier than interurban cars, even though they may be designed with the maximum of skill and care for details. An example will be found in the cars of the New York, Westchester & Boston Railway. These are 70 ft. long, seat seventy-eight passengers and weigh 119,000 lb. including 24,500 lb. of single-phase electrical equipment which is required with the two 145-hp. motors that are used. The motor cars for the Long Island Railroad are somewhat shorter, being only 64 ft. long, and they seat seventy-two passengers and weigh 107,100 lb., including two 215-hp. d.c. motors and other electrical equipment that weighs, all told, 19,600 lb. The latter cars have been duplicated, except for the substitution of single-phase equipment, on the Philadelphia-Paoli electrification of the Pennsylvania Railroad.

As opposed to the reductions in weight that appear in the cases of recent city and interurban cars, the weights of rapid transit cars operated in elevated service have varied but little. One very obvious reason for this has been that old elevated cars were constructed practically without regard for rigidity and only with the aim of producing the lightest possible structure. The 1915 all-steel car of the Chicago Elevated Railroad, for example, is 48 ft. long and weighs 70,500 lb., and these figures are practically duplicated in the 1909 all-wooden design. The latter, however, had neither center doors nor any margin of strength, both of which features are possessed by the more recent car. In the case of subway equipment, the very recent New York Municipal Railways car with a length of 67 ft., a width of 9 ft. 9 in. and a weight of 85,000 lb., has provided a marked decrease in unit weight in comparison with the earlier 51-ft. subway car of the Interborough Rapid Transit Company, which has a width of only 8 ft. 6 in. but has a weight of 77,900 lb. The 1912 subway car of the Boston Elevated Railway, however, did not differ very materially from the New York Municipal car, having a length of 69 ft., a width of 9 ft. 6 in. and a weight of 85,900 lb.

The establishment of light weight as a characteristic of modern car design has been made possible to a large extent by the introduction of steel



Union Railway's Low-Floor Design with Non-Parallel-Axle Truck

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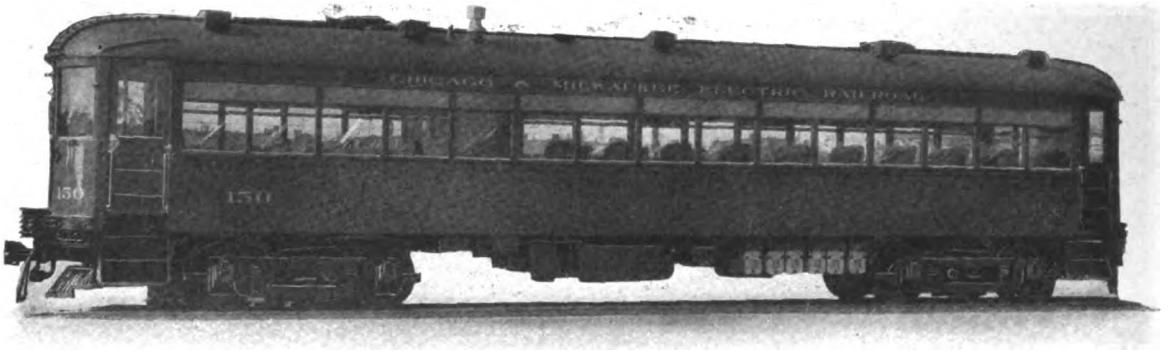
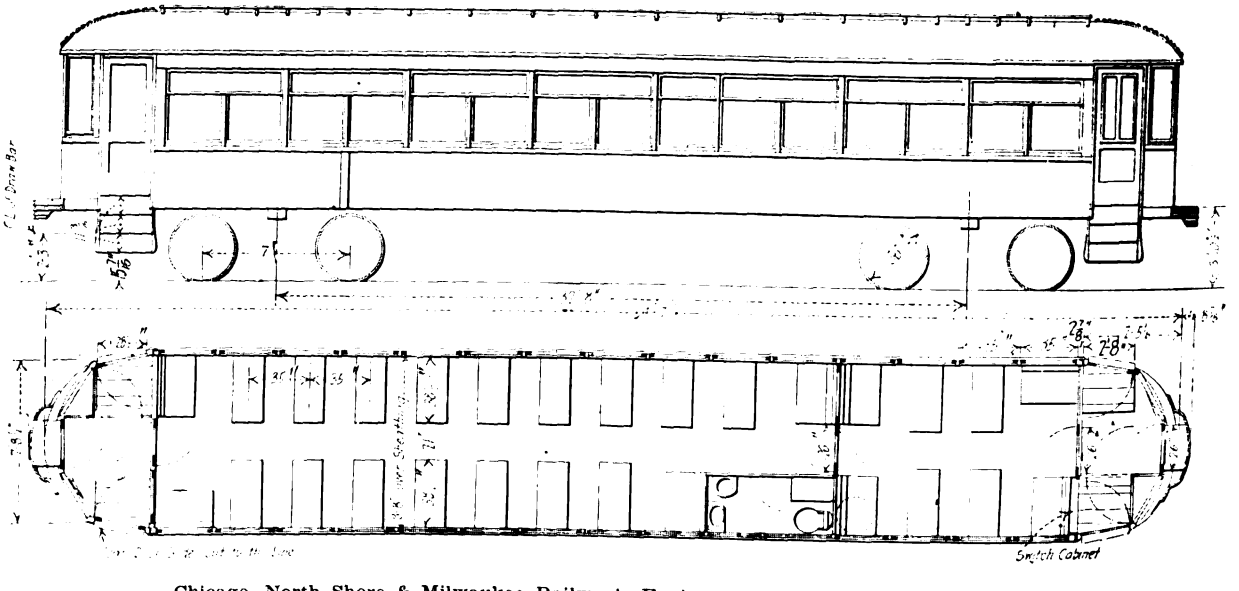


construction, and the latter feature is at the present time practically universal in all representative cars. Without exception, every one of the high-speed cars mentioned in Table IV is built throughout of steel, and of the eight representative city cars mentioned in Table I on account of their low weight, no less than five are of all-steel construction, wherein the framing, posts, carlines and letterboard, at least, are of steel, and in several cases the roof sheathing and floor sheathing as well. The remaining three city cars in the list are of semi-steel construction, in which steel is used up to the belt-rail and wood above that point.

STEEL CONSTRUCTION

For city cars, the development of all-steel construction, as opposed to semi-steel, has been remarkably rapid, the all-steel city car having been almost unknown four years ago. In the case of high-speed service, and especially for rapid transit operation, the development has been longer under way, and all-steel construction is now almost invariably used. This has come about presumably because in no other way but by the use of an all-steel design can the necessary beam strength be provided between the long truck-centers of high-speed cars without absolutely going counter to the modern demand for light weight. In addition, the problem of providing sufficient rigidity of structure to withstand the racking due to high speed is answered satisfactorily by the use of steel throughout.

There is, of course, a reason for this characteristic of modern car design. With cars of equal strength, an all-steel construction will involve appreciably less weight than will one of wooden construction, and since low weight is recognized as a feature of vital importance, all-steel construction follows as a corollary. The semi-steel car, as ordinarily constructed to-day, is approximately of the same weight as a similar all-steel design, so that, generally speaking, the use of steel throughout effects a saving only in the lower maintenance cost that is due to the inherently greater strength of the all-steel construction. As compared with all-wooden cars, the superior strength of an all-steel modern design is especially marked. Even without this advantage in favor of steel, however, it is safe to say that the recent change from wooden to steel construction would have taken place with-



Chicago, North Shore & Milwaukee Railway's Equipment for Heavy Interurban Service

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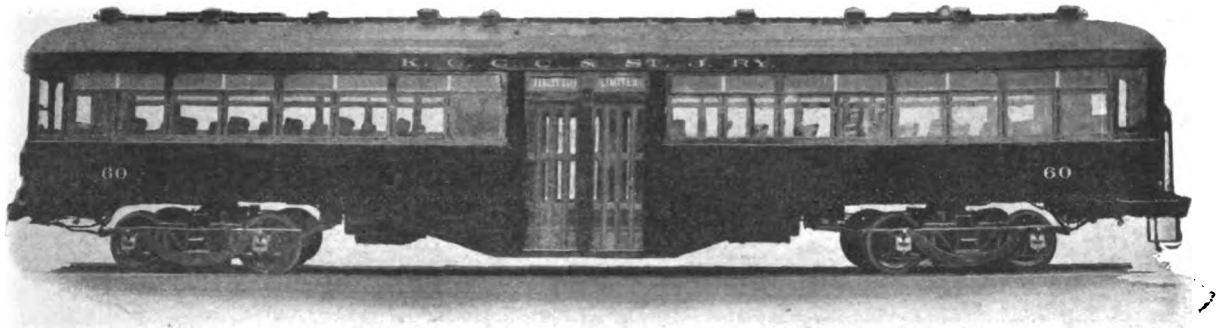
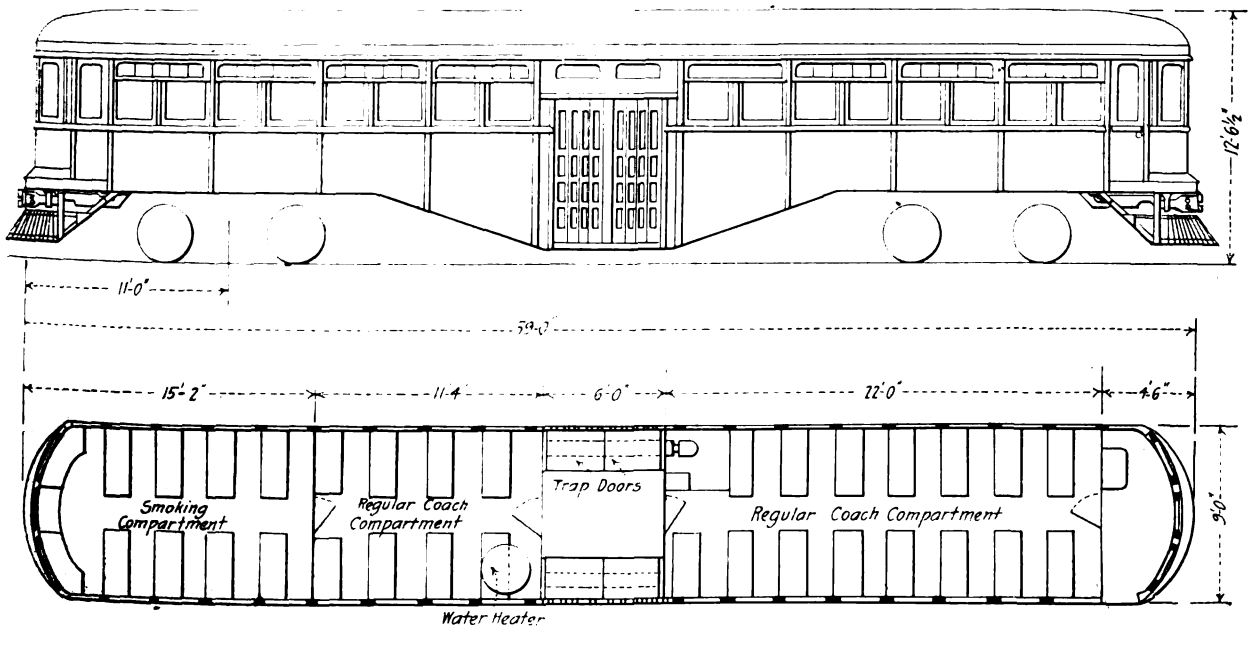


out regard to the relative structural merits of the two materials, simply because the supply of suitable timber is rapidly becoming exhausted and the inevitably higher price would have been certain eventually to make its extended use a commercial impossibility.

Estimates of car builders as to the saving in weight effected by a steel car built to give a degree of strength equal to that of any particular wooden car range from 5 per cent to 15 per cent. It is considered, moreover, that with two strictly comparable cars, one built of wood and one of steel, the steel car will have a materially greater life because of the tendency of wood to rot at the mortises and tenons.

The first costs of similar cars built of wood and of steel under average conditions seem to be approximately equal, or perhaps with a slight difference in favor of steel construction, as estimates of car builders on this point range from zero to 3 per cent. Unfortunately, no direct comparisons of cost are available. This is largely because of the fact that when any railway has decided to adopt steel construction, either throughout or in part, the design of the new cars has been changed sufficiently to prevent them from being directly compared with the older ones. Another consideration is that the cost of a wooden car varies materially in accordance with the weight or general character of its construction. For example, the cost of the labor involved in the framing of a wooden car that is designed with heavy timbers is considerably less in proportion to the cost of the material than it would be if the car were constructed with the lightest possible timbers and with the weight reduced to an absolute minimum.

This difference may easily involve an increase of 20 per cent in the pound price of very light wooden cars over those of the old-style heavy construction, so that there may be little difference in the total cost of the complete car. With steel, however, the pound price remains almost constant, and a light steel car will cost proportionately less than one of the same general dimensions but constructed with heavier steel members, the reason being that the labor cost of fabricating steel bears an almost direct ratio to the number and size of rivets required to hold the various timbers together. This condition appears in specially marked form when the weight of the car is reduced to the extremes



High-Speed Interurban Car of Kansas City, Clay County & St. Joseph Railway

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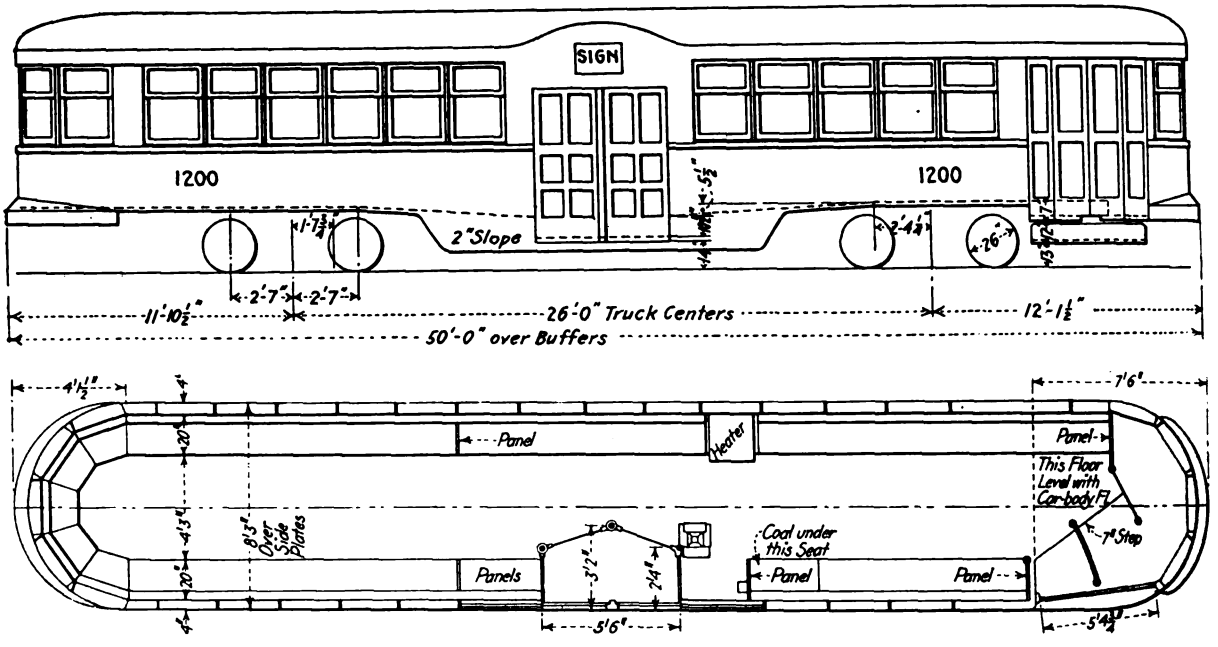


Front-Entrance, Center-Exit Design with Low Floor as Adopted in Rochester

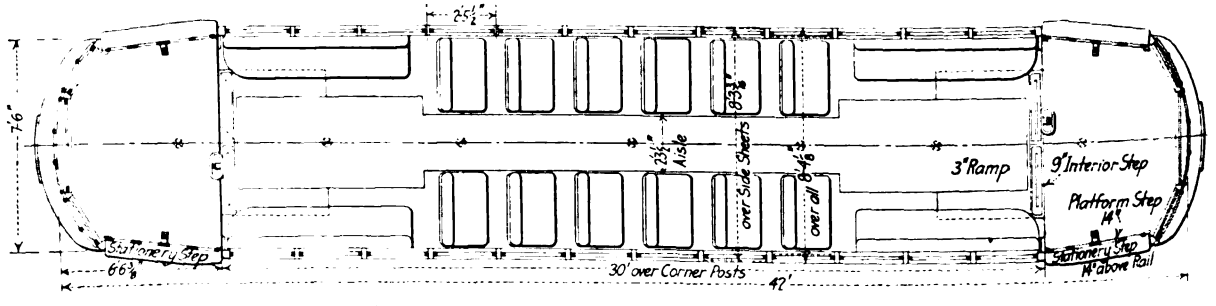
that are considered permissible for city service, and exceptionally light cars of steel may be made as much as 10 per cent lighter than the wooden ones at a cost that is actually lower by 6 or 8 per cent.

MODERN TENDENCIES IN CAR EQUIPMENT

The foregoing outline of the present status of the three major developments in car-body design points to a fairly definite set of characteristics for the modern representative car. In brief, these characteristics will include, in any event, an all-steel construction with a weight of but little more than 30,000 lb. for a 45-ft. body in city service, the latter calling in all cases for a low-floor design and, possibly, also for center doors in modified form. For interurban service a weight of 80,000 lb. for a 60-ft. body may be considered representative, and there is much evidence in favor of the plain center-door arrangement, even though this is by no means in universal use at the present time.

Representative modern equipment for the car displays a much more definite establishment of new practice than that which applies in the case of the car body alone. For city service the introduction of the low floor has brought several new designs of motor in sizes such as 20-25 hp., 30-35 hp. and 33-40 hp., all of which may be used with at least a 26-in. wheel, and for the same reason 24-in. and 26-in. wheels have become the rule, together with axles and trucks of correspondingly reduced size and weight. All of the new low-floor motors, together with the other recent designs of larger capacity, have been characterized by the use of interpoles to improve commutation, as well as ventilation to increase capacity, these two features alone reducing motor weights in the order of 30 per cent for a given rating. At the same time the use of field control and non-rheostat control for four-motor equipments have become practical possibilities that are capable of saving some 10 per cent of the current normally used in propelling a city car.

Other exterior car equipment that may be classed as representative of modern tendencies appears in the emergency feature for the now almost universally used straight-air brake, and as a result of the presence of air on so many city cars there has come the pneumatically controlled door and even air-operated fenders and sanders. Truck design also has been affected to a considerable extent, at least in regard to dimensions, by the introduction of the



Connecticut Company's Car for City and Light Suburban Service

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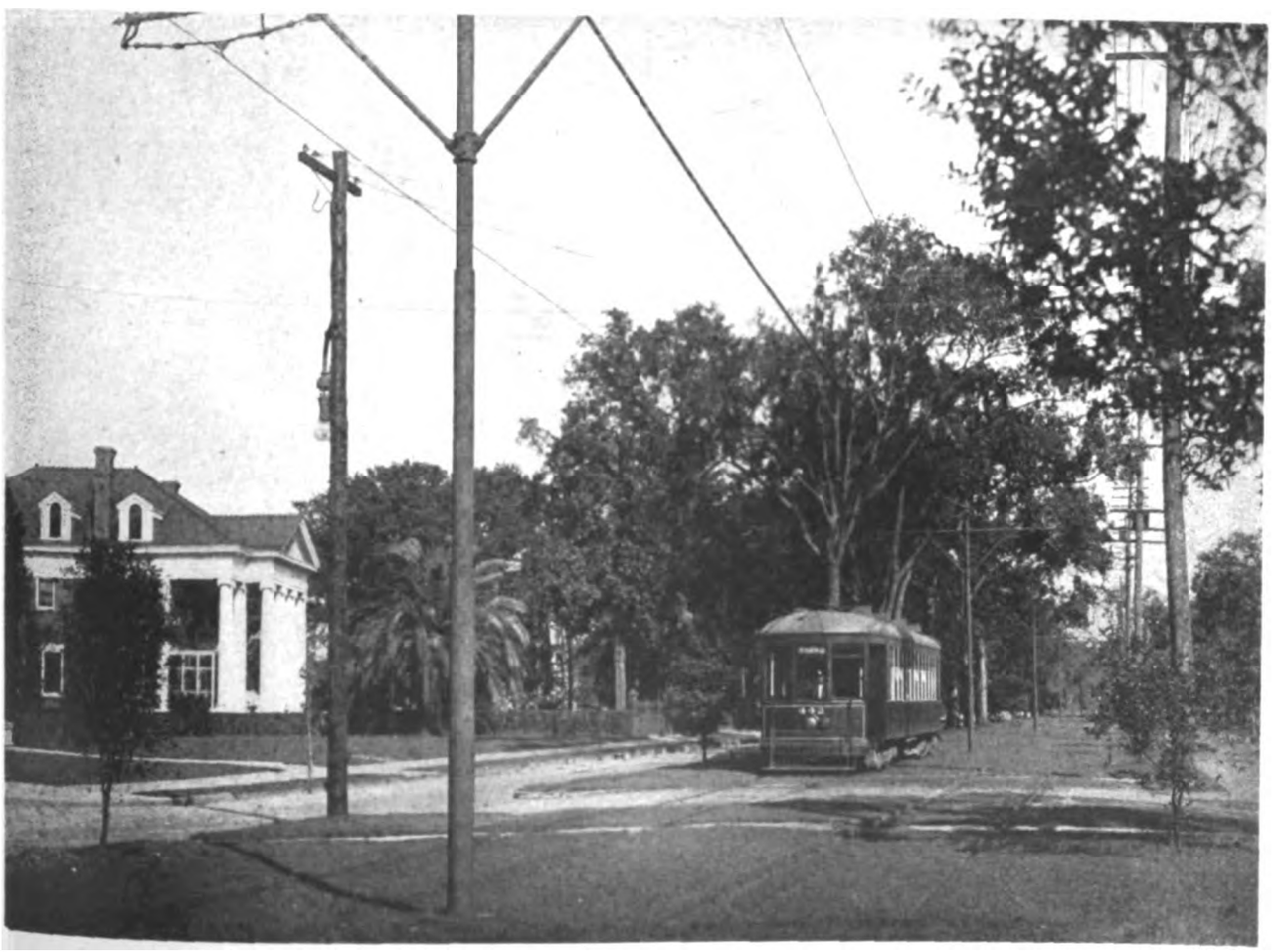
small wheel, and it might be said here in regard to the latter that, within the past few years, there has been displayed, first, a tendency toward the use of the forged steel wheel and, later, a drift back to the use of cast iron. The same sort of a reversal of sentiment, but in a less definite form, appears in connection with the radial-axle truck although the four-wheeled car, in general, is unquestionably growing in popularity at the present time. In recent truck design, also, the built-up type of construction, in which structural shapes are used in preference to forged members, is popular.

In connection with equipment for car-body interiors the final establishment of the prepayment system of fare collection three or four years ago has brought, first, the fare box which is found so very generally on modern city cars, and second, the fully-inclosed vestibule with folding doors and steps that are frequently interlocked with the controller to prevent the car's starting when the doors are open. In addition there is a very evident tendency to devote a constantly increasing share of attention to such detailed improvements as sanitary hand holds, light-weight, non-corrodible fittings, correct-posture seats and the like. Finally, to the equipment for heating, ventilation and lighting there have come the developments that are inevitable with improved understanding of the principles underlying the correct performance of these functions. Thus, although the electric heater has changed but little during the last five years, the introduction of thermostatic control has greatly extended its scope, and within the same period the practically universal substitution of the arched roof for the monitor deck has resulted in the design of a number of ventilating devices with an efficiency that even warrants their introduction on old cars in place of the ventilating sash in the monitor whose abolition (for structural reasons) originally brought them into existence. In the same way, car lighting has been revolutionized by the development of the high-efficiency lamp, and practice in this regard seems actually to be approaching a definite standard involving the use of a few large lamps having glass reflectors to diffuse all except the practically vertical rays.

These changes in car equipment have, perhaps, been less spectacular than those involved in recent car-body designs. Nevertheless, taken all together, their influence upon operation cannot fail to be of great importance. Indeed, when they are considered in combination with the changes that have been incorporated in the modern car body, there is warrant for the question whether, without the revolutionary developments of the last five years, it would have been possible for the industry to have survived the constantly rising costs of labor and material throughout the electric railway field.



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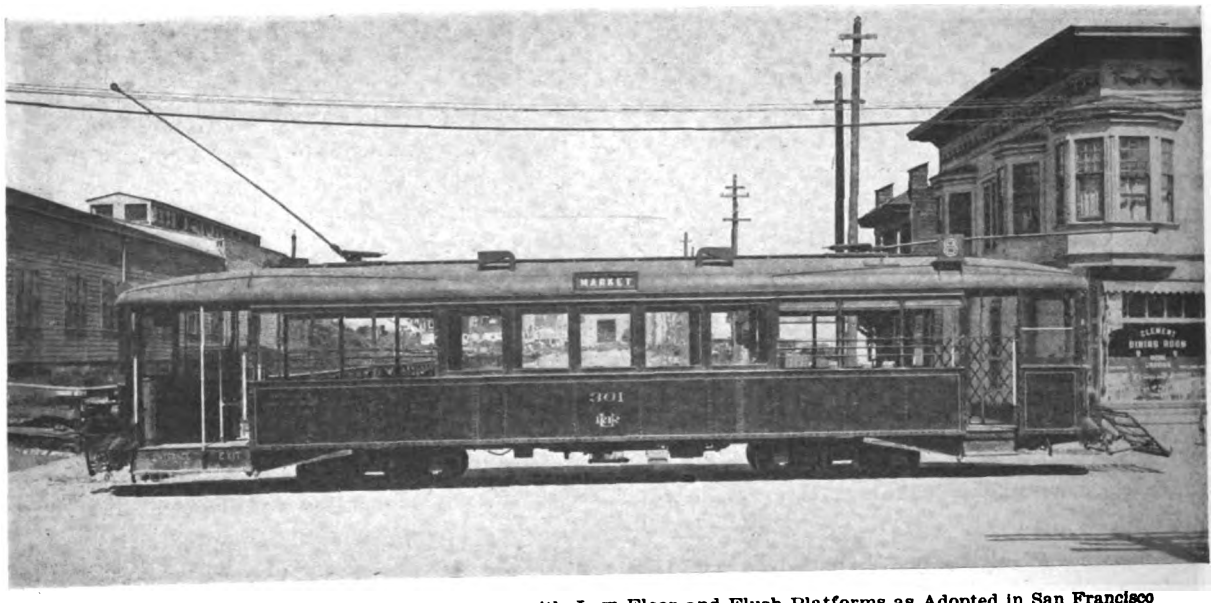
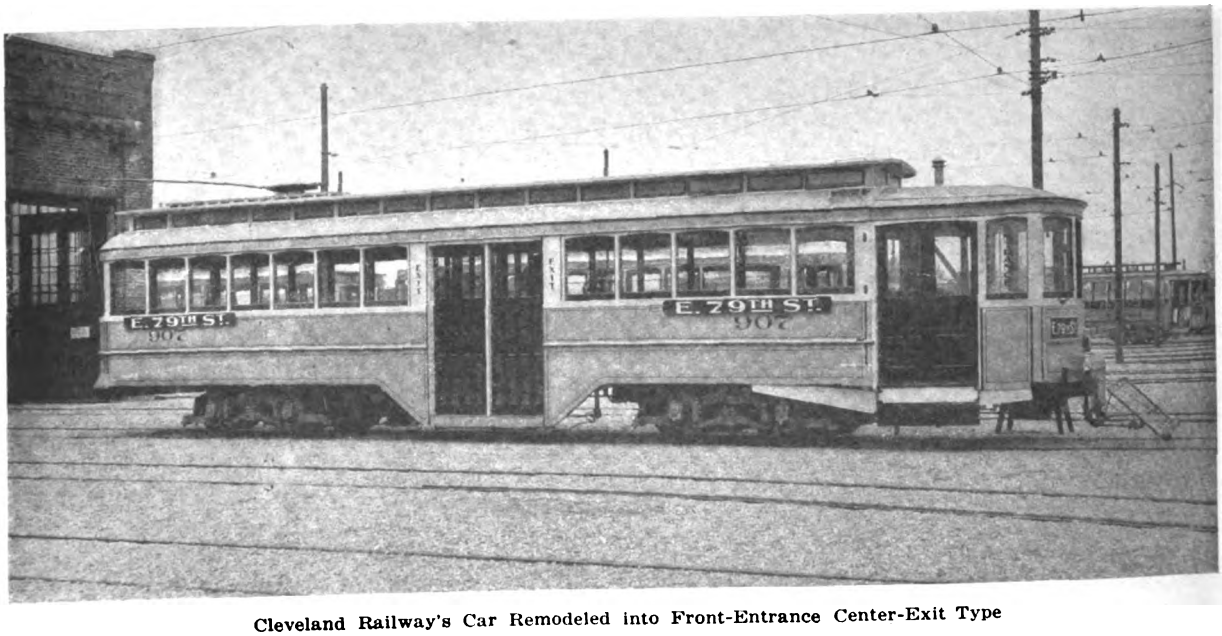
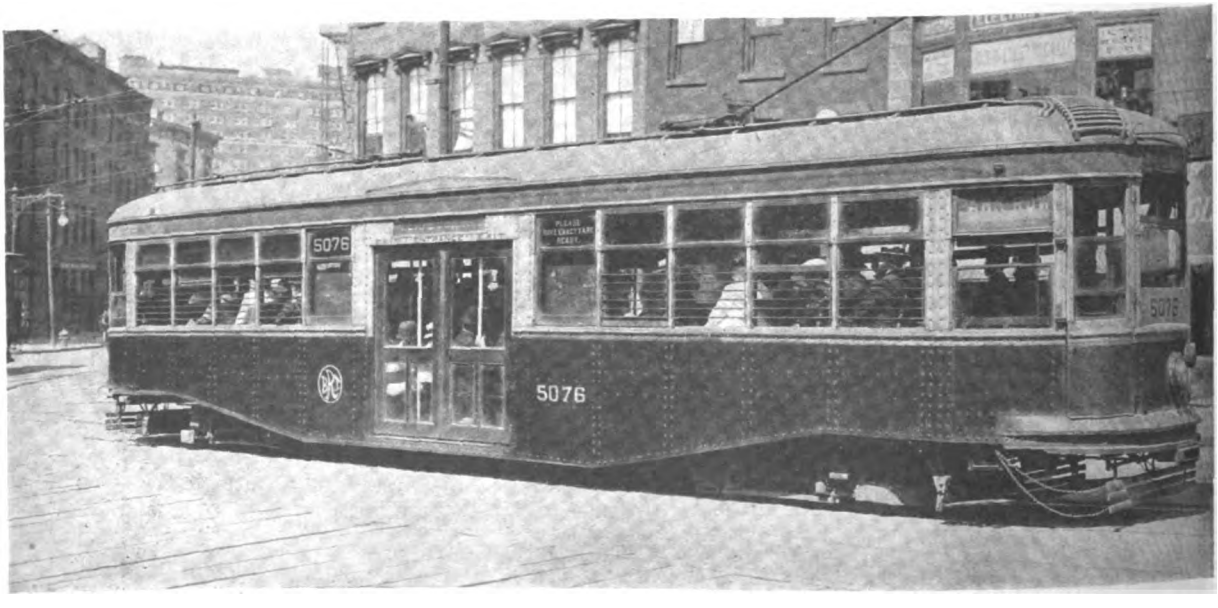


Modern Development of California-Type Car with Low Floor and Flush Platforms as Adopted in San Francisco



Cleveland Railway's Car Remodeled into Front-Entrance Center-Exit Type



Brooklyn Type of Center-Entrance Car with Ramps and Well

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The Car Body From an Operating Standpoint

Recent representative cars have been characterized by the use in city service of small wheels and ramps, reducing floor heights approximately to 30 *in. and permitting weights of* 15 *tons for double-truck city cars. The center door, in its original form for interurban service but modified by combination with a front entrance or exit for city equipment has also become prominent, appearing in about one-third of all latest designs, the remainder having fully-inclosed end vestibules that approach standard dimensions.*

CHIEFLY involved in the all-important problem of serving the public to the best advantage is the factor of car-body design from the standpoint of operation, which, in other words, involves the body arrangement irrespective of structural considerations. This necessitates discussion of a number of features, which are susceptible of being classified as floor height, door arrangement and interior arrangement.

Of these, floor height appears to be the most important at the present time, because its development as a problem in car design has been more definite than that of any of the others. It may, in consequence, properly be placed first in order of consideration, although it is only in city service that the low-floor idea has been a feature of paramount interest up to the present time.

Reduced Floor Heights a Feature of Modern City Cars

The low-floor idea had its real inception in 1910 when a large number of center-entrance trail cars with wheels only 22 in. in diameter were placed in service in Pittsburgh. This design was developed primarily for the purpose of providing large seating capacity in a unit of relatively small weight, in order to reduce the work of the motors on the car that had to haul it. Thus, the seating capacity was sixty-two and the weight only 22,300 lb. The floor was 30 in. above the rail and was reached by means of an interior step 16 in. above the rail, which was covered by folding doors when the car was in motion, the arrangement being devised to furnish the equivalent, in so far as boarding and alighting facilities were considered, of the vestibule floors of the standard Pittsburgh motor cars. Experience with these trail cars demonstrated their numerous advantages, especially their easy-access features, and soon after they were placed in service it was decided to experiment with one of them in operation as a motor car.

Serious obstacles, however, presented themselves in connection with the provision of electrical equipment. The heavy grades and severe schedules in the

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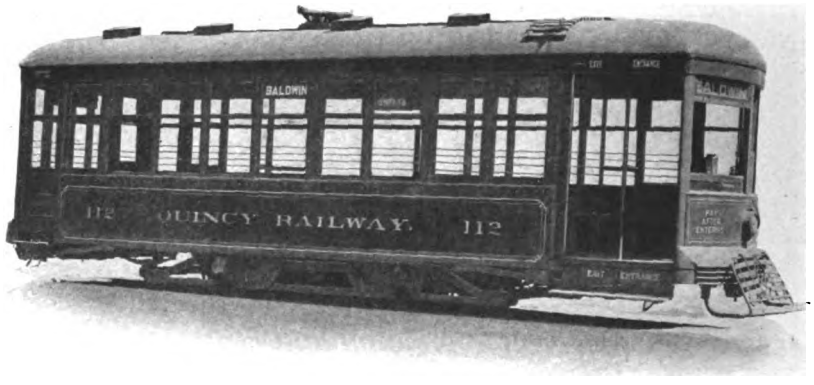
city of Pittsburgh necessitated the application of a considerable amount of power, notwithstanding the light weight of the proposed car, and even with four motors the minimum motor size that was considered feasible was 30-35 hp. Unfortunately no then-existing motor in this capacity, of either the mining, automobile or railway type, could be mounted on axles with 22-in. wheels and yet give sufficient clearance to pass over obstructions on the street, so that although there was some skepticism as to possibilities, both commercial and operative, for a motor of the required dimensions, the development of a new design was undertaken by the Pittsburgh Railways Company.



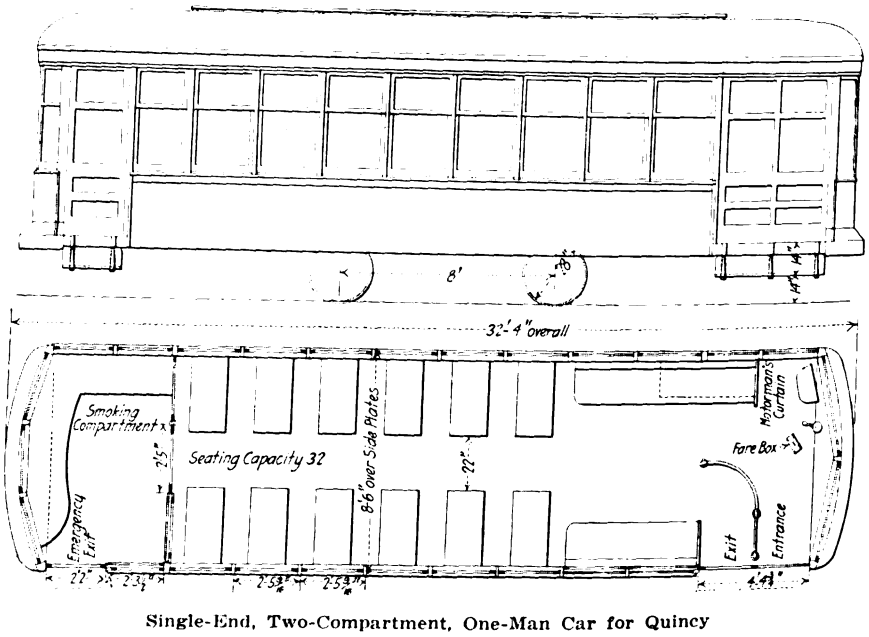
The new motor was designed absolutely along standard lines except that it was provided with commutating poles, which previously had not been applied to motors of such small capacity as 30-35 hp. Also, the core length was somewhat increased and the diameters of both armature and frame were very materially reduced. This enabled it to be carried upon a 22-in. wheel with 2½-in. clearance or upon a 24-in. wheel with 3½-in. clearance. Owing to conditions in Pittsburgh, the latter clearance was considered to be the limit, and when the original "low-floor" car was placed in service in 1912, it was provided with 24-in. wheels.

Development of Low-Floor Types

The floor of this original car, it may be said, was made perfectly level and without wells or ramps, except for a small transverse incline from the top of the step to the center line of the floor, and in this respect, it was wholly different from the two other low-floor designs that were placed in service also during 1912. Of the latter types, one was the center-entrance "stepless" car of the New York Railways.

In the stepless design the floor height is reduced by mounting the car body on maximum traction trucks placed with the small wheels headed toward the center of the car. The longitudinal members of the car floor are carried on the low center plate of each truck so that they just clear the axles of the pony wheels, and the provision for allowing the pony wheels to swing on curves is made by locating them underneath stationary transverse seats placed in such a position in the car body as to provide for a narrow aisle between them. A ramp extends between the entrance space and the ends of the car body, providing for a floor height at the entrance doors of only 10½ in. The motorman is located in an elevated cab that clears the motors and the large wheels of the truck at each end of the car.

The other low-floor car brought out in 1912 was developed by the Brooklyn Rapid Transit Company, and in this design, also, use was made of maximum-traction trucks with the small wheels pointed toward the center of the car, but no radical departure from the customary framing arrangement was introduced. The car floor is level between the bolsters and the ends, while a ramp extends from each bolster to a well at the center of the body, this well serving as a loading and fare-collection space. Only one step is thus required between street level and the well floor, but there is, of course, another step from the well floor up to the main floor.



Single-End, Two-Compartment, One-Man Car for Quincy

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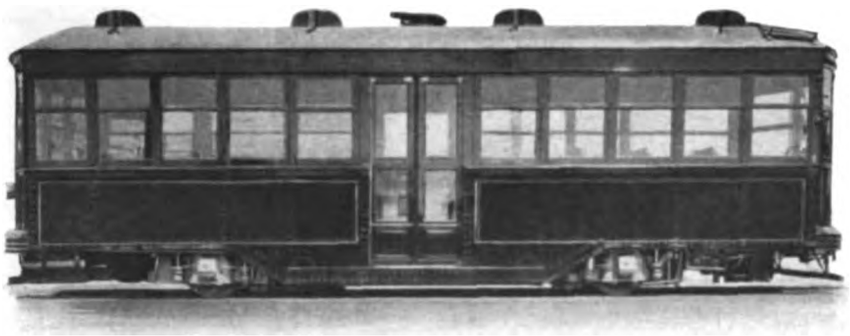
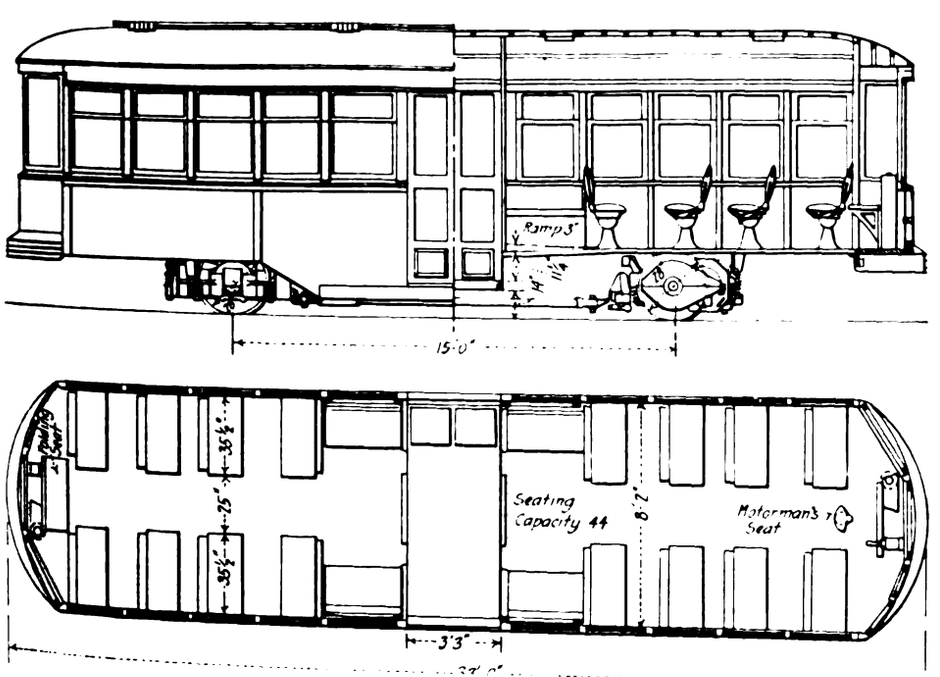


A considerable number of both the New York and Brooklyn types of the low-floor car have been placed in service in their respective cities, the Brooklyn design being used also on several other properties, notably the Manhattan & Queens Traction Corporation—a new company that has adopted the design as standard—and also the Manila, P. I., city lines.

With the original Pittsburgh design, however, a short period of trial operation, together with experiments with modified designs, resulted in important changes that consisted in the adoption of a front-exit door in addition to the entrance and exit doors at the center. In this modified form, the type has been perpetuated in large numbers in Pittsburgh, and, of late, in other cities.

Taken together, these three cars constitute a group of particular importance, because their widely diversified arrangements incorporate every important feature that appears in later modifications of the low-floor idea. However, no other developments of the low-floor principle occurred until the year 1914, when the Cleveland Railway placed in service a lot of center-entrance cars with 26-in. wheels and a floor height of 32 in., the floor being reached by two shallow steps from a well that was 12 in. above the rail. At about the same time the Union Railway (New York City) brought out another low-floor design by applying small wheels and motors to a single-truck car with non-parallel axles. This design has drop platforms at the ends and 24-in. wheels, permitting a floor height of only 26 in. above the rail. The platform is reached by one step of 12 in. from the pavement, and another step 11 in. high brings the passenger to the level of the car floor, at the ends of which are 3-in. ramps. A large number of these cars are in successful use at the present time on the lines of the Third Avenue Railway, of which the Union Railway is a subsidiary property, and the design has served as a forerunner to the several subsequent types in which use is made of the low-floor principle without the center entrance that was so marked a characteristic of the first low-floor cars.



Glens Falls Center-Entrance Car Equipped with Single-Axle Radial Trucks

END-DOOR CARS WITH LOW FLOORS

This plan of using a low floor with end doors appeared in a rather striking manner in San Francisco, where the 24-in. wheel was adopted after an elaborate test on an old car in which small wheels and motors had been substituted for 30-in. wheels and old-style motors, the change reducing the weight of the car from 43,140 lb. to 36,920 lb. The operating results, obtained from records of all-day runs on a line with a number of steep grades, showed a reduction from 3.869 kw.-hr. per car-mile to 3.355 kw.-hr. per car-mile. The resultant saving of 13 per cent in power, together with a reduction of 6 in. in the height of the car floor, promptly brought about the equipment of 123 other old cars in a similar manner. The cost of the new motors and the rebuilding of the truck for the small wheels was reported to have been $1,682 per car, and the return on the investment through the saving in

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power alone was estimated to be between 9 per cent and 18 per cent, according to the basis taken for the value of electric energy. Generally speaking, such a weight reduction as in this case, nearly 3 tons, cannot be expected from the use of small wheels with new equipment. About 3000 lb. per car would be more representative. But even this decrease in weight, at 5 cents per pound per year, would save $150 per annum for each car, so that the present popularity of the small wheel is not surprising.

The introduction of the small wheel in San Francisco led subsequently to the design of a new form of "California-type" car, a time-honored characteristic of Southern Pacific Coast cities. In this new design, which was developed in 1915, the platform floors are flush with those of the car body, the platform being reached by a step 15 in. above the street with a rise of 12 in. to the platform level. There is a ramp from the center of the platform to the king pin of the truck, so that the main floor of the car is about 31¼ in. above the rail when the springs are new and the wheels not worn.

The use of flush platforms in connection with a low-floor design appears also in several 1916 cars,

TABLE V—FLOOR AND STEP HEIGHTS OF TYPICAL CARS

	Floor heights, in.	Wheel diameter, in.	Ramps, trans. and long in.	Center-door step heights, in.	End-door step heights, in.	Remarks
Pittsburgh	29½	24	1 -5	14- 9½	12½-8½-8½	Center-entrance, front-exit.
Union Railway-Single truck	26	24	3	....	12-11	Drop platforms.
San Francisco	31½	24	4½	....	15-12	Flush platforms.
Buffalo & Erie	30½	24	1⅝-2⅛	....	13¾-13	Flush platforms.
Wilmington & Philadelphia	32¼	26	3¾	....	15-13½	Drop platforms.
Des Moines	29½	24	1-2½	14-12	11½-9¼-8¾	Front-entrance, center exit.
Rochester	32	26	2-5½	14-10½	13-12-7	Front-entrance, center-exit.

notably those of the Buffalo & Erie Traction Company. This design in general is similar to that of the latest San Francisco car, the step heights being 13¾ in. and 13 in. respectively. The platform, however, has a transverse ramp of 1⅝ in. on either side of the center line, and there is a ramp of 2⅛ in. between the platform center line and the bolster. This gives a main floor height of 30½ in. On another recent car of the end-entrance type, that of the Wilmington & Philadelphia Traction Company, the platforms are dropped in the customary manner, so that the car body resembles that of the Union Railway's single-truck, low-floor type. In this case, however, 26-in. wheels are used, and the step from the pavement to the platform level is 15 in. in height, the step to the floor of the body being 13½ in., and the ramp to the bolster 3¾ in., giving a main floor height of 32¼ in.

LOW-FLOOR CARS WITH CENTER DOORS

Although the two last-named cars are of most recent construction, having been placed in service during the spring of the present year, the end-platform arrangement that they possess is by no means a characteristic of all of the latest low-floor designs, since several representative 1916 cars make use of the center door in modified form. Among these are the Des Moines front and center-door car and the Rochester front-entrance center-exit car, both of which, in so far as general arrangement of doors may be considered, are modifications of the Pittsburgh low-floor design. The Des Moines car is almost exactly similar to the Pittsburgh car except that the front door is so designed that it may be used either as an entrance or as an exit, pending a decision based on the results of extended trials to be made in actual service. In this design the steps at the center doors are respectively 14 in. and 12 in. above the rail. There is a transverse ramp of 1 in. between the top of the second step and the center line car and a longitudinal ramp of about 2¼ in. from the central loading space to the bolster, making the height of the floor at the maximum 29¼ in. At the front door the steps are respectively 11½ in., 9¼ in., and 8¾ in. between the rail and the floor level. There is no ramp in the floor from the front door to the bolster, so that this door seems likely to be more effective as an exit than as an entrance.

The latest Rochester car has a similar door arrangement, but it differs from the Des Moines car in that the front door is intended only for an entrance and is no less than 5 ft. 5 in. wide, being provided with a rail along the center line to assist passengers in entering two at a time. The step heights at the front are respectively 13 in. and 12 in. from the rail, and an exterior folding step is provided instead of the interior step used in the Des Moines design. Also, the front platform is dropped 7 in., and a rise of this amount is provided at a step that is placed on a diagonal line at the front of the body. The step at the center of the car is made 14 in. above the rail by installing a well that extends half way across the floor, and there is a transverse ramp of 2 in. in this well between the threshold of the center door and the center line of the car. The step from the well to the car floor is 10½ in., and a longitudinal ramp of 5½ in. leads up to the approximate position of the bolster. The floor height is 32 in. above the rail, notwithstanding the use of 26-in. wheels.

From the foregoing, it becomes evident that the low floor has become exceedingly popular during the past year. Floor heights of approximately 30

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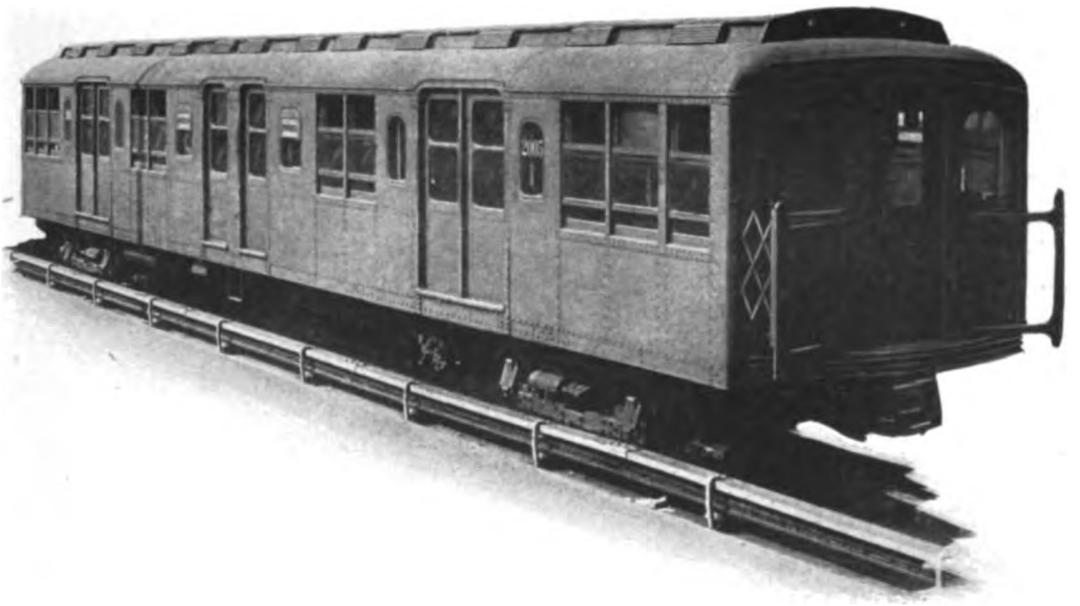
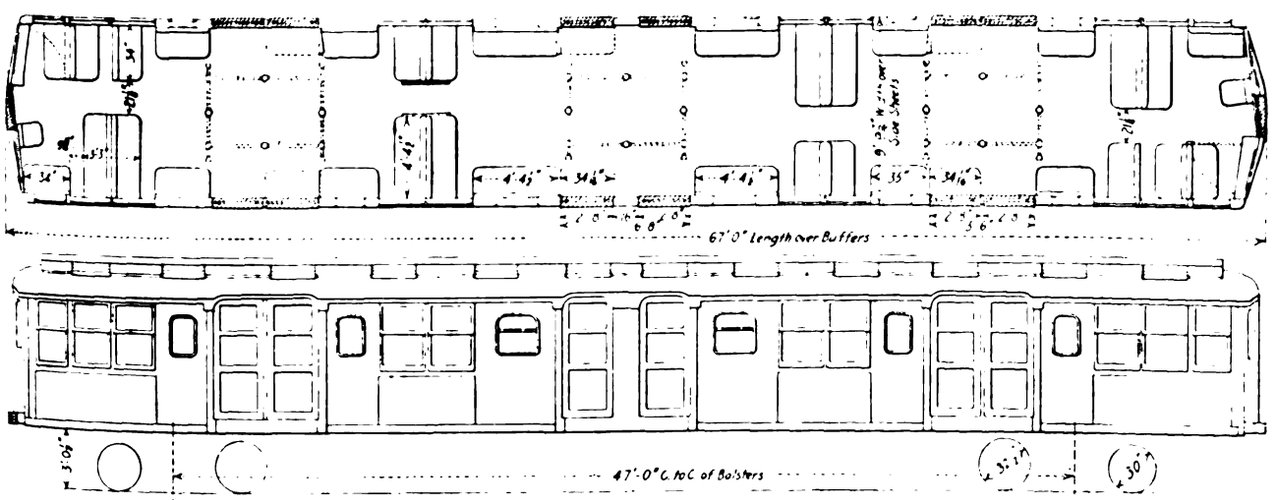


rangement were designed with the idea of eliminating the difficulty. Notable among these was the arrangement provided in several trail cars and in the Cleveland center-entrance cars of 1914, in which the individual entrance and exit doors were separated by a panel 36 in. wide. This provided clearly defined lines for the entering and outgoing passengers even to a greater extent than existed in the Brooklyn and Washington designs; but that it did not eliminate the congestion altogether is exemplified by the fact that during the year 1914 the growth of the plain center-entrance design became almost stationary. At that time, in fact, sentiment appeared to be decidedly against the center door, although admittedly it provided an excellent solution for many of the problems of trail-car design and also for the utilization of old equipment—a subject which may best be discussed in a later paragraph.

Congestion at the center entrance was not the only reason for this situation. Several operators had seriously considered center doors for new rolling stock, but had abandoned the idea because on some properties the overhead construction was not considered to be in sufficiently perfect condition to permit placing the conductor in the center of the car, where he would be far away from the trolley rope, while on other roads it was felt that the center-entrance car had been found to be not so fast in loading as the old-style rear-entrance car with a front exit. Also, the rear-entrance front-exit car automatically distributed the standing load over the entire car, whereas with a center entrance the standing load was hard to move away from the door, thus decreasing the maximum capacity. Again, in small towns where there are many unpaved streets it was argued that neither the entering nor the alighting passengers had the advantage of using the paved cross-walk when the center-entrance car was used.

These objections, of course, with the exception of the location of the conductor in an inaccessible position as regards the trolley rope, did not apply to the Pittsburgh design, but to this arrangement there was the objection of cross-movements of pas-



Rapid Transit Car with Unit-Type Arrangement of Doors and Seats for New York Municipal Railway

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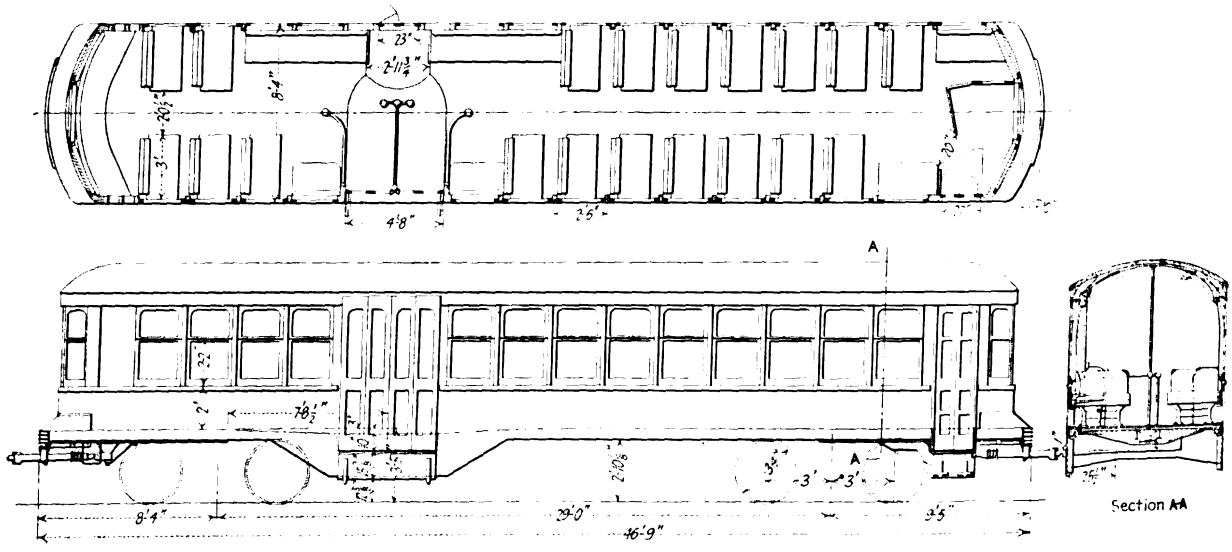
sengers when the center doors were used for an exit by short riders. However, that difficulty was eliminated altogether with the introduction of the modified center-door car brought out in Cleveland early in 1915.

This front-entrance, center-exit design has the same door arrangement as the Pittsburgh car, but the front door, instead of being used for an exit, is used only for an entrance, the center doors being used only as an exit. The conductor is stationed just in front of the center-exit doors, and thus the front half of the car, which has longitudinal seats, is operated on the pay-as-you-leave principle, while the rear half is of the customary pay-as-you-enter type. Cross seats, which are more attractive to passengers, are installed in the rear half. Since all passengers enter at the front and leave at the center, the arrangement automatically distributes the load over the front half of the car, and this entirely eliminates the congestion at the entrance. In addition, it provides a prepayment space of extraordinarily large dimensions and enables heavy loads to be put on board in the shortest possible interval of time, while there is afforded almost all of the advantage of the center-entrance car in shortening the movement of passengers within the car body. It should be noted that the arrangement is designed essentially for single-end operation.

A large number of these cars have been placed in service in Cleveland, including fifty old cars that were reconstructed in accordance with this design since the original car was built because of the success of elaborate tests. More recently a number of similar cars have been ordered for other cities, notably in Toledo and in Rochester, where, as before mentioned, fifty of them have been purchased notwithstanding the fact that the local railway company had just previously made elaborate trials of a plain center-entrance design. Indeed, the combination of end and center doors introduced in this type of car may have given a new life to the whole center-door principle, although its very recent introduction prohibits any definite conclusions on this point.

Possibilities for the Center Door

In general, however, it is evident that the plain center entrance, even with modifications such as a separation of entrance and exit doors, is very evidently lacking in those qualities which will enable it ever to come into general use. As a matter of fact, it now seems obvious that the original plain center-entrance design suffered inevitably from almost exactly the same difficulties as any arrangement in which entrance and exit of passengers are made through a single doorway. Past experience has shown that these difficulties have been sufficient to bring about the general use of the front exit in all end-entrance cars, and under average operating conditions they have led to the abandonment of the near-side design in which both entrance and exit are located at the front platform.



Birmingham, Ensley & Bessemer Car with Offset Side Doors to Provide Small Separate Section for Colored Passengers

The plain center entrance, nevertheless, has the inherent advantage of providing increased seating capacity and of decreasing the structural difficulties and weight involved by having to attach platforms to the framework of the car. Where the problem of rapid loading is not serious, as in the case on interurban and suburban runs, this door arrangement has good reason to be popular, and the percentage of plain center-entrance interurban cars built during the past few years is as large as the total percentage of both plain center-entrance and modified center-door cars that have been built for city service. Increased seating capacity and decreased weight seem to have been the primary reasons for this; but in addition, the center vestibule, or boarding space opposite the center door, pro-

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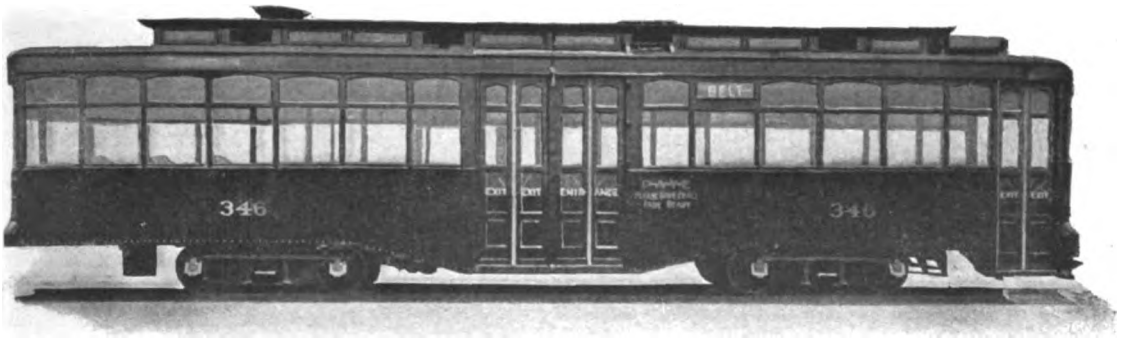
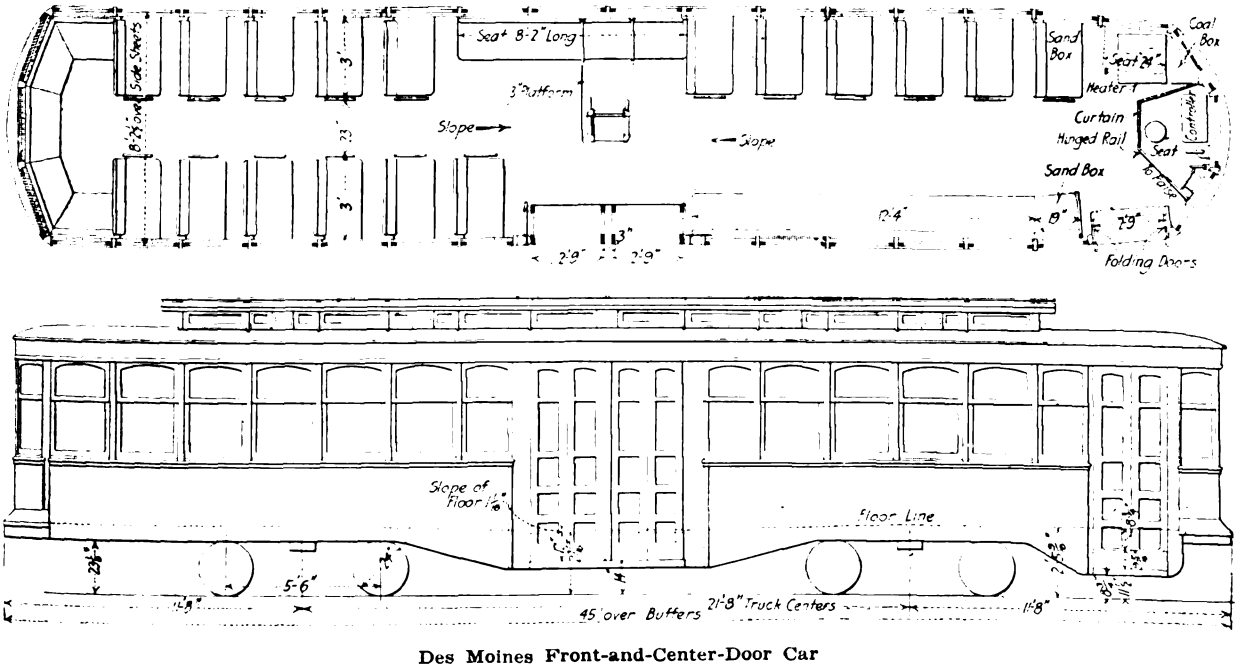


vides a means for automatically separating the main passenger compartment from the smoking compartment, and this feature, as well as the acceleration of passenger movement due to the decreased distances between the door and seats, has been put forward by a number of operators as a reason for favoring the center-entrance over the end-door arrangement for interurban service.

In general, the variations that have been made in the design of center-entrance interurban cars are minor in character, and this fact, together with the very wide distribution of center-entrance cars among the different interurban railways rather than the purchase of a large number of cars for a very few properties, leads to the belief that in interurban service the center entrance will undoubtedly be perpetuated. Note should be made here of the off-set door arrangement whereby the interior vestibule may be made to separate compartments of different size. This plan, of course, is applicable only to single-end cars; but that it may be successfully utilized is evidenced by the Birmingham, Ensley & Bessemer car, in which the vestibule is well located to the rear of the outer line, being used to separate a small compartment for colored passengers from the large compartment at the forward end of the car body.

With new single-truck cars of reduced capacity, the center door has made very little headway, although the operating difficulties of the center entrance are obviously less with a small car than with a large one. The center entrance has, however, been very largely adopted for trail cars because of its previously mentioned advantages of large seating capacity and reduced weight. In addition, it has appeared as a means for modernizing old cars that may be considered too small for regular service and too much inclined to "pitch" on account of a short wheelbase. Generally speaking, the method by which such reconstructions are carried out is to splice two old car bodies together after removing the platforms, using drop sills of steel to span the interior vestibule or well that is left between them, and constructing a rigid steel doorway coupled at the top to the letterboards to provide strength for the structure as a whole. The stresses at the center section may obviously be minimized by balancing each half of the rebuilt structure over its truck.

A number of such reconstructions have been undertaken since the first center-entrance cars were



Des Moines Front-and-Center-Door Car

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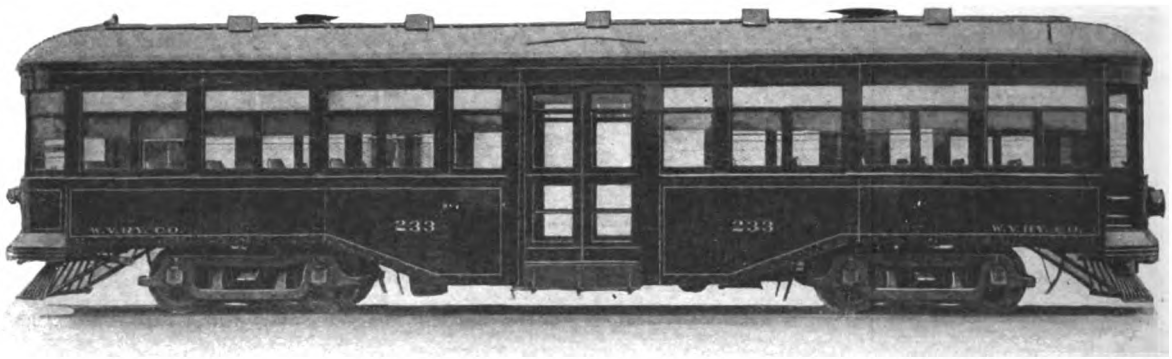


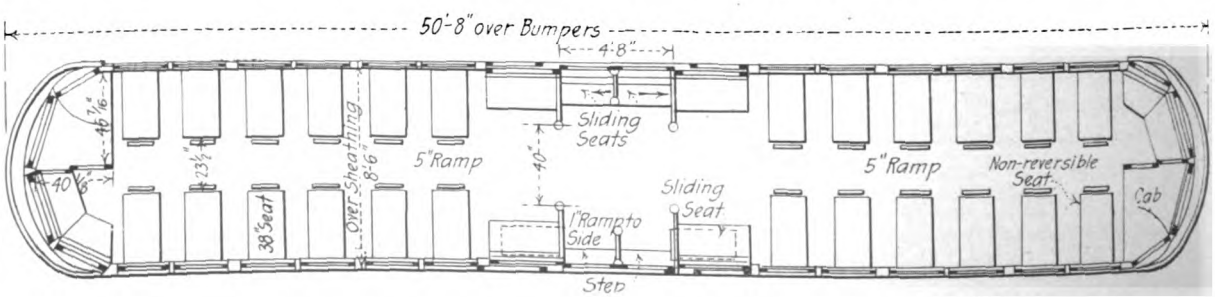
placed in service and the cost in general has been low. In Pittsburgh, for example, the expenditure for splicing two 20-ft. car bodies so as to make a 48-ft. car with a center well and an interior step was found to be $400. In addition a number of open cars, condemned on account of the practical obsolescence of that type, have been made over into center-entrance cars having various combinations of exterior and interior steps and wells to provide access to the car body. On the Pacific Coast, also, many California-type cars have been reconstructed, notably in Los Angeles, where center entrances with ramps and outside steps were provided in the reconstruction of some 300 of the railway company's narrow-gage cars at a reported cost of $678 per car.

The ultimate value of such rebuilt cars is, of course, problematical, in view of the change of opinion that has taken place regarding the plain center-entrance design. However, the Boston articulated type of car, made up from two old car bodies with a specially constructed center section hanging between them, has appeared in a number of cities, and it offers advantages in the utilization of old equipment that are not possessed by plans for reconstruction having no special provision for easy access to the car body. A feature worthy of note in the design of the center section is that housings are provided in the roof for the trolley ropes from the old car bodies at either end of the unit, and, in consequence, the conductor is able to replace a trolley pole that has jumped the wire, or change poles when the direction of operation is changed, without going outside of the car. The cost is estimated to be approximately $1,000, and the added weight has been found in one case to be only 1000 lb. over the original weight of the two small car bodies, the reason being that with the introduction of the center section there are eliminated two platforms and two sets of controllers, together with other miscellaneous equipment. The most obvious difficulties are the extremely large seating capacity and the complication of the passenger's movements within the center vestibule.

Arrangement of Major Facilities Within the Car Body and Vestibules

The kaleidoscopic changes presented by these recent developments in center-door designs have, naturally, obscured somewhat the importance of the end-platform arrangement for car bodies. Nevertheless, in new construction the end platform is still more prominent than the center door, from a numerical standpoint, and it possesses the great advantage of having most of its history behind it. Between the two types of design the main point of difference is really one of passenger movements, because when broad generalizations are made many common features of interior arrangement appear, and these may be discussed at the same time. As a matter of fact, one of the most important recent developments in the design of end-platform cars, namely, the inclosure of vestibules, can be ascribed largely to the results of experience with the early center-entrance cars.

Provision for the complete inclosure of the car while in motion became unquestionably the most prominent feature of surface-car design during



Typical Center-Entrance Suburban Equipment of Washington & Virginia Railway

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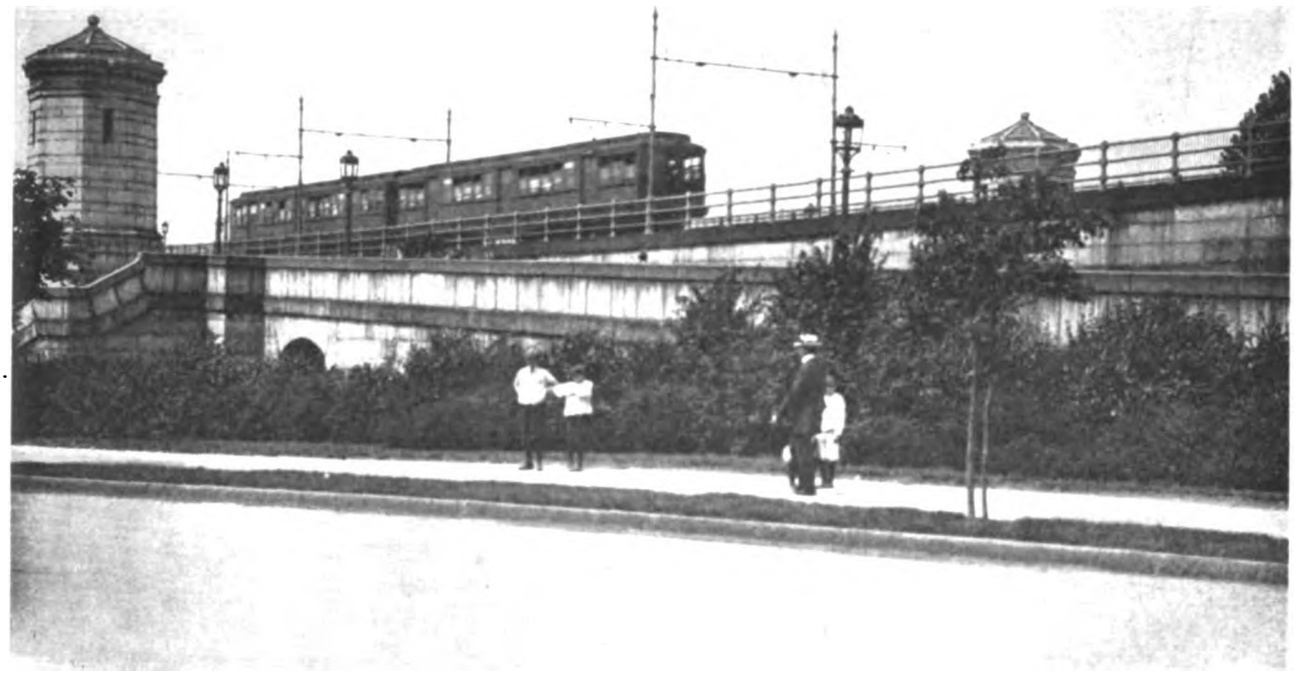

Lengths and Widths for Modern Car Bodies

Experience has shown the most economical carbody length to be 45 ft. for double-truck city cars. The controlling factor, where stops are indeterminate, is schedule speed rather than clearance dimensions, which are dominant solely in high-speed service, but a number of single-truck cars which approximate only 33 ft. in length owing to mechanical considerations have been recently built. Widths for most recent city cars are surprisingly uniform and might even be standardized at 8 ft. 4 in. without difficulty.

THE subject of car-body capacity, or size, offers a problem of considerable complexity and material importance in connection with car design from an operating standpoint, but since it is really basic in character its discussion in a separate chapter is warranted. Generally speaking, the tendencies displayed by the most recent designs indicate that, at least for some time to come, there will be little likelihood of any appreciable change from the general dimensions that have been shown to be best by the accumulated experience of the industry.

Numerically, an overwhelming preponderance of recent cars for reasonably large cities are of a length approximating 45 ft., measured over the bumpers, although occasionally a design is encountered with a length as low as 40 ft. or as high as 50 ft. In the case of cars for the smaller communities there is less tendency toward an agreement on length, but even so, a very large majority exists in favor of the range between 30 ft. and 35 ft. Practically all of the smaller cars are of the single-truck type, and in consequence, they constitute a fairly distinct class by themselves. Since the jitney bus development ran its course, however, still another class of city car has appeared, this being less than 30 ft. long and of extremely light weight, so that city cars in general may be divided into three classes—double-truck, single-truck, and ultra-light. In the same way, interurban cars range between 55 ft. and 60 ft. in length, and cars for heavy electric traction seem to be fairly well standardized between the lengths of 65 and 70 ft., which are set by clearance limitations.

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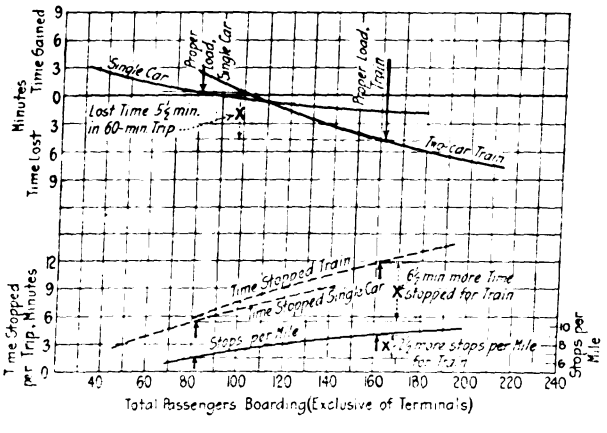
Seating capacities for cars of these several lengths are naturally subject to wide variations, depending upon the interior arrangement, upon the use of platform seats in city service and the installation of baggage compartments in interurban service, as well as upon the possibility of single-end operation. In any event the total capacity, including standing passengers, is better measured by length than by the number of seats, and in consequence the length will here be considered as the unit of capacity.

INFLUENCE OF EXCESSIVE CAPACITY IN CITY SERVICE

In ordinary city service to-day the factors of schedule speed and headway exert a dominating influence on car-body size, and the problem of limitation of physical dimensions because of narrow streets, sharp curves and the like, has become of only secondary importance, except in rare instances. This is indicated by the practical standardization



Operating Results of Test on Two-Car Train Compared with Single Car

of city car-body widths between 8 ft. 4 in. and 8 ft. 6 in., measured over the belt rails. Of the two factors of schedule speed and headway, the former appears to be considerably the more important, although its influence is indirect and, to a certain extent, obscure. Its action is that, as car capacity increases, stops will be longer and will be made more frequently because more passengers will board and alight, and this involves lost time. In other words, a car that holds few passengers will make better time over a run requiring an indeterminate number of stops than a car of large capacity. In practice this has been demonstrated by the inability of the double-deck car, with a capacity of eighty or ninety seats, to maintain schedules, resulting in its failure to be perpetuated after experiments in Pittsburgh, New York City and Washington, D. C., three years ago.

Generally speaking, the two-car train also is an example of extremely large car-body capacity since two cars thus coupled together really make a single unit of double normal size, and the accompanying graphic results of a representative test on a two-car train show this effect clearly. Unfortunately, in any such test the influence of the increased capacity can be expressed only in limiting figures, and the time lost by the two-car train in this case is between the limits of 9 per cent as a minimum and 16 per cent as a maximum. The former figure is derived from the curves at the upper part of the graph which show that a single car, when carrying the proper total number of passengers throughout the run in question to give a proper maximum load, made just about schedule time, while the two-car train, when carrying twice this load, lost five and a half minutes in a sixty-minute trip, or 9 per cent.

These curves were plotted directly from the test observations, but even direct observations are affected by the personal element of the platform men, who will always make an extra effort to move faster when they get behind time. To eliminate this disturbing factor the lower part of the graph was plotted to show the observed "time stopped" as well as the stops per mile by both train and single car during each of a number of trips. From these data the following deductions may be made: Since the trip in question was 9 miles long an assumption of nine seconds lost in acceleration and braking for each step would give a loss of eighty-one seconds, or 1.35 minutes per trip, for each increase of one stop per mile, and since the properly-loaded train made 2½ stops per mile more than a properly loaded single car the loss from this source must be three and a half minutes. Also, the two-car train was actually stationary for six and a half minutes more time during each trip than the single car because it had to handle double the number of passengers, and the sum of the two losses, or ten minutes per trip, amounts to 16 per cent of the schedule time.

This latter result, however, does not take into consideration the effect of vehicular interference, which is less obstructive when two-car trains are used because of the smaller number of units on the street, and, in consequence, some of the 16 per cent of time lost at the stops by the train would be made up by it through faster running between stops. But as this is an indeterminable factor, the actual slowing down of the schedule on the run in question can only be expressed as less than 16 per cent, although the direct observations showed the loss to be more than 9 per cent. This is sufficient, however, to make the two-car train a losing proposition through the increase in operating expense that comes with slower speed.

It should be noted here, perhaps, that the above figures apply only to one particular line. On other

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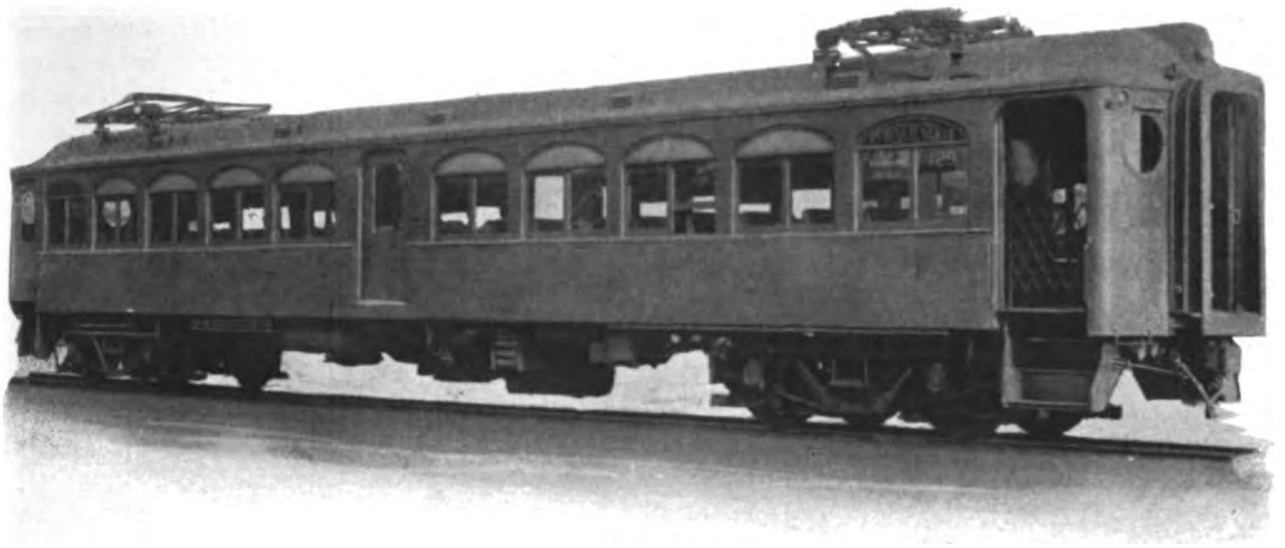


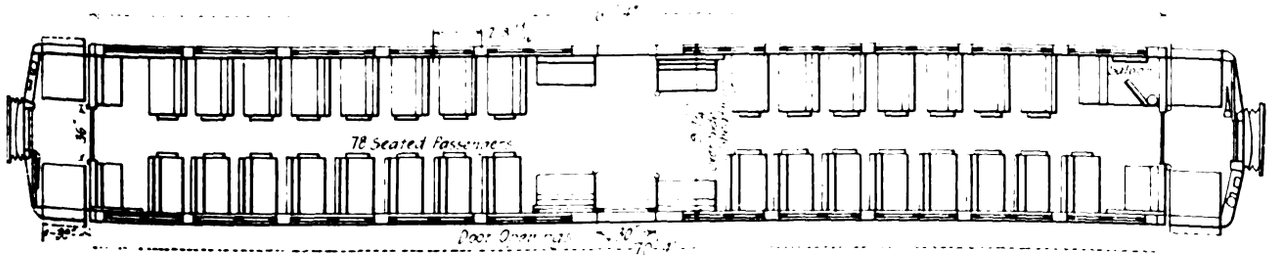
runs the loss might be greater, or it might be materially less, even to the point of making the trail car profitable. Such conditions would be those approaching the case, where, for example, practically all of the load is taken on and put off at a few important transfer points. The increase in capacity of the train would then be less of a handicap, because it would probably make but few more stops throughout the trip than the single car. The skip stop produces a very similar effect, and its introduction has been found frequently to offset the time lost by the use of two-car trains.

From the foregoing, it is evident that there is a maximum size for cars which cannot be profitably exceeded. The double-deck car and the two-car train clearly exceed this maximum, and their failure to be perpetuated show at least that a seating capacity of, say, eighty, and a correspondingly large total capacity is, under normal conditions, very much too high. There are, unfortunately, no data available for determining just how much too large the double-deck car may be. However, a good line on the situation may be drawn from the influence of past experience, and this, as previously mentioned, sets the length of cars for large cities within 5 per cent of 45 ft. During 1915, for example, an analysis of car orders, representing 80 per cent of the total cars purchased, showed that two-thirds of the new cars were within these limits. A total of 133 cars were ordered with a length exceeding 47 ft. 6 in., but of these, three were sample cars and the remaining 130 were purchased for the city of Cleveland, where the existence of the skip-stop method of operation permits larger cars than could be used under ordinary conditions.

For service in large cities, therefore, the maximum permissible car-body size appears to be but little, if any, in excess of 45 ft., and except under special conditions city cars that are longer are very likely to be of too large a capacity. Even the jitney bus craze of 1915 worked as a demonstration of this fact, and one of its results has been a more or less well-defined swing to the opposite extreme, or to the ultra-small car. Nevertheless, a car may be too small just as definitely as it may be too large.

EFFECT OF REDUCED CAPACITY

Unfortunately, the ultra-small car has come to be called the one-man car, and this rather confuses the issue of car-body capacity that is involved. In general, the one-man car should be considered as distinct from the ultra-light design (which includes but a small fraction of the total number of equipments built especially for use in small cities) because the use or non-use of one-man operation is purely an operating consideration. Indeed, the possibility of operation with one man is, apparently, almost independent of car-body capacity, since cars 42 ft. in length and with seats for forty-seven passengers have been operated successfully without a conductor. Consequently, the one-man car, as such, will be considered here only in con-



New York, Westchester & Boston Railway's Equipment for Heavy High-Speed Service

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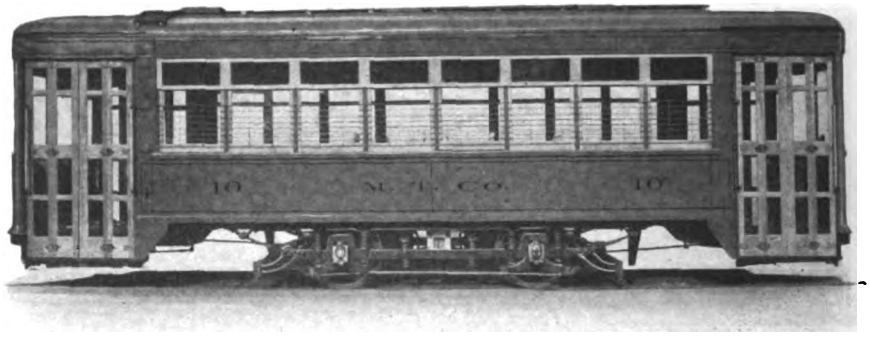
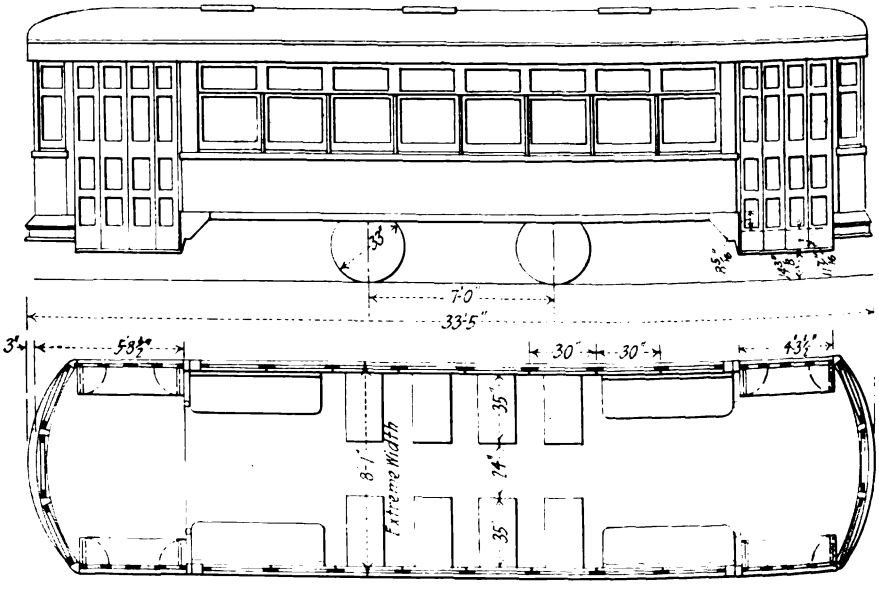
nection with the equipment that is peculiar to it, and no attempt will be made to compare one-man and two-man operation or to generalize regarding the effect of one-man operation on economy through the reduction of platform expense accompanying it.



The item of platform expense in general, however, is a dominating factor in establishing a minimum car size. Thus, while it has been previously shown that a small unit can make faster schedule speed than a very large one, and hence can reduce operating expenses, it is nevertheless inadvisable to have units that are too small because of the resultant excessive cost of platform labor per passenger. For example, if it is assumed that the substitution of a 35-ft. car seating thirty-seven passengers, for a 45-ft. car, seating fifty, increases the speed on a certain run by, say, 5 per cent, the original operating expense would be reduced by some 3 cents in each dollar. But the platform expense, which might well be 35 cents out of every dollar expended in operation, would be increased by one-third, or say 11 cents, because one-third more platform men would be required to handle a given number of passengers. The saving of 3 cents on the dollar due to higher speed would, therefore, be more than offset by the 11-cent loss from greater platform cost, leaving a net deficit of 8 cents on the dollar of operating expense from the substitution of the small cars. Thus appears the general rule that, within reason, the largest car is the most economical one that can be used.

Here, however, the factor of headway enters into the problem. Obviously, a point is reached in every community where an increase in the intervals between cars results in a serious loss in gross receipts. Short-haul passengers, who are the only ones carried at a profit for a 5-cent fare, will not ride if the headways are as long as twenty or thirty minutes, and therefore it often becomes advisable to give a frequent service even if the cars are not filled, the actual frequency depending, of course, upon the circumstances that apply to each particular community.

Under such conditions—leaving out of consideration the question of one-man versus two-man operation—the matter of platform expense ceases to be a factor, because a certain number of cars must be run during each hour and each car will have two platform men (or one if permitted by the circumstances applying to the particular community). The problem of car capacity then becomes one of expense for maintenance and power, considered in connection with rush-hour conditions. If there were no peak the car-body capacity would, of course, be directly determined from the number of passengers normally requiring transportation under the conditions of headway found locally to be most desirable, with an allowance for future growth of the community. However, a peak is practically inevitable in city service, and consequently it becomes conceivable that the extra weight of a large car body may profitably be hauled through the non-peak hours merely to save the cost of trippers during the rush, thus following the previously-mentioned general rule regarding the economy that may be expected from the use of the large car body.



Standard Type Single-Truck Car for Marshall, Tex.

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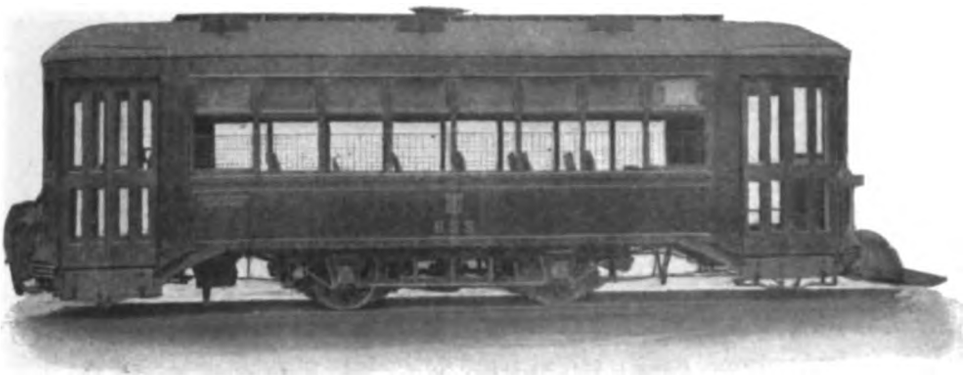


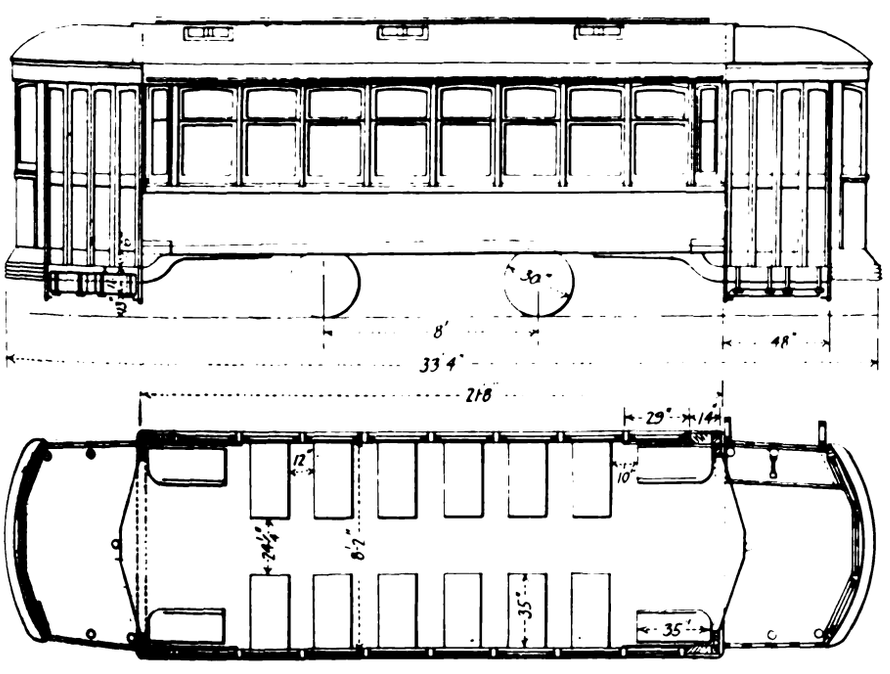
If, for example, the weights of the two previously-mentioned fifty-passenger and thirty-seven-passenger cars are assumed to be respectively 33,000 lb. and 24,000 lb., the cost of hauling the additional weight of the large car during the fourteen non-peak hours will be 32 cents per day for power, this being based on 110 miles run, 130 watt-hours per ton-mile, and an off-peak energy cost of ½ cent per kilowatt-hour. Maintenance and miscellaneous expense at 4.4 cents per car-mile in the case of the large car would mean an increase of 1.1 cents on this score also, or for 110 miles, an increased cost of $1.21 per day, which, added to the power cost, would total $1.53.

However, during the peak the large car's 35 per cent greater capacity will permit it to save the expense of, say, one-third of a tripper car. Tripper-car operating expense naturally will be much higher than the normal car-mile cost and may be assumed at 30 cents per car-mile. Then, during a four-hour peak, the tripper would run, say, 30 miles and would cost $9 daily. One-third of this sum, or $3, would be saved by each large car in normal service, since the increased size would be equivalent to one-third of a tripper. Hence, the saving by the use of the large car instead of the small one would be $3 per day, while the loss due to the extra maintenance and the power consumed by hauling the added weight during the non-peak hours would be only $1.53. The net saving for the large car would then be $1.47, and, under the conditions cited, it would pay to use the big units even though they would normally be only three-quarters full during almost the whole day. It might be noted here that no allowance for interest charges have been made in the above figures, the reason being that the increased cost of the large cars would be roughly offset by the cost of the tripper cars required in case the small cars were used.

Such conditions as these seem to be the rule rather than the exception, judging from the record of recent construction, so that here again is support for the general rule that it pays to use large cars within the limits set by past experience.

INFLUENCE OF THE SINGLE TRUCK

It might well be remarked here, however, that the factor of headway becomes increasingly important as the population of the locality that is served becomes less, and hence the advantages of the large car body has a decreasing value. When extreme conditions obtain, the single truck becomes a feature of decided importance, because its economies may be sufficient to turn the scale against the use of a large car body, and thus warrant the use of a smaller body that can be mounted on four wheels.



Recently Constructed Single-Truck Car for Albany

Assuming good track, there appears to be no question that the single-truck car (within its physical limitations) would be invariably preferred to the double-truck design. The reasons begin with reduced first cost, which has been found in the case of some single-truck cars to be as low as two-thirds of the cost of small double-truck designs of equal seating capacity. In the second place the weight is less,

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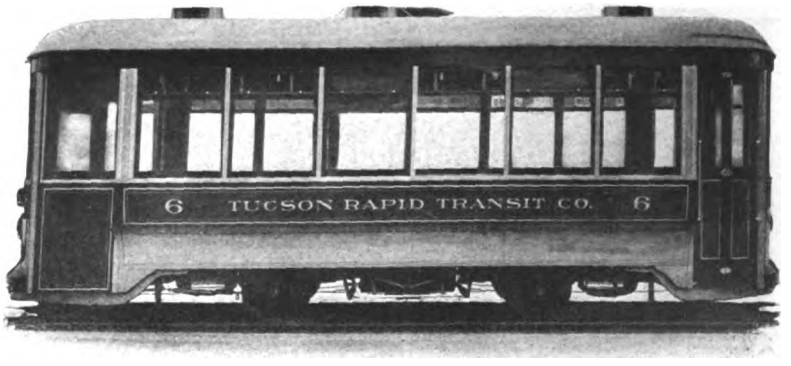
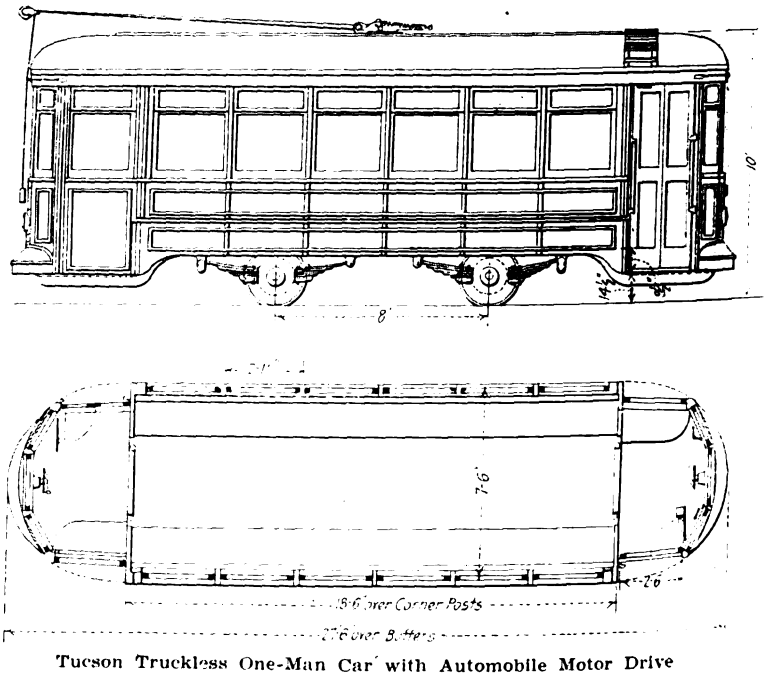
the difference in favor of a single truck for a design approximately 35 ft. in over-all length being of the order of 3 tons. Finally, there is a reduction in maintenance cost because there are fewer wheels and axles to maintain as well as only about half the number of truck parts, brakeshoes, journal bearings, trolley bases and the like.



The absolute maximum of car-body length that appears to be permissible with a single truck is 35 ft. and most of the recent single-truck cars are even slightly shorter than this. Therefore, when circumstances favor the use of a car that is appreciably less than 45 ft. long it is obviously desirable to skip intermediate sizes and go to a body length of 35 ft., thus permitting the use of a single truck. Here, of course, the general rule of using the largest body is upset, in the main, but the rule's influence appears, nevertheless, in the obvious existence of a marked tendency to use, with single-truck cars, the largest body that can be mounted on a single truck. The tendency is demonstrated by an analysis of the motor-car orders for city service in 1915. This shows that while there were twenty-one lots of standard cars with a length approximating 45 ft., only four lots were ordered with lengths between 35 ft. and 40 ft. No less than nineteen orders, however, were placed for cars between 30 ft. and 35 ft. in length, while, notwithstanding the sudden popularity of the ultra-small car designed solely for one-man operation, only ten orders were placed for small lots of cars less than 30 ft. long.

Although the maximum length for single-truck cars has been stated to be 35 ft. measured over bumpers, it should be noted that this length is attained only by use of a non-parallel-axle truck and that the single-truck cars with rigid axles do not appreciably exceed 33 ft. in over-all length. The reason is, obviously, excessive overhang of the car ends because of the relatively short wheel-base which is required with rigid-axle trucks, and which tends not only to make the car pitch or "gallop," especially on bad track, but to require excessive clearance on curves as well. Of course, the non-parallel-axle truck eliminates most of these difficulties, but in case it is used there is lost much of the advantage of simple construction that characterizes the plain single-truck designs, and as a consequence, opinion is divided on the merits of the two types. A majority of the most recent single-truck car orders, as a matter of fact, have rigid-axle trucks, so that the tendency, if anything, appears to be to adhere to the older and simpler design.

Note should be made, however, of the record of the non-parallel-axle truck used in connection with the previously mentioned low-floor car of the Union Railway. A large number of these cars have been in service since October, 1914, and all of them are operating in a very satisfactory manner. The schedule speed ranges from 9 m.p.h. to 11 m.p.h., and the maximum speed ranges from 20 m.p.h. to 22 m.p.h., most of the cars having been worked on outlying semi-suburban lines where the track conditions are, to say the least, rather poor. At the time when the cars were placed in service a question arose regarding the possibility of excessive flange wear, but it has been found from experience that the flange wear is nearly normal and that rolled-steel wheels will run about 40,000 miles between turnings.



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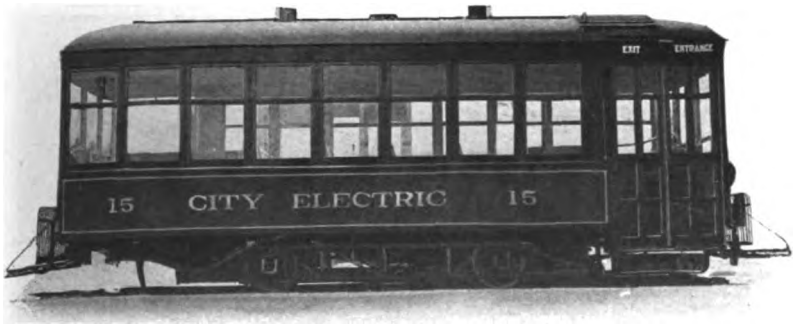


In connection with single-truck cars brief comment perhaps should be made in regard to door arrangement, because practically all of the cars are of the end-platform design. However, a center-entrance design has been purchased for Bangor, Me., and another for Hampton, Va. Both of these cars have single-axle radial trucks, and they have low floors like the Union Railway single-truck design. Otherwise recent single-truck designs display rather marked conservatism—a somewhat surprising condition because seating capacity, which is the glaringly weak feature of the single-truck car, may be greatly increased by adopting a center entrance, although it should be noted that the Union Railway design approximates the same effect by providing large platform seats.

THE ULTRA-LIGHT CAR

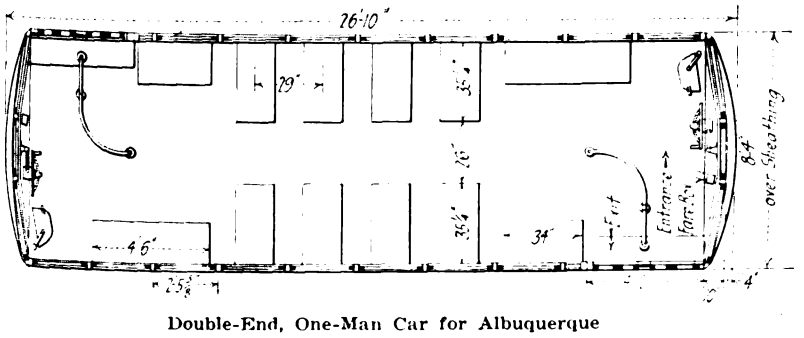
The ultra-light car is the most recent development of the single-truck type, although, as has been previously pointed out, it constitutes an entirely distinct tendency in design and contains no immediate prospect of directly displacing the larger unit. The reasons for and against its existence, which probably have been somewhat exaggerated in importance by the brief but costly activities of the jitney bus, are precisely those that apply to the single-truck car in comparison to the standard double-truck design. The ultra-light car saves in first cost, power, and maintenance over the single-truck car of normal design, but is handicapped by greater platform expense per passenger.

As has been pointed out before there is nothing to prevent any car from being operated by one man, so that the large single-truck designs have the advantage of being operable as either one-man or two-men cars in accordance with the circumstances applying to any particular locality. In fact, it is the practice in several communities to operate single-truck cars, or the equivalent, with one man during the light hours and with two men during the rush, or to operate with one man in outlying districts and with two men in congested zones by having conductors board the cars when they reach the business section of the town.

With the ultra-light car, however, such combined operation is not very readily permitted, primarily because of the car's compact construction, but also because of its small capacity. Its comparison with the large-size single-truck cars operated by one man is no more than the problem of proper car-body capacity that exists between the single-truck car and the double-truck car operated by two men. If the ultra-light car can save enough in first cost, maintenance and power during the off-peak hours to pay for the operation of trippers during the peaks, it is profitable; otherwise the greater capacity of the large single-truck car is preferable regardless of the headway that is necessary to attract traffic. Available information on the cost of operation of ultra-light cars is insufficient as yet to permit even the roughest of approximate estimates on this point, and as some doubt has been raised as to the lasting qualities of excessively light car-body constructions it seems best not to attempt to make comparative figures. There is, of course, no doubt but that the car-building records show a rapid growth for the ultra-light class of cars, but at the same time there is absolutely nothing to show that the class is going to be permanent.

CAR-BODY WIDTHS.

From the foregoing résumé of the existing situation as regards car-body size it is evident that city cars may be very definitely grouped according to their lengths. A double-truck car may be arbitrarily assigned a length of 45 ft. without being more than 5 per cent away from the standard adopted in a large majority of the important cities in the country, while a length of 33 ft. is still closer to the average standard for single-truck cars, if the 35-ft. non-parallel-axle designs are excluded. Ultra-light cars have not yet been built in sufficient numbers to display any ten-



Double-End, One-Man Car for Albuquerque

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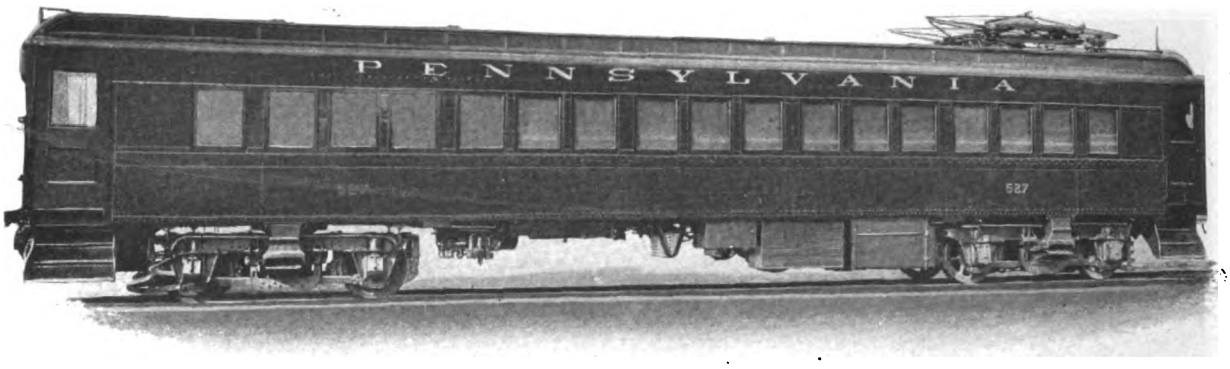


dencies toward a standard length, but 25 ft. would represent a fair average.

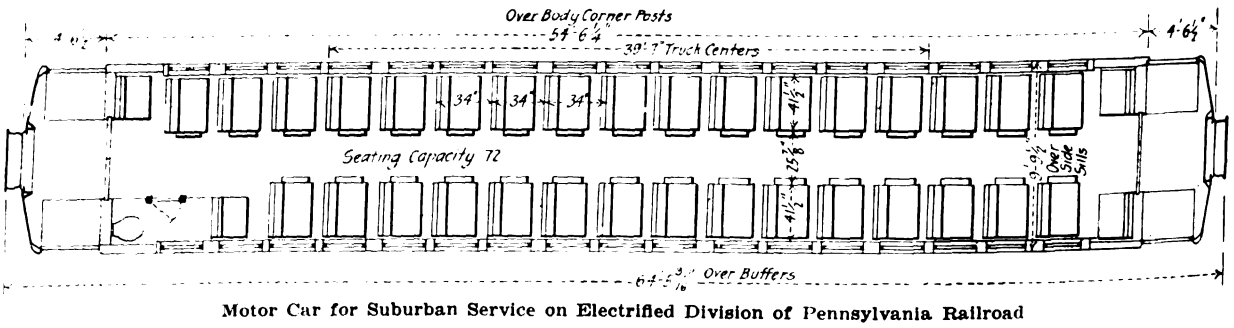
Car-body widths, on the other hand, do not appear to be subject to classification. However, an analysis of the orders for cars that were placed during 1915 and the first half of 1916 shows some rather surprising tendencies toward certain preferred dimensions. Of these orders for new cars, thirty-seven, or nearly one-half, were described in the ELECTRIC RAILWAY JOURNAL, and of these thirty-seven lots of cars, no less than nineteen had widths over the belt rails which ranged from 8 ft. 4 in. to 8 ft. 6 in. Of the orders for cars narrower than this only one was for a double-truck car, this covering equipment 7 ft. 10⅜ in. wide that was built for Pittsburgh, where extremely narrow streets and sharp turns are the rule in the business district. The other narrow cars are of the single-truck type, five out of the thirty-seven lots bought during the year being between 8 ft. 3 in. and 8 ft. 1 in. wide. The latter figure is the low limit except for ultra-light cars, of which there are three in the list, ranging from 7 ft. 8 in. to 7 ft. 10 in. Extremely wide cars are also limited in number, there being five lots with widths between 8 ft. 7 in. and 8 ft. 9 in., together with one 8-ft., 11-in. car that is operated in semi-suburban service, and one California-type car with the rather astonishing width of 9 ft. 2 in.

TABLE VI—WIDTHS OF AISLES AND CROSS SEATS FOR RECENT CITY CARS

Car	Width over sheets, ft.-in.	Side wall thickness, in.	Aisle width, in.	Seat width, in.	Remarks
New Orleans	8–5	½	26	37	Window sill overhangs seat 2½ in.
Empire United Railways	8–3¾	2⅜	25	35	
Bay State	8–2	5	24	32	Low window-sill, flush with seat.
Wilmington	8–2	1	24	36	
Des Moines	8–2½	1¾	23	36	
Baltimore	8–2	2⅛	21¾	36	Wooden car, Low side-plates under seat.
East Liverpool	7–11½	1	21½	36	
Kansas City	8–6¼	1⅞	28½	35	Window sill overhangs seat 1¼ in.
Boston (trailer)	8–4¾	1⅜	28	35	
Pittsburgh (Single-end)	7–9⅝	⅛	24¾	33½	

From these figures two important conclusions are inevitable. One is that a width of 8 ft. 4 in. over belt rails would be suitable for some 95 per cent of the localities in which double-truck cars are used, and the other is that this width, although it may not be liberal, is at least sufficient, as exemplified by the relatively large number of cars built with this dimension and by the fact that the Pittsburgh cars are very much narrower.

Of course additional width is always desirable to provide the maximum width of seat and aisle. Yet the accompanying Table VI, covering seat and aisle widths of a number of modern city cars, shows that with a not unreasonable seat and aisle, a total width materially less than 8 ft. 4 in. is easily obtainable. In this table the widths are measured over side sheets instead of over the belt rails so as to eliminate the variable item of belt-rail thickness. The figures in the column headed "Side-Wall Thickness" represent the sums of the dimensions for thickness of side sheet, side-wall insulation, and clearance between the insulation and the outer edge of the seat cushion on each side of



Motor Car for Suburban Service on Electrified Division of Pennsylvania Railroad

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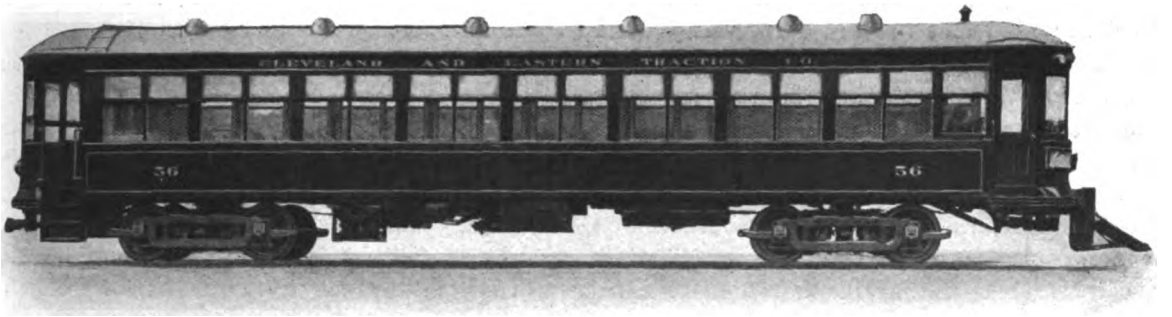


the car; or, in other words, the distance between the seat and the outside of the side sheet.

Judging from the figures in the table a seat width of 35 in. cannot be called unduly narrow since it appears for cars in the list that are not cramped for width. Also, an aisle width of 24 in. seems to be at least an average, while a side-wall clearance of 1½ in. is evidently quite possible, especially in view of the possibility of increasing the effectiveness of over-all width in various ways. One of these is to have the window sill overhang the edge of the seat at the passenger's waist line, as noted for the Kansas City and New Orleans designs, and another is to have a low window sill flush with the seat, as noted for the Bay State car. Then, if a side-wall clearance of 1½ in. is accepted as permissible, together with a 35-in. seat and 24-in. aisle, the width over side sheets would become 8 ft. 1 in., and if ½-in. belt rails were used, the width over these would total only 8 ft. 2 in.

THE LOCAL CONDITIONS FALLACY

It is evident, therefore, that a width of 8 ft. 4 in. at least could be adopted by the great majority of electric railway properties, and this fact, together with the previously mentioned possibility of length grouping demonstrates that the influence of local conditions on over-all dimensions is, after all, almost negligible. As a matter of fact, the importance of the whole theory of local conditions as affecting car-body dimensions has been greatly exaggerated in the past, and the belief that each community required a car-body of special size has been quite unwarranted. If differences in capacity should exist logically, they should, as already outlined, vary at least roughly in proportion to the size of the community, yet the record of recent construction demonstrates that this is anything but the case.

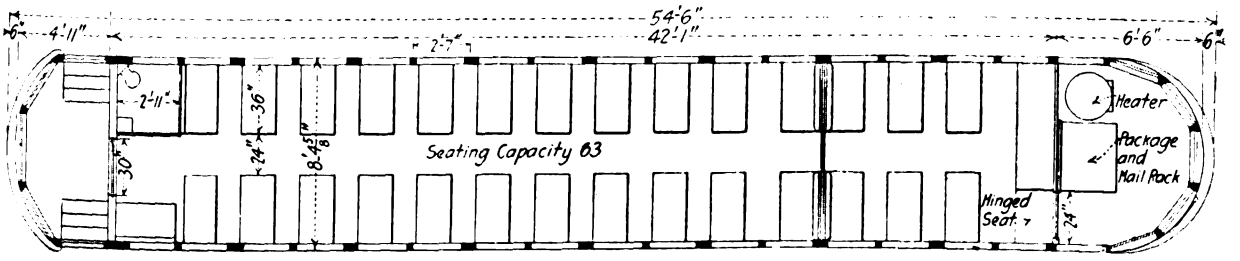
The latest equipment in New York City, for example, is decidedly smaller than that in Rochester. Des Moines, with a population of 86,000, and Pittsburgh, with 534,000, have standardized on practically the same design. The latest Chicago and New Orleans cars are almost exactly alike, notwithstanding the different characteristics of the two cities and their respective populations of 2,100,000 and 330,000. Binghamton with 37-ft. cars has a population of some 50,000, while Charleston, S. C., with 58,000 people, uses 41-ft. cars.

Summed up, the local conditions theory, as applied to general dimensions of car-bodies, is plainly a fallacy. For city cars maximum widths may be desirable, but anything over 8 ft. 4 in. is not essential. Maximum lengths are, perhaps, essential, but these have been limited by experience to about 45 ft. for one class of equipment and to about 33 ft. for another class, with a possible third class, in the vicinity of 25 ft. long, in process of development. Minor variations from these sizes are wholly unnecessary.

CAPACITIES OF HIGH-SPEED CARS

Cars in high-speed service are manifestly free from either of the dominating factors that control the size of city cars, since the influence of schedule speed arises only from the indeterminable number of stops made throughout city runs, and the influence of headway is of relatively negligible importance in interurban service and heavy electric traction. The dominating feature for high-speed cars is, therefore, one of clearances.

On steam roads, right-of-way clearances are well



Light Interurban Car for Cleveland & Eastern Railway

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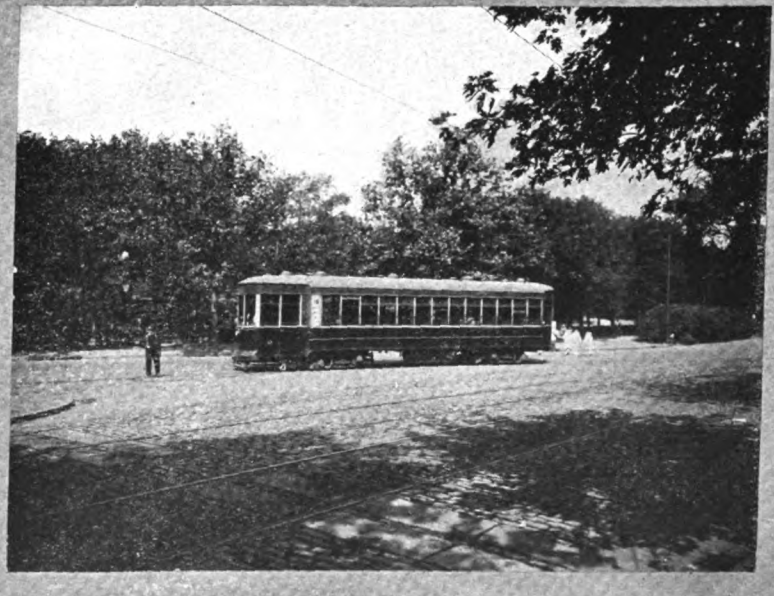
established, and they give arbitrarily permissible dimensions up to about 70 ft. in over-all length and about 10 ft. in over-all width. Interurban cars would, no doubt, approach these figures except for the fact that, normally, interurban service requires operation in city streets. It is true, however, that the route through a city to the terminal may be selected with regard to the clearance problem so that interurban cars may be both longer and wider than city cars operating in the same terminal towns. But this factor, in general, keeps length, and especially width, much less than in cases where private rights-of-way are used altogether. Suburban cars and those on the border line between suburban and interurban service range apparently between 8 ft. 6 in. and 8 ft. 8 in. in width, the former figure being common in the case of city cars. True interurban service, however, appears to call for widths from 8 ft. 9 in. all the way up to 9 ft. 6 in., while length ranges from 55 ft. up to about 61 ft. Seating capacities, as mentioned before, vary widely because some of the cars have baggage compartments that cut as much as one-fifth from the space available for the installation of seats.

Rapid transit car capacities are even more strongly influenced by clearance limitations than those for interurban service. There is, however, an obvious tendency to adopt the largest possible size of unit in new constructions, where clearance lines may be established arbitrarily to suit the rolling stock that is to be operated. This is in evidence in the subway cars of both the Boston Elevated Railway and the New York Municipal Railway, which have respective over-all dimensions of 69 ft. by 9 ft. 6 in., and 67 ft. by 9 ft. 9 in. Either one of these cars would be considered large even for heavy electric traction. The object is, clearly, limitation of platform expense, and in view of the high first cost of building a subway of large cross-section to permit large cars, the tendency to build large rapid transit cars is further evidence of the workings of the general rule in car design to adopt the greatest dimensions permissible with existing conditions.



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Construction Materials and Framing Design

Steel has become universally used for carbody framing within the past five years, although other materials are probably more popular for roof and floor sheathing and for the finish in general. Semi-steel constructions with wooden posts are still used in city service but all-steel city cars are steadily increasing in number, thus bringing about a complete revolution in methods of construction and design which extreme simplicity and universal abandonment of supporting underframes are prominent features.

REFERENCE has been made in a foregoing chapter to the fact that there has been a practically universal substitution of steel for wood as a material for modern car-body construction. This change has been made very rapidly and, naturally, it has revolutionized car design from a structural standpoint, rendering wholly obsolete many types of construction that were common, at least in city service, not more than four or five years ago. As a result there has become common to all new cars the plan of supporting the weight by the sides instead of by the floor framing.

The use of the side framing to carry the weight of the structure as a whole is by no means a new idea, but so long as wood remained the most commonly used material, the practice of building a light superstructure upon a heavy floor construction retained popularity because it was cheap. Since steel has come into use, however, the heavy underframe has been rendered more costly than side supports, and the "house-on-a-flat-car" principle of construction has given way to the side-girder and truss-side designs.

General Principles of Modern Design

Between these two latter types there exist only differences in detail. The side-girder design provides for load-carrying members composed of the side sheathing that extends only between the side sills and belt rails, while the posts are designed merely to carry a light roof. A modification of this is found in cars with steel roof sheathing supported by rather heavy corner posts, the rigidity of the steel roof being said to be sufficient to make the light side posts act as hangers at the center and ends of the car and aid in carrying the load at the

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points of greatest deflection. In general, however, the idea of side-girder construction is to make the roof as light as possible, and this, together with certain difficulties that were originally found in making up satisfactory steel posts, has resulted in the establishment and, to some extent, the retention, of the so-called semi-steel car—a design providing for steel-plate girders up to the belt rail, and wooden posts, letterboards and roof.

For side-girder designs this combination of materials is logical, but it is not altogether desirable because it has the inevitable disadvantage of inviting excessive corrosion wherever the wood comes in contact with the steel. Its advantage lies in the fact that, when deflection, or bending due to load, takes place in the relatively shallow girders extending only up to the belt rail, the light roof must bend with it and distort the posts. This distortion involves a certain working at the roof joints, and here the wooden construction has an advantage over steel in that it has inherent flexibility. If steel is used for the posts and roof, the slight working may involve either buckling of plates or else loosening of rivets, and these in turn are frequently followed by leaking joints, rusting and rapid deterioration.

Such difficulties as these are avoided in the truss-side type of construction, in which the whole side of the car is designed to act as a unit, the posts being made strong enough longitudinally with the car to absorb the shearing force that is set up between the roof and the floor when deflection takes place. In consequence, the load-supporting members, or girders, are increased in height from, say, 3 ft. to about 8 ft., and the rigidity of the structure is greatly increased, while any tendency to develop working joints is avoided. For city cars the additional strength and stiffness is very generally considered to be needless, and at the same time the strains are limited because of the rigid track and low speeds, thus reducing to some extent the objectionable features of working posts and roof sheathing. But for high-speed cars the reverse is the case, and this is reflected by the frequent adoption of the truss-side principle in their design.

The essential feature of such a construction appears in a considerable longitudinal width of post, although the effect may be produced without using wide posts by introducing panels at the points of maximum shear which occur a short distance inside of the bolsters and at the extreme ends of the car. The equivalent of such an arrangement has appeared in rapid transit cars where window spacing may be irregular, but under ordinary conditions the matter of appearance seems to be of sufficient importance to warrant the maintenance of the same dimensions for all posts, even though there may be no stress at all upon those located at the points of zero longitudinal shear, or at the center of the body and over each bolster.

Rigidity in the posts against this shear is generally provided by riveting them to the side sill, the side sheathing and the belt rail and to a deep steel letterboard at the top. However, the thickness of side sheathing has been decreasing very generally, $\frac{1}{8}$ in. having once been almost universal for city cars, while $\frac{3}{32}$ in. is found most frequently to-day, and even $\frac{1}{16}$ in. is not uncommon, and since sheets of less than $\frac{3}{32}$ in. thickness have but a questionable girder strength on account of their readiness to buckle, it is probable that, when the thickness is less than this figure, the side-sheathing plates act only as gussets to hold the heavier members square. Plate thicknesses of $\frac{1}{8}$ in. for high-speed cars are quite common for side sheathing, but when the so-called "unit" type of construction is used, the sheathing serves merely as a protection against the weather and is made $\frac{1}{16}$ in. or less.

In this unit type of truss-side design, each side post, together with half of the window width of letterboard on each side and two diagonal braces at the bottom of the post, are pressed out of a single piece of steel, and by riveting a series of these units to a side sill at the bottom and connecting them together at the top, the whole side framing of a car is formed. No belt rail is needed except as a top for the side sheathing, which, as above remarked, does not assist the load-carrying structure. This, it may be said, constitutes probably the best illustration of the pure truss-side principle that is to be found in modern cars.

SIMPLICITY IN DESIGN

Simplicity in construction has really been forced into existence by the change in car-building methods accompanying the introduction of steel. When wood was the sole material of construction, cars could be almost whittled out from the wood pile. Jigs and dies were practically unknown, and when similar methods of construction were applied to the earliest steel cars, the result was equipment of excessive weight and unreasonable cost.

In the later designs, however, the framework of the body has been simplified until it consists of nothing but a side-sheathing plate, a side sill, a belt rail, posts, carlines and a roof which may or may not include a relatively heavy letterboard or plate. These items, together with crossings that rest on the flanges of the side sills and support the floor sheathing, comprise all of the pieces necessary for the framing of a car between corner posts, and with each addition that the designer makes, just so far does he fall short of his ideal.

Undoubtedly the omission of center sills from the above list of essential members is worthy of comment because this marks most prominently the

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dividing lines between the new and the old. During the past two years hardly a single order has been placed for city cars that were so equipped, and in the same period the center sill has begun to disappear from interurban car designs. For heavy service, equivalent to that provided by steam railroads, a form of center sill has been retained of necessity because this is called for by federal rules for postal-car design, but that it is not essential may be judged from the fact that structural members of the cross-sectional area of, say, 24 sq. in. as used for steam railroad equipment will not support themselves across the space between bolsters of long cars, and in consequence they actually have to be held up by crossings between the two side frames. Under such circumstances the center sills have, no doubt, a certain collision strength, but the extent to which they relieve the body framing in case of a collision is problematical. The entire question of collision strength is, of course, less important on electric railways than on steam roads where heavy trains are the rule, this being recognized in the federal specifications for postal cars by the assumption of a buffing load of 200,000 lb. for electric railway service as against the 400,000 lb. specified for steam roads with trains weighing more than 300 tons.

FLOOR CONSTRUCTION.

Aside from the necessity for supporting center sills, the framing for floors has been notable in its adherence to the principle of simplicity, the preferred arrangement being the use of crossings which are framed into the side sills at the bottom of the side sheathing. Vertical strength is provided through connections to the side framing. To give horizontal strength, which is supposed to be necessary to keep the car from being sprung out of line, gusset plates and diagonal members are very liberally installed in high-speed cars. For city cars, as well as those used in light interurban service, diagonal bracing is also used to give horizontal strength to the floor framing, but frequently these diagonals are so long that they may be stretched under comparatively light stresses and, therefore, they fail absolutely to provide any real rigidity.

Within the past few years there has appeared, even for city cars, a tendency to use steel flooring, and when the material is of reasonable thickness and is riveted to the floor framing it would seem to provide ample stiffness in a horizontal plane, although in a recent city car a thickness of only $\frac{1}{32}$ in. has been used, this being plainly incapable of exerting any great girder strength.

Naturally, when a steel floor is adopted there is a very definite need for a covering not only to provide a secure footing, but also to insulate the floor against extremes of outside temperature. Compressed granular cork about 1 in. thick appears to fulfill the requirements very satisfactorily, and with a surface of battleship linoleum it has been utilized in several recent cars. This arrangement has hardly been in electric railway service long enough to demonstrate its desirability under all circumstances, but that it has been used for years on the decks of steamships points to its probable durability, and as a matter of fact linoleum has appeared as a floor surfacer even in some recent cars with wooden floors. Heat insulation for the floors of heavy, high-speed cars very generally takes the form of a layer of mineral wool or some such material, supported on a false floor of thin steel that is located a few inches below the main flooring.

Floorings that are most commonly used include, first of all, wooden sheathing which has the advantages of low first cost and simplicity because it may be attached direct to the floor framing over reasonably long spans. At the same time it provides an excellent footing on its upper surface. It is undoubtedly the most popular material for floor sheathing on city cars. For heavy cars, however, and especially in the case of rapid transit service, the sanitary qualities of a cement composition that may be molded up into smoothly-curving coves at the walls and at corners where dust might readily collect, have been considered of prime importance. Such composition floors, which weigh about 7½ lb. per square foot when made 1¼ in. thick, are generally laid upon steel sheets corrugated in various forms to provide beam strength, and these sheets span the space between the side sills and center sills, thus eliminating the need for longitudinal members that would be required with the lighter forms of floor. The use of corrugated steel has involved, in many cases, a rather rapid corrosion throughout the under surface of the floor because of the tendency of flying mud or dust underneath the car to become caked in the hollows. Consequently there has been a tendency to use noncorrodible ingot iron for floors as well as for roofs and side sheathing.

The footing that such composition floorings provide may be made ideal by the introduction of a small amount of anti-slip material in the cement mixture, thus making the whole floor a safety tread in effect. However, specially designed safety treads have come to be universally used on the surfaces of all steps and at bulkhead and vestibule thresholds regardless of the type of flooring. The need for them is obvious, especially in wet weather when the customary wooden steps and wooden vestibule floors are saturated with water and in consequence are slippery. One of the recent developments in this field is the elimination of the metal side housings for the strips of abrasive material which have been common in the past. In this case

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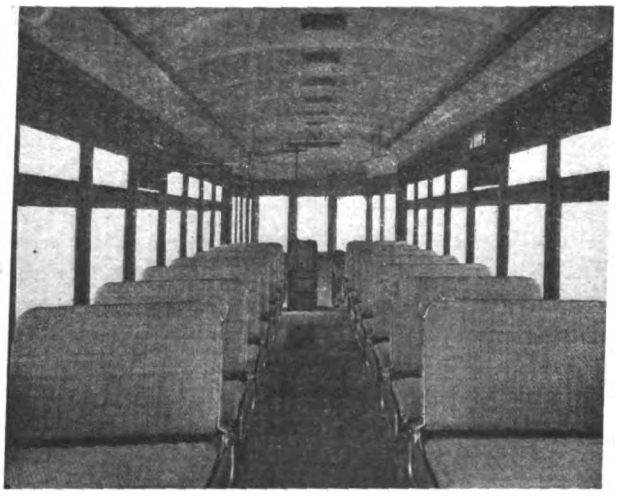


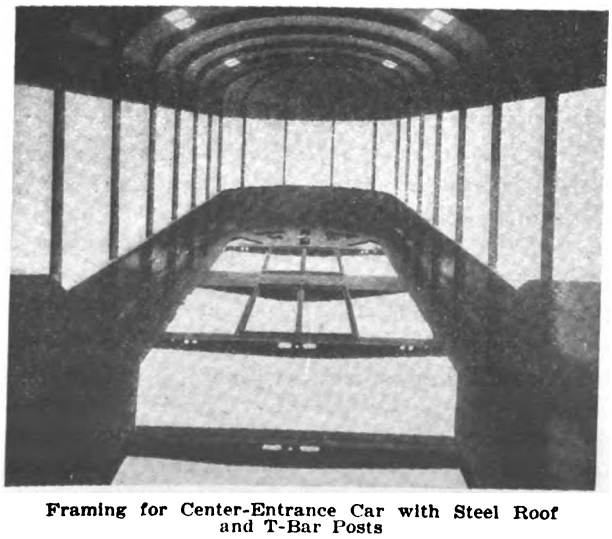
Exposed Carline Finish for Ceiling

the abrasive material is completely exposed, being held together by a soft metal binder composed largely of lead. The required durability is attained by the hardness of the abrasive grains.

ROOF CONSTRUCTION

Roof constructions for modern cars, like their floors, are essentially simple in design. The monitor deck has finally been relegated to the list of antiquities, and with the plain-arched roof that has replaced it, the entire roof structure is composed almost invariably of no more than carlines, a roof sheathing and a weatherproof covering.

Generally, the carline spacing corresponds with that of the side posts and it is very seldom that intermediate carlines are used. Steel is a much preferred material for carline construction even with semi-steel cars, this being made possible by the gradually increasing degree of sanity in the railway operators' viewpoint on the contours for arched roofs—a most unimportant feature which nevertheless has made a lot of trouble because of the insistence with which special outlines have been demanded in the past. At present, however, there is an evident tendency to accept some contour for which the car builder already has dies, and this permits the manufacture of steel carlines at a reasonable cost.



Framing for Center-Entrance Car with Steel Roof and T-Bar Posts

As in the case of the floor, the most popular material for roof sheathing for city cars is wood, because of its low first cost and ready adaptability in application and in weatherproofing. Steel roof-sheathing has certain previously mentioned structural advantages, but it also has serious disadvantages unless the car is of the truss-side design that permits the roof to act in harmony with the framing, this being more common for high-speed cars than for city cars. Nevertheless, there is evidence of increasing popularity for the steel roof in city service in thicknesses as small at No. 18 gage, although it will be a long time, no doubt, before steel, or any of the composition-board materials which also have begun to come into use for the purpose, will surpass wooden sheathing in popularity.

With the steel roof, of course, there are two major difficulties, namely, weatherproofing and insulation. Within the last few years the former has been overcome by electrically welding all seams after they have been riveted, but still more recently a number of cars have been built with a 1-in. layer of compressed cork on top of the steel sheathing, and when this is covered by a layer of roof covering cemented to the cork, the roof is made tight and is insulated as well. Such a construction has the advantage of eliminating the need for headlining, and hence the carlines are exposed in the car interior. From the standpoint of appearance the result, of course, is unconventional, but it is pleasing, nevertheless, because the monotony of the plain ceiling is broken up into panels by the exposed carlines.

Where an uninsulated steel roof sheathing is used headlining is generally considered as a necessity so that a dead-air space may be provided. However, on some very recent cars, designed mainly for summer use, neither headlining nor insulation has been provided. With roof sheathings other than steel the need for headlining is, at least, problematical, although it is very widely used at the present time, presumably because of excessive conservatism in regard to the above-mentioned matter of appearance of exposed carlines. Birch veneer or sheets of compressed wood fiber or equivalent compositions are almost invariably used as a material for this purpose, and the customary thickness of ¼ in. makes a weight of 0.8 lb. per square foot or, say, 200 lb. for the whole headlining. This constitutes a material addition to the weight of the roof, which if made of plain 1/16-in. steel would weigh 2½ lb. per square foot, or about 3½ lb. per square foot when cork insulation is installed. A

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⅜-in. wooden roof sheathing would have less beam strength than the steel, and less gusset strength, but would weigh about 1¼ lb. per square foot, including the necessary canvas covering. The latter, it may be said, appears in many recent cars in the form of a specially woven cotton fabric impregnated and coated with a combination of oils to make it weatherproof. This fills the material so that it is necessary to paint only with one coat to give it the desired color. The weight ranges from 3 oz. to 4 oz. per square foot.

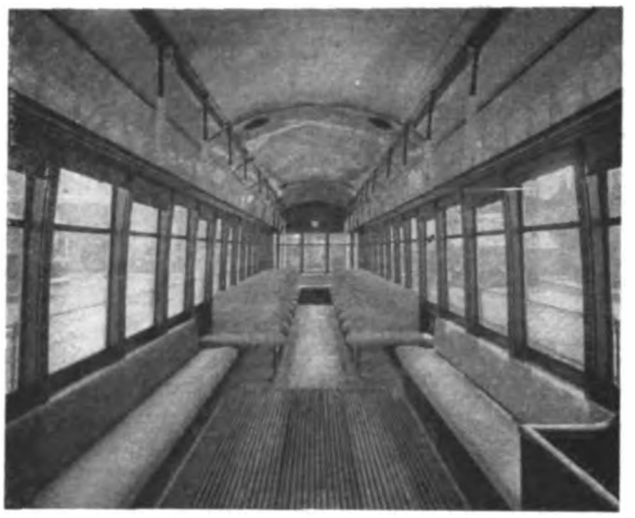
POSTS AND SIDE-FRAMING

The wooden side posts that are used with semi-steel cars display no differences from those used years ago when all-wooden cars were the rule, and they warrant no comment except, perhaps, that the straight post has come to be invariably used since the so-called hub clearance for city cars has been given up. Steel posts may be separated into four classes, namely, the T-bar, the tubular, the U-shape and the built-up, and each one of the designs has strong supporters.

Generally, when the T-bar post is used it is so made as to arch clear over the car and thus provide a pair of posts and a carline in a single member. It has, thereby, the great advantage of simplicity, but the necessity for attaching window guides of steel or wood offsets this to a certain extent. Since it has but little rigidity it is incapable of withstanding any great longitudinal shear and it can be used, therefore, only with side-girder designs. This limitation applies also to the tubular post, which seems now to be less popular than the other forms, possibly because of its high first cost. The tubular post, however, is the acme of simplicity once it is molded to form the window guides, and it can be easily repaired, if it is damaged, merely by driving into it a piece of iron that is shaped to suit the various grooves and corners in the original cross-sectional contour.

The U-shaped post lacks the inherent simplicity of the foregoing types, but as opposed to this it is very easily made up or repaired because of the thin metal and the possibility of access to the inside before the cover plate, which is customarily used, is attached. For city cars of the side-girder design these posts are made of, say, No. 16 gage sheet steel, with a cover plate of the same material riveted with exterior joints across the open part of the "U." In some cases the carlines have been formed to the same shape and inserted in the ends of the posts, thus giving the same effect as the continuous T-bar construction previously cited.

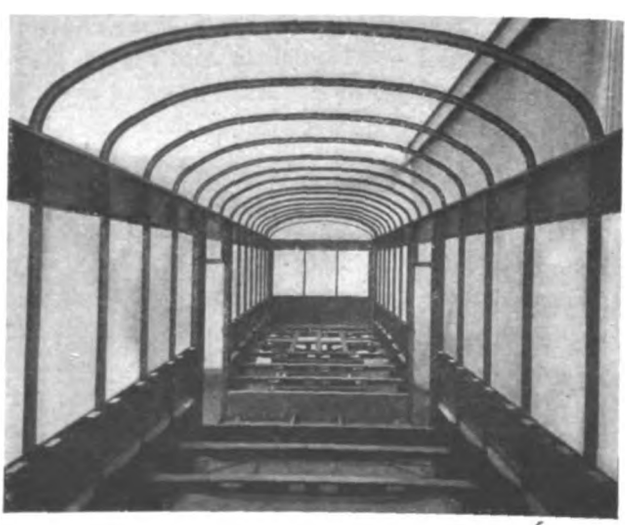
The "built-up" post is designed with considerable width solely for truss-side constructions, having two structural members, one at each edge, and a plate connecting the two to give a strut having great longitudinal rigidity. The plate thus acts as the web of a girder of which the members along the post's edge (generally angles) serve as the flanges. Such a design is, of course, more complicated and more costly than the other types and it is, in consequence, common only for high-speed cars where truss-side constructions demand great longitudinal strength for the posts.



Semi-Convertible Car with Sash That Slide Above Headlining

Side sills for light city cars are frequently 3-in. angles with the lower leg turned horizontally inward, and these members increase in size with harder service all the way up to an 8-in. channel for 70-ft. high-speed cars. The belt rail is generally in the form of a piece of flat steel or a dropper bar, say, ½ in. x 3 in., or ½ in. x 4 in., the long vertical dimension permitting it to hold the posts rigid when they are attached to it.

At their upper ends the posts are, of course, attached to the letterboard, and this, if made of steel, has a thickness ranging from 1/16 in. to ⅛ in. and sometimes, in heavier cars, has been reinforced with horizontal angles. In high-speed cars of truss-side construction the importance of the letterboard is much more likely to be underestimated than over-



T-Bar Posts Combined with Pressed Steel Carlines

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estimated, and it is significant that there has been inaugurated a recent design in which the customary ornamental Gothic sash above the windows have been discarded to deepen the letterboard. An approximation of the same idea appears in some cars that have the window rail at the bottom of the upper sash continuous for the whole length of the car, the rail being framed into each side post.

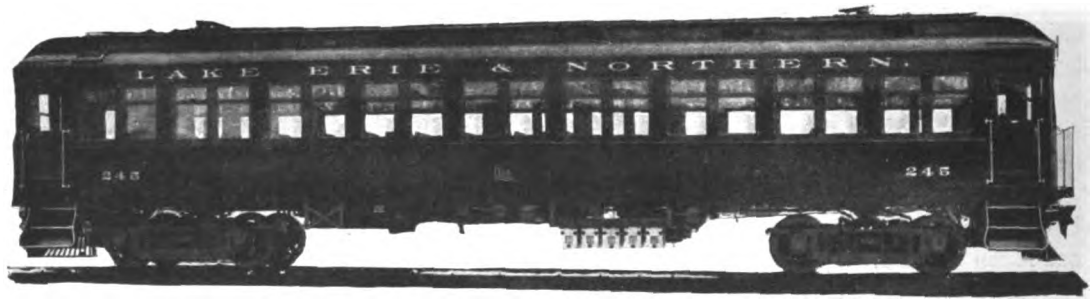
PLATFORM AND BODY-END CONSTRUCTION

With the practically simultaneous development of steel construction and the fully-inclosed car, the platforms for city cars have become more and more an integral part of the body rather than an attachment that merits only secondary consideration. Main platform knees are now made frequently of deep built-up sections with a beam strength corresponding to that of the side girders to which they are riveted, and occasionally the platforms are supported largely by the roof. Sagging platforms are practically unknown with properly designed steel cars, and the auxiliary platform knees near the center line of the car appear to be required to provide support against buffing strains at the center of the crown piece rather than for any supporting effect that they may have.

The end sill, which at one time had a very definite value as the base for the bulkhead in the old box cars, has also lost much of its importance and serves now more than anything else as a support for the auxiliary platform knees midway between their anchorages at the bolster and crown piece. The center-entrance car no doubt has had much to do with the situation, since it has shown definitely that there is no necessity for elaborate provisions, such as were once introduced at the corner posts, to stop weaving of the superstructure. Occasionally, special means for insuring transverse stiffness of the corner posts are installed, but in the main the bulkheads of modern cars are relatively shallow and light structures, dependence for rigidity of the roof being placed largely upon the strong connections between the posts and carlines that have been made possible by the use of steel and the plain-arched form that the roof generally takes. It is obvious, of course, that, except for a possible element of weakness introduced by the large vestibule-door openings, bulkheads could be eliminated altogether.

In the case of high-speed cars transverse strength for the superstructure has been elaborated in a number of instances by the introduction of a moderately heavy plate running for the entire length of the car and riveted to the carlines, thus acting like the flange of a channel whose web is the side framing. Such a stiffening member, in combination with properly designed carlines, would permit a car to be rolled over on its eaves without destroying the superstructure. This, it may be said, constitutes an argument for a flat roof contour, because when the angle between the roof and the sides at the eaves is a sharp one, the construction approaches more nearly to the ideal condition of strength in every direction that is displayed by a commercial angle-bar.

High-speed car platforms, of course, have always been constructed as an integral part of the car and have developed along lines wholly different from city car platforms. The reason has been that the high-speed, end-platform car has for years had its platforms supported on extensions of the center sills which carry also the bumper beams, vestibule housing and draft rigging. The universal use of interior steps for the vestibules has, in fact, practically compelled this arrangement, and under such circumstances the use of heavy bulkheads and end sills has been obligatory. The end sill is especially important because it serves as the last point of support for the out-board ends of the center sills.



High-Speed Motor Car for Electrified Lake Erie & Northern Railway

In this connection it might be well to mention the scheme used on the Pennsylvania and Long Island motor cars whereby no body bolster is installed, the center plate being attached to the center sills, while these in turn support the car body at the end sill and at a so-called cantilever beam extending across the car at a point equally distant from the center plate. Thus the overhanging ends of the center sills that support the platform are provided with an anchorage which gives a much greater leverage than when the sills are anchored only at the bolster.

Mention might also be made in connection with

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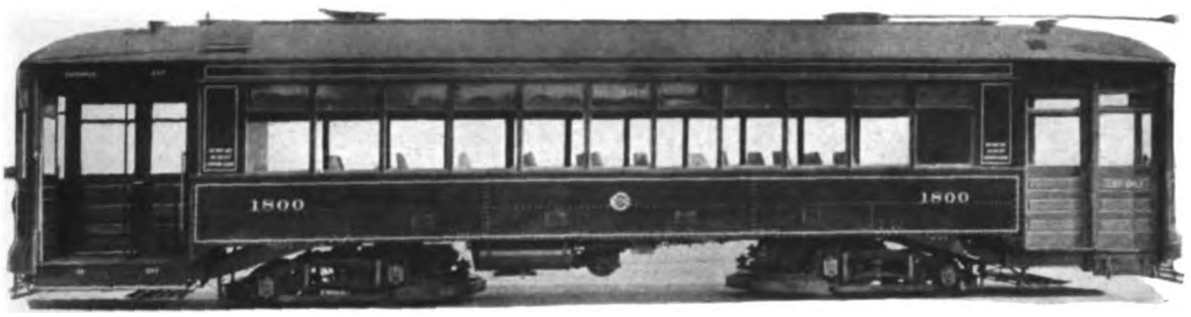
the end construction of high-speed cars, of the anti-telescoping construction used for the latest Long Island Railroad trail cars. This consists in the installation of two vertical 12-in. I-beams each framed into one of the two center sills at the bottom and located on either side of the end doorway. At the top, each I-beam is framed into a purlin that extends for the full length of the car and is riveted to each carline that it crosses. Thus the anchorage of the heavy upright I-beams develops the full strength of the body construction as a whole, and before the car could be telescoped it would be necessary to destroy every one of the connections between the side frame and the center sills and purlins that back up the uprights. This arrangement, of course, does not add to the strength of the car against cornering impacts, and here it might be said that the center entrance for high-speed cars has a certain advantage in this regard over the end entrance. The latter, because of the interior steps, depends upon the strength of the bumper beam in a cornering collision, and this has been demonstrated in practice to have not nearly so much ability to resist damage as the corner of a car in which the thrust is taken by the actual side framing of the body.



Semi-Steel Design Adopted in 1913 by Chicago Railways

For city cars the problem of buffing strength is confined to the vestibule floor framing, and here the modern tendency of simplicity shows to especially good advantage, since the old-style complication of multiple crown pieces has been discarded very frequently for the plain arrangement of riveting platform knees direct to the anti-climber. That heavy backing for the bumper is not necessary has been definitely shown in practice, steel cars that use only an anti-climber for a crown piece and bumper having stood severe impacts without as much damage as might be expected with an old-style wooden platform.

INTERIOR FINISH AND INSULATION

Reference has already been made to the practically universal use of birch veneer or composition board for the headlining. This is the most important item in connection with interior finish, although its necessity on the grounds of appearance plainly does not exist. Composition board is used also in a number of cases for sidelining below the window sills when an air space is provided next to the side sheathing, and steel is also semi-occasionally used for this purpose as well as for headlining, although the latter use is very rare. Other types of sidelining appear in the form of cork covered with linoleum or with canvas cemented in place, and it might be said that the latter arrangement, although it may seem to be incapable of standing much hard usage, makes strong and durable construction.

Sheathing for steel posts is sometimes provided in the form of wooden cover pieces, not so much on the grounds of appearance (although such a finish may be made very handsome), but rather to prevent exposure of cold metal to passengers' hands during low temperature weather. Composition board has been used for this purpose and also thin sheet-steel forms which provide a space that may be filled with mineral wool or some other type of heat-insulating material. The same result has been accomplished more simply when tubular or U-shaped side posts are used, merely by filling the interior of the post with mineral wool.

Insulation against noise is a feature of steel car construction that has been brought up only very recently, but it is almost as important as insulation against heat and cold. Of course, the steel car is subject to the evil effects of resonance when passing over rough track or special work, and to eliminate the noise, the plan of deadening all riveted joints has been introduced. This has been accomplished very successfully by inserting, between the two plates making up each joint, a layer of about 1/16 in. of felt. It has been found that this material compresses sufficiently under the riveting pressure to obviate working or weakening of the joint, and at the same time there have been no evidences of burning when hot riveting is employed. The result is that the whole car is thoroughly deadened, and when it is struck with a hammer at any point, the customary ringing sound is absent. In practice a car of this construction has been found to pass over special work with almost no noise that is noticeable, at least to the extent of being objectionable to passengers inside of the car.

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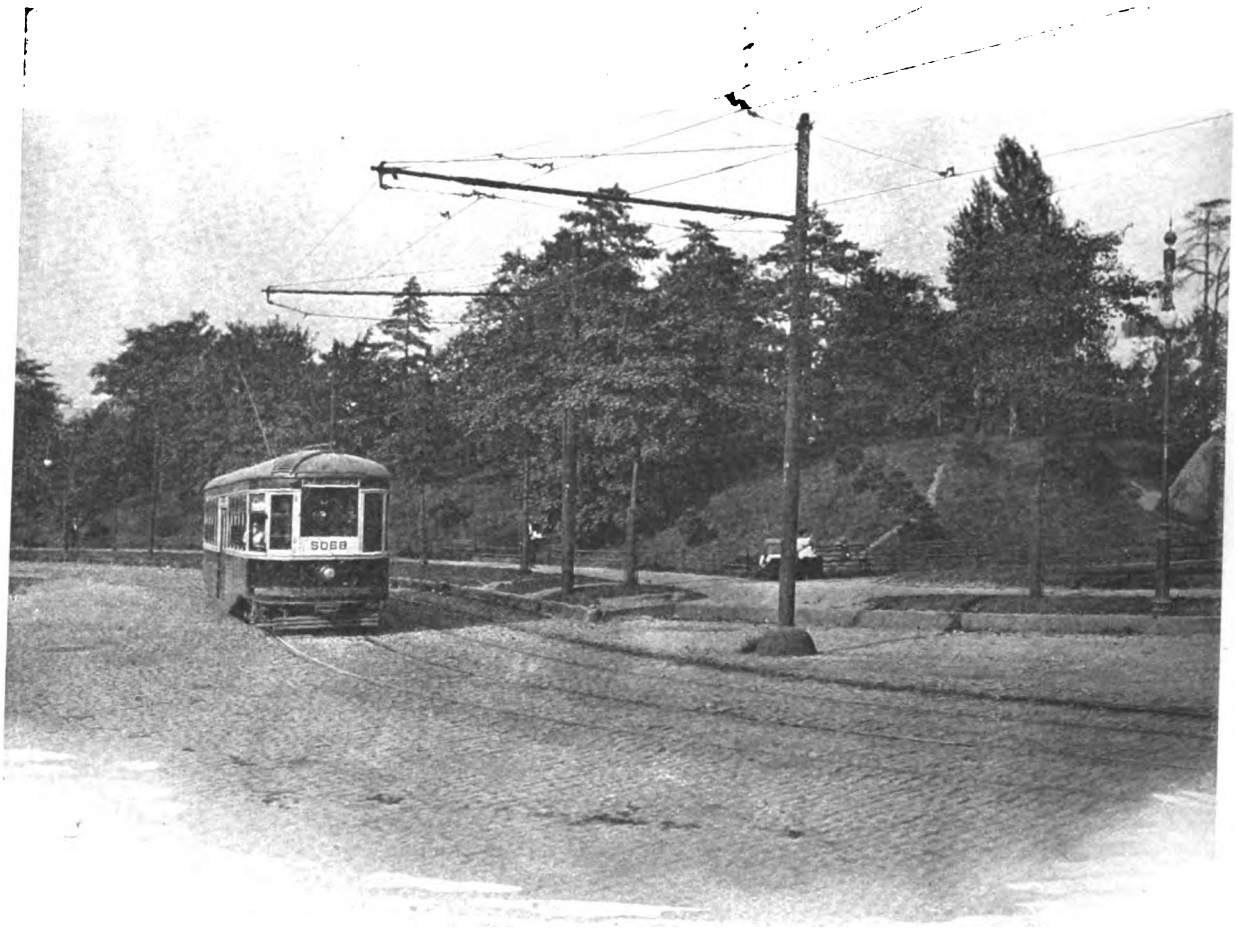

Heating, Ventilation and Lighting

Except for improved methods of control, electric heaters could hardly have been retained for modern cars because recent increases in inclosed volume for carbodies and decreases in weight would otherwise have doubled the percentage of the total energy demand that is consumed by the heaters. Requirements of ventilation have also been somewhat increased since the principles involved are becoming better understood, but the energy demands for lighting have been greatly reduced with the practical standardization of systems using high-capacity lamps and vertical glass-ware reflectors to diffuse horizontal light rays.

HEATING, ventilation and lighting of passenger car bodies may be classed as functions which may be only incidental to electric railway operation, but which are, nevertheless, essential to public convenience. That they should be satisfactorily performed is, therefore, a matter of material importance, and in recent years a great deal of attention has been devoted to the perfection of equipment designed with that end in view. However, this has not resulted in the development of any definite tendencies for modern practice except in regard to car lighting, for which general approval has been granted to the semi-direct system with the use of a few large lamps whose horizontal rays are diffused by glassware reflectors. Opinion with regard to heating and ventilating methods is decidedly divided at the present time. This is especially marked in the case of ventilation, possibly because of the unfortunate attempts of a few cities to settle by ordinance the complicated technical questions involved, and the resulting interference with the orderly, if slow, process of survival of the fittest, whereby unsatisfactory methods are invariably eliminated, has left the whole subject in a chaotic condition.

This lack of definite settlement of the ventilation problem has, very naturally, had a disturbing influence on the problem of car heating because the two operations are so closely allied. Thus, an approximate analysis of the expenditure of heat in an ordinary city car, according to the Carpenter heat-loss formula, shows that the loss due to changes of air at the rate of ten per hour is 40 per cent of the whole heat consumption, while the

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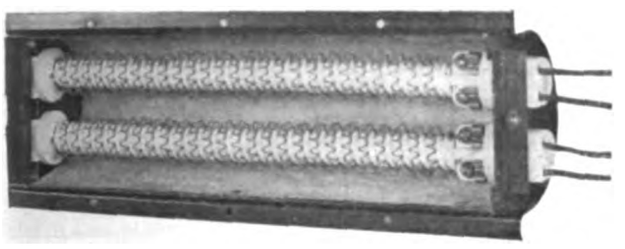
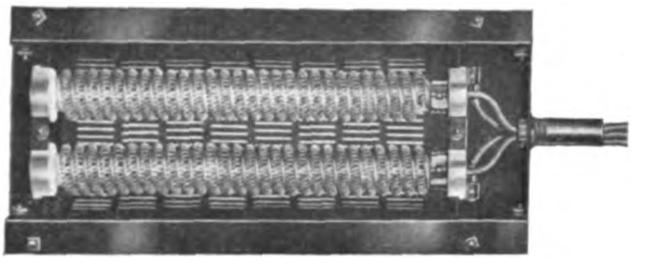
radiation loss from the windows is only 35 per cent and that from the floor, roof and side sheathing is 25 per cent. If, then, the air changes could be eliminated, the heating requirements would be almost cut in half.

Leaving aside, for the present, consideration of the ventilation problem, two alternatives appear in connection with the heating of cars, namely, the use of the coal-fired heater, generally in connection with a forced-draft system, and the use of the electric heater which may or may not be used in connection with a mechanical ventilating system. For modern city cars, the electric heater seems to be the most popular, numerically speaking, the obvious reason being that it is particularly well adapted to the mild climatic conditions that obtain throughout the major part of the country except for occasional cold snaps, and it is only in localities where cold weather is protracted that the coal-fired heater (considered purely as a heating device) has come extensively into competition with it. For interurban service, however, the coal-fired heater is very frequently used because of the greater demand for heat and the greater cost of electric current in such service.





Typical Modern Electric Heaters

HEATING WITH ELECTRICITY

Primarily the advantage of the electric heater lies in its light weight, low fire risk, low maintenance, reliability, accurate regulation, limited occupancy of space within the car body, cleanliness and freedom from dirt or obnoxious gases. It involves a minimum amount of attention from the car crew, and its appearance is excellent. When used in connection with thermostatic control—a most important development that was introduced a few years ago—the operation is entirely automatic and, to some degree at least, the high cost of the electric energy is reduced.

In especially cold climates this item of operating cost of electric heaters is a serious one. Its importance has been emphasized within the past few years through the introduction of fully-inclosed cars without bulkheads, and also indirectly through the great decrease in car weight that has recently been in evidence. As an example of the way in which this has worked out, there may be cited a widely published test made some years ago on a Chicago car in which the energy consumed by the electric heaters when on the third point amounted approximately to 7.75 kw., this being equivalent to 3.75 watts per cubic foot of volume within the car body—by no means a high figure, since a unit heater capacity of 4.5 watts per cubic foot of car-body volume has been recommended frequently for localities where zero temperatures are common. The car in question had old-style, non-inclosed vestibules and weighed 30 tons, including about 2 tons of live load. The energy required to move the car amounted to 37 kw. on an average, or at 9 m.p.h., 137 watt-hours per ton-mile. In this case, therefore, the heaters added 21 per cent to the load on the power house, and this is by no means an unreasonable figure.

On the other hand, a strictly modern car might weigh only about 15 tons, or with passengers, say, 17 tons. Using the above mentioned unit energy consumption of 137 watt-hours per ton-mile, the total power required for the propulsion of the car must be 23.3 kw. The energy consumed by the heaters, however, is greater in a modern car with fully-inclosed platforms because of the greater volume of air to be heated, the additional volume in the case under consideration being about 30 per cent. In consequence, the heaters would consume, using the same unit figure as in the previous paragraph, about 10 kw. This is no less than 43 per cent of the power required to propel the car. Such a great addition to the normal load involves the equivalent of a separate power house to supply the electric heaters, and since the load factor of heaters is invariably low, the cost of the energy thus required is correspondingly increased, a figure ranging between 2 cents and 2.5 cents per kilowatt-hour being not unreasonable under normal conditions.

Obviously, the major part of this high unit cost for current to supply electric heaters lies in the excessive demand charge caused by the synchronism of the peak of the heater load with the peak of the normal propulsion load. The actual consumption of energy is an almost insignificant element in the cost, and from this it follows that, when synchronism of the two peaks can be avoided, or where cold days are sufficiently rare to permit a heater installation of only moderate size (thus letting the heater load be carried as an overload on the generating

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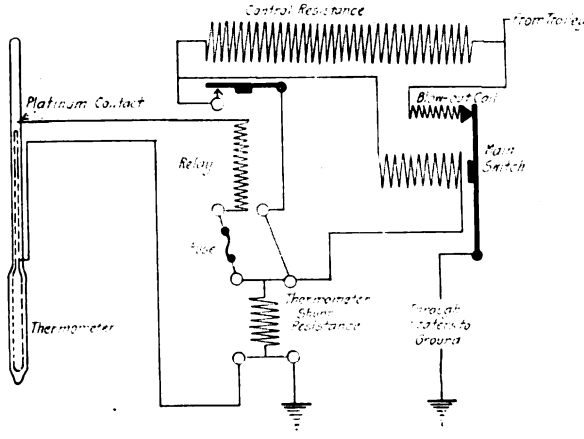
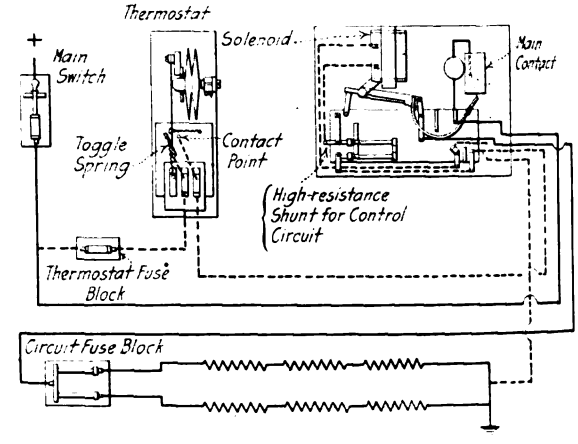
equipment) the unit cost of energy for the heaters may be considerably reduced.

The cost of energy that may be properly charged to the heaters is reduced also when advantage is taken of the heat given out by the bodies of the passengers during the rush hour, the principle involved being that the normal peak on the power house comes only at times when the cars are crowded, and this is the time when the cars are most easily heated. Results may be obtained either by changing the heater control by hand to a lower point of heat when the cars fill up, or else by installing automatic control for the heaters so that they operate only in accordance with the actual needs. The influence of this human heat is a most important item in car heating, since a load of eighty-five passengers gives out approximately the same number of heat units as 10 kw. of heaters.





Arrangement of Apparatus and Wiring for Two Types of Thermostat

Thus, heater tests that are made only on empty cars are meaningless, except to show the worst possible conditions. With a full load of passengers it may be necessary to shut off the heaters altogether.

ELECTRIC HEATER CONTROL

It is, therefore, almost impossible to over-emphasize the importance of controlling electric heat during the rush hour. Control, of course, may be obtained by hand, but it has been thoroughly demonstrated that car crews have neither the time nor the ambition to pay even moderately close attention to the refinements of heater operation. To meet this difficulty, automatic control of the heaters offers the most obvious opportunity, and since thermostats designed for this purpose were placed upon the market a few years ago, they have grown rapidly in popularity, one type, which has been installed on 3000 cars during the past four years, having never had a serious complaint registered against it.

Thermostats for the control of electric heaters appear in several forms. One of these makes use of the movement produced by temperature changes on a receptacle composed of double diaphragms and containing a volatile liquid. Another make uses the movement of mercury in a thermometer, a control circuit being opened when the mercury falls away from a contact point extending through the wall of the thermometer tube.

With all types of thermostat the regulation is extremely sensitive, the thermometer type being able to cut the heaters in or out with a change of 2 deg. in the air temperature of the car. Such devices, therefore, permit the elimination of the two-coil type of heater which has become common in connection with three-point manual control. However, it is a policy of some railroads to have the thermostat operate different heater circuits at different periods according to climatic conditions, and since the only advantage of the single-coil heater is a slight difference in first cost, it appears to be considered preferable to install the three circuits of different resistance as normally provided with manual control.

At the present time, therefore, the majority of electric heaters are provided with two coils which may be used either singly to give different resistances, or else in multiple together to give the highest degree of heat. Other features of modern heaters consist in the use of perforated ventilated porcelain cores to support the resistance coils, these perforations allowing air to pass freely through the coil and making the heater wire more effective in giving up heat. Non-corrosive resistance wire is also a feature that has met with considerable popular favor, a nickel-copper alloy eliminating corrosion during the summer months when the moisture is liable to collect upon the metallic surface. This has been known to limit the life of resistance wire to some two years. The desire for reduced maintenance charges has also brought about quick detachable constructions whereby the heater element may be removed by loosening a few nuts, thus mak-

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ing it possible to replace an element on the car without removing the complete heater.

Comment might be made here upon the possible savings in current consumption to be effected by thermostat control. Unfortunately, there appear to be no extended tests giving representative figures, but the indications are that the saving will be in the vicinity of 25 per cent of the total current consumption in moderate winter weather, although a figure of 70 per cent has been reported.

However, the really important saving to be effected by the thermostat is not in the reduction of the kilowatt-hours consumed during the course of the heating season, but rather in the reduction of the peak load that the heaters impose upon the power station during the rush hour. Thus, if the full heater load of, say, 10 kw. per car, has to be kept on throughout the rush hour, and if the heater load has to be carried by additional generating equipment rather than by overloading the existing equipment, there would be a charge of $180 per car per year, approximately speaking, to cover the fixed charges for the demand alone. Yet, the probable energy charge for the current would be only $50 per year. In other words, if the peak load for the heaters could be cut in half during the rush hour by taking advantage of the bodily heat of the passengers or by other means, even though the total current consumption might be but little affected, the true total cost of the heat for the year would be reduced by 40 per cent, or from $230 to $140. A 7 per cent reduction would cover the first cost of the thermostat.

Coal-Fired Heater with Nickleplated Trimmings Installed in Parlor Car of Empire United Railways to Reduce the Consumption of Electric Energy Which Is Purchased by this Company

COAL-FIRED HEATERS

Since the demand for light car weight became pressing, the various heating systems that make use of the combustion of coal have been increasingly limited to the so-called hot-air type of heater, in which ventilating air is warmed by contact with a coal stove and transmitted by a duct to the various parts of the car. The hot-water heater, notwithstanding its low first cost and its ability to heat the car uniformly and with reliability, has an extremely weak point in its excessive weight, and at the same time it has no advantage over the hot-air heater in the matter of attention required by the car crew, the lack of cleanliness, the necessity for maintenance and the occupancy of space within the car. In city service, at least, the hot-air heater is, therefore, the only modern competitor with electric heat, although the hot-water heater appears on a number of recent high-speed cars.

The feature of either coal-fired system is the low cost of direct operation in which the major item is the expense for coal. Leaving aside the hot-water system because of its restricted field, it may be said that the cost of coal for hot-air heaters ranges from, say, $30 up to $50 per year, and the cost of operation thus compares very favorably with the expense for current of, say, $200, that may be involved in city service with the electric heater. The first cost for the hot-air system, including the installation of the air duct, is relatively high, being from 50 per cent to 100 per cent in excess of the cost of electric heaters, and the maintenance, owing to the moving parts involved by the use of a forced-draft fan, is also greater.

In cold weather, however, the cost of operation is so much less than that of electric heaters that when the two are compared upon a basis involving only extreme climatic conditions rather than operation during the whole heater season, the expense of electric heat appears to be absolutely prohibitive. Nevertheless, such comparisons are really meaningless unless all factors are taken into consideration, including the relatively warm variable weather of spring and autumn, the smaller capacity of electric heaters required on account of their ready regulation, and the indirect factors such as cleanliness, attention by the train crew and the like. Briefly, the place for the hot-air heater appears to be in localities where prolonged cold weather is the rule during the winter. If power is purchased upon a

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flat rate, this item of cost in connection with electric heat is not of great importance, but where the use of peak-load power is penalized heavily, as it is in some situations, the factor of cost of current may be of even more influence than the climatic conditions in comparing the two systems as it may make the electric heater cost prohibitive and thus compel the use of hot air.

VENTILATION OF CARS SUBJECT TO PRINCIPLES NOT APPLICABLE IN BUILDING VENTILATION

Closely associated with the whole subject of passenger car heating is the problem of ventilation. The temperature maintained by any heating system, in fact, is dependent to practically as great an extent upon the amount of fresh air that is ordinarily admitted into the car body for ventilating purposes as it is upon the radiation losses from the windows and walls of the car. Unfortunately, recent developments have failed to establish even symptoms of a standard for car ventilation either in regard to practice or in connection with the equipment by which it is effected.

Apparently there are two reasons for this situation. One is that legislation on the subject of ventilation has been based upon the practice and principles applying to building ventilation, and these principles are, almost obviously, not applicable to the case of the electric railway car. The other reason is that no legislative enactment has yet made provision for the lack of constant conditions obtaining in railway service, and by this failure to provide flexibility in the ordinances, railways are forced either to take a chance in neglecting to comply with the terms or else must be put to a wholly unreasonable hardship.

With regard to the lack of applicability, to electric railway service, of commonly accepted practice for ventilating buildings, it may be said that the principal difficulty involved is a general neglect of the influence of room volume in connection with systematic ventilation. Existing data on the subject involves in all cases consideration of situations wherein each occupant of the room, or other inclosed volume that is to be ventilated, is accorded a cubic space ranging from several hundred to several thousand cubic feet. Also, in many cases practice is based on what is known as unsystematic ventilation, wherein incidental leakage plays a large part. Diffusion of pure air and foul air is always carried to its logical extreme.

As opposed to these conditions, an electric railway car generally provides a space of only about 30 cu. ft. per passenger, and at least of late years, a very definite attempt to secure systematic ventilation is frequently made. It has become not uncommon to change the air within the car as frequently as ten times per hour, and this is a rate of air renewal that is twice as rapid as that set by some authorities even for restaurants, where the odors that are the real basis for most agitation in regard to ventilation may be said to be almost a maximum.

An example of the manner in which the factors of cubic space and frequent air renewal apply to ventilation may be given by citing two extreme hypothetical cases. Thus, if a 1-in. by 1½-in. duct contained a stream of fresh air flowing at 1 ft. per second, and if a man placed his mouth at an opening in the side of the duct and breathed only through this opening, he would find the ventilation excellent. As a matter of fact, he would be supplied with only about 35 cu. ft. of air per hour (one-tenth of the amount required in the Chicago ventilation ordinance), but since he would vitiate only about 15 cu. ft. of air per hour this small supply would be ample under the conditions. However, a supply of 35 cu. ft. of air per hour would be wholly inadequate in a large room. Thus, if the man was in a cell 20 ft. square and 20 ft. high, and if the cell was hermetically sealed except for ventilating openings that supplied 35 cu. ft. of air per hour, he would begin to suffer very seriously after two days and eventually might succumb, provided, of course, that he could not reach the air inlet to obtain fresh air direct. The reason for this contradictory situation is that in the former case the number of changes of air per hour would be 3600, while in the second case only about 0.005 renewals per hour would take place.

It is evident, therefore, that the problem of ventilation for electric railway cars is not likely to be worked out off-hand by the use of data obtained in another field, where the influence of the factor of air change is of minor character, and until more direct information regarding air renewals has been obtained it is certain that the problem will remain in its present chaotic condition. However, recent experience has pointed to the fact that cars in which ten renewals of air are made per hour appear as a rule to be well ventilated.

CARBON-DIOXIDE MEASUREMENTS

In general, it must be recognized that the public invariably considers, and probably will always continue to consider, that ventilation is synonymous with odorlessness. This, of course, complicates the problem because the railway, as a public carrier, is bound to grant transportation to every one requesting it, and a car well filled with workers from a glue factory is hardly likely to be considered properly ventilated by a florist's clerk regardless of the rate of air renewals.

It is this feature of odors that causes carbon-dioxide measurements to be made a part of ventilation tests and brings about their inclusion in ven-

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tilation ordinances. Theoretically, the principle here involved is a thoroughly logical one because carbon-dioxide is a tasteless, odorless gas, and the fact that it is an approximately fixed component of air that has been vitiated by human beings permits its measurement to serve as an indication of air quality and the degree of ventilation. Tests based upon such measurements are absolutely independent of the question of odor which, in the main, has no effect upon physical well-being. According to a number of investigators, a proper standard of purity is maintained when the carbon-dioxide content ranges from 10 volumes to 13 volumes per 10,000 volumes of air, the latter ratio being recommended for buildings by the more recent authorities. Thus the standard for breathable air contains roughly three times as much carbon-dioxide as the air ordinarily found in cities, which has generally roughly 3.5 parts per 10,000 volumes.

Although this principle of measurement is logical it has a serious weakness in the great difficulty of its application. In a large room, perhaps, where thorough diffusion of pure air and vitiated air has taken place, measurements may be made with a reasonable degree of accuracy. However, where a rapid renewal of air is taking place and where people are crowded together, as in the case of a railway car, there is every possibility of obtaining readings from pockets of air that contain high percentages of carbon-dioxide, and it is notorious that observers, especially when not exceptionally experienced, always obtain unduly high results.

Consider, for example, a space of 35 cu. ft., through which 350 cu. ft. of air is passed in an hour, so that the air is changed ten times per hour, or once in six minutes. One man in this space will throw off 0.06 cu. ft. of carbon-dioxide during each six-minute period, and if perfect diffusion exists, there will be in the air at all times (allowing for the three and a half parts of carbon-dioxide in ordinary city air) approximately 20 parts of carbon-dioxide per 10,000 volumes of air. If, however, the entering air supply, which is about twenty-five times the amount actually passing through the lungs of the average adult, is brought in at breathing level and the vitiated air is moved upward in a systematic manner, the action will approximate that of the previously cited case where a man breathes from a small duct, and the air that is actually breathed will be of as high a standard of purity as may be expected in a city. The vitiated air rising toward the ceiling of the car will show a content of several times as much carbon-dioxide as in the case of perfect diffusion.

In the ventilating ordinance that was passed in the city of Chicago some seven years ago a minimum air supply of 350 cu. ft. of air per passenger per hour was specified in addition to a limitation of the carbon-dioxide content to not more than 10 parts in 10,000. Yet the latter provision is clearly impossible of attainment, is indicated, if the specified air supply is 350 cu. ft. per passenger.

If perfect diffusion is established, such an air supply will give a higher carbon-dioxide content than that which is allowed, and if stratification or systematic movement of the air is established, the measurement of carbon-dioxide becomes meaningless. The vitiated air, which invariably tends to rise on account of the warmth and moisture that it takes up in the passengers' lungs, will inevitably show a high content of carbon-dioxide while the air in the lower part of the car will show but a small content, the amount decreasing with the increase in rapidity of air renewal.

INFLUENCE OF VENTILATION ON THE HEATING PROBLEM

The Chicago ordinance constitutes, also, an excellent example of the inevitable difficulties involved in the lack of flexibility of such arbitrary practice. In addition to the minimum air supply of 350 cu. ft. of air per passenger per hour that is called for by the ventilation ordinance, there is specified a minimum temperature of 50 deg. Fahr. On its face, the establishment of these two minimums appears to be within reason, because a maximum load of eighty passengers calls for 28,000 cu. ft. of air per hour to be passed through the car, and the resulting rate of air renewal of, say, ten changes per hour, is well within the capabilities of existing means for ventilation. To heat this amount of air from zero temperature to 50 deg. Fahr. requires 25,000 B. t. u., while the radiation loss from the car body (according to the Carpenter formula applied to a typical fully-inclosed car) would be about 30,000 B. t. u. in addition. To supply this heat are the passengers, themselves, who contribute 32,000 B. t. u., leaving 23,000 B. t. u., or 6.75 kw. to be supplied by the heaters—a perfectly reasonable figure.

Unfortunately, the above estimate applies only to constant conditions, and constant conditions do not obtain in surface car operation. In the first place, there is the opening of the entrance doors which may temporarily overwhelm the heating system. In the second place, if the passenger load happens to be reduced from eighty to, say, ten, the heaters will have to supply the heat that would otherwise have been produced by the seventy passengers who have left the car. This makes a total demand of 51,000 B. t. u., or 15 kw. per hour. The heater load would thus become about two-thirds of the energy required to propel the car, and such a demand for heat would involve prohibitive operating cost. The only alternative would be the employment of an operator on each car to adjust the

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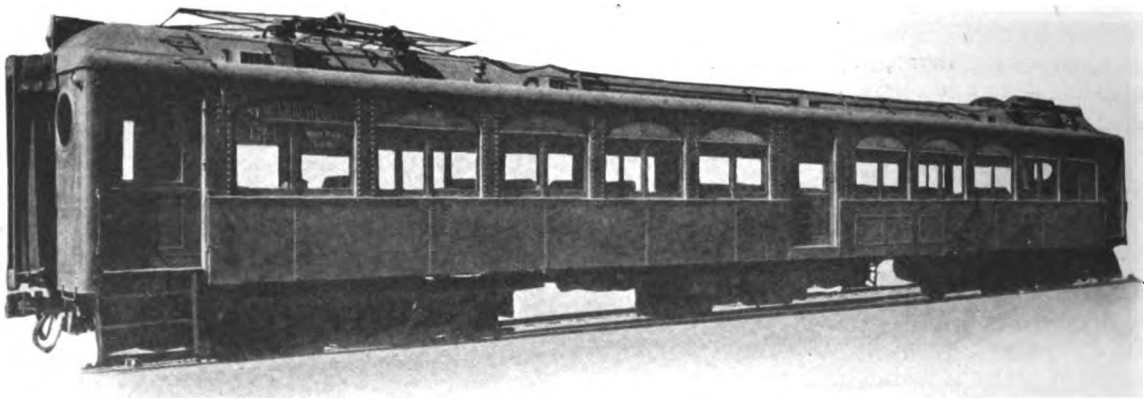


Exhaust Ventilators on Modified Arch-Roof Car

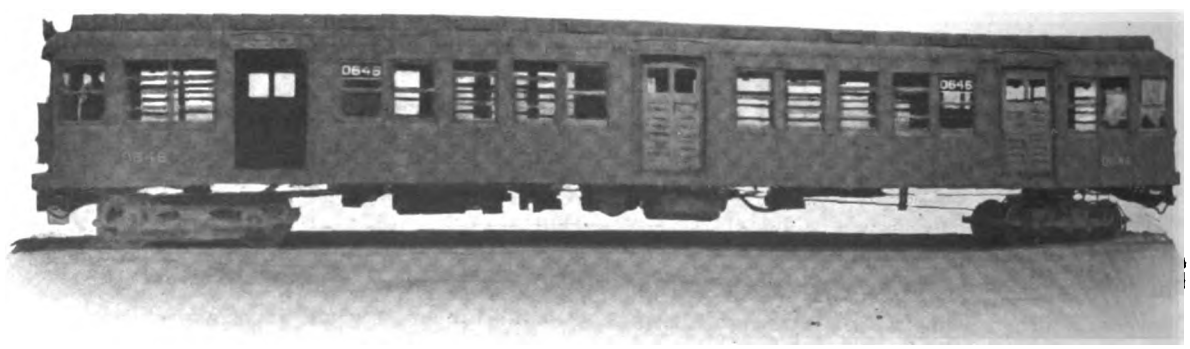
ventilators to the continually changing passenger load.

From the foregoing it is obvious that the establishment of combined heating and ventilation rules by ordinance, even when the terms are as apparently moderate as those in Chicago, is practically certain to be unreasonable at times. The logical procedure, if such legislative interference is inevitable, is the selection of either heating or ventilation as the more important and the establishment of a single standard covering only that feature. Yet in the end there is too little definite knowledge on the subject of ventilating railway cars, as opposed to the ventilation of buildings, to permit the general acceptance of any arbitrary set of rules at the present time, and the establishment of such rules can hardly have a beneficial effect in accelerating a solution of a problem that needs so much study as that of car ventilation. Even the various forms of ventilation equipment that are available to-day display wide differences in principle, although it is certain that each one of the different types must have been successful, at least under some circumstances, to have permitted its perpetuation.

VENTILATING EQUIPMENT

Such ventilating equipment may be classified roughly into four general groups. These are (1) the forced-draft, hot-air system; (2) the diffusion system; (3) the mechanically operated vacuum system and (4) the automatic vacuum system. Still another type might be cited in the case of the monitor-deck-sash system, but since this requires a stretch of the imagination to be classed under any circumstances as a ventilating system, and since it is rapidly disappearing because of the weight, cost and structural weakness of the monitor roof, it may perhaps best be left out of consideration.

Of the four systems, the most prominent example of first named has already been mentioned in connection with the subject of coal-fired heaters. In this case, heat for ventilating air that is discharged into the car is provided by passing the cold air from the intake around the fire-pot of an inclosed coal stove. The cold air is drawn in by means of a small motor-driven fan and is discharged into a duct along the floor at one side of the car. In general it is difficult to consider this apparatus as a ventilating system without reference to its action as a heater, because its most important point is an ability (in case a demand existed for such large units) to provide, without abnormal expense, an unlimited amount of air heated to any desired temperature. Yet the features that apply purely to ventilation are not without weight, one of them being the definite maintenance (unless strong exhaust ventilation is also installed) of air pressure within the car so that air leakage is always outward, thus avoiding localized drafts of cold air around the



Boston Subway Car Equipped with Exhaust-Type Ventilators

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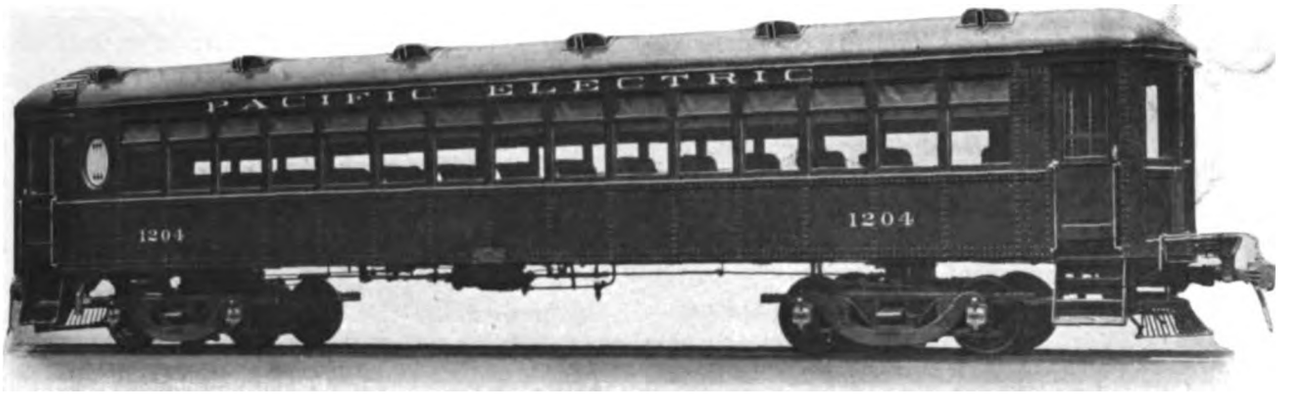

Pacific Electric Railway's Heavy Interurban Car Equipped with Diffusion Type Ventilators

windows and reducing the effect of blasts of air coming through open entrance doors. As a ventilating system, also, this form of equipment constitutes an excellent example of systematic ventilation provided that the air supply is sufficient to afford definite stratification and the regular movement of air from the floor up to the outlets in the roof. In practice, however, it is certain that some diffusion takes place, air renewal being accomplished ordinarily at the rate of, say, five or six changes per hour, and such diffusion, which is brought about through the relatively rapid horizontal discharge of fresh air at the floor, aids in preventing the short-circuiting of currents of fresh, warm air direct to the roof outlets use.

Mention should be made here of a plan for ventilation that has been used to some extent with hot-water heaters. In this a fan capable of handling 500 cu. ft. of air per minute is installed in the forward compartment of an interurban car, drawing fresh air from the roof and discharging it into ducts that extend along the floor line back of the hot-water pipes. The discharge of this air across the heater pipes warms it, so that it rises, and after it becomes vitiated it passes out of the car through exhaust ventilators in the roof.

As opposed to these methods, the diffusion system of ventilation involves the use of both an exhaust and a fresh-air intake in the roof. A typical form consists of a vertical deflector plate extending at right angles to the direction of motion of the car so that the wind piles up air pressure in front of the plate and produces a vacuum behind it, and since an opening into the car interior is provided on either side of the deflector, the forward opening acts as an air intake and the rear opening as an exhaust while the car is in motion. The principle involved is the diffusion of vitiated air by a plentiful supply of fresh air from above the breathing level in the car, as well as a constant agitation which prevents the establishment of pockets of bad air in the upper part of the car. Tests have shown that the intake for a single ventilator may be as high as 100 cu. ft. of air per minute, and indicate in general that only 85 per cent or 90 per cent of this amount of air is discharged at the exhaust. Consequently, this system of ventilation also establishes a slight air pressure within the car, the difference between the amount of air taken in and the amount exhausted necessarily finding its way outside through crevices at the doors and windows. Based upon the flow at the intake, the number of changes of air in the whole car may reach thirty per hour, and assuming that perfect diffusion is effected (or that none of the fresh air at the intake is discharged immediately through the exhaust) a carbon-dioxide content of ten parts should be possible of attainment. If only the upper half of the car (or

Exhaust Ventilator Arrangement for Arch-Roof Car

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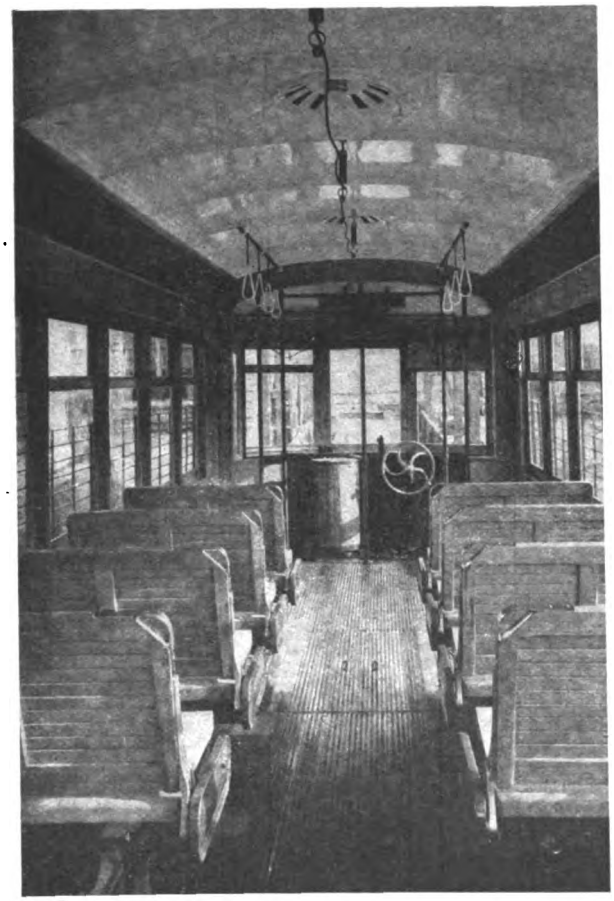
the space above breathing level) is considered as being affected, the carbon-dioxide should be maintained at eight parts per 10,000.

In the mechanically operated vacuum system a small exhaust fan with a motor of 1/3 hp. capacity is mounted under the roof and this is operated continually at such capacity as to discharge from the car interior an amount of air equal to 350 cu. ft. per hour per passenger under the maximum loading conditions. Air intakes are provided in the side sheathing and air from these is led by horizontal ducts to intake boxes under the car seats. In each



Combination Ventilator-Registers and Lamp Fixtures

intake box is an electric heater, so that the fresh air is warmed as it enters the car. When considered only as a ventilating system this arrangement is, no doubt, highly efficient if a sufficient number of intake boxes are provided, because the fresh air is bound to rise slowly past the seated passengers, thus providing them with pure air without necessity for diffusion.

The simplest of all of the existing ventilating systems involves the use only of exhaust ventilators. This plan has the advantage of requiring the installation of no moving parts, and the first cost is low. The ventilators depend for operation upon the aspirating action of wind across an orifice or else upon the ejector action of a blast of air induced by the motion of the car. For their simplicity they pay the penalty of dependence upon leakage of air around the doors and windows to provide fresh air within the car, although it is probable that, when the car movement is rapid, a double current of air is established in the ventilator, so that there is a small diffusing action as well. Naturally, when the windows and doors are kept reasonably tight, the reduced leakage of air to supply the ventilators must bring about a relatively strong vacuum in the car interior, and this probably exceeds that of the mechanically operated vacuum system because of the unrestricted intake passages of that arrangement.

LIGHTING OF CARS REVOLUTIONIZED BY MODERN HIGH-EFFICIENCY LAMPS

None of the confusion of ideas and widely divergent principles of design that are apparent in connection with car ventilation apply to the subject of car lighting. Here the comparatively recent development of the metal-filament incandescent lamp has practically eliminated the question of current consumption as a vital factor, since the new lamps require only about 1.25 watts per candle-power as against 4 watts needed by the old style, carbon-filament units. In fact, this permits lighting at an expense for power of, say, ½ cent per car-hour, together with lamp renewals, amounting to, roughly, 50 per cent of this sum. It has been shown that, with an investment for an improved system of metal-filament lamps, with fixtures and reflectors, at an approximate cost of $20 per car, the interest earned on the investment, based on saving in cost of operation per car per year, amounts to more than 50 per cent.

The major feature of such modern car lighting systems is the use of large lamps, this condition resulting logically from the relative length and slenderness of the commonly used tungsten filaments, as compared with those made of carbon. The physical weakness of the tungsten lamp that is thus introduced shortens the average life, especially where vibration exists, as it does in railway service, and the obvious alternative is to increase the thickness of the filament and reduce its length either by increasing the lamp capacity, or else by reducing the rated voltage.

This practice of using large lamps has become so generally recognized as an essential in car lighting practice that some electric railways have taken up the rewiring of old cars to obtain the economy in maintenance accompanying the use of large capacity units, and to-day the popular sizes appear to be 56 watts and 94 watts, corresponding to ratings of from 45 c.p. to 80 c.p. per lamp, although 23-watt and 36-watt lamps are occasionally used. A life of 1400 hours with 56-watt lamps has been re-

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ported in service tests as against only 400 hours for the 23-watt size, although the manufacturers claim for both types a life of 1200 to 1500 hours. It should be noted that the energy consumption of these two sizes are respectively 1.16 watts and 1.34 watts per candle-power.

In consequence of the reduced number of units, lamp arrangement has come to be practically standardized upon a single row of five or, if necessary, ten lamps along the ceiling. Lamp spacing with the large units appears to make comparatively little difference, intervals of 5 ft. and 6 ft. between lamps being common. However, a remarkably elaborate series of tests carried out on the New York Municipal Railway cars indicates the existence of a limit to lamp spacing, because with two experimental lamp arrangements having the lamps more than 11 feet apart, the lighting was extremely uneven, although another arrangement with a spacing of slightly more than 7 feet gave very uniform results.

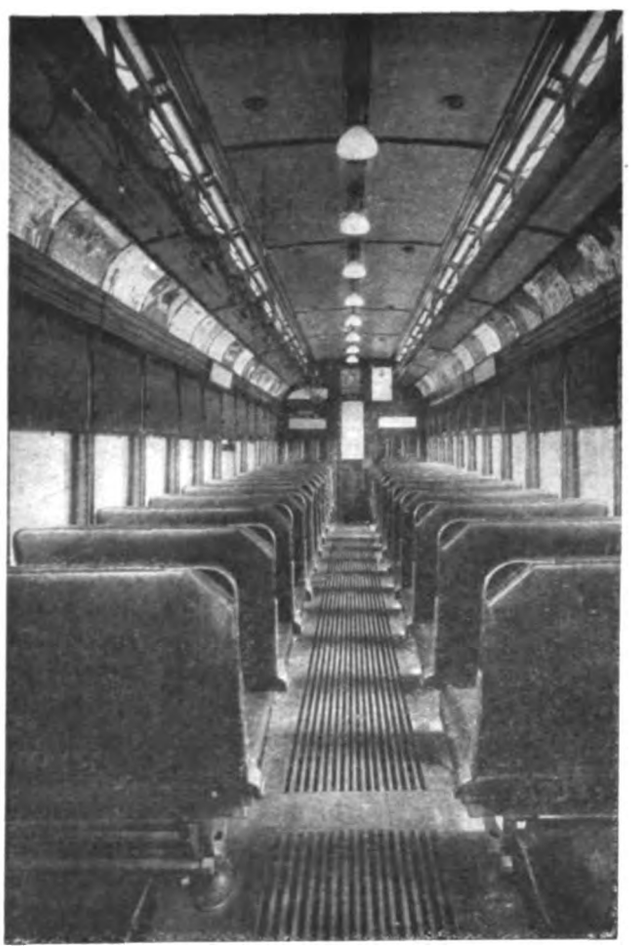
The preferred size and number of lamps for the main lighting of cars of various dimensions appear to be about as follows: For car bodies having lengths up to 25 feet, five 56-watt lamps; for bodies up to 35 feet in length, five 94-watt lamps; for bodies between 36 feet and 45 feet in length, ten 56-watt lamps, and for bodies longer than 46 feet, ten 94-watt lamps.

The second essential feature of modern car lighting is the use of diffusing devices to prevent the glare from the direct rays of an unprotected filament emitting light of high intensity. Without such diffusion, which in extreme cases has even taken the form of frosted lamp bulbs, the use of large lamps would be anything but desirable because of the resulting unevenness of light distribution, as well as the direct eyestrain imposed on passengers through the brilliancy of the localized sources of light. Of course, these diffusion devices diminish the amount of illumination provided by the lamp to an extent depending upon the absorption of light during its reflection or transmission. The loss may be as high as 50 per cent, but on the other hand, the true effectiveness of the illumination is increased enough to offset it, in large part, through the elimination of shadows and underilluminated portions of the car body.

The expense involved by such net loss as may exist is rendered insignificant by the high efficiency of the modern lamps and reflectors, together with the general use of white enamel paint for car-body interiors. This latter, in several cases has been found to increase the utility of illumination by more than 50 per cent over that obtained with an interior finished in yellow or green and, as a consequence, the interior painting of electric cars shows a decided tendency toward the use of white.

In general, for such modern lighting systems, energy consumptions appear to range as low as from 1 watt to 1.5 watts per square foot of floor, leaving an average effective illumination at the reading plane, 42 in. above the floor, of from 4 foot-candles to 7 foot-candles at normal voltage. The minimum permissible average illumination in this plane appears to range from 2 foot-candles to 3 foot-candles, these figures providing for a voltage variation of 15 per cent or 20 per cent from normal.

Diffusing devices which are provided for the lamp and which in general are reflectors as well as diffusers, are available in many types and styles



Modern Lighting System Installed in Old Car

and they provide for all classes of illumination from direct to indirect. Popular approval, however, seems definitely to have settled upon the semi-direct system with the use of translucent or clear-prismatic reflectors that are sufficiently deep to prevent the lamp filament from being seen except from directly below.

The principle of this arrangement is, obviously, to direct the greater part of the light downward onto the reading plane, since the eyes of passengers are protected from vertical rays by their hats and eyebrows. At the same time a material amount of soft, diffused light is transmitted through the so-called reflectors, and this prevents glare and violent contrasts. Some opposition to the use of

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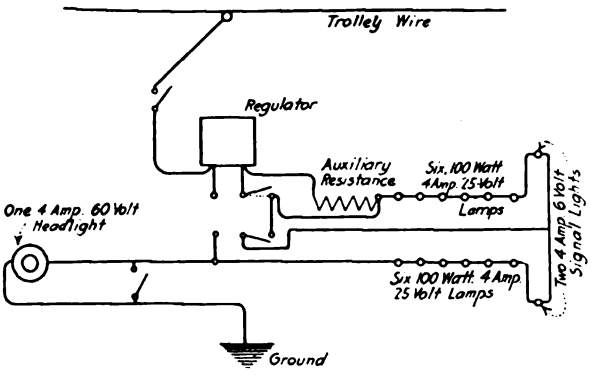

Wiring Diagram for Voltage Regulator for Lighting System

such reflectors has arisen from a belief that the advertising signs above the car windows would not be brilliantly lighted. As a matter of fact it has been found that a sign that is evenly illuminated, with no obstruction in the way of glare from a bare lamp, is more easily read and has more advertising value than a sign that is brilliantly illuminated but is placed before a bare lamp so that the passenger is compelled to read through an intense glare.

RECENT PRACTICE IN LIGHTING EQUIPMENT

Recent practice indicates, therefore, that reflectors should be at least translucent and deep enough to prevent direct sight by passengers of any lamp filament except the one immediately overhead. In addition, it is obvious that the reflector must be susceptible of easy cleaning, since it may, if covered with dust, absorb some 50 per cent of the light directed upon it from the lamp. Therefore the comparatively smooth, plain, heavy-density opal reflectors have acquired a considerable popularity, although they are obviously less efficient in transmitting light than the reflectors made of clear glass with prismatic corrugations. The difference between the two, however, is not a material item and decision as to the choice of translucent or clear glass reflectors seems largely to be made on the basis of lamp arrangement.

Typical Prismatic Reflector

Thus, with a given number of lamps of a certain size, a shorter car body may make use of opalescent reflectors, while a somewhat longer body might better be equipped with prismatic reflectors than with lamps of a larger size.

Obviously the use of a reflector entails also the use of a fixture to support it, the cost of reflector maintenance being divided between renewals on account of cleaning and breakage, and adjustment of damages due to reflectors falling. A satisfactory fixture must therefore provide for quick and easy application and removal of the reflector and also for a sure grip on the reflector to prevent its falling when the car is in service. One such typical device consists of a number of metal fingers which engage the neck of the reflector and which are sufficiently rigid to hold it temporarily when it is being inserted in the fixture. As an additional safeguard, a lock in the form of a cap-nut can be adjusted on the threaded portion of the fixture until its conical inner surface bears against the metal fingers and absolutely prevents the release of the shade.

It might be noted here that the working of tungsten lamps at less than rated voltage materially increases the life. The increased life is said to vary as the fourteenth power of the reduction in voltage, on which basis a 114-volt tungsten lamp in a 110-volt circuit will have its life increased by 60 per cent. For interurban cars, of course, the voltage variations are very much greater than this, and the lamps are alternately operated at an excessive temperature and then are practically extinguished. To avoid this difficulty several devices have been tried out, the simplest one among them being a regulator which has been used for some two years on the Milwaukee Northern Railway and which consists of a series of relays that cut varying resistances into the lighting circuit as the voltage rises above an arbitrarily established minimum.

Other recently developed features in connection with car lighting that might be mentioned include a selector switch for short-circuiting any lamp in the lighting circuit that is burned out, an extra lamp being placed in the circuit in its place. This is considered especially advisable on cars lighted from a single circuit because the loss of one lamp would put the whole car in darkness and make the replacement of the damaged lamp a difficult matter. Vestibule step lighting has very naturally become popular with the introduction of fully-inclosed platforms, and a large number of cars are so equipped, the lamps being placed sometimes over the door and sometimes under the threshold for the vestibule entrance, the light in some cases being put in circuit only when the doors are open.

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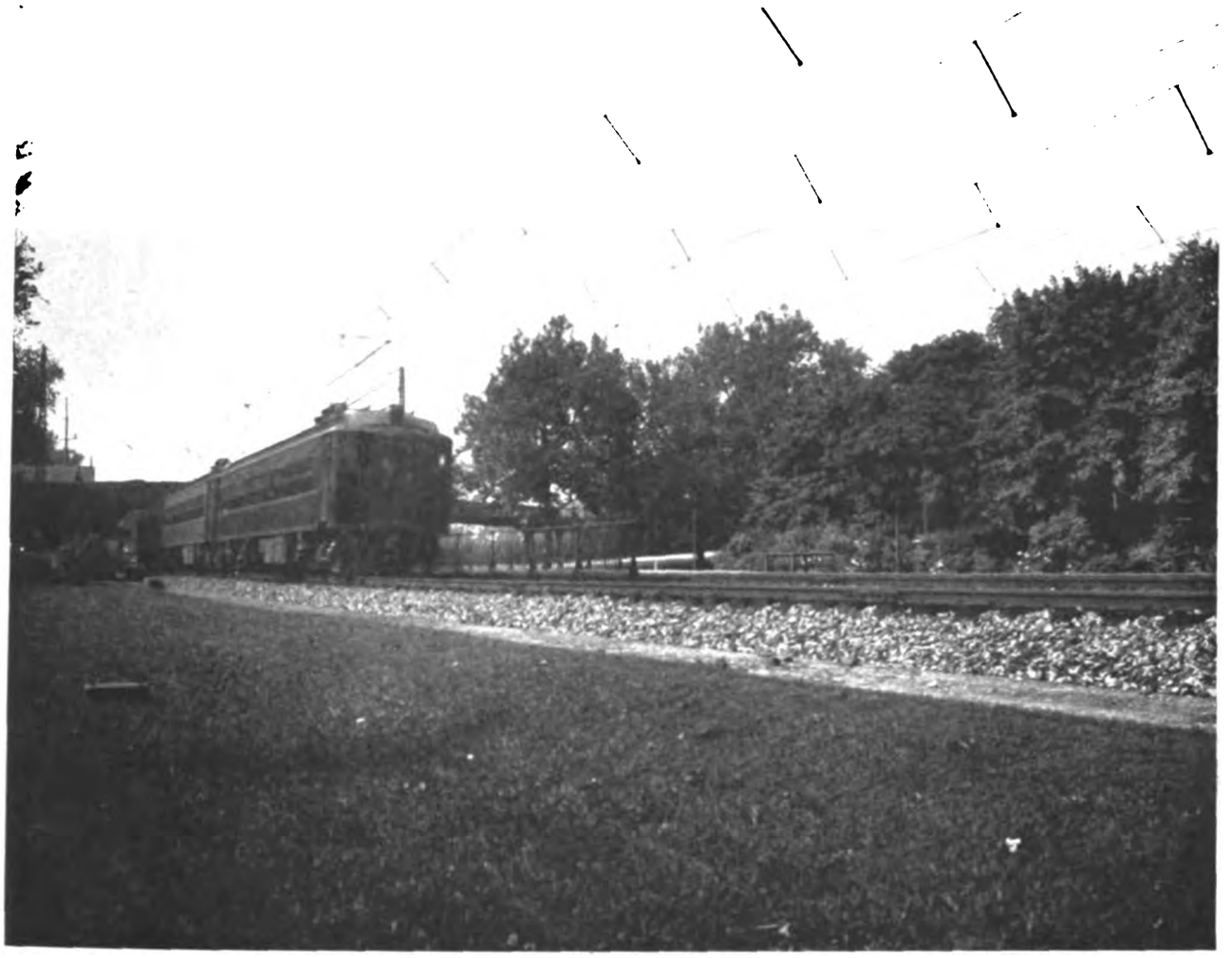

Doors, Seats and Miscellaneous Interior Equipment

Inclosure of vestibules, which has come to be a feature of practically all modern electric railway cars, has brought about the development of many different styles and combinations of doors and steps, generally hand-operated in city service but air-controlled on heavy cars. Modern seats are frequently characterized by improved forms of cushion, permitting closer spacing with greater knee-room, and similar provisions for the convenience of the public appear in the extended use of sanitary interior fittings.

EQUIPMENT for the car body, in addition to that provided for heating, ventilation and lighting, has been very generally subject to the same rapidity of development during the last half-decade that has characterized the car body as a whole. The entire matter of vestibule doors, for example, has arisen practically since 1912, before which time the fully-inclosed car in city service was a rare exception, whereas at present an almost infinite variety of vestibule door and step arrangements are available for use. Vestibule equipment has also been affected by the elimination of bulkheads, and head lights of the incandescent type have acquired a greatly extended field. In regard to windows the methods of housing have undergone, in general, a complete change since the introduction of the simplified type of side frame construction that are common to modern city cars. Seats have been characterized recently by decreased weight to meet the ever-growing demand for light equipment, and the development of light-weight, non-corrodible or sanitary fittings has helped to bring about almost a revolution in the interior appearance of car bodies that have been built within the past few years.

Folding Door and Step Mechanisms

As outlined in the chapter dealing with the car body from an operating standpoint, the type of door that most frequently appears on modern city cars is of the folding design, and with it there is frequently installed a folding step. In brief, the popularity of this arrangement has been due to its light weight and simplicity of installation, and these features, together with the limited travel of the

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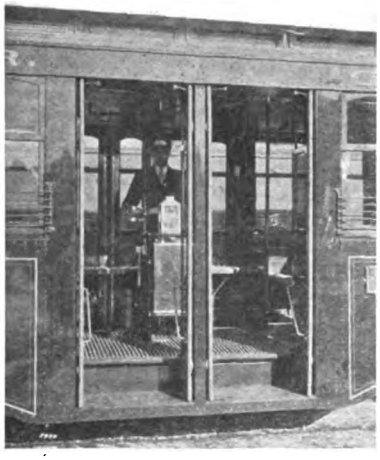
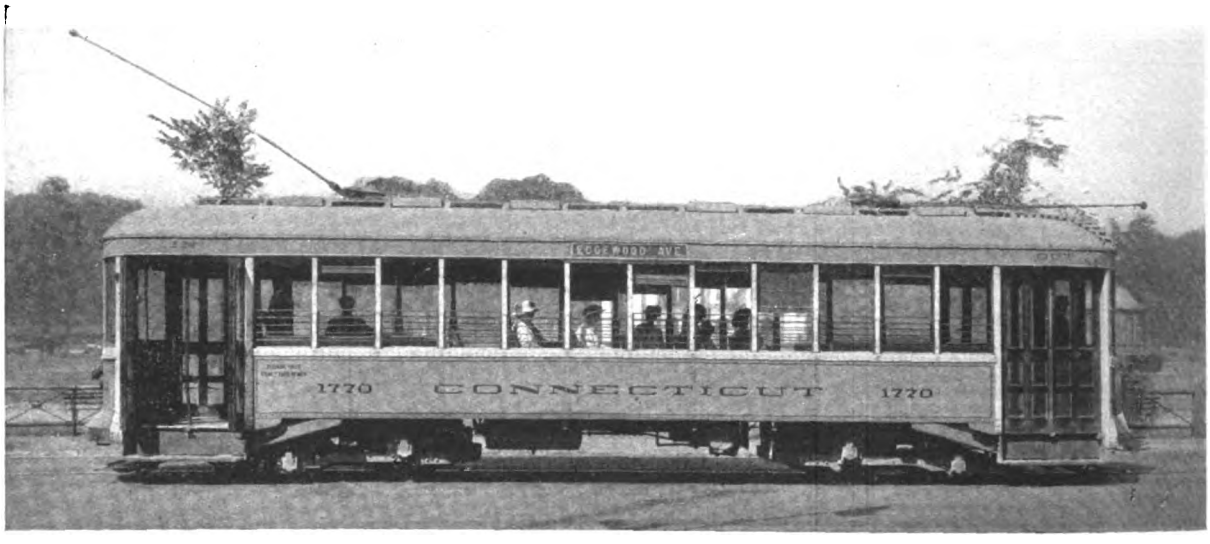


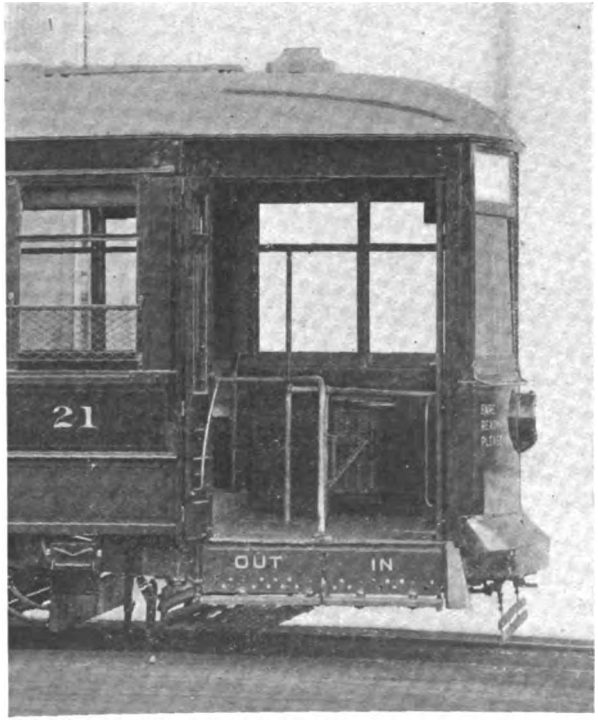
Non-Sweep Doors and Interior Step Used in Pittsburgh

Semi-Outwardly Folding Doors and Folding Step

Semi-Inwardly Folding Doors and Folding Step



Outwardly Folding Doors and Stationary Steps as Used on Latest Connecticut Company Cars



Inwardly Folding Entrance and Outwardly Folding Exit Doors

Inwardly Folding Doors and Stationary Steps

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folding door when opened, have offered a desirable contrast to the sliding door which, of course, had been brought to a high state of perfection in rapid transit service long before the folding door came into general use.

In its construction the folding door is exceedingly simple, the door itself being hinged vertically in halves and attached to a vertical shaft which supports the whole arrangement. The shaft is supported in ball bearings that are attached to the side of the doorway and these bearings constitute the only ones that are required for the door alone, the runners, top and bottom, being required merely to guide the door so that it will take a position along the line of the threshold when it is extended.

For the folding step which is frequently used in connection with the vestibule doors for city cars the operating shaft is horizontal and a coil spring is wound on it and attached to the step and to the step brackets to counterbalance the weight. Operation of the step is effected by attaching to the step shaft a bell crank of the same length as that which operates the vertical shaft for the door. The two bell cranks are connected by rods to the same operating handle and hence the door and step operate together.

Single folding doors as above described may be used for openings up to about 28 inches in width, but for door openings that are wider than this double doors are generally used, either mutually or independently operated by handles at a control stand on the platform.

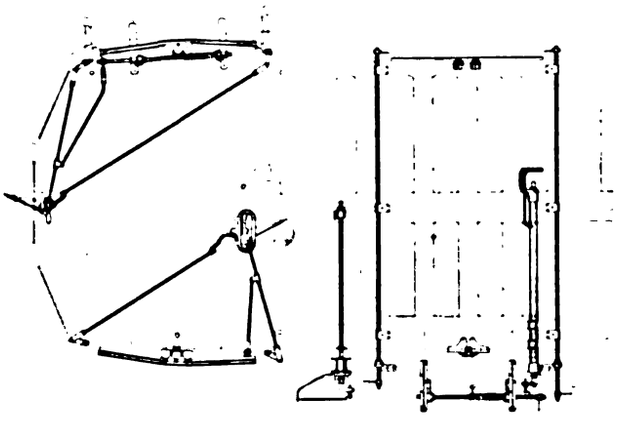
Movement of the door requires but little force, and hence manual operation is very generally adopted. Naturally this makes for a moderate first cost for such installations, and as a result there appears to be a recent tendency to equip city cars with front exit doors that are as wide as the entrance doors at the rear, the object being to permit two streams of passengers to alight at the same time through the forward exits at terminals or at intermediate points where a large number leave the car.

Previous mention has been made of the fact that the majority of doors are made to fold outwardly because an inward movement may be interfered with by passengers who are waiting to alight. From a structural standpoint, also, inwardly-folding doors are not favored, because a weather joint cannot be made at the top and bottom, while outwardly-folding doors generally extend about 1 in. above the door lintel and the same distance below the edge of the platform floor and thus keep wind and rain from blowing into the vestibule.

For vestibule doors generally the evident tendency is to use glass panels for practically the whole height of the door, the aim being to give a clear view of the street close to the step from any point on the platform. There is, however, an apparent division of opinion as to the use of wire-glass for these panels, since some recent cars have been provided with clear glass and others with the less fragile but more expensive material. For the exit doors in a number of recent designs the bottom door panels have been made of wood, with the evident object of reducing the amount of glass on the car and thus diminishing the expense for glass replacement; but this arrangement does not appear to be universal by any means, the belief being evident that there is need for a view of the pavement opposite the exit just as there is at the entrance.

SLIDING DOORS AND DOOR ENGINES

The sliding door, of course, is universally used in rapid transit service because it has the very definite advantage of a minimum transverse clearance. Its weight and amplitude of movement, however, seem to call for a door engine rather than manual operation. Pneumatic door engines for this purpose have been brought to a high state of perfection, so that the possibility of catching the clothing or body of a passenger between the door and the door post has been absolutely eliminated, and if desired a door may be made actually to retract after hitting such objects. Control is effected either manually, by mechanical connection to the valve on the pneumatic engine; electrically, by push-buttons or special switches connected to the magnet valves on the engine; or pneumatically, by means of a small air valve located adjacent to the conductor. Any one of these types of control permit a door to be reversed at any point in its travel without slamming, but, in addition, air cushions are invariably provided so that the movement of the door is retarded during the last few inches of its travel. For city service the door engine is of importance when remote control is desired, and in several such instances engines have been installed, one case being where suburban runs required the conductor to go inside the car to collect second fares. Here electro-pneumatic operation from remote points within the car was essential to rapid operation.



Arrangement of Apparatus for Folding Door

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With power operation for sliding doors, the factors of weight and amplitude of movement are nullified; but for city cars the necessity for a longitudinal recess into which the door can slide is an objectionable feature of material importance for structural reasons. However, sliding doors have been used to some extent for exits, having been adopted for the Cleveland front-entrance, center-exit car's center doors, although the front-entrance door of this car is of the customary four-panel folding type.

The non-sweep or folding-and-sliding type of door, which is a modification of the sliding door that obviates the need for a door pocket, has a peculiar movement, in that the door slides around the inside of the corner existing between the plane of the doorway and the side of the passageway leading to it. In one such arrangement the motion is defined by guides and runners which compel one edge of the door to travel straight in and out transversely with the center line of the car and the other edge to travel straight across the threshold. The result of the combined movement of both edges is to make the door as a whole slide into open position around a sharp curve, taking its open position at right angles to the doorway and in line with the door post. The operation is effected by a pair of bell-cranks housed within a space above the door and only a few inches in height.

NON-SWEEP DOOR OPERATION

This type of door has been used for several years in Pittsburgh and some other cities. Its advantage over the sliding type lies in the easier action due to the character of the movement. Also, it may be used for independently-operated double center doors, because in this case the two half-doors that are in the middle fold practically out of the way in line with the center post of the doorway, while with the sliding type of door a space must be left between the double doorways into which the middle half-doors may slide, unless the advantage of having small half-doors is given up and full-width sliding doors are installed across the whole doorway on either side of the center post. Obviously, the non-sweep door does not extend beyond the edge of the car when it is open; and yet the operation of opening cannot be interfered with by passengers ready to alight, as in the case of a folding door that folds inward. This feature, it may be said, is the reason for the non-sweep door's development in Pittsburgh because clearances are reduced to an absolute minimum, and the extension of even an open door beyond the side of the car is likely to result in trouble. The influence of this condition appears also in the location of the grab handles at the doorway, these being mounted upon the door so that when the door is closed the grab handle is inside of the car.

The weight and first cost of the non-sweep type of door appear to be about the same as that of the folding door. Its ease of operation is about similar to that of doors of the folding type, and it is generally operated by hand. With pneumatic control the operation is not as satisfactory as in the case of folding or sliding doors, owing to the fact that the non-sweep design appears to slam more than the other two types. There is, of course, in common with the inwardly-folding door, a small clearance space under the non-sweep door which does not exist with the outwardly folding type.

MISCELLANEOUS VESTIBULE EQUIPMENT

Trapdoors for vestibules, which are used to cover interior steps, especially in the case of cars for heavy electric traction, have been made mutually operative with the entrance doors in some instances, the trapdoor movement being effected in the same manner as that of a folding step. An innovation that has been brought out within the past two years provides for a horizontal movement or extension of several inches for the trapdoor when it is in lowered position. Thus the car may be operated on a foreign road that has raised platforms with clearances appreciably greater than the width of the car, the extensible trapdoor filling the gap between the edge of the platform and the car side. The extension is effected by a simple mechanism which is operated mechanically by pulling on a folding mast-arm located within the vestibule, and provision is made so that the trapdoor cannot be extended while the vestibule door is closed, thus eliminating danger of having the projecting edge of the trapdoor cause damage by being inadvertently left extended while the car is in motion.

For end-entrance, double-end, high-speed cars the vestibule, of course, serves as a motorman's compartment, but for single-end and center-entrance cars special partitions have to be installed in case the motorman is to be separated from the rest of the car. In city service the importance of seating space makes the use of collapsible compartments desirable, and these appeared in different forms in several of the early center-entrance cars. At present there is in evidence a tendency to omit such permanent compartments, especially since end doors under the control of the motormen have appeared as a feature of recent modified center-door arrangements. Therefore, the most popular plan is to have the motorman separated from the body of the car only by a curtain drawn down behind him. The use of railings as an additional means of separation for the motorman appears also in a number of recent city cars, and in one case he is virtually placed in a separate compartment by the use of three curtains, one at his back and one at each side, these being carried normally on rollers hung from the vestibule ceiling. The reasons for this tendency to omit par-

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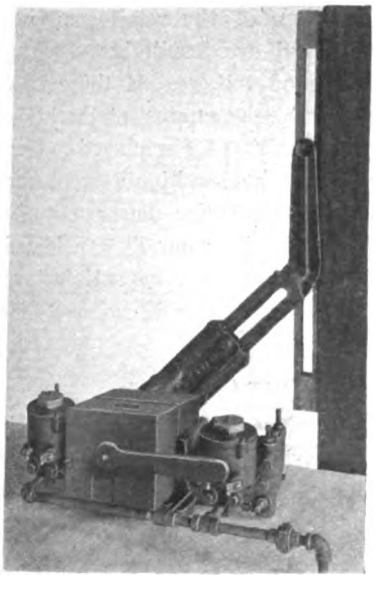
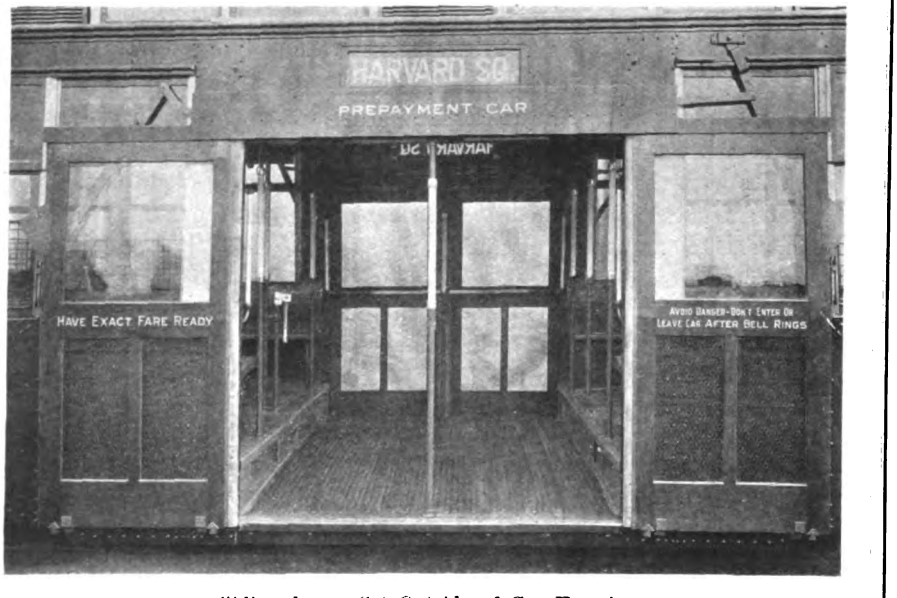
titions are, obviously, the desire for retaining full seating space within the car, to give the motorman better control of the customarily-installed front door and, at the same time, to maintain simplicity in the interior construction. On this basis the controller and brake valve have even been located under permanent end seats extending around both ends of center-door cars, and the connections for the controller and air-brake handles have been carried up through pipe railings that act as seat spacers when at the rear of the car.

With the practically universal use of air brakes for city cars, seats for motormen are becoming a customary part of the vestibule equipment. From the plain round stool on a pipe standard these seats have been developed to provide adjustable height by a cam or ratchet in some cases, and in others to provide either for collapsing the seat against the vestibule sheathing or for its removal to the opposite end of the car in case that proceeding is preferred when the car is turned. Seats for the conductor have been installed occasionally so that he is in position behind the fare box but still can observe the entrance doors, and on the early center-entrance cars in New York City the conductor was seated behind a small change desk opposite the entrance. Nevertheless, the provision of special seats for this purpose has not acquired general popularity, because fare collection and door control seem to be performed much more efficiently when the conductor is standing and he has a chance to sit within the car on long runs.

Other items of vestibule equipment on recent cars include provisions for electric marker lamps instead of oil lamps, which have been generally used because of their reliability. Electric markers, of course, require provision against interruption of the main power supply, and in one such scheme there is used a back contact relay that closes a shunt circuit through a storage battery and low-voltage circuit if the power supply should fail, the circuit serving small lamps located in the markers alongside of the large lamps that are normally lighted. The storage battery is kept charged by a shunt connection from the main circuit, and thus the car is provided with marker lights even when the power supply is interrupted. Frequently emergency interior lamps and emergency illumination for the headlight are also provided by shunt circuits with storage batteries. Still another item worthy of note in connection with frequent development in vestibule equipment is the cab telephone, which may be connected with the company telephone wire by plugging into a jack box on a pole near the track or by getting connection by means of a pole having on the end a metal hook that may be caught on the bare telephone wire overhead.



Pneumatic Engine for Sliding Door



Sliding Doors Set Outside of Car Framing

HEADLIGHTS

Headlights, at least in the case of interurban cars, constitute an important item of vestibule equipment. For city cars an incandescent headlight recessed in the dash of the car and operated in series with the car lighting is most generally used. In general, the equipment consists of a metal reflector within a cast-iron casing equipped with a plain glass door, although several companies make use of a semaphore lens, which produces a longer and more concentrated beam. For suburban service the headlight is generally powerful enough to throw a beam from 400 ft. to 500 ft. ahead of the car; but this, of course, is not so brilliant as to blind pedestrians when the car is operating through city streets. These headlights are frequently mounted

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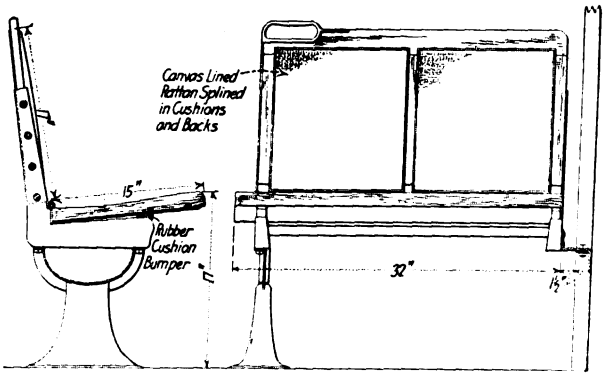
permanently on the car dash, although in some cases portable headlights are used so that they may be shifted from one end of the car to the other. In suburban equipment the modern tendency is to make use of a concentrated-filament Mazda lamp that is mounted in a headlight with a silver-plated glass



Non-Reversible Folding Seat for Ultra-Light Cars

reflector parabolic in shape. A focusing device is usually considered essential in order to obtain the best results. In some cases headlights are operated in series with the car lighting, but usually they are supplied from an independent circuit containing resistance. In addition, dimming resistances are sometimes provided so that high-powered headlights may be controlled but not extinguished when circumstances make a strong beam undesirable.

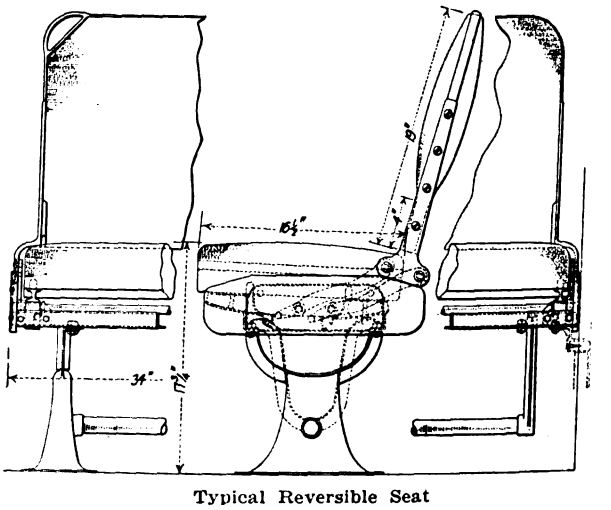
For high-speed service modern practice appears to require headlights that will produce a beam of sufficient intensity to enable the motorman to pick up objects on the track from 1200 ft. to 1500 ft. ahead of the car, and there is some difference of opinion as to whether the high-powered luminous-arc headlight or the incandescent headlight is better adapted for these conditions. The arc lamp has retained a great deal of popularity because of its ability to give a constant illumination when operating on fluctuating voltage; but opposed to this there is the objection of the wandering of the beam, although the latter difficulty has been largely overcome of late by the use of flattened electrodes. Arc headlights are equipped with parabolic reflectors where a widespread beam is desired for use on single-track lines. For double-track service a semaphore lens equipment gives a more concentrated beam and does not interfere with cars approaching from the opposite direction.

Within recent years a number of high-speed electric railways have adopted incandescent headlights that are essentially similar to those designed for suburban service, except that the reflectors are made larger in order to produce a longer beam. These headlights are nearly always portable and are mounted on the car dash, although some few roads giving a fast, heavy service use incandescent headlights mounted permanently above the vestibule. The obvious advantages of the incandescent headlight are its simplicity and absence of moving parts. In addition, a very important recent improvement has been effected through the development of a reflector that absorbs the high-frequency rays from the lamp and thus makes the headlight emit a greenish-yellow beam of light without violet or ultra-violet components. The principle upon which this is based is that the glare from high-powered headlights, which has been shown to be actually dangerous in extreme cases because of its blinding effect on motormen of opposing trains and its tendency to make light signals fade out and lose arrestiveness of aspect, comes largely from the ultra-violet rays. The practical elimination of these rays, therefore, permits the use of a high candle-power lamp that can give an intense beam of light without the usual objectionable features.

In general, the problem of the relative advantages of incandescent and arc headlights resolves itself into the question of voltage. If there is a steady supply of constant-voltage current the high-capacity incandescent lamp may be employed to best advantage. If, however, the headlights are to be operated direct from the main power circuits the luminous arc headlight is generally considered to meet the requirements in a very satisfactory manner because of the variations in voltage that will inevitably occur.

SEATS AND SEAT CUSHIONS

With regard to seats for electric railway cars, it has already been remarked that a transverse arrangement has become practically standardized in



Typical Reversible Seat

all classes of service and, since the large majority of newly-built cars are designed for double-end operation, reversible seats are now almost invariably installed. Ruggedness and light weight are the major considerations in the mechanism by which reversibility is provided, and recent improvements along these lines have been more in the nature of evolution of existing constructions than novelties in

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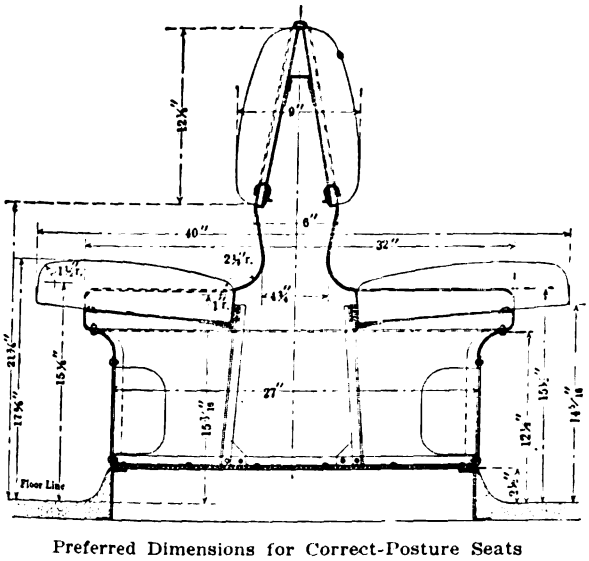
design, although perhaps the substitution of pressed steel for the originally-used malleable-iron pedestals might be classed as a radical change of past years. As a material for seat cushions rattan is overwhelmingly in the majority for city cars, although the wooden-slat seat has been gaining in favor, especially for ultra-light designs where thinness of the seat back and lightness for the seat as a whole are of special importance. In interurban service plush is still the most popular seat covering, although rattan cushions are being used to an increasing extent in both smoking and passenger compartments. At present, imitation leather is probably most popular for smoking compartment seats, and it is occasionally used in main compartments as well.

Within the past two years no small amount of attention has been devoted to the design of a proper form for seat cushions. The major point raised is that, since the seat back is a support for the shoulders only, any extension of the seat back below the shoulders of a seated passenger is not only unnecessary but becomes actually harmful by pushing the body forward at the plane of the seat. The principle is indicated in the accompanying illustrations, of which one shows the theory and the other one of its recent applications in practice with the preferred dimensions. From the latter it may be seen that a depth of 15½ in. in the clear is called for, this being somewhat less than the dimensions that have commonly prevailed for some years. However, this provides considerably more space than would be

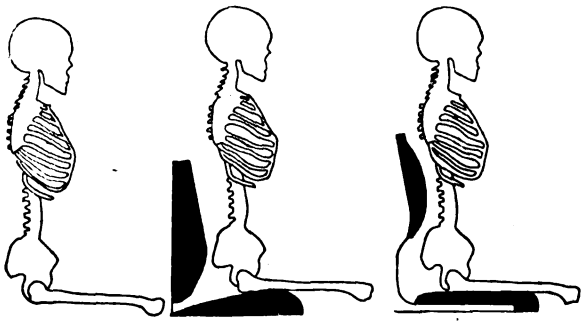


Preferred Dimensions for Correct-Posture Seats

otherwise installed because of the overhang of the seat-back cushion.

The influence of this theory in seat design appears in a number of the most recent cars for city service, one such design being shown in the accompanying line cut. This is a light-weight reversible seat with a width of 34 in. and a weight of about 60 lb. The back is shaped thin at the bottom, and the cushion is 16½ in. wide. Practically the full width is effective seating space, owing to the extra throw of the cushion and the formation of the back, which, it should be noted, furnishes increased knee room for the passengers in the seat to the rear.

In connection with this particular seat it might be remarked that although a foot rest is employed, there appears to be a considerable difference of



Effect of Seat Design on the Human Spine

opinion on the advisability of such devices, at least for city service. Seats for a number of recent cars have been furnished without any foot rest whatsoever, while in other cases double rests have been employed. Logically, however, it would seem that for city service, where a large majority of the passengers are short riders, the foot rest is a complication that is hardly necessary.

In connection with the recent development of ultra-light cars, a new type of seat is worthy of passing mention owing to its novel features, although it is designed only for single-end cars of especially light construction. This seat is non-reversible, and it is made with pressed-steel end and back standards combined with a pressed-steel pedestal designed so that it centers well back of the center line of the seat cushion. The seat cushion is hinged and can be lifted like a theater seat so as to permit the passenger occupying the position next to the aisle to step back without moving into the aisle in order to allow the passenger occupying the inside seat to move out. This is considered to be of considerable value in small single-end cars where the aisles are none too wide and space is at a premium. The seat weighs but 25 lb., and it is made with a hardwood frame and rattan webbing panels with the idea that these are more comfortable than wooden slats and make a better appearance. It is reported that this construction is as durable and is more easily repaired than the plain slat seat.

So far as the widths for seats may be considered, there is, as mentioned in a previous chapter, no evident tendency toward any standard dimension, 35 in. and 36 in. being frequently but not invariably used for city service. For interurban cars the seat widths are, of course, increased, ranging up to about 41 in., including seat arms,

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when that width can be provided without cutting down the clear aisle-width below about 22 in., although a 25-in. aisle seems to be more popular when this clearance can be obtained. Forty-three-inch seats, it may be said, appear on one of the latest interurban cars.

WINDOWS AND CURTAINS

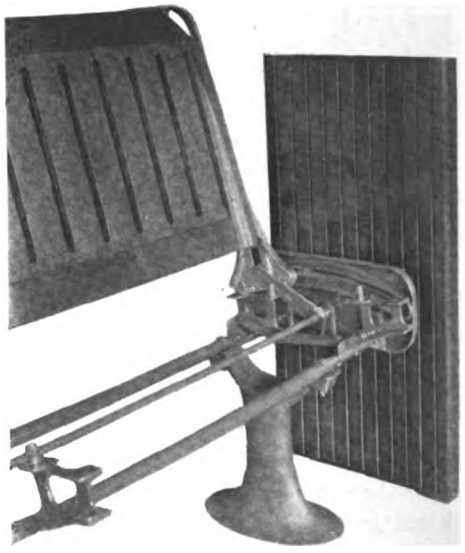
Not a great deal of change has been apparent in connection with the construction and operation of car windows within the period under discussion except for the practical elimination of the space-wasting drop sash and the development of metal sash frames. The latter, however, seem recently to have lost somewhat in popularity, and one reason that has been put forward for this lack of general acceptance of a feature of such obvious advantage is that the expansion and contraction of metal is so much greater than that of wood under extremes of temperature that it becomes a difficult matter to keep the sash tight, although means designed to overcome this have been provided in one design by the use of a filling of compressible composition in the groove that holds the edges of the glass. Such sash is formed into the necessary shapes from seamless brass tubing, and the bottom sash rail is furnished with a rubber strip which prevents shock in case the sash is lowered violently and protects passengers' hands in case they should be caught under the window, acting at the same time as a bottom weather strip.

For city service the two-section window with a high bottom section is still the rule, although the very recent Bay State car has three-section sash.

Interurban Seat with Cushion Removed to Show Reversing Mechanism

For semi-convertible cars popularity appears to have been accorded equally to the two arrangements which permit the sash either to be removed completely from the car or else to be raised on curved guides into a space between the roof and the headlining. The former arrangement, of course, requires only that the sash guides on posts shall be readily removable, so that the appellation of "semi-convertible" to cars so equipped is rather finely drawn; but the fact that only a small percentage of recent cars have provision for removing the sash perhaps permits this classification.

Sash locks for holding windows in open position



Modern Slat Seat with Bench Removed to Show Reversing Mechanism for Sliding and Tilting Movement of Bench

are available in a very great variety of forms. The simplest types make use of such arrangements as a bolt engaging with holes drilled in the side posts at various heights, or a cam pivoting on a pin in the side post and swinging against the sash frame so that the weight is held up by friction. Among the more elaborate forms might be cited a safety lock with a corrugated guide that cannot be improperly latched and fall through carelessness on the part of the passenger. Window guards in many recent cases have been made of wire screens instead of the horizontal rods that are usually of ¼-in. steel tubing or lightweight metal spaced on, say, 2½-in. centers. Generally, such wire mesh screens are stationary, being needed as a guard only when the sash is removed, but in one case the guard is attached to the bottom of the lower sash of each window, and it slides into a pocket in the side wall of the car below the window sill when the sash is lowered. This arrangement, of course, eliminates any difficulty introduced by the presence of the window guard in connection with washing of the windows. Other schemes for simplifying the window washing process may be cited in the case of arrangements where guards of the horizontal-rod type are supported in multiple castings that are hinged on the center rod so that each half of the guard may be swung outward by loosening the clips that hold the castings to the posts under normal conditions. Another similar plan is the sup-

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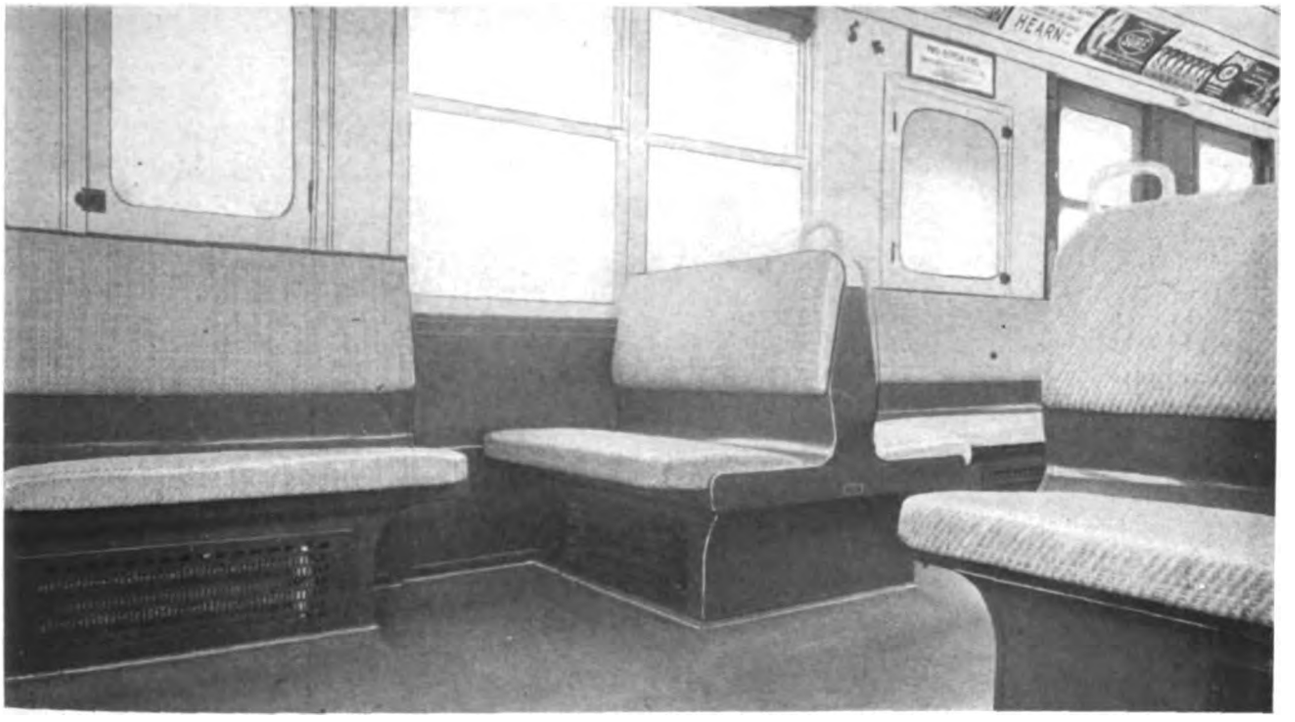
port of the guard on vertical rods rather than direct attachment to the posts, so that the whole guard can be raised or lowered.

Window curtains for recent cars have displayed a surprising unanimity in connection with the material that is used for the curtain itself, imitation leather on a cloth base having been used in practically all of the most recent equipment orders. Novelties in the construction of the curtain fixtures have not been prominent since the introduction of combined pinch handle and friction devices which prevent the curtain from creeping upward, but recently there has been brought out a fixture that makes use of a double-acting, automatic friction device on the roller tips, permitting the curtain to be pushed up or pulled down without frictional resistance and without need for pinch handles, although the curtain normally is held in place by friction.



Correct Posture Seats for Rapid Transit Car

MISCELLANEOUS CAR-BODY EQUIPMENT

Probably the most spectacular of the developments in miscellaneous car-body equipment that have recently taken place is the introduction of a sanitary covering in the form of white porcelain enamel for interior hand holds of various types, including stanchions and hand straps and the grab handles attached to the back of seats. Since the enamel is not affected by acid, it becomes possible to wipe such hand holds with dilute carbolic acid when the cars are cleaned, and thus render the equipment truly sanitary and free from possibility of transmitting contagion. Grab handles on the back of seats have been made also with enamel covering as well as of lightweight, non-corrodible, tluminum-base metal. This latter material has a silver finish that does not tarnish, and therefore adds greatly to the eappearance of the car interior, although perhaps not as much as is the case with the white enamel porcelain.

Buzzer systems fed with 600-volt current from the trolley circuit are still a part of the interior equipment of every modern car, but there is, apparently, a tendency to discontinue the liberal installation of push buttons that was the original practice. Frequently buttons have been installed, only at or near the exit so that there will be less tendency to delay the movement of the car because of the leisurely movement of passengers who signal to the motorman and then take their time about leaving their seats, but this arrangement has not proved to be invariably satisfactory. In some cases the buzzer has been used as a signal between the conductor and the motorman, and the cord-operated bell has been omitted.

Destination signs for practically all recent city cars have been of the type where a long reel of cloth is wound between a pair of drums, the various destination names being painted upon the cloth and illuminated by lights from the rear. However, the use of numbers for designation of routes has come into use of late, and these are displayed on the car in a number of different forms ranging from perforations in a metal plate to large numbers that are painted upon steel or cardboard and illuminated from the front side.

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Equipment for Fare Registration and Collection

At the present time equipment for fare collection displays diverging tendencies, one general class, which includes the locked fare-box and the register, aiming toward the utmost development of the human element and the other toward the sole use of mechanical devices. Elaboration of the various types of apparatus has brought about within the past few years not only the money-counting fare-box but also motor-driven registering fare-boxes, totalizing registers, traffic-mileage recorders, and even transfer-issuing machines.

ALTHOUGH equipment for the collection and registration of fares is really subject to classification as part of the interior fittings of a car-body, it has been omitted from the discussion in the foregoing chapter and treated as a separate division of equipment because of the extraordinary number of improvements made within the past few years, as well as the great importance of the equipment in the operation of the car. Broadly speaking, the recent developments in this field have resulted in the rather surprising situation wherein there is a direct division of opinion over the basic question of manual versus mechanical collection of fares. Thus there are, so to speak, two widely-separated schools of thought in connection with fare collection. One of them involves the use of mechanical means in collecting fares, reaching an ultimate development in the registering fare box, while the other aims solely toward the development and utilization of the human element.

Aside from the equipment that is involved in this general division of opinion, it may be said that the latest devices to be introduced have all been characterized by a tendency toward elaboration of mechanical operation. Among the fare-registration devices, which, of course, antedate the fare box, this tendency appears in the development of totalizing registers which add up the results of the day's operation by mechanical means. For interurban service, where the greatest variety of data are involved, opportunity for elaboration in operating records has even been provided by a machine that produces printed data for traffic statistics of a most complete character. Printed register records

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with some types of registers are made to include figures for transfers, tickets, passes, cash fares and total passengers. In addition, light portable registers have been gaining materially in importance because of the successful establishment in several cities of front-end collection for congested loading points. One type of portable machine even approximates the action of a coin-counting fare box, and it is used widely in towns of moderate size.

With the coin-counting fare box in general, development has naturally been very rapid because of the relatively recent introduction of the device. In its latest form, wherein the machine is motor-driven, it has unquestionably aided in the elimination of several serious difficulties with which the original mechanical fare-collecting machines had to contend, and the same idea of elaborating mechanical operation also has appeared in the production of registering fare boxes for both cash and metal tokens used for reduced fares. A recently designed fare box includes provision for counting and cancelling paper tickets by mechanical means, although this has hardly reached a commercial stage as yet. Also, there are combined registers and fare boxes which enable a single machine to collect and register automatically the cash fares that are dropped into it, while provision is made on the same machine for manual registration of tickets and transfers; and there has even appeared an automatic change-making machine for installation on the car platform to relieve the conductor of this duty. A similar tendency toward mechanical operation is in evidence, although in a somewhat different application, through the placing on the market of transfer printing and issuing machines.

Development of Human Element in Fare Collection

That phase of the previously-mentioned division of opinion regarding the means for fare collection which depends upon the development of the human element rather than mechanical apparatus for securing to the company the fares that are collected involves primarily the use of a register alone. Carried to a logical conclusion the fare box is omitted, at least in the registering form, although in numerous instances a non-registering fare box is used as a safe-deposit or receptacle for fares. The basic idea underlying this plan is that real protection in fare collection should depend more than anything else upon the public indication and registration of the fare and the printed record of it. Thus, it is held that the placing of a fare box on the car is an intimation to the conductor that he is no longer to be trusted to handle the receipts. This results in the conductor becoming less interested in getting the proper receipts into the fare box, since he cannot logically be held responsible for something that he is told to let alone. On the other hand, if fares are registered upon dials or indicators placed at different points within the car to give publicity to the act of registration and the conductor is given authority to reject improper fares, as well as responsible supervision over the sale of transportation, it is considered that real protection for fare collection can be secured.

Exponents of this principle advocate the establishment of competition between conductors in regard to their accuracy of handling fares, and records are kept of the shorts and overs that exist between the printed register record and the actual turn-in of each conductor, who does not see the register record and does not know what has been registered when he makes his turn-in. In consequence, he turns in everything that he has in his pocket less his own change. If he is over he is not given an opportunity to hold this amount out, thereby making his turn-in balance with his register. Neither is he required to make up any shortages, and if any conductor is consistently short he is disciplined.

In brief, the basic idea of this system is to make an appeal to that which is best in the employee and to provide means for analyzing the characteristic errors of the various men, thus bringing to the surface those who should be watched more carefully because of carelessness or dishonesty.

Fare Registration Equipment

Apparatus for the registration of fares without combination with a fare box has undergone relatively few changes within the past few years, except as regards the previously mentioned development of a totalizing register, of which a typical record is shown in an accompanying illustration. With this device the printing wheels are turned back to zero when each conductor starts to work. Therefore, when the records are figured in the auditing department no subtractions are necessary between the first print made and the succeeding prints with the exception of the total passenger count, thus providing a check between the records of successive conductors and between the closing and opening figures of successive days.

Another recent development in apparatus for fare registration is found in a fare recorder which is operated on the basis of mileage traveled by the person paying fare. Thus, instead of setting the register in terms of money the machine is set in terms of stations or fare points, and the act of setting the pointers to any two given stations automatically computes and records both the distance traveled by the passenger and the amount of fare to be paid. The dial of this device is mounted in the car in the usual manner, but is divided into half-mile divisions covering 100 miles of run. The dial carries three pointers, one indicating the start-

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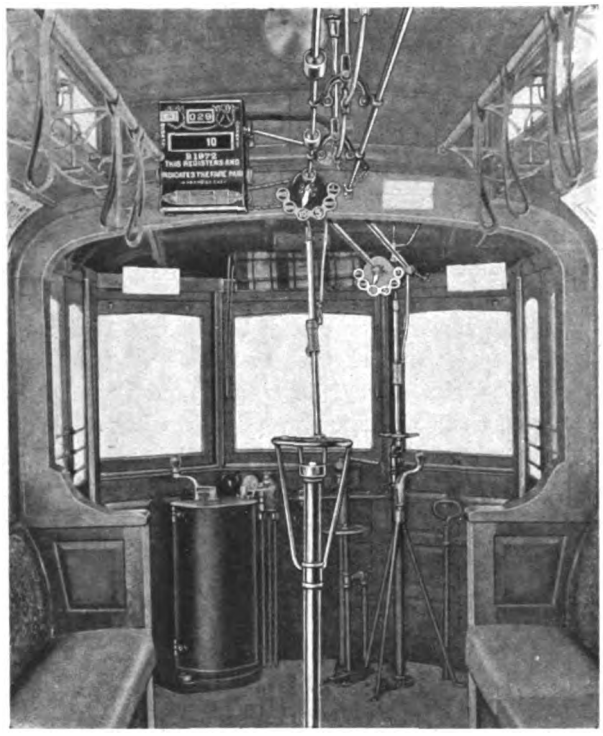
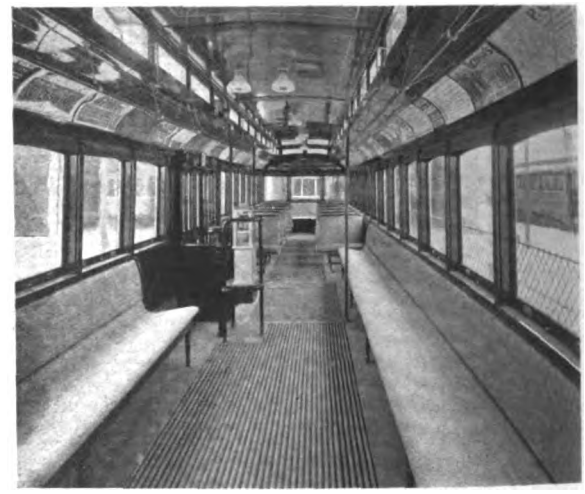


Register Fixtures Arranged for Either One-Man or Two-Man Operation

ing point and another the destination, while the third is provided for arbitrary fares, being moved backward or forward to make the deductions or additions involved by the change from the standard rate per mile. Movement of the pointers and registration is effected by rods running the length of the car in the usual manner. The printed record, which is completed by the automatic printing of the totals for cash passengers, ticket passengers, passenger miles and total fares collected, as well as the date, the train and the division, may be made up either at the end of the trip or at the end of each conductor's run, the conductor being identified by signing his name on the record through an opening in the case.

Traffic Recorder for Registering Fares on a Mileage Basis

The use only of such fare registers is diametrically opposed to the alternative general plan of mechanical fare collection, if it may be so termed, whereby the use of fare boxes eliminates the human element from the process of collecting fares in so far as this is possible. The underlying idea of the latter plan may, perhaps, be best exemplified by citing the method under which the fares are dropped into a locked fare box without registration—a scheme that was first tried out in the early days of prepayment operation. Here the process of fare collection was wholly independent of the conductor, whose duties were limited to the making of change and to seeing that entering passengers dropped their fares into the box.



Fare Box Location on Cleveland Front-Entrance Center-Exit Car

MECHANICAL FARE COLLECTION

Theoretically this provided the ideal arrangement from the standpoint of mechanical fare collection. The locked receptacle assured a complete turn-in to the company of the money that was dropped into the box, and the arrangement had the great advantage of simplicity both in regard to accounting practice and in the mechanical construction of the apparatus. In addition, it was generally considered to facilitate loading in comparison with hand collection, because passengers having the exact fare did not need to wait for those getting change or transfers. However, the original arrangement of having a locked fare box without registration of fares has been generally found to be very weak in practice, because dependence has to be placed upon the public to hand over the fares to the box and not to the conductor. Thus it becomes relatively

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easy for a dishonest conductor to hold out fares in making change or to substitute for tendered fares coins of lower denomination. The result has been a return to the use of the register in connection with the fare box, and this is the almost invariable practice at the present time, regardless of whether the box is locked or is of the money-counting type.

COIN COUNTING FARE BOXES

Within the last few years the money-counting fare box has become a formidable rival of the locked box. The objects sought in its development as a substitute for the locked box were to avoid the trouble and expense of supplying each conductor with some $25 in small change each day, as well as

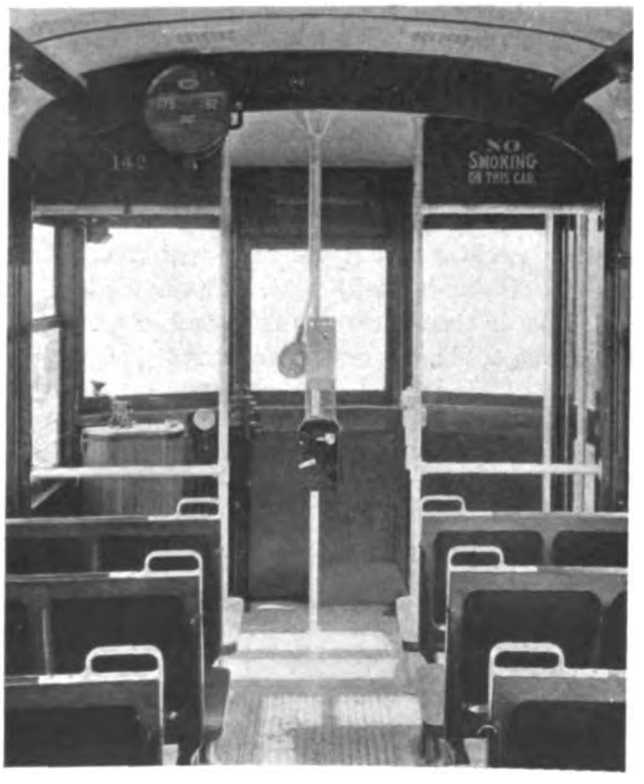
Locked Fare Box Opposite Center-Entrance on Pittsburgh Low-Floor Car

the expense of removing all of the inner compartments of the fare box, transporting them safely to the auditing department, counting the money and putting it up in sacks to be sent up for the next day for use of change. In addition, it was desired to avoid the necessity for a check on those who did the counting, as well as the difficulty in properly checking the register readings against the fare-box contents.

With the first money-counting fare boxes a serious obstacle was encountered in the mechanical difficulty of counting coins accurately according to value on account of the small difference in diameter between the penny and the dime and the great variations due to wear and mutilation, together with the constant introduction of dirt into the counting mechanism. Several years of experiment, however, as well as experience derived from the increasing use of the machines, eventually served to overcome the difficulties, and within the last two or three years the money-counting fare boxes may be said to have met the conditions of normal operation in a satisfactory manner. When kept reasonably clean they are accurate, and under normal circumstances

Combination Fare Box and Register with Extra Sections, Permitting Tickets and Transfers to Be Rung Up by Hand

they are reliable and generally give first-rate service. In addition to the refinements of detailed design brought about by practical experience, the money-counting fare box has been brought to a high state of development in its operating possibilities. Among the recent designs that have been introduced is one in which the standard registering fare box has been supplemented by a registering



Coin-Counting Fare Box and Transfer Register on One-Man Car

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UNIVERSITY GEN.P. JEFF SW925PM 03393 JAN 1016

5 TRANSFER REGULATIONS. ISSUED BY CONDUCTOR No. 2
Good for continuous trip begun within transfer limit, on FROM and TO lines, on date and before time printed above. Subject to companies' rules. Improper use of transfer is a misdemeanor.
NEW YORK STATE RAILWAYS ROCHESTER LINES.

Transfer Printed by Transfer-Issuing Machine

mechanism which automatically counts upon separate cyclometers two different denominations of metal tickets or tokens, as well as the nickels, dimes and pennies that are ordinarily counted. The metal tokens, which are made in two sizes to serve the needs of railways where two classes of ticket fares are in use, are counted and indicated on two different indicators, while the cash fares are totalized and shown on another indicator. A fourth indicator totalizes all of the fares collected. All fares are deposited in one hopper, and the counting mechanisms select automatically the different classes of fares and indicate them on the dials.

The metal tokens used with this machine are made with a german-silver center and a bronze rim swedged securely around it. The size is midway between that of the penny and the nickel in one case, and in the other midway between the American dime and the Canadian 5-cent piece. The combination of metals, together with the printed matter impressed on the token, makes counterfeiting a very difficult matter, and the hardness of the metal employed insures a long life.

In another type of machine a device is furnished for separating pennies and depositing them in a locked compartment which may be taken out later by someone in authority, the object of this device being to prevent beating the machine with flattened dimes or turned-down nickels that might otherwise pass through and register only as pennies. Still another machine makes use of a registering fare box in combination with a ticket-receiving box in which paper tickets may be deposited, these being registered by hand on a separate register. Obviously, this is an attempt to take care of both paper tickets and money with an inexpensive machine, the need for which appears in many small towns where cut-rate paper tickets are required by ordinance. This apparatus appears to be operating satisfactorily, but owing to the fact that the passenger is expected to put the ticket in the small opening provided for it, the box does not seem to be practical where traffic is heavy. Machines have been built which receive both tickets and money in the same hopper, and which, after separating the tickets from the money, cancel the tickets and count the money; but the apparatus can hardly be considered to be perfected at the present time, since it is very expensive and requires a motor for its operation.

Time	Direction	Line No.	Transfers	Tickets	Passes	5c Fares	Total Cash	Register Number	Total Passengers	Date	Identification
4 23P	L	18	000	000	000	000	$00.00	5	7470	DEC 5	INSP
4 23P	I.	18	042	047	056	198	$09.90	5	7470	DEC 5	27
3 34P	O.	18	035	032	036	163	$08.15	5	7393	DEC 5	27
2 25P	I.	18	024	017	021	106	$05.30	5	7295	DEC 5	27
1 36P	O	18	007	009	008	050	$02.50	5	7201	DEC 5	27
12 27P	I.	39	000	000	000	000	$0000	5	7127	DEC 5	27
12 27P	I.	39	072	074	068	247	$12.35	5	7127	DEC 5	14
11 27A	O.	39	059	055	043	189	$09.45	5	7012	DEC 5	14
10 38A	I.	39	034	034	016	138	$06.90	5	6888	DEC 5	14
9 29A	O.	39	016	015	003	063	$03.15	5	6763	DEC 5	14
8 30A	I.	39	000	000	000	000	$0000	5	6666	DEC 5	14

Section of Record from Totalizing Fare Register

Undoubtedly the most practical solution of the ticket problem is the use of metal tokens, but this idea has grown very slowly in popularity. Nevertheless, the metal ticket has appeared to have many advantages wherever it has been tried out, and apparently no disadvantages of any consequence have been developed.

Transfer-Issuing Machine

Still another development in fare box construction, one of the most important improvements in the past few years, has been the combination of the register with the fare box, so that the registration of fares is effected by action of the counting mechanism of the fare box itself. In this machine, the register (instead of being mounted on the bulkhead of the car and connected by cords or rods to a position convenient for the conductor) is mounted on a standard extending up from one side of the fare box. Registration of fares is accomplished without any effort on the part of the conductor other than turning the handle that operates the coin-counting mechanism, the counting of each fare resulting in a change in the large numbers on the dial of the overhead register.

Motor-Driven Registering Fare-Boxes

The motor-driven fare box, which constitutes the most recent development in mechanical fare collection, has come as an almost obvious sequel to the combined fare box and register. It is probable that the device has made its greatest strides in the city of Boston, where about 60 per cent of all fares are now handled in this manner, both on the rapid transit lines and on the surface cars. On surface cars, when a passenger offers his fare, he is not allowed to deposit pennies or tickets, and if a letter carrier or other government employee tenders a ticket of value, the conductor gives him a nickel in exchange for it, whereupon it is deposited in the

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box and registered. If a passenger tenders a 4-cent exchange ticket or a transfer, the conductor registers it by hand on the transfer register which with the cash register is located on a stanchion directly above the fare box.

When the passenger drops his nickel in the fare box it falls upon a tilting table, this being hand operated, under the control of the conductor. The money is registered automatically by the motor, which is started by tilting the table, and the fare drops into the bottom of the box, where it is immediately available for change. Therefore, the conductor does not have to spin the operating handle of the fare box nor to operate a register except for transfers, checks and employees' tickets, and he cannot possibly show an honest difference between the money collected and the indication on the register. Also, on a heavy traffic line it is no small convenience to the conductor to have change immediately instead of being obliged to interrupt his work by grinding the fare-box handle.

The old trick of securing a fractional registration with a penny or clipped nickel is useless, because the register will not record anything below a full fare. Furthermore, it is dangerous to the conductor who tries it, because such coins drop into a locked receptable not accessible to the conductor, and a conductor whose box contains several such coins lays himself open to suspicion. In general, the motor-operated coin register is said to be very popular with the great majority of the Boston Elevated Railway Company's employees, because it relieves them of much work and worry, while there is instantaneous registration of each fare upon a register that is visible and audible from inside the car, thus overcoming one of the weak points of the ordinary fare box.

Generally speaking, the motor-driven fare-box registers are similar to standard hand-driven machines except for the fact that they are provided with a separable base containing a 600-volt 1/15-hp. motor designed for operation on a circuit direct from the trolley. The current requirement is only 1/5 amp. and the motor base contains an automatic switch which cuts off the current as soon as the money in the machine is registered.

TRANSFER PRINTING ON THE CAR

Reference has already been made, in connection with the general subject of fare collection, to the use of transfer-printing machines that may be mounted on the car near the conductor's station to relieve him of the labor of punching transfers and at the same time to furnish a check upon this operation. Such machines have not as yet been produced in large quantities, but the limited number in use at the present time have given successful results, indicating that the principle is well adapted for general electric railway service. The transfers are printed as issued from the machines, which are provided with operating pedals or small hand levers for setting the time and other data to be printed. The transfers as issued are cut from rolls of inexpensive white paper and are neat and sanitary.

The machines are usually so arranged that they can be changed from one end of the car to the other very readily if necessary, and the cost is moderate, involving in the case of one design an expenditure of about $100. The size is about the same as a coin-counting fare box, and the weights of the different types range from 17 lb. to 35 lb.

Apparently, such devices should be decidedly economical, because they reduce the cost of transfers to the equivalent of that of plain rolls of paper, while the expense of handling and checking transfers is also eliminated. The conductor's transfer record of the day is simply a matter of issuing to himself a transfer upon beginning his work and another upon quitting. He fastens the two together and turns them in, so that the opening and closing consecutive numbers are thus reported, the times showing when he began and finished his run. However, the important element of the device appears to be speed because with one type of machine tests have shown that between sixty and seventy transfers per minute can be easily issued.

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Trucks, Wheels, Axles and Gearing

Many recent trucks have been characterized by the general use of structural shapes and pressings instead of forgings, and they have frequently been simplified by the omission of the once-universal equalizer bars, while spring systems have been improved by the use of coil springs in series with leaf springs. For city service the non-parallel-axle truck has come into use and there is evidence of a tendency toward a return to cast-iron wheels and possibly toward the use of annealed axles and anti-friction bearings

TRUCKS of the four-wheeled swiveling type, which are generally representative of the electric railway practice of this country, have been subject to very little change within recent years, at least in so far as basic methods of design may be considered. However, there appears to be a marked growth in popularity in the use of structural steel shapes that are fastened by rivets in preference to bolts, since bolts generally display a tendency to get loose and yet are difficult to remove in case repair work becomes necessary. In all cases a swinging truck bolster is used to support the center-plate load, the movement of this being absolutely essential to safe and easy riding as speeds increase, although the swing motion has been dampened in some instances by adjustable friction devices.

One of the most important of recent improvements in truck details has to do with this feature, the innovation being designed to eliminate uneven frictional action by the chafing plates ordinarily employed to hold the bolster between transoms in an upright position. For example, when the car is coasting the bolster is free to ride upon its springs, but when the torque of the motors or the pressure from the brakes forces the bolster against the chafing plates, there is a certain amount of friction, and very frequently a locking effect, which interferes with the swinging as well as the spring action, and may stop it altogether, resulting in rough, jerky riding. By the employment of the new device, which is called a bolster guide, this condition may be entirely removed. The guide is shown in one of the accompanying illustrations of a truck of the M. C. B. type, appearing between the brake release spring and the side bearing on each side of the truck. It consists of a pair of links pivoted at one end to the bolster and at the other to the transom, allowance for play or side swing of the bolster being provided under spring pressure. Consequently, the bolster floats on top of its springs and is held in position

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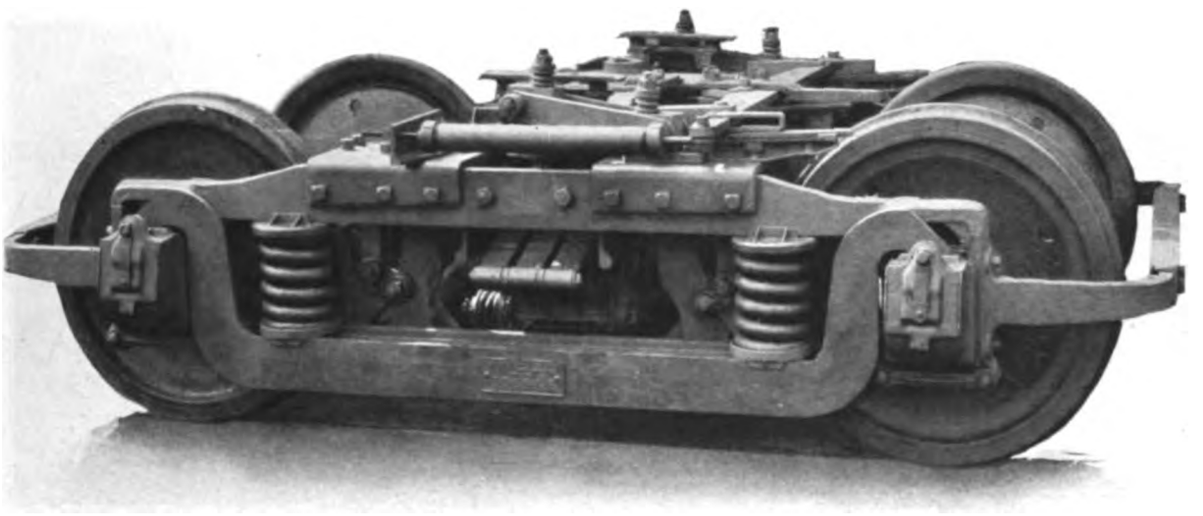

Truck Equipped with Bolster-Guide Links Pivoted to Ends of Bolster and to Transom

exactly parallel with the transom, although it is able to move freely up and down or sidewise to provide swing easement at curves. As the links are pivoted to the truck bolster on the vertical center line of the truck's pivot plate, a dead-center pull on the truck bolsters is established when brakes are applied, and this absolutely prevents the bolster from tilting.

MODIFICATIONS OF THE M. C. B. TRUCK

For swiveling city-car trucks, certain variations have appeared in the location of the swing links that carry the bolster, thus modifying the M. C. B. design, in which the links invariably hang from the transoms and support a spring plank that carries the elliptical springs upon which the bolster rests. One of these alternative arrangements is to hang the swing links from the top member of the truck-side, so that they support directly the ends of a half-elliptical spring, on top of which rests the end of the bolster. With such a design the springs are placed lengthwise with the truck-side, and the side movement for the bolster is limited, the springs being rigidly attached to spring-seats at the ends of the bolster. The design is, of course, intended particularly for city service where speeds are low, and its obvious advantage is its simplification or reduction of the number of parts required in the truck.

Modifications of this design make use of spiral springs mounted in series with the leaf springs to absorb vibrations of short amplitude. This method of improving truck spring systems was worked out two or three years ago, and it has been adopted as a part of many recent constructions because it automatically brings into action the soft-acting spiral springs to insure easy riding of the car body under light loads and to cushion the smaller vibrations and shocks.

Notwithstanding the popularity of the above-mentioned plan of hanging the springs direct from the truck side-frame, a number of low-floor trucks for city service have been designed along the line of the M. C. B. design, in that the leaf springs are set transversely with the truck-side and are located on a spring plank hung from the transoms. Such trucks are frequently made up from flat steel bars for the truck-sides similarly to the arch-bar truck commonly used under freight cars. In this case no end frames are used to connect the ends of the truck-sides together, and, as a matter of fact, end frames have been omitted also in many interurban truck designs where both motors and brakes are inside hung, thus showing plainly that the end frame in itself is not essential to the alignment of the truck.

Among the modern trucks of modified M. C. B. type that have been built within the past few years are several which make use of structural shapes and pressings, instead of the flat bars above mentioned. This results in a construction of a great strength and lightness. One such truck, which is illustrated on page 630, has been designed for extremely heavy high-speed service involving an actual center plate load of 48,000 lb., and a maximum center plate load within the elastic limit of the material amounting to about 120,000 lb. The weight of the truck, complete with brake rigging but without motors or gearing, is 12,500 lb.

In general the M. C. B. type of truck is invariably associated with the use of equalizer bars for transmitting the load at the center portion of the truck-side to the boxes, and although this device was almost universally used at one time in electric railway service, present opinion is very much divided as to the necessity for the complication. The object of the equalizer bar is, obviously, to permit movement of one wheel, in case it encounters some irregularity in the track, without compelling

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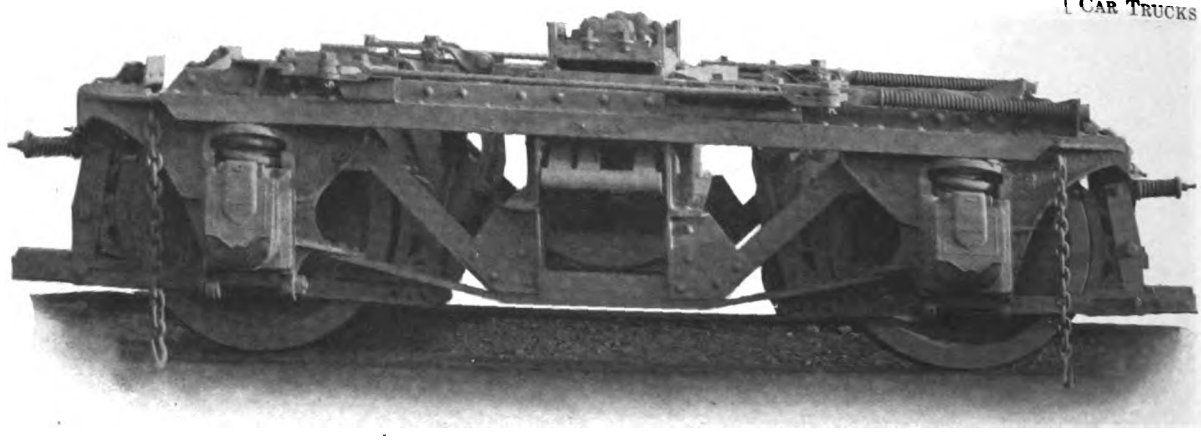


High-Speed Truck Built with Structural Shapes and Pressings to Give Light Weight

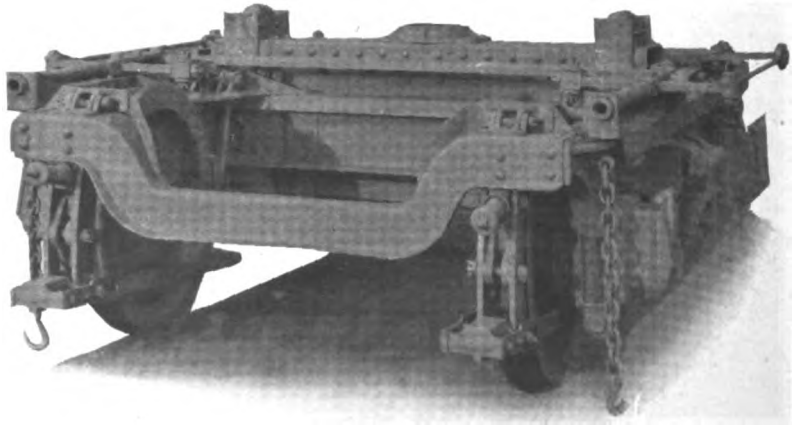
a corresponding movement of the whole side of the truck, and if this result could not be obtained in any other way, there would be ample reason for the construction. However, the use of spiral springs on top of the boxes has proved to be perfectly practicable, and where the matter of height has been important the requisite length and amplitude of movement for these springs have been attained by placing them alongside of the box and supporting them on lugs instead of on top of the box. It is true, of course, that the omission of the equalizer bars must, for a given spring, reduce to some extent the freedom of relative movement between the wheels and the truck as a whole, so that the problem of the use or non-use of equalizer bars would seem to be largely one of track conditions.

However, non-equalized trucks have been used successfully under recent passenger coaches for steam railroads that have been by no means noted for their smooth roadbeds and, in consequence, more than a discussion of principles appears to be required to warrant the retention of the equalizer bar. In fact, in city service the equalizer seems to have been abandoned at the present time, except in very rare instances, because of its weight and its complication of its truck construction.

Where two motors are mounted on one truck, the inside-hung motor arrangements display an overwhelming popularity for recent cars, the possible reduction in wheelbase to be effected by outside-hung motors evidently being an insufficient recompense for the savings in weight and complication that accompany the inside-hung arrangement. Of course, where maximum-traction trucks are adopted, the location of the driving wheels near the bolster necessitates hanging the motor outside of these wheels, but other than this, the use of outside-hung motors to reduce wheelbase to the extremes that were occasionally used several years ago, seems to have been altogether given up. In this connection the influence of modern small-sized motors appears in the question of truck wheelbase, which now ranges down to 5 ft. 2 in. for recent cars having two inside-hung motors per truck.

MAXIMUM TRACTION AND SHORT WHEEL-BASE TRUCKS

In city service the maximum-traction truck has, of course, retained its popularity of some years ago, but at the same time the influence of the small wheel is making itself felt also in this regard, although, on one recent two-motor car, typical maxi-



End View of High-Speed Truck Shown Above

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mum-traction trucks with 26-in. wheels have been used in connection with the modern small motors. However, in another two-motor city car both motors are mounted on one truck, which has 24-in. wheels, the opposite truck being an idler. For this idler truck 24-in. wheels are used as well as on the motor truck, the reason for not going to a smaller diameter being that the slight saving in weight thus effected would hardly compensate for the greater complication of spare parts that would have to be carried in stock to provide for the maintenance of two different truck designs on each car. In several instances, also, the recognized advantages of the maximum traction truck have been given up in favor of the greater advantages to be derived from the use of small motors, several cars being equipped with four motors and small-wheeled trucks, in preference to the use of the same total capacity of motors in a two-motor equipment with maximum-traction trucks. However, a division of opinion exists on the advisability of this procedure, owing to the fact that maintenance of motors is commonly held to depend rather upon the number of motors to be kept in repair than upon the horsepower of the motors, so that the maintenance of two 60-hp. units would be less than that of four 30-hp. motors.

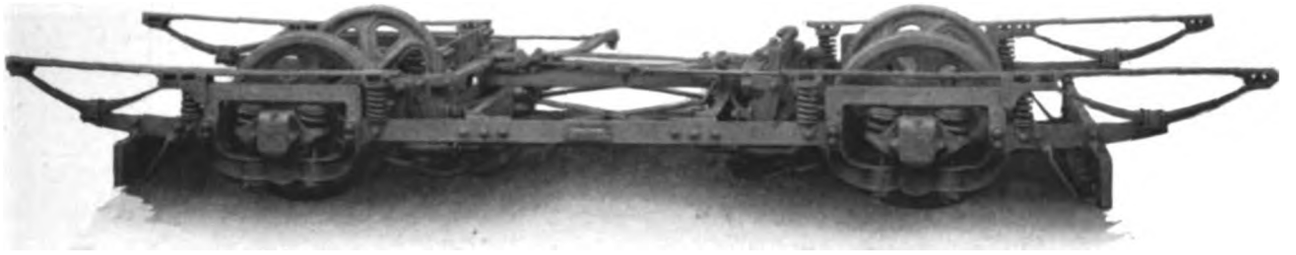
In connection with maximum-traction trucks it might be said that recent designs have almost invariably been constructed for operation with the poney wheels toward the ends of the car, the object being to avoid the loss of adhesion that occurs at the extreme front wheel whenever a car starts. Also, in a recent single-end design this effect of inertia has actually been utilized to good advantage by facing both poney wheels forward, the tilting of the trucks during acceleration increasing adhesion.

TRUCKS FOR LIGHT CARS

Although the double-truck car is really the representative type on American electric railways, the single-truck design has experienced a marked revival within recent years, this being reflected in the number of radically different types that are in use at the present time. Of these, the rigid-axle truck is apparently the most popular, as mentioned in a previous chapter, and this type has evolved from the form in which it originally appeared largely through simplification and through the substitution of structural steel members for the forgings that were originally common. One such truck, which has been designed for ultra-light cars, has a weight complete with truck brake rigging of only 3,200 lb. For larger cars, single-truck weights increase up to about 6,000 lb., a wheelbase of 8 ft. seeming to be about the maximum that is popular. However, rigid wheelbases up to a length of 8 ft. 6 in. have been used, and it is considered by one manufacturer that a 9-ft. wheelbase could be made to give satisfactory service if necessary.

In connection with the use of four-wheeled cars having rigid axles, mention may be made here of the principle of omitting the truck altogether and supporting the car direct on the journal boxes. An example of this construction is to be found in the ultra-light-weight cars built by the New York Railways for storage battery operation some three years ago, the car in this case being designed with a considerable hub-clearance, so that the bottom of the side sheathing comes about in the plane of the boxes. The side sheathing of the car supports the entire load and it is reinforced at the journal boxes to provide seats for helical springs arranged in multiple, which constitutes the entire spring equipment. Nothing is installed that is equivalent to the half-elliptic springs that are commonly extended beyond the wheels on single-truck cars to increase the spring base for the car body, but in the case under discussion the speed of the car is at all times extremely low, so that the tendency to pitch or gallop is reduced to a minimum. The use of such multiple helical springs for single-truck cars has been popularized to a considerable extent by the development of the so-called wide-wing journal box which increases the possible length of the spring support of the frames and, with the large diameter spiral springs in pairs on the journal box wings, adds to the strength as well as to the riding qualities of the truck.

The tendency to gallop is, of course, the great difficulty with all short-wheelbase single-truck cars,



Typical Non-Parallel-Axle Truck

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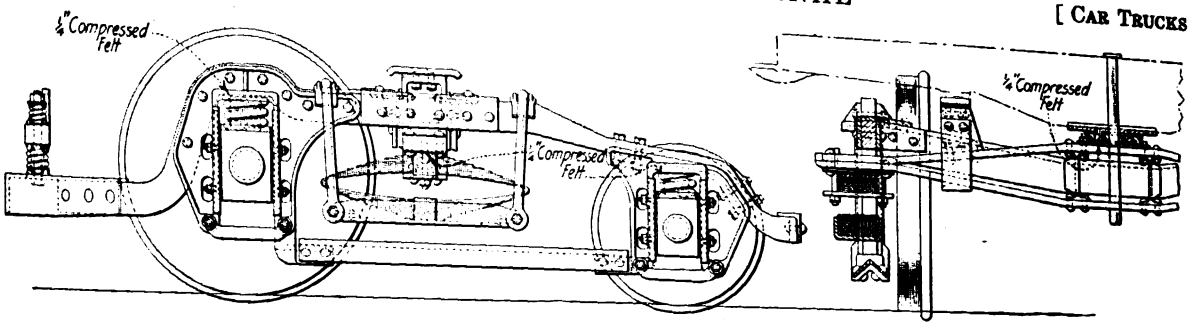
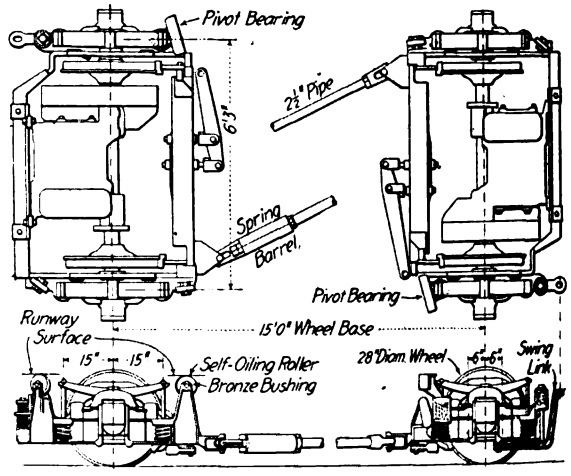


Modified M. C. B. Truck for City Service

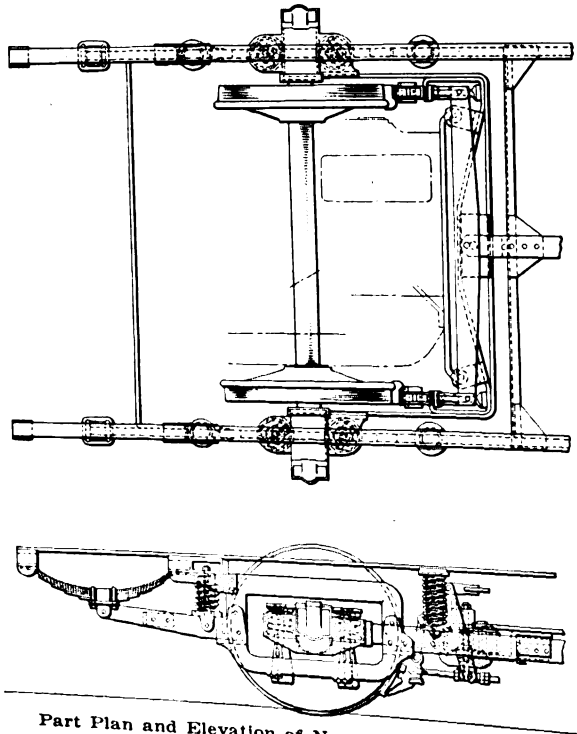
the limitation to the wheelbase existing, of course, because of the difficulty of getting the car around curves. To meet the situation the non-parallel axle truck has been developed, and although this has not as yet extended the field for the single-truck car materially beyond its original limits, it displays very definite promise. Existing designs of non-parallel-axle trucks have increased the truck wheelbase from 9 ft. up to 12 ft. and occasionally 15 ft., and by thus decreasing the length of the overhanging ends of the car body the tendency toward galloping has been materially reduced.

NON-PARALLEL-AXLE TRUCKS

The basic principle of the two most common types of non-parallel-axle trucks involves the use of swinging links which hang from the boxes on diagonally placed pins and which thus compel the boxes to swing in a direction such that when any wheel is forced inward by the pressure of curved track against the wheel flange, the wheel is also moved toward the end of the car, radiating, so to speak, about a center which is on the center line of the car. Such a movement is brought about by the use of pins at one end of each swing link, the pins for the links of the forward wheels (for a given direction of movement of the car body) being set so that they make the links move only in planes pointing inward, while the pins for the links for the rear wheels are set in such a direction that these links swing only in planes diverging from the center line of the car. To be exact, all pins are really on radial lines from the center of axle movement. When one of the forward pair of wheels is forced inward, it also moves ahead, while the outward movement of the opposite wheel involves a corresponding movement to the rear. With the rear pair of wheels (it being understood that the arrangement is symmetrical, and hence is reversible in so far as car movement is concerned) inward pressure causes a rearward movement for the wheel, while the opposite wheel has to move forward. Thus, the two pairs of wheels when subjected to the pressure of the outer rail on a curve, tend to assume positions such that the car is guided around the curve without grinding of flanges.



Single-Axle Radial Trucks as Used on Glens Falls Car



Part Plan and Elevation of Non-Parallel-Axle Truck

Provision is made so that the links have a tendency always to return to the vertical, so that the car will ride steadily on tangents. In one case this consists in providing the lower end of each link with two pinions or trunnions, which engage in the

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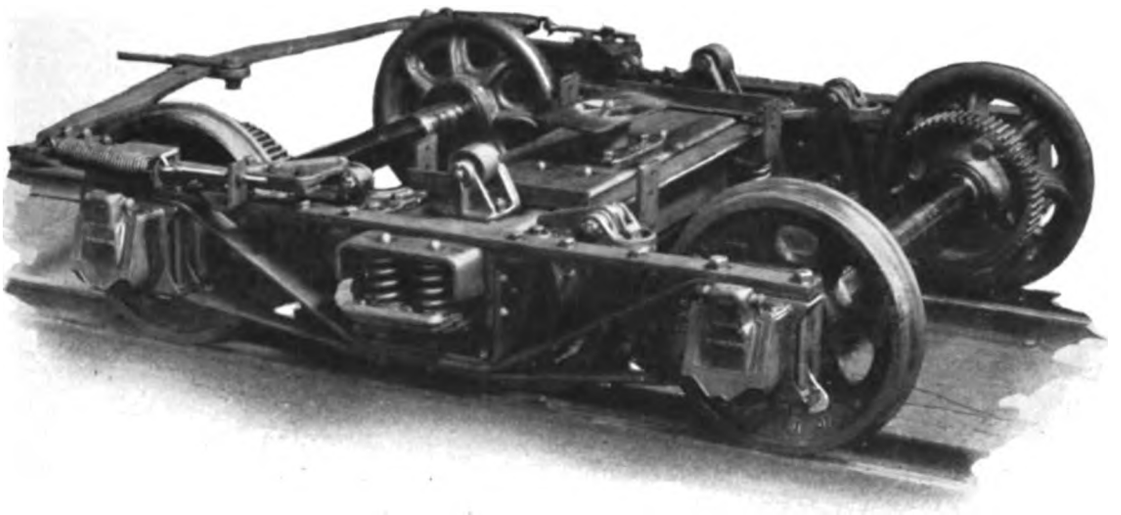

Plain Arch-Bar Truck of Light Weight for Low Floor Cars

yoke braces and are designed so that when the wheels radiate on a curve the trunnion at one side of the lower end of each link leaves its groove, throwing the weight on the other pin and causing the link to return to the normal upright position as soon as a curve is passed and the flange pressure is removed.

Still another type of non-parallel-axle truck for four-wheeled cars has been brought out recently, this differing from the foregoing arrangement in that the two axles under the car are not carried in one structure. Instead, each axle has its separate truck so that, although the arrangement is very commonly known as a radial-axle truck, it might well be distinguished by the term single-axle truck. The two trucks under a car, it is true, are connected by a guide bar, but since this has a spring-controlled sliding sleeve joint, it permits uneven action, which occurs in going over special work or rough track.

The most radical feature of the arrangement is the use of a pivot bearing at one diagonal corner of each truck, instead of at the center, as is customary. At the other corner of the same side of the truck is a swing hanger, and on the opposite side of the truck both corners are provided with rollers which carry the weight of the car, but which permit the axle to swing radially about the pivot bearing at the other side of the truck. Radiation is effected by pressure of the rail against either one of the wheel flanges. The swing hanger supports a swing link or radius bar that is attached to the car body at one end and is extended horizontally to a pivot under the journal box, this tending to keep the truck in alignment with the rail.

WHEELS FOR ELECTRIC RAILWAY SERVICE

Recent practice in regard to the choice material for wheels under city cars has displayed evidences of a swing back to the use of cast iron in place of solid wrought steel, which was so popular a few years ago, while the revival of the cast-steel wheel with a manganese tread has been a still more recent development. The steel-tired wheel is now almost universally used for high-speed service, but it has been supplanted in low-speed service by the solid wheel, especially in the regularly rolled sizes, or, say, 36 in. or less, because of the solid wheel's superior simplicity as well as its reduced cost on a mileage basis. Incidentally, it may be said that the one-wear wrought-steel wheel seems to have been very generally supplanted by thick-rim designs, the most economical rim thickness being generally conceded to be 2½ in. This thickness permits two or more turnings to bring the final rim down to the discard limit of 1 in. that is generally used, although frequently a minimum rim thickness of ¾ in. is considered to be safe.

Under such circumstances a solid wrought-steel wheel of large size, or, say, 33 in. or 34 in. in diameter, is frequently expected to give a mileage of approximately 200,000 under favorable conditions, the mileage per 1/16 in. of wear being variously assumed between 8000 and 11,000. As compared with this, the mileage of a cast-steel wheel is estimated at between 110,000 and 200,000, while the mileage of a cast-iron wheel seems to be quite well established at about 45,000 miles. The first cost

Standard Railway Motor End-Housing Equipped with Ball Bearings

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of the forged steel wheel and the cast-steel wheel are approximately the same, but the scrap value of the forged steel wheel is somewhat greater than in the latter case. The cast-iron wheel, on the other hand, costs less than half as much as the forged steel wheel, and although its scrap value is actually less, the relative importance of the scrap in the case of the cast-iron wheel is greater than in the case of forged steel. Representative weights of wrought-steel, cast-iron and cast-steel wheels, of say 34-in. diameter, are respectively about 650 lb., 550 lb., and 465 lb. In general, when the influence of all these various factors is taken into consideration the net cost per car mile of the three types does not seem to be very greatly different.

Obviously this situation is due to the extremely high mileage credited to the wrought-steel wheel, because both its cost and weight are high, and the high mileage depends absolutely upon the fact that the wheel may be turned two or more times in service. These conditions may have had some influence on the recent revival of popularity for the cast-iron wheel in city service and, in addition to this, there is the fact that some difficulty appears to be experienced in manufacturing wrought-steel wheels in the small sizes that are now so frequently called for on city cars.

The cast-steel wheel, which is made with a tread of high-manganese steel that is chilled and subsequently ground true, has been only recently introduced generally in electric railway service, and mileage records are not available. However, in one case, 30-in. wheels operating under 80,000 lb. capacity motor cars in high-speed interurban service, are reported to be averaging from 175,000 miles to 200,000 miles for their one wear. No definite statistics are available in regard to the percentage of failures before the end of the normal life of this type of wheel, but in the case of service tests under heavy freight cars, a total number of 83,000 wheels in service for an average period of two years and four months, gave a record of sixty-nine wheels removed on account of worn flanges or treads, sixty removed on account of mechanical damage, fifty-six on account of defects in manufacture, and 482 slid-flats, which were removed, reground and returned to service. The feature of this record is the very small percentage of wheels removed for flange wear, this characteristic being reported to have been found in all cases when manganese-steel treads are used.

AXLES AND GEARING

Wtih regard to axles, the most prominent development of recent years is the fact that many of the heat-treated axles that were installed six or eight years ago are now coming to the end of their normal lives, and as a result there have been quite a number of failures. Undoubtedly, the heat-treated material, which was introduced solely as a means to make axles carry an increased load without giving them correspondingly increased dimensions to suit the larger motor bearings and greater weights of recent years, is capable of producing steel that will give thoroughly satisfactory results. The fact that heat-treated axles have been found in a great many cases to have a life not necessarily exceeding 200,000 miles and sometimes less, is not necessarily an indication that the use of heat-treated material is undesirable. Apparently the prime necessity is that the steel should be so installed that it will not have to bend in any way, an example of the effect of this being a recent case where electric locomotive axles with reduced centers actually cracked in the middle instead of within the wheel hub, as is almost invariably the case in a locomotive axle failure. This extraordinary location for the cracks has been ascribed to the fact that the heavy loads on the axles produced bending at the middle, and this the heat-treated material was unable to stand. However, heat treatment is a complication, and unless it is properly performed it may not improve the qualities of the axles in any respect. For this reason it has been argued that it is better to make use of annealed steel and to accept the increases in diameter that are necessitated by its use.

During the period covered by this general discussion the changes in gears and pinions for electric railway motors have been mainly those accompanying increased knowledge of the subject gained by past experience. No particular tendencies are in evidence in regard to the use of special classes of material, which include at the present time almost every type of steel. Preference is divided between cast-steel that is case-hardened and tempered and homogeneous forged steel that has been heat-treated to give a hard exterior, grading off gradually to the center of the tooth where the toughness is at a maximum. Untreated steel is used in many cases for gears, but alloy steel does not appear to be popular. Mileages are guaranteed in some instances with gears and pinions that are furnished for particular electric railways, the figures being based upon the life attainable among gears and pinions already in service in the same localities, but it is not considered possible generally to estimate the life that can be attained under ordinary circumstances, since no two companies have the same operating conditions. Gear and pinion mileage is especially influenced by the condition of the track, and where the roadbed is kept free from sand and dust, and the wear on the armature and axle bearings is kept at a minimum, the life of both gears and pinions should reach the highest possible average, assuming that lubrication is carefully attended to. Forged steel, heat-treated pinions, when used with untreated gears, are reported to be giving all the way from

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60,000 miles to 175,000 miles. Untreated gears for this combination give from 100,000 miles to 300,000 miles, depending upon the gear ratio and other factors, while heat-treated gears giving a life of 800,000 miles have been reported.

In regard to the design of gears and pinions, it might be said that the split gear fastened by bolts over a key on the shaft has definitely been displaced by the solid gear in all modern construction, the reason being that the solid gear is not only stronger and lighter, but also eliminates the harmful effect of indifferent workmanship during repairs or adjustments. The diametral pitch for gearing has been definitely limited to a maximum of 3, but a figure of 2.5 is very commonly used. Owing to the fact that pinions must have not less than fourteen teeth, while some authorities even advocate a minimum of fifteen in preference, the gear ratio on electric cars with small wheels is limited, and this in turn involves the use of motors having a lower armature speed and consequently higher first cost than would be involved in the case of higher gear ratios. To meet this difficulty there is a growing belief that smaller teeth will have to be used, although this will mean a shorter life for the gearing.

In regard to gear cases, it may be said that steel has been rapidly replacing malleable iron as a material of construction, because of its lighter weight and ability to bend rather than break when the gear case strikes an obstruction in the street. Such steel gear cases are made in various ways, some having each half pressed out complete from a single sheet of metal, and others being pressed in quarters that are hand-riveted and spot-welded along the central seam. The welding process is favored because of its ability to make the gear case absolutely oil tight, and because of the possibility of rivets becoming loose in the thin metal.

MISCELLANEOUS TRUCK FITTINGS

In connection with miscellaneous fittings used in electric railway car trucks, there has appeared a tendency to adopt hardened pieces of alloy steel wherever wear is likely to take place. Case-hardened pins and bushings have been used in a number of cases for the brake rigging and for hangers or other pieces where movement occurs under heavy unit pressures. Bolster chafing plates in some instances are being made of manganese steel, this material being used in preference to case-hardened metal because of the fact that extended wear does not get through the skin and expose soft metal. The same thing applies in the case of motor-nose supports which have been similarly fitted, the motion in this case being almost infinitesimal, although, of course, the unit pressure is heavy.

During the past few years general recognition has been granted to the great importance of having friction reduced to a minimum at the side bearings, and a number of devices have been brought out to produce this effect. Apparently the most simple of these arrangements are the most popular ones, although some very ingenious schemes have been devised. Ball-bearing center plates have appeared also to a limited extent, and in some cases single balls for the center plates have been used, these giving the ideal condition of universal movement of the center plates with a radius that is reduced to the absolute minimum. The difficulty with such an arrangement is, of course, the greatly reduced bearing area, and here it may be said that opinion seems to be that practically all existing designs of center plates are too small to carry the load properly. This appears in the almost universal tendency of center plates to squeeze out even the heaviest kind of lubricant, so that eventually the center bearings are cut badly and obviously tend to bind. That large bearing areas eliminate this trouble has been demonstrated in practice, some cars even being able to get along with a relatively light oil in the center plate bearings.

The most spectacular development of recent years in connection with truck details has been the introduction of anti-friction bearings in place of plain journals and brasses. These anti-friction devices are of two classes, namely, roller bearings and ball bearings; the former having a theoretical advantage in its ability to carry load, but a weakness in the fact that it has no universally satisfactory means for withstanding end thrust. In practice the roller type of bearing has had an advantage in a cost that usually has been lower than that of the ball bearings, but of late the difference in cost between the two has been approximately equalized. There have been numerous installations of each type of bearing, and although these have been unsatisfactory in some cases (generally owing to an inability of the rolling members to withstand the heavy unit pressures), there have been an ample number of instances to show anti-friction bearings to be really economical provided their life is assured.

The use of ball bearings on motor axle bearings, although it seems more logical than on journal bearings where the loads are heavy, has only recently begun to pass the experimental stage. The reason for this has been that motor manufacturers have not wanted to undertake the use of ball bearings, regardless of the advantages that they might have, until assurance was given that the bearings would be mechanically reliable. Now, however, there has appeared a light-weight railway motor with ball bearings for the armature shaft. In this arrangement the use of ball bearings in place of the customary plain bearings has permitted the motor to be made shorter and generally more compact in its design.

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Brakes, Couplers and Other Safety Devices

Prominent recent developments in the now almost invariably-used air brake include, for high-speed service, the universal valve whereby any degree of elaboration in operation may be attained by adding attachments to a single fundamental device, and for city service, emergency valves for plain straight-air equipments. Pneumatic operation also has been utilized frequently for all classes of safety devices such as sanders, fenders, door operating mechanisms and control equipment, the latest development in couplers providing for automatic establishment of air pipe and electrical connections between coupled cars.

SAFETY devices, which naturally occupy an important position in connection with the means for movement of electric railway cars, have had a greatly accelerated development since the comparatively recent establishment of the safety-first movement. In this class of equipment the brake is unquestionably the most prominent, not only because the means for stopping a car are quite as important as the means for moving it, but also because the practically-universal adoption of air-operated brakes has made available on the car a supply of compressed air whose influence on the design of safety equipment has been far-reaching. Pneumatically-operated doors, as previously outlined, are now almost universally used for rapid transit cars and have gained at least a foothold in city service, and at the same time, air operation has been frequently applied to propulsion-motor control equipment when it has been removed from the platforms. Sanders and even fenders that depend upon compressed air are by no means uncommon, while the latest development in car-coupling equipment makes provision for automatic connection of air hose a feature which originated solely from the universal adoption of the air brake.

Air Brakes

With the brake itself, however, the recent changes are improvements only more or less basic in character that have been made from time to time as demanded by service requirements. For city cars the plain straight-air equipment which has been

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standard during a number of years has been improved by the addition of an automatic emergency feature, and this has come widely into use, especially in large communities. For high-speed service, where automatic air brakes are essential, the most important development has been the introduction of a so-called "universal equipment" which provides for the extension of operating functions merely by the attachment of additional parts to a fundamental device.

With this universal equipment it is possible to supply the equivalent of the simplest automatic brake in a fundamental form, given an ordinary brake application and an ordinary release. By attaching a special cover to the universal valve, the release of the brake may be graduated, and by adding another portion, greatly increased pressure is obtained in emergency from a supplementary reservoir automatically connected with the brake cylinder at that time. With the operating features mentioned, the universal equipment becomes equivalent in function to the AMM equipment that has been popular for many years in interurban service. Then, if desired, simple flexible straight-air operation (with the automatic feature always in reserve) may be incorporated in the universal valve, straight-air, owing to its convenience, being generally called for at present in service involving operation of both single cars and trains of not more than three cars. When trains longer than three cars are the rule, a quick-action portion may be attached to the universal valve and, similarly, other functions may be added depending upon the needs of the situation.

In subway and elevated rapid-transit service, where load-carrying capacity must be at the maximum and high speeds and short headways are called for, as well as the necessity for the utmost reliability, electric control of pneumatic operation is provided by suitable devices added to the fundamental universal equipment. This permits instantaneous application and release of the brakes throughout the train, as well as other practical advantages making for a higher over-all efficiency and economy in train movement.

In general, it may be said that the universal valve is designed primarily for rapid transit service and for heavy electric traction because it can handle any required size or combination of brake cylinders. Inasmuch as many interurban lines have already standardized upon previously-manufactured types of triple valve, such as that included with the above-mentioned AMM equipment, the universal valve has not come generally into use for electric railway cars having brake cylinders with diameters of 12 in. or less.

Comment might be made here in connection with the electro-pneumatic feature that is provided with the universal valve in that the positions of the motorman's brake-valve handle are the same for both electric and pneumatic operation. With earlier forms of electric brakes, for example, the position of the brake-valve handle for electric service application was not the same as that for a pneumatic service application, making possible a failure to obtain full braking power unknown to the motorman in case of poor contacts or open circuits in the electric control wires on any car. With the new equipment, potential pneumatic control takes place simultaneously with the action of the electric control, and so long as the electric brake functions properly, the pneumatic brake merely stands ready to act. Therefore, if the electric brake is in perfect order, it controls the train at all times, but if, on the other hand, the electric circuits on any car happen to fail, the only difference appears in the slower operation of the pneumatic control which then operates on that particular car.

In the latest form of this equipment instantaneous action of all brakes in the train is brought about electrically by admitting air direct from the auxiliary reservoir to the brake cylinder on each car of the train, in an amount that is determined by the time during which the controlling magnet valve is energized through the holding of the motorman's brake-valve handle in service-application position. At the same time, because of the position of the brake-valve handle, brake-pipe pressure is also reduced in the usual way, resulting in a readjustment of the internal parts of the universal valve locally on each car and thus placing the pneumatic control in position to function in case of failure of the electric operation. For this electric operation air from the auxiliary reservoir does not pass through the triple valve and, in effect, therefore, the electric service application is similar to that of a straight-air brake.

IMPROVEMENTS IN AIR-BRAKE DETAILS

In connection with high-speed equipment, it is of interest to note that tests made within recent years have exploded the old belief that to keep wheels from sliding at low speed, a blow-down is necessary for heavy emergency pressures in the brake cylinder. In the Pennsylvania Railroad tests it was shown conclusively that the condition of the brake-shoes automatically took care of the tendency toward an increased coefficient of friction at lower speeds, because they heated up sufficiently during the progress of the stop to lose much of their gripping ability. At extremely low speeds, perhaps, this condition might not obtain, but when a train's speed has been brought down to, say, 5 m.p.h., the distance that is run before the full stop is made is so short that the damaging effect of sliding wheels is eliminated. With the modern high-speed brake,

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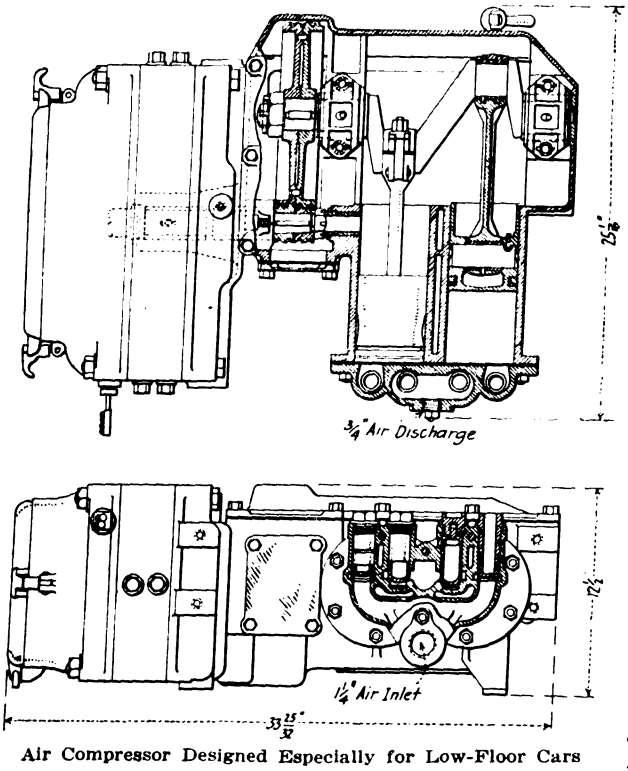
therefore, the blow-down has been eliminated for emergency applications, although emergency pressures at the brakeshoes range from 120 to 180 per cent of the weight on the wheels, depending on the service.

As a consequence of the heavy braking forces necessary to control modern heavy trains, much attention has been given to the clasp type of brake rigging wherein brakeshoes are hung on both sides of each wheel to reduce the unit pressures on the brakeshoes and to prevent the shifting of the journal from under the brass that has been found to accompany high-braking pressures with single shoes. However, the clasp brake has been generally adopted only for cars weighing more than 100,000 lb., and since shifting of the journals can be avoided much more easily by the use of semicircular journal brasses, it seems doubtful whether the more complicated plan will be used extensively in electric railway service, where the relatively light cars escape the problem of eliminating excessive brakeshoe wear and heating due to high pressures at the contact surfaces.



Air Compressor Designed Especially for Low-Floor Cars

For low-speed city cars, as previously mentioned, an automatic emergency feature has been developed and added to the plain straight-air brake. This equipment is automatic only in emergency, because such application may be brought about either at the will of the motorman or by the breakage of pipes caused by collisions or otherwise. The emergency action is accomplished by sudden reduction of pressure in the emergency pipe that is installed under the car in addition to the straight-air application-and-release pipe, and this moves a valve and opens ports that let main reservoir pressure directly into the brake cylinder. Because of the higher factor of safety over the ordinary straight-air brake and the opportunity to add a conductor's valve and thus put control of the car in the hands of a second man when needed, this emergency equipment is now being installed on a large proportion of modern city cars.

In addition to the above-outlined developments in the air-brake equipment, when considered as a complete system, many improvements have been made in individual devices. One of the most important of these revised designs appears in the air compressor. Here the changes have been along the lines laid down by the modern demand for low floors in city cars, which require the air compressor to be of reduced dimensions to go under the car floor and yet to leave ample room to clear a rough pavement. One such compressor with a weight of 565 lb. has a displacement of 16 cu. ft. per minute at about 200 r. p. m. This capacity is almost universally used with double-truck cars equipped with straight air, while 25 cu. ft. per minute is equally common when automatic brakes are used. Some of the newest one-man cars weighing approximately 10,000 lb. have, however, a compressor of only 5 cu. ft. capacity, the aim being to secure light total weight, but in this case the ratio of compressor capacity to car weight is about the same as it is in the case of the double-truck equipment.

Before leaving the subject of recent developments in air-brake equipment mention should be made of the installation of a successful variable load brake in passenger service, after many years of experiment. In this scheme, the braking pressure is varied in accordance with the load on the car by means of a multi-chambered brake reservoir whose variable volume changes the effective pressure in the brake cylinders, the control being established through electro-pneumatic means, including the use of the car springs as a weighing device. Its possibilities are, naturally, very much greater in electric railway service than on steam railroads because of the relatively greater ratio of passenger load to light weight of car and the better inspection that electric railway cars receive. But for the present, at least, the field for the variable load brake is limited, its particular adaptation being to heavy, high-speed, subway and elevated service where the road's traffic-carrying capacity is limited only by the number of trains that can be operated. Obviously, the ability to brake according to the load and thereby to insure a uniform minimum stopping distance and a minimum headway must contribute materially to increased capacity of the road at congested points.

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Brakes other than air-controlled have appeared in several experimental electric equipments of the solenoid type for city cars. They have appeared also in regenerative brakes that make use of the generator action of the main propulsion motors for heavy electric traction, although this type of brake in its modern form has been applied more frequently to locomotives than to cars, since it was tried and abandoned for general use long since in city service.

BRAKES FOR ULTRA-LIGHT CARS

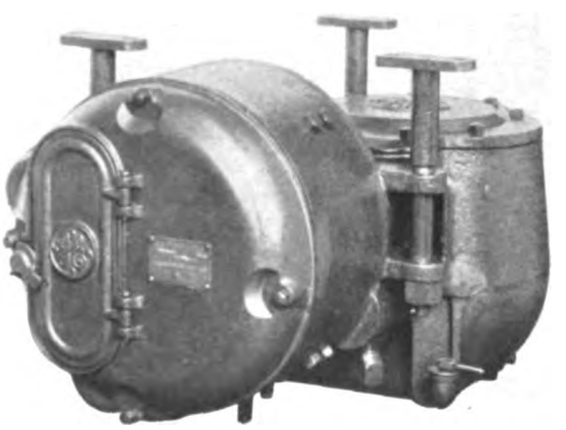
The recent development of an ultra-light air brake has unquestionably restricted the outlook for the electric brake even on one-man cars, the new type of equipment weighing complete only about 600 lb. In addition, the use of air in this case has the advantage of permitting control of the entrance and exit doors by movements of the brake handle, a feature of no little importance where the motorman's duties are elaborated to the extent of having him collect fares as well as operate the car. With this apparatus the brake valve handle has six positions: release (doors open), release (doors closed), service, lap (doors closed), lap (doors open) and emergency (doors open). The brake valve also embodies a pneumatic sanding feature, whereby sand may be applied to the rail in any position of the handle by the mere pressing down of the handle. The emergency valve operates to apply the brakes, open the front door, lower the steps, unlatch the rear door and blow sand onto the rails should the emergency line be ruptured from any cause or should the operator make an emergency application.

As an adjunct to power-operated brakes of every type, the hand brake has, of course, an absolutely unrestricted field, and in the case of cars ranging in weight up to, say, 25,000 lb., there still remain situations where the hand brake is occasionally used alone. With ultra-light one-man cars, however, the additional duty for the motorman's hands that it imposes has resulted in the installation of air as above mentioned, and even in some cases the use of the foot-operated brake. The latter, however, suffers inherently from a lack of amplitude of movement at the power end, so that band brakeshoes must be used if sufficient force is to be applied at the wheels. This has not proved to be an altogether satisfactory arrangement on account of the necessity for continual readjustment to maintain the small clearances, and it is probable that the foot brake will never be generally used notwithstanding its convenience in the case of ultra-light cars.

HAND BRAKES

Hand brakes of the vertical staff type have been subject to but few changes from the geared devices with cam-shaped drums that were commonly used a number of years ago, the most important improvement being that sweeping reductions have been made in weight. Modern hand brakes for heavy cars now frequently weigh between 40 lb. and 50 lb. and for light cars actually less than 25 lb. Of late, also, it would appear that staffless brakes have gained materially in popularity, owing to a demand for brakes that will conserve the utmost amount of space on the platform, one of these projecting only 3¼ in. into the vestibule while the distance to the outside of the hand wheel is about 5 in.—roughly half that found with the customary forms of vertical-wheel brakes. With this brake, which weighs about 75 lb. complete, the chain from the brake rod passes under an idler up through the car floor and around a sheave cast integral with a gear that is operated by a pinion on the ratchet-wheel shaft. The gearing is on the order of 4 : 1 so that a 75-lb. force on a 20-in. wheel will provide 2000 lb. pull on the brake rod.

The popularity of the staffless type of hand brake has no doubt been influenced by the fact that the



Three Point Suspension for Air Compressor, Designed to Eliminate Cradle Support

hand brake is becoming more and more of a standby device that is designed for use only when the air brakes fail, and this fact is responsible also for a recent revival of the ratchet brake in the form of a double-acting device with a long handle that is oscillated in a vertical plane, operating a drum such as is used with the staffless type of brake by means of a double pawl and ratchet. The box containing the drum occupies but a small amount of floor space and the fact that nothing but the handle extends above the top of the box makes the device as a whole present a minimum of interference to movement on the platform or in the motorman's compartment where it may be installed. The weight is 67 lb. complete, and the machine is capable of developing a pull of 3000 lb., the double-acting ratchet eliminating all lost motion during application.

No changes of importance have taken place in the design of foundation brake rigging except, perhaps, the revisions that have been necessitated by the introduction of the low-floor car in city service. An

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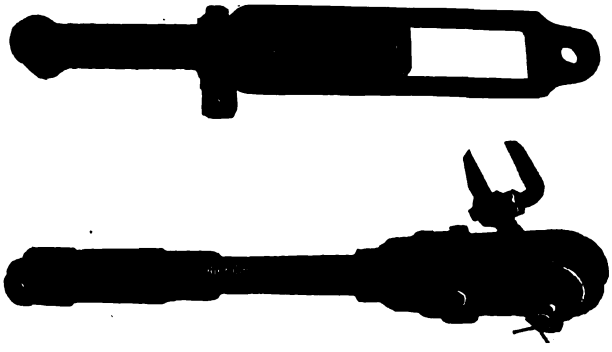
example might be cited in the case of the Pittsburgh low-floor car in which the general arrangement is practically standard in principle. The brake cylinder, which is 8 in. x 12 in., is mounted at an angle with a horizontal, so that the ends of the brake cylinder levers where they make connection with the pull rod are at the highest possible point, just clear of the under side of the floor. The pull rod extends in a straight line to the equalizer bar connection on the truck.

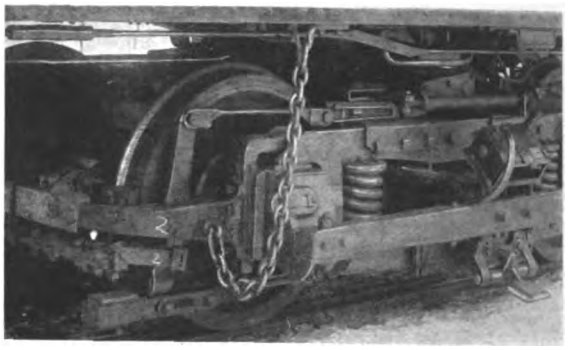
Another development that has been prominent during the past few years has been the introduction of several very satisfactory brake slack adjusters. In one of these devices, when the brakes are applied, the brake beams separate horizontally against the slight friction exerted by a rod that is attached to one beam and slides in a friction sleeve connected to the other. Upon release of the brakes, a small amount of lost motion is first taken up, thus giving clearance for the brakeshoes. As the release continues, the brake beams are held apart by the friction sleeve on the sliding rod, and since the clevis



Non-Automatic and Rotary Types of Slack Adjuster

connecting the live lever with the brake beam is slotted, the live lever slides within this slot and shims that are contained in a box attached to the clevis drop behind the end of a short push rod attached to the lever and moving within the shim box. When the brakes are again applied, the clevis connecting the brake beam to the live lever has been shortened by the total width of the shims that have dropped behind the end of the short push rod, and all clearance is taken out. A non-automatic slack adjuster has also appeared which makes use of shims in about the same manner.

Very much the same principle is applied in the case of another automatic slack adjuster that has recently been brought out except for the fact that, instead of shims that drop behind the end of a rod to shorten the brakeshoe travel, there is used a gripping device on the strut normally separating the bottom ends of the live and dead levers in the truck brake rigging. This, as well as the foregoing devices, are representative of the type of slack adjuster that may be classed as reciprocating as opposed to that which makes use of a screw to attain the same end. Among the latter, one of the most recent forms makes use of a screw and sleeve that takes the place of the usual turnbuckle connecting the lower end of the live and dead levers. At one end of this screw device, there is a simplified friction clutch that is given a motion backward and forward by a bell crank attached to the brake lever whenever the brakes are applied or released, provided that there is excessive motion at the brakeshoes. Although the clutch moves backward and forward, it is bound to slip when the brakes are applied because of the heavy compression then exerted on the screw. But when the brakes are released the clutch is sufficiently strong to turn the rod, screwing it a short way out of the clevis at the opposite end.

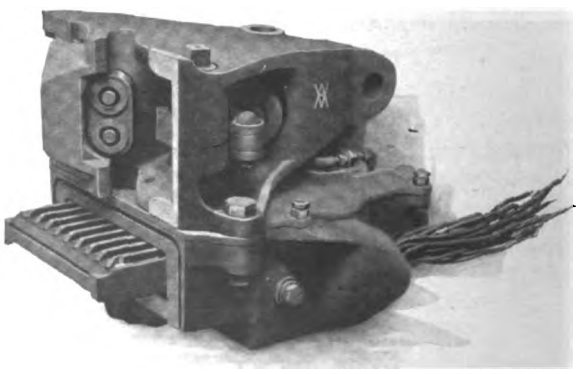


Automatic Shim-Type Slack Adjuster for Outside-Hung Brakes

Another slack adjuster of the rotating type makes use of air from a port uncovered by excessive air-brake piston travel to operate a simple ratchet, which in turn rotates a screw and changes the position of the cylinder lever fulcrum. The movement is effected by air pressure working against a strong spring, and the latter turns the ratchet only after the brake is released, giving a movement of about 1/30 in. at each operation.

COUPLING DEVICES

The most important recent development in coupler design, whereby provision is made for automatic coupling of connections between cars, includes con-



Automatic Car, Air and Electric Coupler

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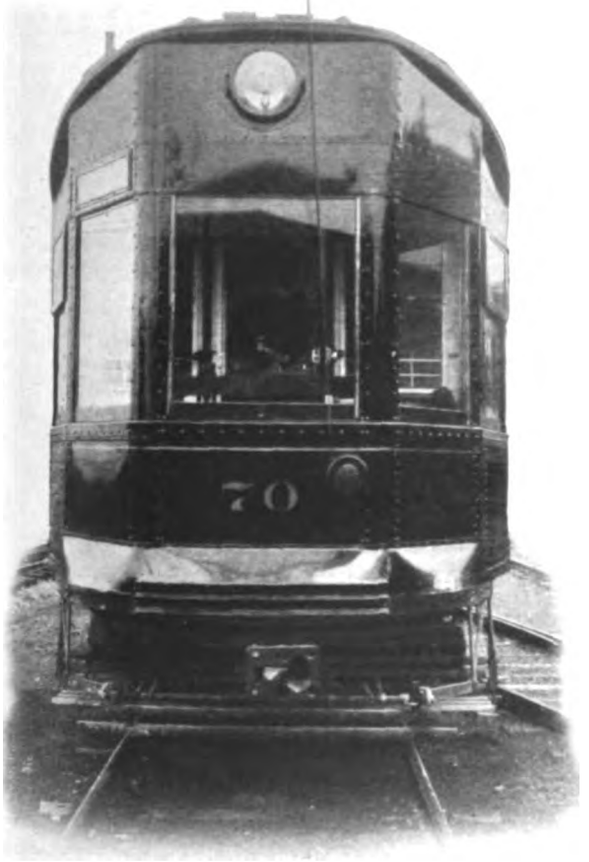
nections in the coupler heads for two air-brake lines and for any number of control wires as well. All of these connections, of course, are made instantaneously by contact of the two couplers and without necessity for attention by trainmen. Even the operation of uncoupling may be made by air from within the motorman's cab.

In electric railway service, such automatic connectors have been installed only with couplers of the tight-locking type which do not couple with those of the M. C. B. design having vertically hinged knuckles. In consequence, the use of automatic air connectors has found its greatest field for rapid transit service, for city cars that are operated with trailers, and for cars on interurban lines where interchange of traffic is not considered as a possibility. However, it may be said that, by using a connecting device separate from the coupler and flexibly hung below it, automatic coupling of air hose and control wires may be accomplished, and such devices are to-day in use to some extent with steam railroad passenger equipments.

Two types of tight-locking couplers are especially prominent at the present time for electric railway equipment. Both have the distinguishing feature of the type in general which consists in free radial movement in a horizontal plane together with provision to permit several inches of relative movement vertically between the ends of the two coupled cars. In general, the operation of coupling is effected by the action of a wedge or hook against which a lock is forced transversely, and as a result all lost motion is taken up and no opportunity exists for the two coupler faces to work transversely upon one another. The air connections are made by lining up openings in the faces of the couplers that are fitted with rubber gaskets, leakage being prevented by the pressure with which the gaskets are held together. Electrical connections have only recently been installed regularly as a part of automatic couplers, but they have otherwise been added to the plain air-connector equipment both by using a short, hand-inserted cable between the two couplers and by attaching a block containing jumper points and receptacles along each side of the coupler face.

M. C. B. Coupler with Deep-Face Knuckle



Tight-Lock Type Coupler with Air Connections on Suburban Car

In general, the tight-lock type of coupler appears to be much more popular in electric railway service than the M. C. B. type because of its simplicity, lightness and convenience. However, where there is an exchange of traffic with steam roads or where such an exchange may be a future possibility, the M. C. B. type with a knuckle operating in a vertical plane is absolutely necessary. In such cases, however, a different arrangement of draft rigging to that which has become standard on steam railroads has had to be adopted on account of the sharp curves and sudden changes of grade common on many electric railway lines. This arrangement provides for free radial motion from the drawbar anchorage which is several feet back of the coupler face, and it is not uncommon for the

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couplers to swing through arcs approximating 80 deg. from the center line of the car as trains pass over curves. To provide for vertical curves or sudden changes in the vertical alignment of the rail, two plans have come into general use. One of these makes provision for anchoring the coupler shank at some little distance below the bottom of the bumper framing and supporting the outer end in a spring carrier that permits vertical movement as well as horizontal radiation. As an alternative to this appears the plan of holding the coupler shank permanently in a horizontal plane and extending the knuckle vertically so that ample vertical motion is provided for without danger of the couplers becoming separated, and following out this idea several interurban railways have adopted knuckles that are 13 in. deep.

SANDERS, FENDERS AND WHEEL GUARDS

The track sander is another item of car equipment in whose recent development appears the influence of the presence of compressed air upon the car, pneumatic sanding devices having come into use to a considerable extent within recent years although, of course, they by no means dominate the field. In general, their popularity depends upon their ability to throw sand under the wheels where it is needed as well as their elimination of sand valves whose moving parts are frequently a source of trouble. Nevertheless the moving gate of the gravity-operated sand box has one very definite advantage in that it simplifies the introduction of agitation to break up caked sand when the gate is opened, a comparatively recent development carrying the principle of sand agitation to the logical extreme of having a rotary sand drum with a pick-up arrangement like an inverted water wheel at one end. This delivers a definite quantity of sand to the discharge pipe whenever it is rotated by pressure on a pedal in the vestibule floor.

Popular types of sanding equipment that have been more or less recently developed include a vacuum sander that differs from the common compressed air form in that it is designed to draw the sand from the supply receptacle by means of the vacuum created by the expansion of compressed air discharged from a nozzle at the outlet chamber. Since the sand is not moved directly by contact with the air jet there is avoided the possibility of introduction of moisture from the compressed air into the sand. Instead, dry air is drawn from the inside of the car body through the sand and this assists in keeping the sand dry. The feature of another pneumatic sanding device is the use of a valve so located that it becomes possible for the motorman to apply sand at any time without removing his hand from the brake-valve handle, beneath which the sander-valve handle is mounted.

The attachment of sander pipes to the truck frame in such a position that they will deliver sand to the rail even on curves has become common. A recently developed device along these lines has been brought out in the form of a telescoping spout of steel tubing, this being fastened at the upper end to the body of the car. The lower end which includes a short length of flexible steel tube is attached to the truck, so that the discharge nozzle retains a position directly in front of the wheel regardless of its position relative to the car body.

Either fenders or wheel guards in some form are included as a part of the safety equipment for almost all modern city cars, especially in the larger communities. For interurban service, however, the slow speed at which runs through city streets are made, as well as the danger of hanging such equipment at the front end when speeds are high, practically prevents its use, and the pilot, as a rule, is the only device of the kind that is found on high-speed cars except in isolated cases.

For city service there is a division of opinion as to the relative merits of fenders and wheel guards. Of a number of representative cities in the United States and Canada, four have fenders only, four have both fenders and wheel guards, and five have wheel guards only, including three which recently replaced fenders with wheel guards. In European cities the question of equipping street cars with safety devices has apparently been satisfactorily solved by the abandonment of the protruding fender and the general adoption of automatic wheel guards. In this country, however, the situation is complicated by the irregular and uneven surfaces of highways, accumulations of snow and ice for extended periods of time, and climatic changes which frequently result in the upheaval of paving blocks. This handicaps the wheel guard which, in addition, does not protect against impact with the bumper, and yet extensions beyond the car end like the fender may even introduce an element of danger.

At the present time an almost infinite variety of devices are being installed in new cars. However, a clear majority appears in favor of the type of wheel guard that is operated automatically by a simple trip actuated by a vertical apron hung under the dash, a backward movement of the apron causing the wheel guard to drop upon the rail, while resetting is provided for by a crank connected to a pedal extending through the vestibule floor. Next in popularity to this type of apparatus, as shown by the record of recent construction, comes the home-made fender which appears in various forms, although it generally involves the simplest kind of construction wherein there is only an extending apron supported by light chains extending back to the dash and without means for automatic operation.

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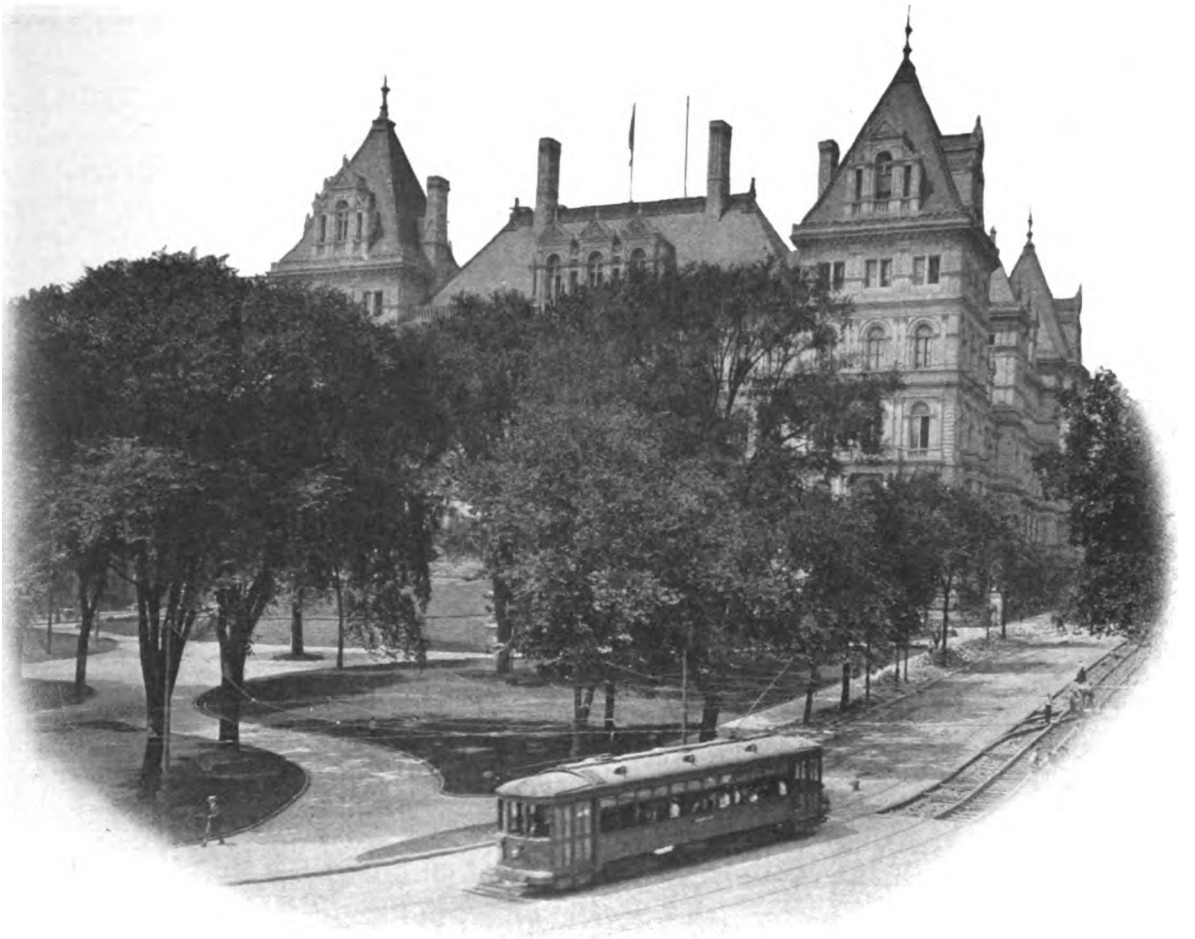

Modern Railway Motor Design and Methods of Construction

The use of interpoles and ventilation, which appear in practically all recent designs for railway motors, has made practicable the reduction in dimensions characteristic of modern low-floor car equipments, and has decreased modern motor weights by about 30 per cent. Field control motors also have come into service to a considerable extent and have effected appreciable economies in energy consumption, while improved insulation now permits hotter working and has thus materially increased nominal ratings.

THE development of the modern railway motor has, perhaps, extended over a greater period of time than that which has obtained in the case of the other features of modern electric railway car equipment. However, the improvements that have become common in recent designs have been so marked that in some instances they have actually brought about the displacement of propulsion equipment which has been in perfectly operable condition aside from a lack of the high efficiency attained by the modern apparatus. Recent motors have been very generally provided with interpoles and ventilation and in some cases with field control, and these improvements in turn have permitted the compact lightweight construction essential to the modern, low-floor car designs. As an aid to this there have been important but less spectacular improvements in details, and, in addition, experience has brought about many minor changes in construction and insulation which have exercised an important influence on durability and reliability of operation.

Interpole Motors

Of the various improvements which have marked the progress of railway motor design, the interpole, or commutating pole, introduced about 1907, is probably the most important. Certainly no other improvement has ever led to such far-reaching results. At the time of the introduction of the interpole motor the straight series motor had practically reached a standstill in so far as development was concerned, and, with the increased demands of service, the limitations of existing motive power were beginning to be felt. The new type of motor offered so many advantages over the older

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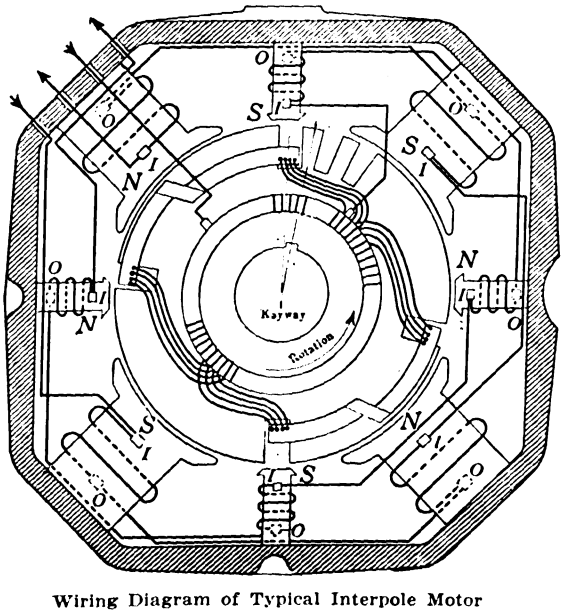
one that, particularly during the last five years, there has been a marked increase in its use, all of the newer designs being of the interpole type, while some operating companies have even built interpoles into their old motors.

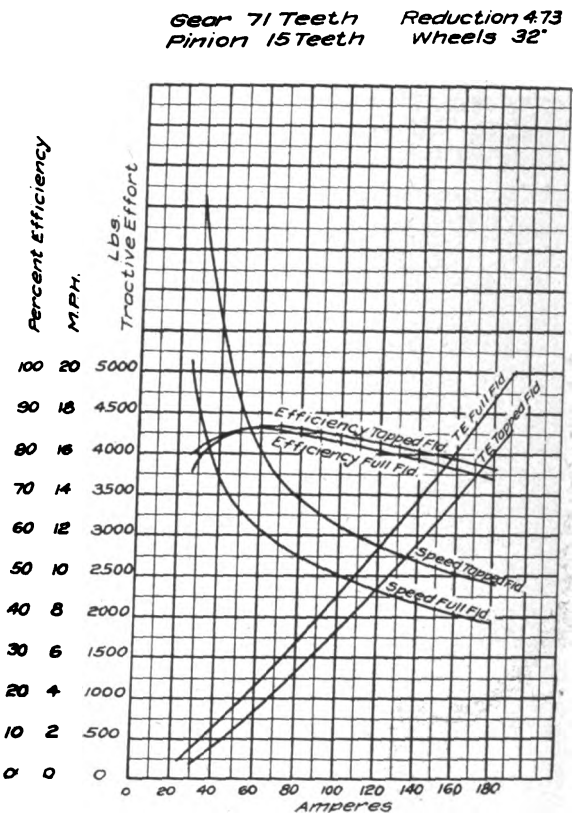
The principle of the interpole is based on the fact that in any dynamo machine of the commutator type, the current in a coil undergoing commutation must not only be brought to zero value, but must also be reversed and brought up to full value in the opposite direction. If this is not done the tip of the brush as it leaves the commutator segment to which the coil is attached will be carrying current, and because of the interruption of this current, will cause a tiny arc. Briefly stated, it is the function of the interpole to provide means for reversing the coil current and building it up in the opposite direction, and thus to eliminate sparking at the brushes.

The interpole, which is a small pole placed between the main or exciting poles of a motor, is usually constructed of a solid piece of soft steel wound with a few turns of wire in series with the armature. If the strength of the interpole field was always directly proportional to the armature current, sparkless commutation could be expected for all loads, provided the motor ran at constant speed. But inter-pole field strength is not directly proportional for all loads, and further, the speed of a railway motor varies between wide limits; yet, even with these limitations, currents of from two to three times the rating may be commutated sparklessly.

Interpoles make possible a reduction in the air gap, with a consequent reduction in the weight of the whole motor, and raise the limiting voltage between segments to a considerably higher value, thus making possible the design of motors for operation on higher voltages. Further, the inductance of the interpole windings tends to reduce the number of flash-overs by limiting the flow of surge currents.



Wiring Diagram of Typical Interpole Motor



Characteristic Curves of Typical Field-Control Motor

Besides the partial removal of the important design limitations just noted, the practical elimination of sparking has resulted in many operating advantages. The short-time ratings of motors have been materially raised, thus permitting the use of higher rates of acceleration. More rapid acceleration in turn results in decreased energy consumption and in many cases in decreased motor heating. Commutator maintenance costs are also decreased, as reflected by the fact that the sale of replacement commutators by manufacturers has practically ceased since the general introduction of interpole motors. In addition, brush life has been increased about 50 per cent on the average as the result of the decreased flashing and sparking, and the accompanying decrease in commutator losses has reduced motor heating to some extent.

Briefly summarized, the introduction of the interpole has made available to railway operators a lighter, cheaper, more reliable type of motor. At the same time, the partial removal of important limitations in design has made possible the development of successful new types of high-speed, high-voltage and field-control motors.

Control of motor speed by varying the strength of the motor fields was practised on some of the earliest railway motors but was discarded because of the poor commutation secured when a motor

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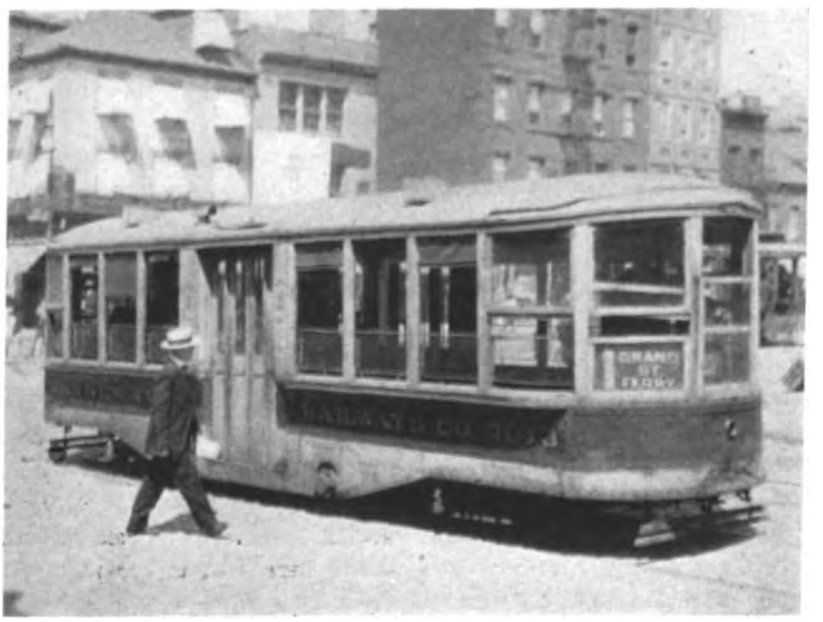
was running with weakened field. Its reintroduction in connection with motors for street railway service about five years ago was largely due to the fact that the interpole had practically solved the commutation problem, although, of course, the general progress in the art of motor design and the better understanding of the principles of motor application had something to do with this.

FIELD-CONTROL MOTORS

Field control motors had been successfully used for locomotives prior to 1911, but it was not until that date that they were given a thorough try-out on electric railway cars, and that their application to this service has been a successful one is to be inferred from the fact that some fifty operating companies now have in operation motors of this type with an aggregate rating of nearly 850,000 hp. In general, the adoption of field control adds to the first cost of motor equipments, but this appears to be offset by the numerous consequent advantages.

On some equipments the connections are so arranged that the use of the weak field is possible only when the motors are connected in parallel. There is, however, an increasing tendency to use field control on both the series and parallel connections of the motors, and when this is done there is considerable flexibility in the matter of motor speed, because four economical controller settings are possible. The change from full field to short field ordinarily secures a speed increase of from 10 per cent to 30 per cent, depending upon the design of the motor.

Speed and tractive effort curves of a field-control motor are here given for both the full field and the normal field conditions, and from these it will be noted that the full-field characteristics indicate high tractive effort and low speed as compared with the normal field characteristics. Equipping a car with field-control motors, therefore, provides the car with means of accelerating rapidly, and with a minimum amount of loss in the starting rheostats, as well as with means for maintaining a high-running speed.



Storage-Battery Car of New York Railways Operated by Two 7½-Hp. Motors

In interurban work the speed flexibility of the field-control motor is of value because it permits the use of the same equipment for both local and limited work. Also, because of the low speed that can be secured with the motors in series on the full field connection, more economical operation on city streets is possible. Further, the starting current peaks are usually from 10 per cent to 20 per cent lower than those produced by non-field-control equipment, and, as these peaks usually decide the substation capacities on an interurban road, this advantage is one of importance.

MOTOR VENTILATION

During the past five years special attention has been paid by designers of electrical machinery in general to the subject of ventilation and the flow of heat through the materials used in the construction of such apparatus. In fact, next to the interpole, the introduction of modern ventilating methods has constituted the most important step in advance in the art of railway motor design made during the last decade.

Modern motors are being ventilated either by the forced ventilation or by the self-ventilation system. With forced ventilation, air from an auxiliary fan is blown through the air passages of the motors, the flow of air being independent of the motor speed and susceptible of some adjustment, and by sufficiently increasing the flow of air overloads can be carried for a considerable period of time, the increase in continuous motor rating ranging from 50 per cent to 250 per cent. Forced ventilation is the most effective of all methods of motor cooling, but the auxiliary apparatus that is required limits its use to locomotives and to extremely heavy cars. Self-ventilation is, therefore, the system that is of major interest in connection with motors for ordinary electric railway service.

A number of different forms of self-ventilated motors have been developed. In the armature-ventilated type, external air is circulated through the armature only, the air entering the casing through inlet openings at the commutator end and

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passing in turn through longitudinal ducts in the commutator and armature, the fan and the exit opening at the pinion end. In the field-ventilated type the air is passed over the outside of the armature along the air gap and through the spaces between the field coils. Obviously the best results cannot be obtained by the use of either of these methods, but they increase the continuous rating of the motor from 10 per cent to 35 per cent over the unventilated rating.

With the more recent series-ventilated fan-type motor an effort has been made to force cooling air into intimate contact with all of the heated parts. In this type outside air is circulated in succession through the inter-field spaces, the armature coils and the commutator, a suitable inlet being provided on top of the motor at the pinion end and an outlet at the side or bottom of the casing at the same end. In order that the air striking the windings may be as dry and clean as possible under the conditions set by operation, some of the more recent motors using series ventilation have the direction of air flow reversed from that just described, the outside air coming in contact with the longitudinal ducts in the commutator and armature before it strikes the windings. The increase in motor rating with this system of ventilation is from 25 per cent to 35 per cent in sizes up to 55 kw. and from 35 per cent to 80 per cent in larger sizes.

The parallel-ventilated type is another recent introduction. Motors using this type of ventilation are provided with a double fan mounted on the pinion end of the armature shaft. Air is drawn in through ducts at the commutator end, passes in two parallel streams, one through the inter-field spaces and the other through the armature and then through the fan and carefully designed passages in the motor casing to the outside. This is a very effective method of ventilation, the increase in continuous rating ranging from 30 per cent to 70 per cent for the smaller motor size and from 40 per cent to 100 per cent for the larger sizes. However, the system requires a large fan, and in cases where space limits the fan diameter the ventilation is apt to be ineffective.

In the compound type of ventilation external air is circulated by a double fan along two routes, one similar to that followed by the air in the straight series-ventilated type and the other similar to that in the field-ventilated type. This plan seems to combine to a certain extent the advantages of both the series and parallel schemes and eliminates some of their disadvantages, giving about the same increase in continuous rating as the parallel system of ventilation.

Ventilation does not greatly affect the short-time rating of a motor, because such ratings are more affected by the heat-absorbing ability of the motor than by its heat-radiating ability. The most important advantage of ventilation comes in its increase of continuous rating, or, to put it in another way, the reduction of motor size required to handle a given service.

Since the amount of air circulated in a self-ventilated motor depends upon the speed of the fan, it is evident that in a service where low motor speeds (not necessarily low car speeds) are involved, no great weight reduction can be gained by the use of a self-ventilated motor. Obviously, the best results with any self-ventilated motor can be gained in a high-speed service involving few stops. This does not mean that the use of ventilated motors for city service is not accompanied by a reduction in weight of equipment, but it does mean that if a material reduction in weight is to be secured the matter of gear ratio must receive careful attention. The point is that it is motor speed and not car speed which affects the efficacy of the fan. In this connection, the influence of abnormal voltage is of interest. In continuous service, motor operation on reduced voltage means a low fan speed, and, therefore, poor ventilation. On the other hand, voltages above normal result in a high-fan speed so that a ventilated motor may run cooler than on its rated voltage. Whether or not it will do so depends, of course, upon the relative importance of the copper and iron losses of the motor.

In actual service, even an inclosed motor receives considerable benefit from the movement of the car through the air, and hence the advantages gained by the use of ventilated motors are not as marked as might be expected from a comparison of the increased motor ratings as mentioned above. Also, it is worth while to note, that because of its lighter weight the ventilated motor may have a lower thermal capacity, and therefore a lower short-time overload capacity than the non-ventilated motor.

One would naturally expect that dust and weather conditions would seriously affect the operation of the ventilated type of motor. But experience has shown that dust does not accumulate in the air passages to the extent that it was expected to, and that if the passages are blown out occasionally with compressed air no serious reduction of motor capacity will occur. It is important, however, that the motor receive some such attention occasionally. As far as moisture is concerned, it seems that ventilated motors are fully as reliable as non-ventilated motors. A consensus of the opinions of those who have had considerable experience in the operation of ventilated motors seems to be that, in most services, ventilation results in a perceptible decrease in weight, a decrease in cost amounting, in some instances, to 25 per cent, a more uni-

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form temperature throughout the motor, a lower maintenance cost due to the elimination of hot spots, and a decrease in the tendency to spark or flash over because of the removal of the copper and carbon dust and of the hot metallic vapors produced by sparking and incipient flashes.

MOTOR DETAILS

Although improvements in construction details have not been quite so widely heralded as some of the important innovations already described, many such changes have been made within the last few years. Designers have attempted to utilize the materials of motor construction to better advantage and to develop a "foolproof" and highly reliable type of motor.

In the matter of motor frames, there has been an increasing tendency toward the use of the box construction. In fact, reports of motor sales seem to indicate that approximately 80 per cent of the motors sold during the last few years are of this type. One of the objections which has often been urged against this form of construction is that, in order to change an armature, particularly one of the larger sizes, it is necessary to remove the truck from under the car. Thus, the operation requires more time and more elaborate equipment than would be required to effect a similar change in a split-frame motor. In the opinion of some operating men, however, this is not an objectionable feature since the removal of the truck enables the men to work to better advantage and at the same time brings to light any truck and wiring defects. Further, with the development of new shop methods, it is found that repairs on box-type motors can be executed just as rapidly as on motors of the split-frame type.

The advantages usually given for the box frame as compared with the split frame are the greater output for a given weight and space, the greater structural strength and durability, a better support for the gear case, an unbroken magnetic circuit, more space for the passage of cooling air around the field coils and the elimination of exposed field coil connections.

As far as fundamental principles are concerned no marked improvements in devices for lubricating motor bearings have been made since the introduction of the oil-lubricated bearings nearly fifteen years ago. Until recently it was the practice to operate street railway motors with no protection for the ends of the motor shaft bearings and the axles. Thus dirt entering the bearings formed a grinding compound which naturally increased bearing wear. Now, however, caps are provided for the ends of motor shafts, and a sleeve extending between the inner ends of the two axle bearings is used to protect the axle from dirt. The results obtained from the use of the axle sleeve have been so favorable that many operating companies are equipping their old motors with sleeves as fast as the motors come into the shop for repairs.

Experience with the operation of the older types of motors has indicated that electrical troubles are often caused by mechanical defects. For instance, armature insulation not infrequently has broken down as a result of abrasion caused by the relative movement of windings and core. In the newer motors vibration of the individual core disks is eliminated by assembling them under hydraulic pressure either on the armature shaft itself or on a spider which in turn is pressed onto the shaft. Also, the construction is such as to permit the removal of the shaft without deranging the windings in any way. In order to insure that the armature coils are permanently tight in the slots it is now common practice to band the armatures while they are hot.

The bolted construction is still the only safe method of holding large commutators together, but the methods of manufacturing mica V-rings and of ageing commutators under heat have improved to such an extent that the ring-nut construction for small and medium size armatures is considered as safe as the bolted construction. The practice of undercutting the mica between segments which has been followed for the last few years has materially lessened commutator troubles and has greatly increased the reliability of the motor. Experience has shown that, where good brushes are used, it is not necessary to undercut the mica to the extent that was formerly considered essential.

Apparently the progress in brush manufacture has kept pace with that in the other details of motor manufacture, as the average modern brush is vastly superior to the average brush of ten years ago, especially in uniformity of composition. Small irregularities in the commutator should not cause chattering of the brushes. In order to prevent it the masses that are moved up and down with the brush must be kept small. This fact has been given careful consideration in the design of modern brush-holders, and further to minimize vibration a frictionless vibration spring is usually included between the brush rigging and the hammer which holds the brush in position. This permits the brush to move slightly without moving the rigging. In general, modern brush-holders have been marked by simplicity in design and ruggedness of construction.

Recent improvements in methods and materials for coil insulation have been truly remarkable. Formerly the heat limits of a motor were determined absolutely by the ability of the cotton insulation to withstand heat. Now the limit seems to be either that of the dielectric strength of the insulation itself

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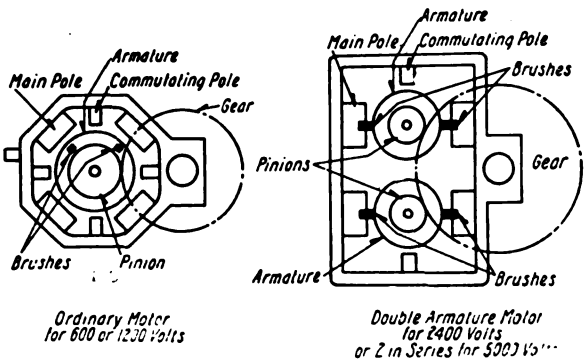


Comparison of Standard and High-Voltage Twin-Armature Motors

or that of the melting point of the solder which is used to attach the coil leads to the commutator. The use of asbestos tape, mica and the various fireproof, heatproof and moistureproof compounds used in impregnating cotton insulation and in mummifying the coils has made the modern armature as durable at 100 deg. Cent. as its predecessor was at 55 deg. Cent. The mummifying process, by eliminating air pockets, has materially increased the heat-conducting power of insulation. In addition, the use of modern insulations and strap or bar windings has improved the space factor of the armature slots and increased the output for a given size of armature, while the introduction of U-shaped pieces of slot insulation has cut down the number of coil break-downs. Mummified strap-wound field coils are being used almost universally. The insulation between the various coil layers is usually of mica disks. In bringing out the field coil connections it is considered good practice to attach the connecting cables permanently to a strap inside of the coil with a well-soldered joint and to connect the outside cables together with a rugged joint of the sleeve type.

MOTOR CAPACITY FOR RAILWAY CARS

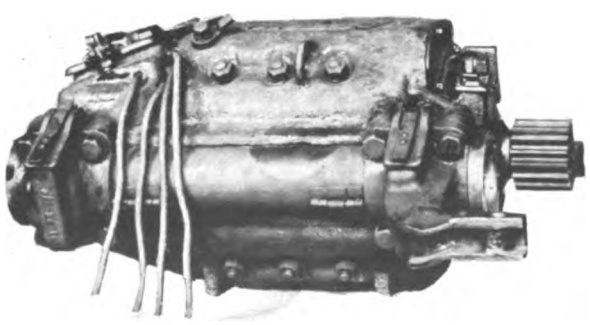
With regard to railway motors in general it may be said that the experiences and studies of earlier years have given engineers a better understanding of the principles of motor application and of the qualities of materials, and consequently a more accurate predetermination of the equipment suitable for given service is now possible than was formerly the case. In the latest standards of the American Institute of Electrical Engineers the continuous rating for railway motors is required to be specified in addition to the older one-hour rating, the modern ratings being expressed in kilowatts instead of horsepower.

That there is still room for improvement in some of the methods of selecting motors now in use, however, seems to be evident from the accompanying Table VII. In this a number of modern cars have been grouped into several classes on the basis of the nature of service. A study of the figures in the column headed "Kw. per Ton" indicates that there is a considerable variation in this factor among the various companies. Differences in schedule speed, number of stops per mile, grade and other local conditions will account for part of the variations, but it hardly seems that all of the differences can be covered by these factors.

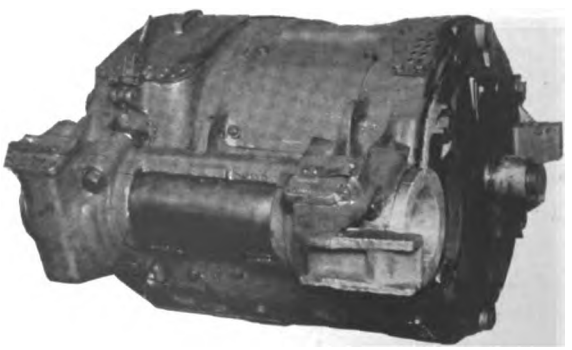
RECENT MOTOR TYPES

Among the recent interesting designs may be mentioned those which have been developed for the popular low-floor type of car in which severe space limitations are set by the small wheels. Data covering the motor which was originally built for the Pittsburgh low-floor car, and which has been used widely in other cars of similar design, are shown in Table VIII, and a comparison of its main dimensions with that of an old-style, non-ventilated, non-interpole motor of the same one-hour rating is included. It will be noted that the new motor is 270 lb., or 13.5 per cent, lighter than the old one. The comparison is made on the basis of the same one-hour rating, and as the new motor is well ventilated its service capacity is much greater than that of the old motor. A comparison of weight based on service capacity, therefore, would show up much better for the new motor.

The recent demand for small ultra-lightweight cars has brought with it a demand for a very small motor. As a result, motors with ratings as low as 13.1 kw. (17½ hp.) are now on the market. Standard automobile motors are used on some very light cars.



Original Low-Floor Motor



Repulsion-Type A. C. Motor for Heavy Service

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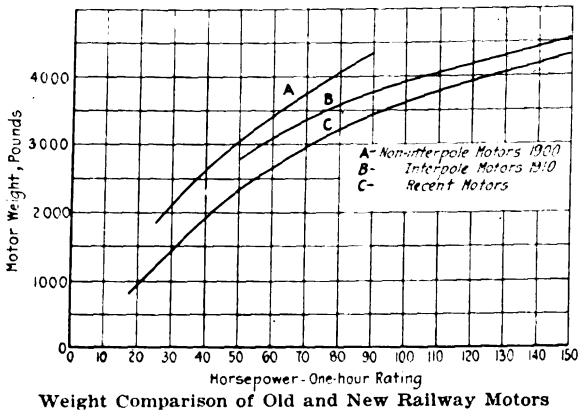
Of late the range of voltages for which direct-current motors can be constructed has been greatly increased. For new interurban roads, voltages ranging from 1200 to 2400 are being adopted, and on an experimental road a contact line pressure of 5000 volts is being tried out. Of course, these high contact-line pressures involve motor designs using as much as 1250 volts across a single commutator. The motors for the 5000-volt line are of special interest in that their construction makes use of the twin armature idea. This eliminates the difficulty of wheel slipping involved when armatures on different axles are connected in series to cut down the voltage across each one.

In the field of alternating-current railway motors the only important innovation has been that made by the Pennsylvania Railroad in its recent electrification of some of the suburban lines in Philadelphia. This motor is of the so-called repulsion type and has a one-hour rating of 225 hp. and a continuous rating of 200 hp. when ventilated with 1200 cu. ft. of air per minute. In this case the repulsion scheme, as originally developed by Prof. Elihu Thomson is modified by the addition of a series connection of the armature and field windings. These windings are, therefore, both "conductively" and "inductively" connected. To the extent that current is induced in the short-circuit armature because of the transformer effect of the auxiliary winding it is a repulsion motor. On account of the low resistance of the armature short-circuit, the induced current during the starting period has a high value. It may be well to state here, however, that these motors are still in the process of development, and must still stand the test of hard service over an extended period of time.



Weight Comparison of Old and New Railway Motors

To show the general advance that has been made in the way of weight reduction in direct-current motor design the accompanying curves have been plotted. The points through which the curves were drawn were, of course, more or less scattered, but it is believed that the curves represent a fair average. The cycle through which small motor sizes has passed is indicated by the locations of the left-hand termini of the curves. The average weight of a modern 37½-kw. (50 hp.) motor is about 2300 lb. Using it as a basis of comparison the average interpole motor of the same horsepower rating in 1910 was 21 per cent heavier and the average non-interpole motor of 1900 was 32 per cent heavier.

Briefly summarized, as a result of recent progress the limits set by commutation, motor heating, speed and voltage, which fix motor capacity, have been greatly extended. The weight of a motor for a given service has on the average been reduced in the neighborhood of 30 per cent. The reliability of the motor has been increased, as published reports indicate that for modern motors the inspection cost is from 50 to 75 per cent and the maintenance cost 25 per cent of that of the old types. Thus the economies obtained with modern type motors are sufficient, in some services, to justify the replacement of many old motors which are still in good operating condition.

TABLE VII—MOTIVE POWER AND CAR WEIGHTS

Kind of car	Name or location of road	Car weight tons (empty)	Number of motors	Kilowatts per car	Kw. per ton
Modern ultra-light weight cars	Puget Sound Type Car	5	2	27.0	5.4
	Tucson, Ariz.[1]	5.5	4	21.0	3.8
	Corpus Christi, Tex	7	2	26.3	3.7
	Albuquerque, N. M.	5.9	2	26.3	4.4
	New York Rys.[2]	6.1	2	12.0	1.9
	Average (first four)				4.3
Modern single truck cars	Union Rv., N. Y.	12	2	64.5	5.3
	Bangor, Me.	13	2	60.0	4.6
	Albany, N. Y.	11	2	60.0	5.4
	Marshall, Tex.	11.9	2	75.0	6.3
	Average				5.4
Light-weight, double-truck cars for city service	Wilmington & Philadelphia	15.2	4	75.0	4.9
	Buffalo-Erie	15.9	2	52.5	3.3
	Rochester	15.9	2	52.5	3.3
	Des Moines	16.5	4	105.0	6.3
	San Francisco	17.1	4	105.0	6.1
	New Orleans	17.8	2	97.5	5.5
	Chicago	17.7	2	90.0	5.1
	Pittsburgh	17.8	4	105.0	5.9
	New York	18.0	2	75.0	4.2
	Average				5.0
Interurban cars	K.C., C.C. & St. J.	40.5	4	375	9.3
	U. T. Co. of Ind.	42.8	4	330	7.7
	Chi. & Mil.	44.6	4	420	9.4
	Cleve. & East	29.7	4	195	6.5
	Cleve. & Erie	28.1	4	150	5.3
	Tol., Fost. & Findlay	34.0	4	225	6.6
	Annap. Short Line	40.1	4	225	5.6
	Wash. & Va.	29.0	4	150	5.2
	Average				7.0
Rapid transit cars	Chi. Elev.	35.2	2	240	6.8
	N. Y. Mun.	42.5	2	240	5.6
	Boston Elev.	42.9	2	300	7.0
	Interboro R. T.	38.9	2	300	7.7
	Average				6.8

[1]Automobile motors.
[2]Storage battery car.

TABLE —VIII COMPARISON OF LOW-FLOOR AND OLD-STYLE MOTORS

Motor	Low Floor Type	Old-Style Standard
Rating:		
600 volts	35 hp.	35 hp.
500 volts	30 hp.	30 hp.
Clearance, underneath:		
30-in. wheels	.....	4⅜ in.
24-in. wheels	3 1/16 in.	.....
Speed (500 v. 58 amperes)	605 r.p.m.	610 r.p.m.
Diameter of armature	10½ in.	11½ in.
Number of slots	27	29
Turns per coil	3	3
Length of commutator	2¾ in.	3 in.
Thickness of shell	1/16 in.-1⅛ in.	½ in.-1¼ in.
Diameter of armature shaft	2¾ in.	2¾ in.
Weight with gears and case	1750 lb.	2020 lb.

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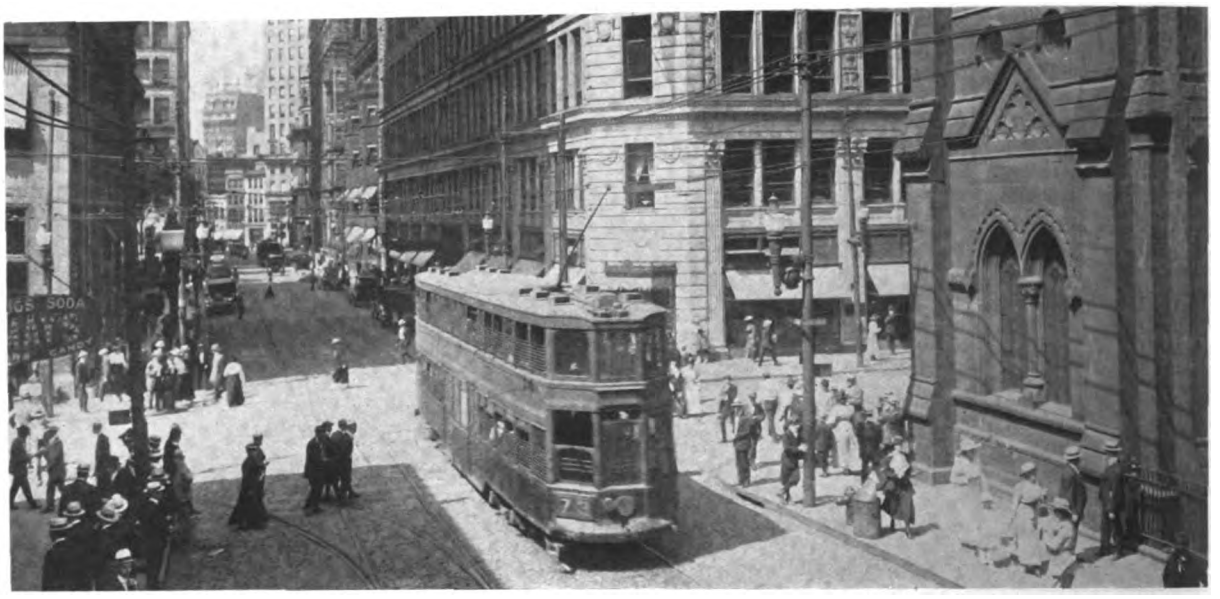
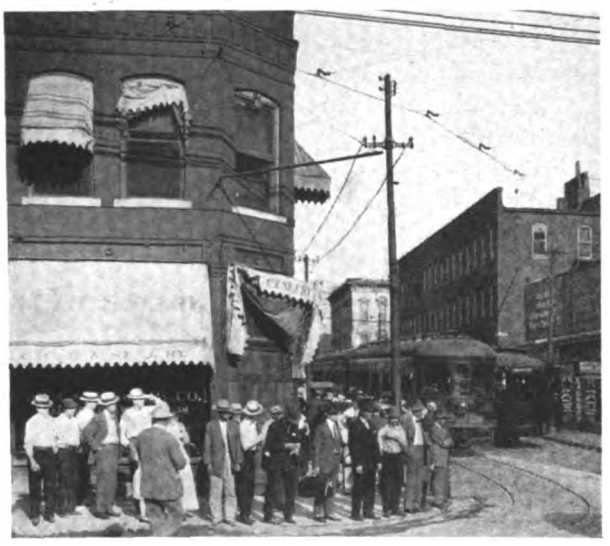


One of the Five Double-Deck Cars Operated by the Pittsburgh Railways in Service Where Heavy Traffic Is Handled from a Few Loading Points



Busy Interurban Terminal of K. C., C. C. & St. J. Ry. in Kansas City

Difficulties of Traffic Movement in the Loop District of the City of Chicago

In Cleveland the Adoption of the Skip-Stop Plan of Operation Has Permitted the Use of the Trail Car Without Reducing Schedule Speed

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Control Systems and Wiring for Railway Motors

Developments in control for recent high-speed cars have been largely simplification of the indirectly-controlled unit-switch apparatus. For city service this system has proved less desirable than the directly-operated platform controller, which, however, is now frequently modified by combination with a contactor to break main circuits beneath the car floor, and to permit door and control interlocking. Another recent innovation in control for four-motor equipments practically eliminates the rheostat and its losses.

CONTROL systems for modern electric railway cars may be classified as direct and indirect, this division being based on the method used in performing the switching. Both use the series-parallel method of adjusting the voltage, wherein the motors, or groups of motors, are arranged first in series and then in parallel, the "non-rheostat" system for four-motor equipments giving an intermediate step with the motors in two series groups.

In order to effect the rearrangement of motors or the change from the series to the parallel connections three schemes are in use, namely, the shunting-out, the bridge and the open-circuit transition. The shunting-out method short-circuits one motor, or group of motors, while the controller handle is being moved from the last series position to the first parallel position on the controller. The decrease in tractive effort which occurs when this is done tends to produce on unpleasant jerk during acceleration, particularly if the cars are heavy. At present this method is largely confined to control equipments, both direct and indirect, for small and medium size motors. The bridge system is now widely used with indirect control systems for large motors. Direct controllers equipped with the bridge transition have not proved very satisfactory because of the time element involved in making the various circuit connections. The connections in this system are such that all motors are working during the transition period, with the result that a fairly uniform tractive effort is maintained throughout the notching-up portion of the accelerating period. The open-circuit transition at one time was quite widely used in connection with direct control for large motors, but the development of the bridge transition and

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the indirect systems of control has rendered it practically obsolete for the heavier classes of service. It is still used, however, with some of the modified forms of direct control.

DIRECT CONTROL SYSTEMS

Of the direct control systems, the most familiar is that in which the Type-K controller is used. Within recent years the most important developments in connection with this controller have been its adaptation for use with field-control motors and the many improvements in structural details. For the more recent designs, 600 volts, 750 volts and 1300 volts are the standard voltage ratings. Those rated at 1300 volts were designed for use on interurban roads having a trolley voltage of 1200, but they have not proved very popular in interurban and all high-voltage services, the tendency being

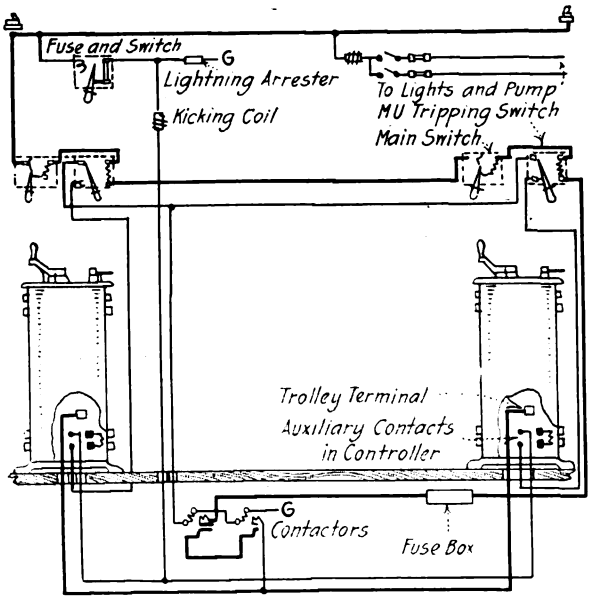

Diagram Showing Connections for Modified Direct Control

toward the use of indirect control. In the way of structural details for the controller itself, many improvements have been made. On modern Type-K controllers, an asbestos-lined wooden cover is used in place of the old asbestos-lined metal cover, thus eliminating the danger of an arc being drawn to the cover. Also the old terminal board, with its soldered joints which were always breaking loose, has been eliminated, and the cables are now connected directly to the finger bases by means of mechanical clamps, and individual blow-outs have been provided for the contact fingers. In general, the tendency has been to simplify the construction and increase the accessibility to the various parts, thus facilitating inspection and repairs.

Direct control was used five years ago on practically all city and suburban cars and on many of the lighter interurban and rapid transit cars. However, in the heavier services this type of equipment was rendered objectionable because of the large size of controller necessary to provide sufficient current-carrying capacity and to insure the safe breaking of circuits carrying heavy currents, and because of the necessity of running a number of heavy cables to each operating platform, the danger of passengers being frightened by the explosive sounds accompanying switching operations, the inability to operate cars in trains and the great weight of apparatus. Its use to-day is largely confined to city car equipments where the motors are of less than 50 hp. For these small equipments it is a reliable type of control, and because of its simplicity and low cost it is still popular.

A modification of direct control, which was introduced several years ago, has recently come into rather wide use. For small motor equipments it combines a number of the advantages of both direct and indirect control. In this system remote-controlled circuit-breaking or contactor switches are mounted underneath the car to break the main power circuit. These switches are used in connection with a regular cylindrical controller, and they relieve the controller fingers of the heavy arcing and burning incident to the rupture of circuits carrying heavy currents. The controller is provided with an auxiliary contact device on the main cylinder, which consists of two contact fingers operated by a pivoted arm that in turn is actuated by a cam on the controller drum. The action is such that when the drum is turned in the "on" direction the main circuit drum fingers close first and then the control fingers. The power circuit is thus closed by the contactor switches instead of by the main drum fingers. When the drum is turned in the opposite direction the sequence of operation is reversed. The same action may also be arranged to open the contactors in passing from series to parallel. It will be readily seen that this auxiliary equipment relieves the controller of all heavy duty and thereby greatly increases its reliability. Provision may be made for a tripping mechanism which, in case of overload, operates the tripping switch and thus permits the contactors to open. The contactor switches, therefore, also perform the functions of the usual automatic overload circuit-breaker.

This type of control is not only more reliable than the standard direct control, but the use of remote-control switches in the main power circuit makes possible the interlocking of the control system with door opening and closing and other safety devices. In fact, the latter advantage has been very largely the cause of its popularity.

Indirect control was developed primarily to permit the operation of several cars as a unit from the master controller of the leading car, and up to a few years ago its application was largely confined to rapid transit cars, suburban cars on elec-

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trified steam lines and electric locomotives. But the success that it achieved in these applications, together with its many advantages where heavy motors are used and space limitations are severe, has led to its more general application.

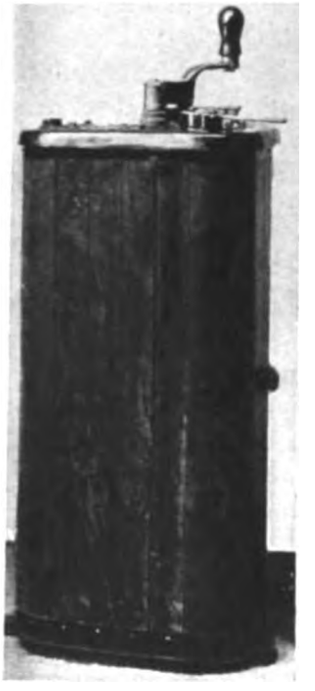
INDIRECT-CONTROL SYSTEMS

Indirect control is now used altogether for rapid transit and other heavy services and quite widely in interurban service. In the latter case it is almost universal where the contact line carries more than 600 volts. In city service it is being used to a limited extent, largely without the multiple unit feature, however, particularly in connection with some of the low-floor types of car, because of the ease with which the various control features may be segregated and mounted in limited spaces and the readiness with which safety features may be incorporated.

By the addition of a current limiting relay, which opens a control circuit when the motor current exceeds a predetermined value, and suitable interlocking devices, either electrical or mechanical, automatic acceleration can be secured with any indirect-control system. With automatic acceleration the handle of the controller can be thrown to the full "on" position, but the "notching up" will proceed only as permitted by the limit relay. Automatic acceleration insures against abuse of the motors by the motorman, and if the control system is properly designed, tends to provide a fairly uniform rate of acceleration. It has long been used on elevated roads and in other rapid transit service, and in connection with some of the new light-weight, indirect-control designs it seems to be gaining in popularity for city service.

The earlier indirect-control systems, designed as they were for heavy multiple-unit train or locomotive service, were not very satisfactory, even in their improved forms, for services which ordinarily involved single car operation. They were too heavy, and besides, automatic acceleration was quite often a feature of these equipments. This was of importance where operating conditions were more or less uniform, but did not have so many advantages when applied to interurban service. There were the objections, also, of high cost and complexity, the latter being a serious objection on a road that operated only a few cars and could not afford highly-skilled repair shop men. For these reasons, and because of the demand for a control system in which the controller manipulation was the same as with the Type K controller, simplified types of hand-operated indirect-control systems were developed, and during the last five years they have found wide application.

Of these systems, the Westinghouse HL and the General Electric MK are the best known. In both these systems the arrangement of control handles is similar to that of the Type K controller, and the energy for the auxiliary control circuit is taken through a resistance from the contact line. The main parts of these systems are the main circuit or motor controller and a master controller, the manipulation of which operates in proper sequence the switches of the motor controller. In both systems the switches are of the unit type and are mounted in a compact group. These switches are closed against powerful springs, in the HL system by electrically controlled compressed air cylinders, and in the MK system by powerful solenoids. The unit



Modern Type K Controller for Direct Control

Master Controller for Repulsion Motors

switches are equipped with arc chutes and magnetic blowouts, and are capable of interrupting very heavy currents without severe burning. Instead of the type of automatic overload circuit breaker used with direct control, an overload relay is used which either opens the control circuit and trips out all of the contactors, or unit switches, or else trips a remote-controlled line switch.

These systems have given highly satisfactory service, and their range of application is now such as to cover many voltages and motor sizes. Of late the HL system has been still further simplified by reducing the number of groups and parts. In its light-weight form it is being applied to light-weight cars, and in the heavier-weight forms it is recommended by its manufacturer for general interurban car service. The MK system is now being superseded to a certain extent by a later type known as PC control.

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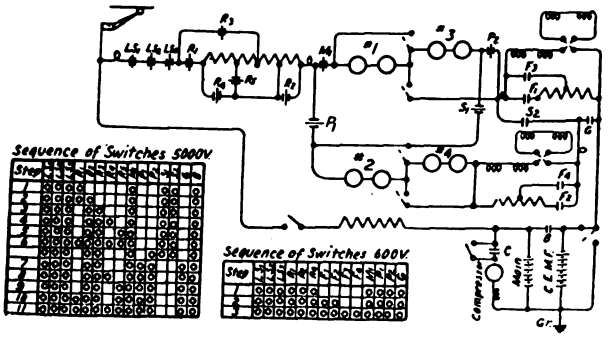
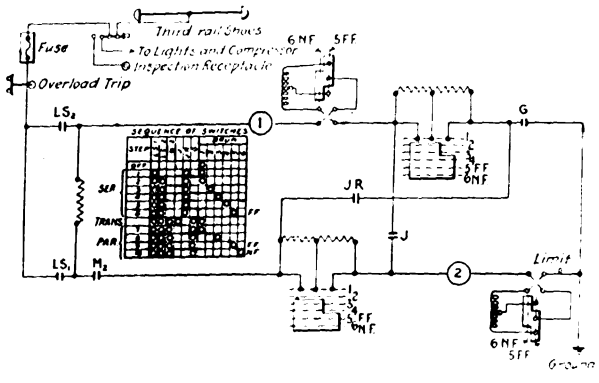


Schematic Control Diagram for 5000-Volt D. C. Equipment

Indirect control systems for use in connection with high-voltage, direct-current motors are essentially the same as those used with lower voltages. The main differences are in the greater amount of insulation, more powerful magnetic blowouts, increased creepage distances, and in the complications sometimes necessary because the motors are required to operate at low voltage within cities. In the latter case, to insure the opening of the power circuit, two switches that are connected in series are generally used to make the interruption.

In connection with the control of alternating motors the only development of special interest is the control for the doubly-fed motor adopted by the Pennsylvania Railroad Company. This control is an adaptation of the unit-switch system, and it is arranged for automatic acceleration. The motors, which are connected in series, are started and operated up to approximately 15 m.p.h., as repulsion motors, with the auxiliary or compensating field, the armature and the main field in series. With these series connections the armature is also paralleled by a resistance. Resistance is inserted with the motors on the first step and is cut out on the second. The third step changes the connections so as to energize the auxiliary field from one portion of the transformer, and the armature and main field, connected in series from another portion, thus affording the doubly-fed connection. The armature short-circuit is removed when the motors are operating with the double feed. Subsequent steps in the control are obtained by increasing the motor voltages.



Schematic Diagram for Type 214 Control

NEW CONTROL SYSTEMS

The control system devised originally for the stepless center-entrance cars of the New York Railways, which is known as the Westinghouse PK control, is a simple, light-weight form designed for use in connection with motors of small rating. It consists, in brief, of a drum motor controller equipped with a power-operated notching mechanism. This notching mechanism consists of a pair of opposed air cylinders whose common piston rod carries a rack that engages with a pinion on the shaft of the motor-controller drum. Electrically controlled valves admit or discharge air from the cylinders in accordance with the manipulation of a master controller located on the car platform. The motor controller may be located on the platform underneath the car or in some other convenient place. A line switch or remote-controlled circuit breaker similar to that used in connection with modified direct control is used to break the main power circuit and relieve the control fingers of serious arcing and burning. It also takes the place of the overhead circuit breaker.

In appearance the master controller is a miniature platform controller. It is provided with a notch for each position of the motor controller in order to make manual acceleration possible, although a current limiting relay of standard type is provided on most equipments and the circuits are so arranged that automatic acceleration will occur in case the controller is moved more than one notch at a time. The latest form of power-operated head can be readily applied to any Type K controller. Energy for the control circuits may be obtained either from the contact line or a storage battery carried on the car.

A later control system brought out under the trade designation of Type 214 control is a combination of the principles involved in the PK and the older ABF system. As designed for the field-control motors of the New York Municipal Railway rapid transit cars, the motor controller box includes the following parts: Two unit switches acting as circuit breakers, four unit switches for series paralleling the motors, one drum-type reverser, one drum-type commutating switch, one current-limit relay, one overload relay, one main circuit terminal board and one control circuit terminal board. Electro-pneumatically operated unit switches, interlocked to secure proper sequence, are used for making main-circuit changes while a commutating switch of the drum type, operated by a PK notching mechanism, is used to cut out resistance. A line relay cut-out permits feeding up of the control when power is off the line and the bucking of

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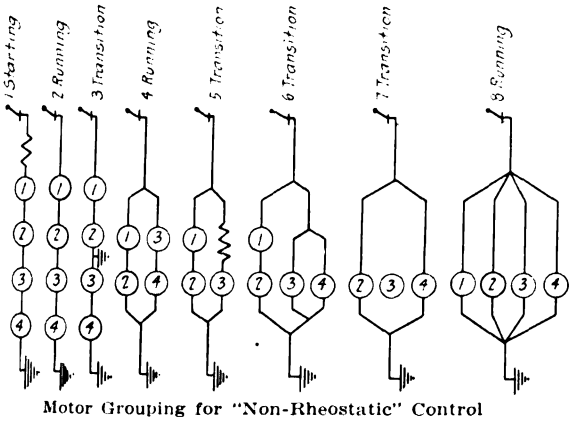
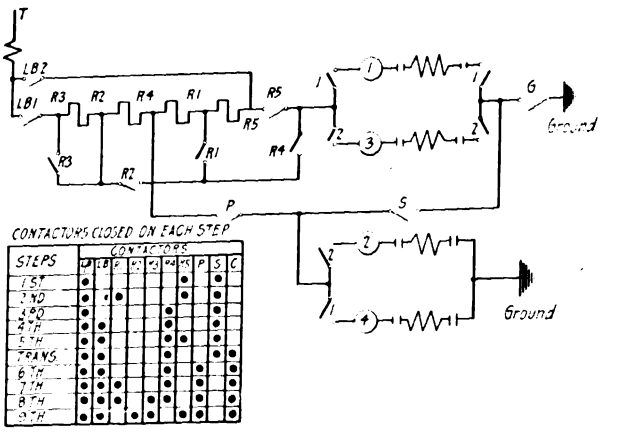
the motors for emergency braking in case of failure of the air brakes.

The automatic acceleration feature of this control is particularly interesting as the action of the current-limiting relay is modified by the current passing through an auxiliary winding of the relay, in such a way as to provide for the same rate of acceleration for all loads. The amount of current passing through this auxiliary winding is controlled by a switch operated in connection with the variable-load brake mechanism. The adjustment of this mechanism corresponds directly to the deflection of the bolster springs under load. Energy for the control circuit is obtained from a 34-volt storage battery which also furnishes energy for emergency car light, signal lights, door interlocks and other special circuits. This control is designed for use with the larger motors, those on the New York Municipal cars being rated at 160 hp. on 600 volts.



Motor Grouping for "Non-Rheostatic" Control

The PC control equipment, recently placed on the market by the General Electric Company is another indirect system designed to secure maximum reliability with minimum weight. It is being constructed in a wide range of sizes, and is expected to supersede the older forms of General Electric indirect control. The important parts of this system are a motor controller and a master controller. The motor controller consists of a group of switches or contactor units (used for effecting the series and parallel groupings of the motors and in cutting out resistance), together with a reverser, a circuit-breaker and overload, potential and current-limiting relays, all of these being assembled in a single case. The contactors are closed mechanically by means of cams mounted on a shaft which is revolved by a rack and pinion. The rack is operated by two air cylinders, whose valves are electrically controlled by the master controller. All of the contactor arc-chutes are grouped in one unit similar in construction to that used in the ordinary drum controller. The circuit-breaker switches are also operated pneumatically and controlled electrically.

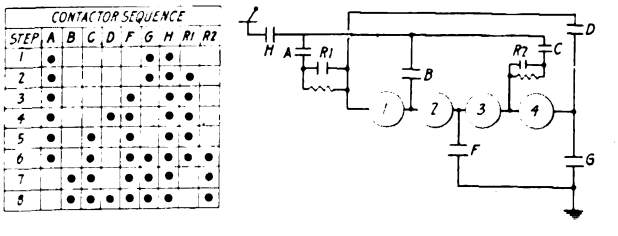


Schematic Diagram and Contactor Sequence for PC Control

The overload relay operates to de-energize the control circuit of these switches in case of excess current. When opened by an overload, a reset switch must be thrown to close them again. The switches are of the unit type and are readily removed. The reverser is very similar to the drum reverser used in a Type K controller, except that it is power operated by means of compressed air cylinders with electrically controlled valves.

The master controller is similar in general construction to that used with the Type M control systems built by the same company. It is provided with a slip-ring attachment which closes the control power circuit when the handle is moved from the "off" to the first position, and maintains the circuit for any forward motion but opens it if the handle is moved back.

This type of control may be arranged either for automatic or hand acceleration, and may receive the power for the control circuit either from the contact line or storage batteries carried on the car. Also, it can be used in connection with large motors and can be designed for high-voltage service. The control circuit requires about 0.3 amp. per car. As with most modern systems of indirect control, the power circuit is opened in case the motorman removes his hand from the control handle and provision may be made also for setting the brakes. As compared with the well-known Type M control, the parts are greatly reduced in number and are grouped into fewer units. Trouble from voltage variations is largely eliminated by the use of the pneumatically operated switches,



Schematic Diagram and Switch Sequence for "Non-Rheostatic" Control

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and the cam operation provides for a positive closing of the switches in a fixed sequence regardless of how rapidly the operation may take place. Electrical interlocks on the contactor switches are eliminated.

"NON-RHEOSTATIC" CONTROL

From the standpoint of economy and flexibility in speed regulation, the "non-rheostat" control for the four-motor cars of the Pittsburgh Railways is of interest. In this system resistance is used on only two transition points, the first and the fifth, and as there are three running notches the transition points are used only for very short intervals so that the control is operated practically without rheostatic losses. It has been found that motormen make frequent use of the first running notch, with motors all in series, when following behind slow-moving wagons or when running through congested traffic. As low speed can be secured on this first point, excessive controller operation is avoided, and savings in the maintenance costs of control equipment, wheels and brakes are effected. Tests over an extended interval of time indicate that the energy consumption is from 8 per cent to 15 per cent less than with a standard series-parallel control when used on cars of the same weight operating in a similar service.

The contactor switches for the Pittsburgh cars are arranged in two switch group cases, the reduced size of unit thus obtained making it easy to mount the groups under the low floor of the car. The combinations and connections provide for interlocks on the contactors to establish holding circuits whereby the motors are maintained in parallel groups while the control handle is being thrown to the "off" position, thus affording a closed path of low resistance for the discharge of the energy stored in the magnetic fields of the motors. The use of field control with this system would of course add some complication but would result in a speed flexibility practically equal to that of the steam locomotive.

CONTROL AND WIRING DETAILS

The assembly of the various items of control apparatus into a few groups has materially reduced the number of parts usually classed as control details. In indirect control for city cars the number is often still further reduced by the elimination of the train couplers and other control cable details necessary for multiple-unit operation. There has also been a tendency to group the various auxiliary circuit switches on a single switchboard or in a cabinet.

However, the train line cables in some of the new rapid transit cars have been complicated by the inclusion of extra wires for the operation of electrically controlled brakes, speed-control devices, car signal and door interlocking circuits. In the new cars of the New York Municipal Railway there are eighteen train wires, of which only seven are used directly for control purposes, and the wires are of extra large cross-section so as to permit the multiple-unit operation of a large number of cars.

With indirect systems, a knife-blade switch of the quick-break variety connected between the trolley base and main fuse, and located in a box under the car or some other convenient place, is used to disconnect the main circuit so that the motor controller can be operated for test or inspection purposes. The use of a main fuse box of the magnetic blow-out type is becoming almost universal, the accepted form of fuse consisting of a thin copper ribbon held at the ends between heavy clamps.

The recent introduction of steel and semi-steel cars has brought in a new problem in connection with control, namely, that of effective insulation of the resistance grids from the car frame, and the higher contact-line voltages used of late in interurban service have tended to complicate the problem. For this insulation a type of porcelain bolt insulator has been developed and this is giving very satisfactory service. On the older wooden cars more attention is being paid to keeping the rheostats at a safe distance and properly heat-insulated from the combustible material of the car body. Improvements in the resistance grids have been along the lines of increased reliability and weight reduction. Jointless grids drawn from rustproof metal have come into some favor, and the newer cast grids made of alloy metal are less affected by expansion and impact strains and rust than the old cast-iron constructions.

In the earlier attempts to systematize car wiring and reduce fire hazards, the wires and cables were inclosed in wooden conduits, moldings and canvas wrapping. With the advent of steel as a material for car construction, metal conduit similar to that used in interior wiring service came into use. Later practice tends toward the use of light steel conduit that is enameled, galvanized, sherardized or treated in some other way to make it rust-resisting, the conduit for some of the later cars having walls only 1-32 in. thick. In cars designed for very light weight there is an increasing tendency to use some of the fireproof non-metallic conduits now on the market. Of these one that has been extensively used is made of natural warp cotton yarns woven very tightly to give it strength and saturated with a waterproof and fireproof compound. It is more economical than metallic conduit, not only because the price is much less but also because no fittings are required, since the non-metallic conduit can be bent into any desired posi-

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tion. The provision of a single wall prevents blistering and breaking down, and provides a corrugated inner surface permitting wires to be fished through without difficulty. The weight of ¾ in. conduit in this material approximates 0.13 lb. per ft., while metal even 1-32 in. thick should weigh 0.25 lb., including the fittings.

The arrangement of control details in a few groups has greatly simplified the control wiring necessary, and there is a tendency to use multiconductor cables for the motor and other current-carrying leads instead of single wires. This facilitates the placing of a number of leads in a single conduit. For the wiring of lighting and other auxiliary circuits, the best practice calls for the use of some form of approved conduit, either metallic or non-metallic, or metal molding together with suitable fittings.

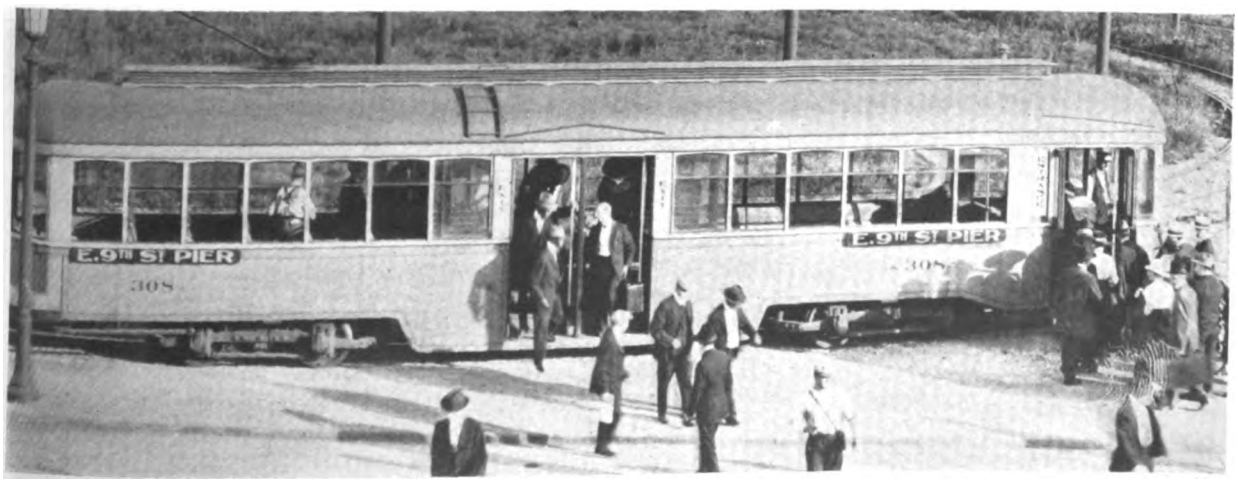
With regard to lightning arresters, it may be said that a difficulty experienced with many of the earlier types was that the voltage at which the arrester would start to discharge was higher than the break-down voltage of the insulation of the motor windings. Other than the remedying of this, recent improvements have been in details of construction rather than the development of new principles of operation. The magnetic blow-out types are still very popular for car service, and a form of condenser arrester seems to be meeting with some favor.

The aluminum-cell type of lightning arrester has been adapted for car service, and while it is without doubt the most efficient of all the protective devices now in use it has not met, as yet, with great favor among operating men. Its bulk, first cost, and the care necessary in its installation and maintenance are the chief objections urged. However, several companies have installed it on their latest types of cars. Modern arresters are more sensitive than the older ones, and far more care is being taken in their installation and maintenance. There is a tendency to use larger choke coils than were used formerly. The favored location of the arrester seems generally to be on the roof of the car.

CONTROL CIRCUIT AND DOOR INTERLOCKING

In an effort to promote safety and accelerate traffic, several methods of interlocking the car doors and the control system have been devised. Generally speaking, any of these schemes is applicable, as far as principle is concerned, to any system of indirect control as well as to the system of modified direct control. The door apparatus consists of a wooden rod attached to the door and upon which is a brass ferrule. When the door is closed this ferrule engages with a pair of contactors which form a part of the circuit energizing the contactor, or line switch in the motor control. In any position of the door, except tightly closed, these contactors engage with the wooden surface of the rod and not with the brass ferrule. Consequently, the contactor control circuit is open and the contactor itself cannot be closed, but when the door is shut the control circuit is complete and the motors are under the control of the motorman. This enables a motorman to set his controller handle on the starting position immediately after a door is opened at a stop. Then, when the door closes, the car starts ahead at once without any signal from the conductor. Frequently switches are provided that operate in connection with the conductors' emergency brake valve. The operation of this valve, therefore, shuts off the power as well as sets the brakes, and eliminates the current surge that would result if the motors pulled against the brakes until the overload relay tripped.

Such interlocking devices, by permitting a quick start after passengers are loaded, have a very marked effect in speeding up traffic. They eliminate to a large extent the need of a signal system for the conductor, and by requiring the door to be shut before the car can be started, reduce the number of door and step accidents.



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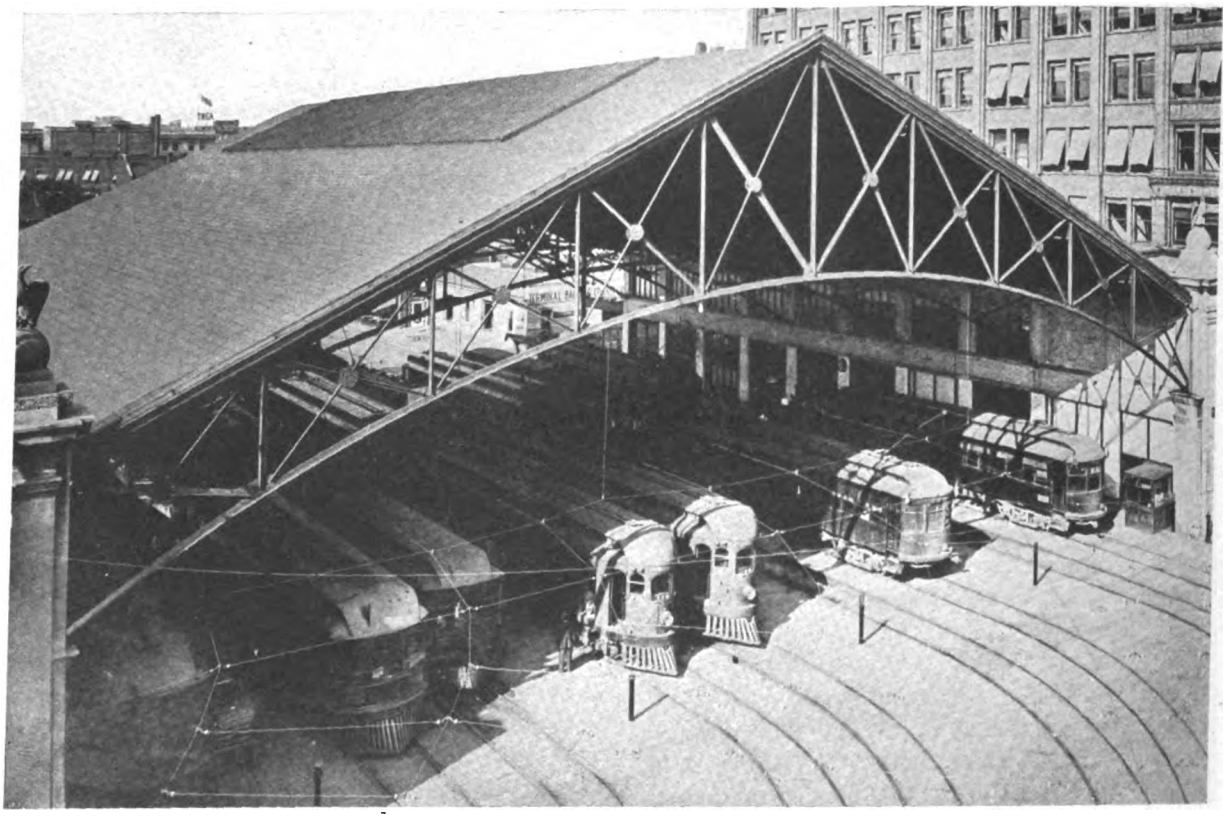

Current Collection and Utilization

Large-diameter trolley wheels for high-speed cars, air-retrieving trolley bases, and the introduction of a sliding shoe in place of the trolley wheel constitute the most important recent innovations in connection with current collection. For promoting efficient utilization of current, new devices such as the air-brake and control interlock, the mercury-float wattmeter and the coasting clock have provided means for economies that have been reported in some instances to be 25 per cent of the total energy that is consumed.

RECENT developments have been few in connection with the collection of propulsion current for electric railway cars. In city service the length of time during which the wheeled trolley has been universally standard has practically limited changes to matters of detail, and even in regard to details, the introduction of innovations has been exceptional. The problem of efficient utilization of the current collected by these several means, however, had been almost unconsidered until about three years ago, and the remarkable growth of interest in the subject of economy in current consumption since that time is one of the really striking features of modern electric railway practice.

Equipment that is installed on electric railway cars as a means to this end may be classed under two general headings, namely, direct-acting devices that definitely prevent the waste of current, and apparatus designed merely to serve as a check upon the efficiency of the motorman. In the former class are included the several well-known mechanical controller regulators, which, however, seem generally to have lost in popularity of late, and also field-control, non-rheostat control and the various means for producing automatic acceleration which have been already touched upon in the previous chapters on motors and control equipment.

In addition, there has appeared a simple but very effective device called an air-brake and control interlock which prevents the working of current through the motors until the brakes are fully released. This apparatus was developed some two years ago on the New York, Westchester & Boston Railway not only to save current, but to reduce heating of motors by over-hasty motormen who frequently apply power before the brakes are released after a sudden slow-down. It consists of a plain switch that is placed in the main control circuit of the indirect control system and is operated by a small air cylinder directly connected by a small pipe to the brake cylinder on the car. Therefore, when any air pressure exists in the brake cylinder, the switch is held open by this pressure which acts on the switch-operating cylinder, and current can-

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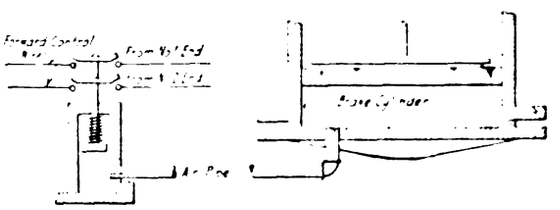
not be applied to the motors. But when the air-brakes are fully released the switch is closed by a spring, and the control is operative as under ordinary conditions.

Devices that furnish a check upon the motorman's methods of handling the controller are available in the form of wattmeters and ammeters, which measure the current consumption directly, and coasting clocks, power-mileage meters and current-time clocks, which are designed to provide a measure of the efficiency of the motorman in his utilization of power. Of these several devices the wattmeter and the coasting clock are by far the most prominent, and it seems likely, in fact, that eventually one or the other will be installed as an indispensable part of every car equipment.

The wattmeter in its latest form is typical of the electric instruments used in powerhouse operation, being provided with mercury-float bearings to eliminate the disturbing effect of the vibration found in railway-car service. With it is provided a registering apparatus whereby the machine issues a printed record of the energy that is consumed, the recording mechanism being set when the run begins and the printed slip withdrawn and turned in by the motorman when the run is completed. The



Air-Brake-and-Control Interlock

advantage peculiar to this equipment is, obviously, its simplicity. It gives direct readings of the energy consumption, so that such savings in energy as the motorman may make are recorded without interposition of other factors.

The coaster clock, which is designed to record the time spent in coasting, or permitting the car to run by momentum without using power, is based upon the principle that, for any given cycle of movement between two stops, the percentage of coasting time approximates the percentage of energy saved over the amount which would have been consumed if the cycle had been made without any coasting whatsoever. The device, therefore, does not provide a direct measure of energy consumption, but is designed to register the relative efficiency of different motormen on any particular run. The advantage of such indirect measurements is that they are independent of some of the variable factors in energy consumption such as the weight of car. It might be remarked here that, in its latest form, the coaster clock has been very greatly elaborated, so that it now provides important information on traffic matters as well as on the utilization of current. On the slip that is withdrawn from the clock and turned in by the motorman at the end of his run there is printed separately for each trip the number of stops, the total time stopped, the coasting time, the badge number of the motorman and the car number.

The savings that may be made by the consistent use of either the wattmeter or the coasting clock are literally enormous, reaching a maximum in city service, where the frequent movements of the controller offer a wide field for the exercise of judgment on the part of the motorman. Where no such equipment is installed there is, of course, no chance whatsoever for knowing how much energy is being wasted, and except in cases where special attention is paid to the subject, and instructors or traveling motormen are employed, the introduction of the apparatus seems generally to reduce the energy consumption by at least 10 per cent. In extreme cases savings of the order of 25 per cent have been reported, but these figures apply only to city service, and for interurban runs a range between 5 per cent and 10 per cent appears to be representative.

However, with the assumption that a minimum figure of 10 per cent for city service is conservative, it is possible to approximate the savings that may be effected. In the case of a city car weighing with load, say, 20 tons and making, say, 20,000 miles during the year, the annual energy consumption, at 125 watt-hr. per ton mile, would be 50,000 kw.-hr., and with a power cost at the car amounting to, say, 1½ cents per kw.-hr., the total annual expense for power would be $750. The saving of 10 per cent of this sum annually which should be brought about by the introduction of energy-checking apparatus would, therefore, be sufficient to make a wattmeter on each car pay for itself in about nine months, or a coasting clock in about twice that time. Clearly enough, this opportunity for economy is one of the most important that has been presented to the electric railway industry, especially in view of the fact that all the above assumptions are conservatively low.

CURRENT COLLECTION BY TROLLEY

In connection with current collection for city and interurban cars, for which the wheeled trolley is practically standard on account of its simplicity, ruggedness and ability to operate satisfactorily with a festooned contact wire, the most radical recent development in design lies in the numerous experiments with wheels of extremely large diameter. This idea has been based upon the obvious principle that wear decreases as the wheel diameter increases. On the Oakland, Antioch & Eastern Railway the introduction of 10-in. trolley wheels three years ago were reported to have practically eliminated serious difficulties of jumping and burning,

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and gave a wheel life of the order of 5,500 miles, as against the 4,000 miles that may be said to represent an average life in high-speed interurban service. At the same time the 10-in. wheel was said to have normally collected 900 amp. for thirty minutes continuously without heating, the pressure against the contact wire being 35 lb.

The large wheel, however, does not appear to have any field in city service, where 4½-in. diameters are very frequently used. The reason is that the weight of the wheel appears to be of vital importance because of the influence of inertia on the ability of the wheel to follow irregularities in the wire. Thus, a weight of about 3 lb., which might be expected with a small wheel, obviously should follow irregularities in a fairly rigid overhead construction better than the 10½-lb., 10-in. wheel above mentioned, although, of course, when there is much "give" in the contact wire this advantage is clearly reduced. In addition, the question of wheel life in city service is of much less importance than it is with high-speed cars, since mileages of 20,000 are common.

However, neither the small wheel for city service nor the extremely large wheel in high-speed operation receives universal support, this being exemplified by the belief of one prominent maker of trolley equipment to the effect that a 6-in. wheel produces best final results for all purposes and conditions of service. This is based upon the idea that with a slowly-revolving wheel there will be provided better contact, greater reliability in holding the wire and less lubrication. Thus, a 6-in. wheel has been found to give nearly double the mileage of one 4½-in. in diameter, and it involves only half the expense for changing and oiling wheels, while the price of the large wheel is less than double that of the small one. However, when a diameter larger than 6 in. is used the increase in weight, without giving any more wearing surface, is too great to be carried on the end of a trolley pole, the tension having to be increased to a point such that, if the wheel should leave the wire the overhead construction would be badly damaged.

TROLLEY EQUIPMENT DETAILS

An attempt to eliminate altogether this mooted question of trolley-wheel diameter has been made very recently by the introduction of a grooved sliding shoe for the customary wheel. This has a specially-hardened steel contact piece set at the bottom of a grooved housing, which is mounted on trunnions to permit the shoe always to rest flat against the trolley wire. The object in the use of steel for the contact piece is to reduce friction and wear on the copper contact wire, the length of bearing of about 6 in. permitting the low contact pressure of 18 lb. without causing arcs. Shoe mileages of 10,000 are reported, and it is said that micrometer measurements indicate the wear on the contact wire to be no greater than the standard wheel on tangents, and actually less on curves, possibly because the shoe clings to the wire better.

Trolley harps, in the general form, have become quite thoroughly standardized, the important char-

Wattmeter Located to Permit Direct Reading by Motorman

Coasting Recorder Mounted in Motorman's Cab

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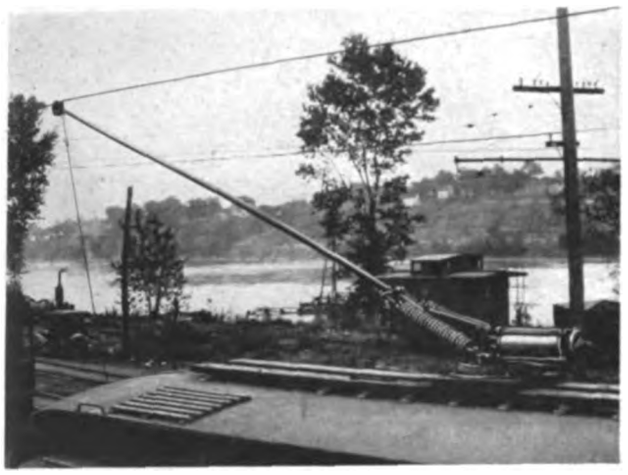
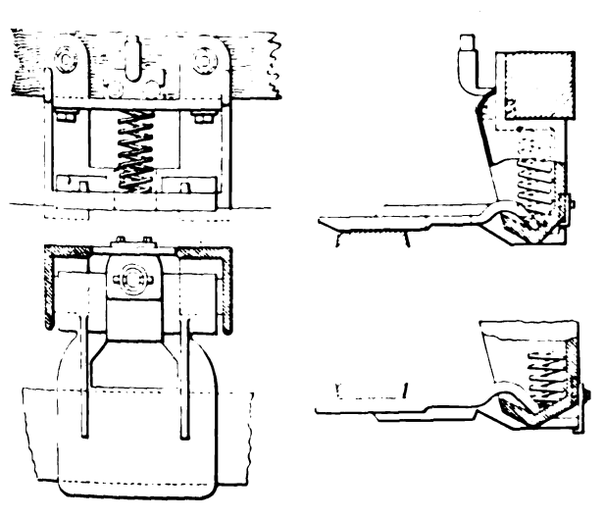


Air-Retrieving Trolley Base

acteristics being ample lubrication for the pin on which the wheel rotates, and good sliding contact between the sides of the wheel hub and the flat-spring shunts that are attached to the sides of the harp. Ears for the harp appear in many instances for the purpose of preventing the wire from being caught anywhere but in the groove of the wheel. For the trolley base, whose primary function is to provide free motion for the trolley pole, as well as to support it, ball-bearing and roller-bearing designs have come into very general use.

Recently an air-retrieving trolley base has been developed to take the place of the various commonly-used trolley catchers and retrievers which are mounted on the rear dash, and which operate in general by the action of centrifugal force on a series of dogs and latches within a drum over which the trolley rope is wound. The air-retrieving base, however, depends upon the action of main reservoir pressure in a cylinder cast integral with the revolving part of the ball-bearing base, the piston within this being connected to the trolley pole. The pole is normally held against the wire by tension springs, and small breathing ports in the cylinder permit the piston to make gradual movements with perfect freedom; but if the wheel leaves the wire the sudden movement compresses the air in back of the piston, and opens a differential valve in the cylinder head, the small section of the differential valve opening a passageway from the main reservoir into the cylinder so that the pole is pressed down against the spring tension. An air cushion is provided to prevent damage to the roof from the rapid movement of the pole, and there is a locking device to prevent the retriever pole from swinging laterally. Release is effected by a valve in the pipe connecting the base to the main reservoir.



Detachable Third-Rail Shoe for Under-Running or Over-Running Contact Rail

PANTOGRAPHS AND THIRD-RAIL SHOES

With pantograph collectors, almost the only feature that has not become standard is the contact surface. Both rollers and flat pans have been installed at comparatively recent dates, and on direct-current the former have given a life for the shoes of steel tube ranging between 20,000 miles and 50,000 miles. Roller bearings for the rollers, however, appear to be necessary, and as this increases the cost materially, the tendency at present appears to be to prefer the simpler design of a plain contact pan, ordinarily about 4 ft. long and with curved aluminum horns at each end. Light weight is, of course, an essential to permit the shoe to follow closely any irregularities in the overhead wire, and in one of the latest designs the shoe is carried on auxiliary spiral springs seated on the pantograph frame, so that small movements do not affect the framework as a whole, but only the mass of the shoe itself. To meet the demand for light weight, shoes have been made of metal as thin as 1/16 in., weighing only 7 lb. The same idea of light weight appears in the use of steel tubing of No. 22 gage for the pantograph arms, and under these conditions vertical pressures of only 10 lb. between the shoe and contact wire (measured when the shoe is being pressed down) have been permitted.

Sliding Trolley Shoe

Both the material of which the contact surface is made and the life of the shoe display very great diversity in modern installations. Black steel shoes 1/16 in. thick, working against a steel contact wire that carries alternating current, have had a life approximately 2,500 miles, while 1/8-in. shoes on direct current have been reported to have attained 25,000

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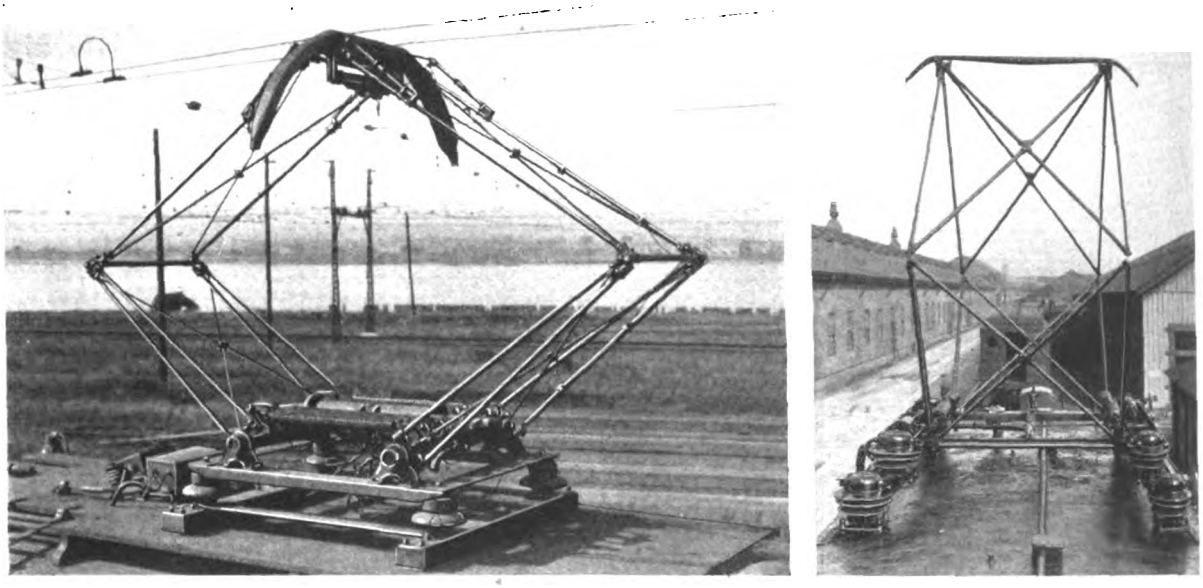

Roller-Type and Pan-Type Collectors for Pantograph Frames

miles. Strange to say, considerably less mileage than this has been reported where steel shoes work against copper wires. In the latest installation of pantographs, however, copper against copper has been adopted as the result of exhaustive tests, but at the present time insufficient data are available to establish the life with the combination. The question of greasing the shoe, also, is still altogether unsettled, since some railways have dispensed with lubrication of every kind for the contact surface, and state that no difference in wear is discernible, while others claim the use of grease to be almost an essential to reasonably long life for shoes.

In the design of third-rail shoes the only improvement of note that has been developed is the attachment of the shoe proper to the supporting bracket only by the pressure of a short spring, so that if the projecting shoe strikes an obstruction, or catches in the third rail, it is knocked free from the bracket without breaking the latter. Under such circumstances the shoe itself is seldom damaged, and if it is picked up from the side of the track and turned in at the shop it may be used in another car. The arrangement involves the use of a shoe which is practically flat, but which has three extensions at the inside for the support. The outer two sections are bent downward at an angle, and the ends rest in short troughs formed at the sides of the supporting bracket. The center-portion of the bracket is open, and a spring extends from the beam on which the bracket is carried to the central extension of the shoe. When the shoe is over-running, as is the case on the Hudson & Manhattan Railroad, where the design was developed, the spring seat is placed outside of the line of support at the ends of the curved extensions and the spring thus holds the outboard portion of the shoes downward against the rail. When an under-running shoe is desired, the spring seat is moved inward until the contact surface of the shoe tends to rise. No bolts are necessary, and to remove the shoe the curved extensions are merely pulled out of the troughs against the pressure of the spring. No lubrication is needed, and no shunts are required.

Large illustrations of street scenes and other views appear on various pages of this publication. For the information of those who may be interested the localities thus represented are listed by pages as follows:

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Wood Block Flooring
Hoists
Jacks and Buggies
Armature and Field Maintenance Tools
Taping and Winding Machines
Babbitting Molds

And such materials as

Varnishes
Insulating Compounds and Paints
Tapes, Webbing and Mica
Lubricants

Up to the complete coil and commutator, as well as a great variety of

Car Castings, Forgings, Bearings and Trim

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Practical advice in the shop is trouble saved on the road

That is one of the many benefits secured through our free Expert Service. Read the following partial report from one of our Experts:

"The manager understands of course that if the bearings are in poor condition, even the best oil will not prevent trouble, but he is greatly perturbed by the hot boxes on their interurban cars. I have made *suggestions* to obviate this and bring about permanent betterments to the service, as follows:

"First—The work of rebabbitting journal brasses should be done at the main shop and by one man, so as to place the blame for poor work that is being done.

"Second—That a more liberal supply of new brasses be placed in service, as there are a number of the old ones that must be scrapped.

"Third—That as soon as possible rebabbitting of journal brasses be discontinued and the brass be allowed to wear to a scrapping point and then taken out of service.

"Fourth—On account of the high speed and weight of cars, there should be a more liberal renewal of high grade packing, as a large proportion of the journal packing now in service is short strands, and while it would prove satisfactory in slower service, it is not conducive to good operation under the present conditions.

"Also, I have *requested* them to discontinue a practice which, no doubt, has been the cause of a part of the journal trouble, and if continued it will ruin the journals. I refer to a block of wood that has been made in the form of a journal brass and when they have a hot journal they remove the brass and put in the block of wood with a sheet of emery cloth on its face and then run the car. The result is another hot journal, as it is impossible to remove all the emery from the journal without removing the journal box. Furthermore, any irregularity in the journal face or diameter will be aggravated by such a proceeding and new journal brasses will have so little surface in contact with the journal that the weight per square inch is out of all proportion to what it should be. This was proven by an inspection of journal brasses that had only been in service twenty-four hours. The journal box dust guards have not had the attention they deserve, and there are a number of journals without them."

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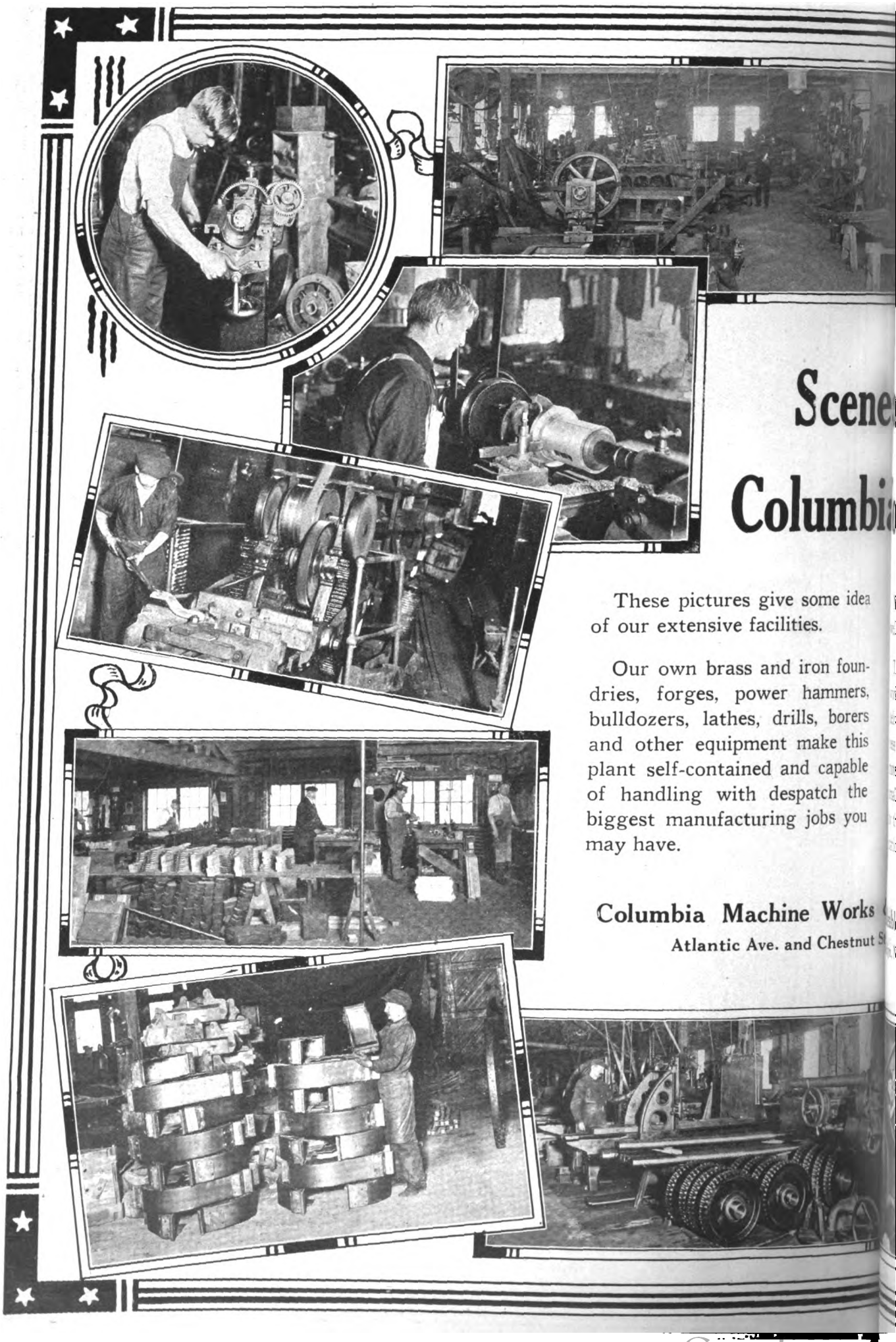

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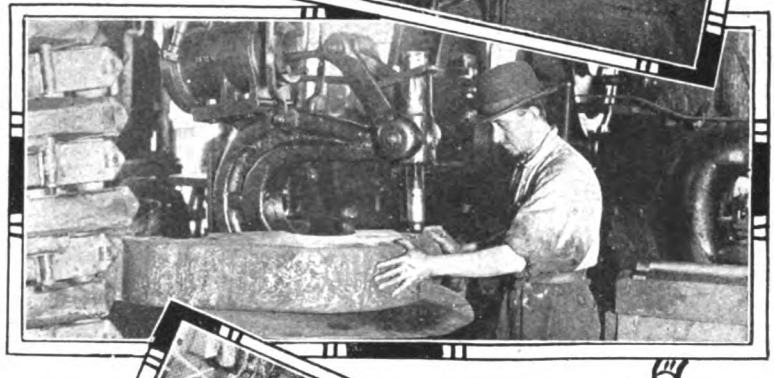

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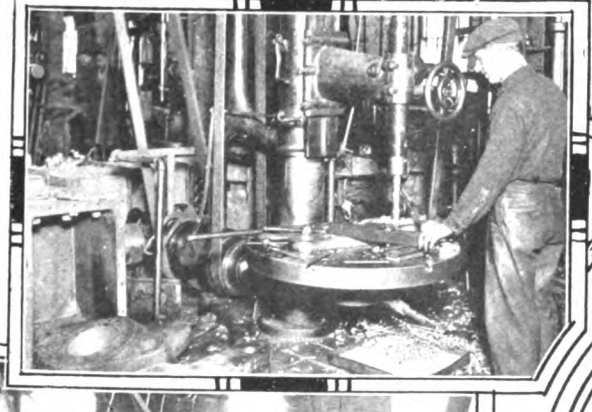

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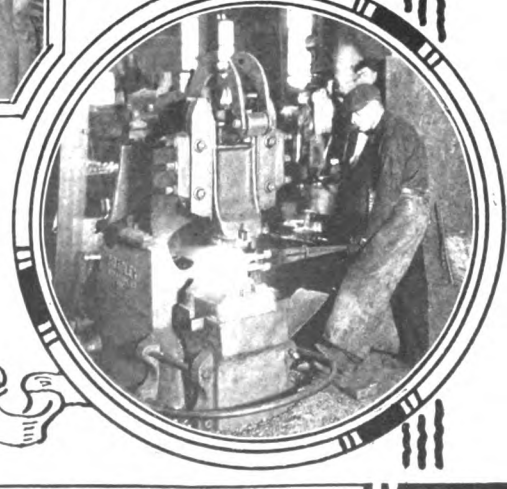

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Car hoists
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Tension stands

CAR EQUIPMENT

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Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
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Commutators
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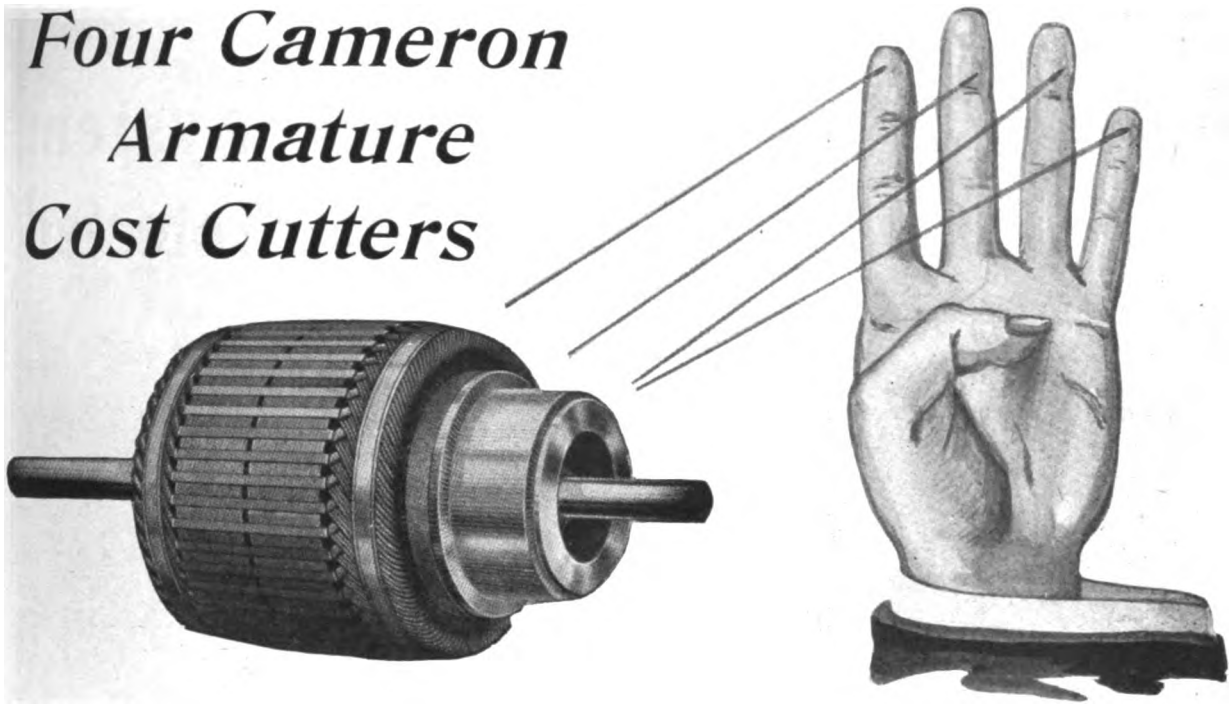

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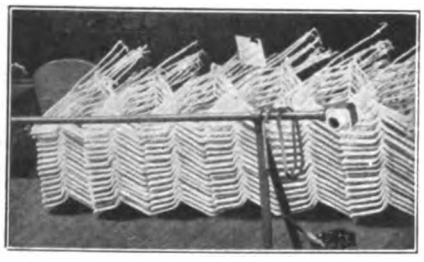

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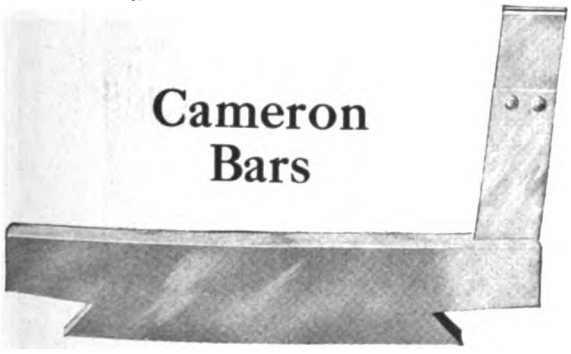

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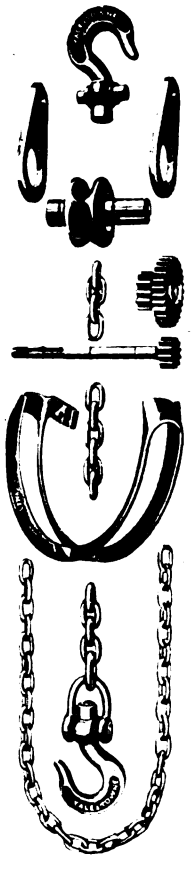

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Welding of broken gear cases is one of the most frequent applications. The field of usefulness of Davis-Bournonville apparatus is unlimited in the repair department.

See Our Exhibit at the Convention

We will occupy spaces 207 and 209, opposite the aquarium

and write the General Office for data and information about equipment. "Davis Apparatus" leads the World in Range, Efficiency, and Volume of Apparatus in Successful Use.

DAVIS-BOURNONVILLE COMPANY

NEW YORK CHICAGO

GENERAL OFFICES AND FACTORY: JERSEY CITY, N. J.

SALES OFFICES: NEW YORK, CHICAGO, CLEVELAND, DETROIT, PITTSBURGH, PHILADELPHIA, BOSTON

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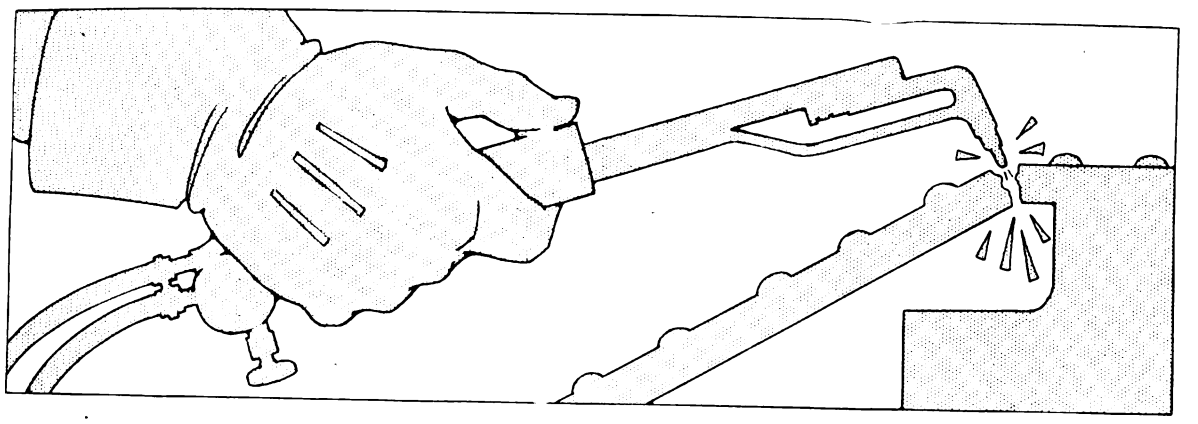

A New Job For Oxweld Apparatus

is discovered every hour of the day in the electric railway field, but one of the largest traction companies in Michigan recently uncovered a brand new way to make the scrap pile replenish the store room; they now

Cut Car Repair Parts From Heavy Steel Plate

These people no longer buy expensive forgings for many repairs; they simply lay out the parts on 1¼-inch steel plate and apply the Oxweld Cutting Blowpipe; very quickly the replacements are ready, cut to dimension and with a smooth, clean edge. Scrap metal is used for smaller parts. Oxweld-cut plates are stronger than forgings—the fibres of the steel are not injured or disturbed and the work is accurate—results not always so certain in forgings. Here are just a few of the shapes they make:

Radial Draw Bars **Brake Cylinder Floating Levers**
Truck Equalizer Bars **Carry Irons**

But electric railways have hundreds of other uses for Oxweld Apparatus—reclaiming broken and worn castings and forgings in the car shop; making machinery repairs in the power house; rail-bonding, repairing frogs, switches, etc., out on the line. Every day you will find profitable use for your

Oxweld Portable Welding and Cutting Unit

Cheapest to buy—to operate—to maintain

When you buy a piece of equipment as a measure of economy, you naturally seek the most efficient—that's OXWELD, in the welding and cutting field. The exclusive "injector type" construction insures an economy of gases and time and a certainty of results that you should know about before you buy.

Send for Bulletin Series 700-R
telling about some of the economies Oxweld Outfits are producing in your field. You'll be interested.

OXWELD ACETYLENE COMPANY

LARGEST MAKERS OF OXY-ACETYLENE APPARATUS AND SUPPLIES IN THE UNITED STATES

NEWARK, N. J. CHICAGO LOS ANGELES

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"Hitting the nail on the head"

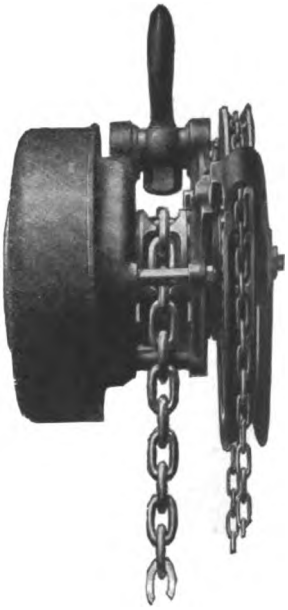
That's what we have been trying to do ever since we first built the

Ford Tribloc Chain Hoist

Have we succeeded?
Let the following facts answer.

We introduced steel working parts in place of iron used on other hoists, making a longer wearing, safer hoist and at the same time cutting down repair bills. We made the patented Loop Hand Chain Guide a part of standard equipment. This guide prevents gagging of the hand chain no matter at what angle or at what speed it is operated. This is another safety feature the value of which was quickly recognized.

We backed our faith in the Tribloc with a guarantee that really protected the purchaser. Not just the usual one-year guarantee "against imperfections in workmanship and materials," but a guarantee that protects you for years after the purchase.



Evidently we did "hit the nail on the head" when we designed the Ford Tribloc, for our sales increase steadily month by month and year by year. We get repeat orders from all over this country and from many parts of the world. Why? Because we build the Tribloc the best we know how, sell it at a fair price and stand back of it every minute.

Have you our catalogue? If not, we think you will find it worth having.

Ford Chain Block & Mfg. Co., 139 Oxford St., Philadelphia, Pa.

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Insulating Varnishes and Compounds

Superior for all applications of insulating varnish or compound in the manufacture, operation or repair of electrical apparatus.

There is a Sterling product for every purpose. Our engineering department will aid you in the selection of the proper one to solve your particular problem.

Endurance of electrical stress is only one of the requirements which all Sterling insulating products must meet before they leave our hands. Their mechanical and working qualities must all be right, too.

Reliance, absolute reliance, can be placed in all our products. A quarter century employment in the world's electrical equipment assures you of this.

Long life in service is assured by flexibility, pliability, toughness and heat endurance.

Insulating varnishes and compounds receive our undivided attention. We are specialists in their manufacture and use.

No order is too large nor too small. Agents in the larger cities of United States, Canada, Europe, Australia and Japan carry a stock of our products.

Getting your order is not nearly so important to us as giving you complete satisfaction. We desire to serve as well as to sell. If there is any point in the application of insulating varnishes or compounds which is troubling you our engineering department is at your service.

Write for our Catalogue. It contains information of value to your maintenance department.

The Sterling Varnish Co.
Pittsburgh, Pa.
Manchester, England

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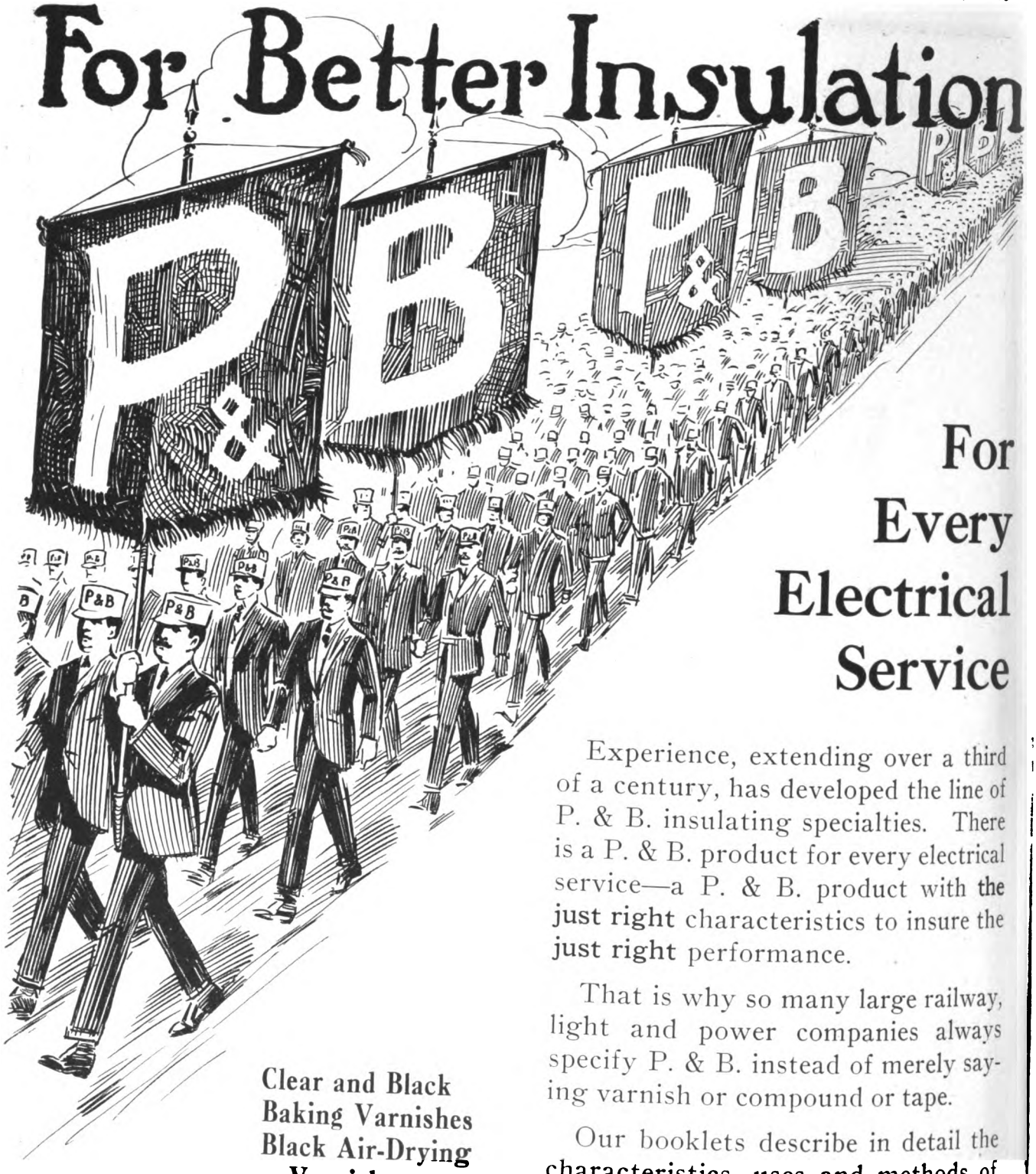
For Better Insulation



For Every Electrical Service

Experience, extending over a third of a century, has developed the line of P. & B. insulating specialties. There is a P. & B. product for every electrical service—a P. & B. product with the just right characteristics to insure the just right performance.

That is why so many large railway, light and power companies always specify P. & B. instead of merely saying varnish or compound or tape.

Our booklets describe in detail the characteristics, uses and methods of application of every P. & B. insulating product. They will help you solve your insulation problems.

Write For Them

Clear and Black Baking Varnishes
Black Air-Drying Varnishes
Black Finishing Varnishes
Electrical Compounds
Insulating Tapes

The Standard Paint Company

Woolworth Building, New York

Boston **Chicago**

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PERFECT MICANITE INSULATOR

REG. U. S. PAT. OFF.

MICANITE
Commutator, Insulators, Tubes, Washers, Rings, Segments, Sheets, Tapes, etc., made of imported mica.

EMPIRE
Linseed oil treated Cambric, Linen Silk, Canvas Duck and Papers. High puncture voltage, long life.

LINOTAPE
Linseed oil coated tape, both straight and bias cut for coil winding, cable splicing bus bars, etc.

Insulation For Severe Service

KABLAK
Black Varnished Cambric, Linen, Silk, Canvas, Duck & Papers, Flexible, efficient under high temperature.

MICO
Untreated insulating fabrics, Papers, Fibres, Linen Tapes, Sleeves, Shellacs, Cements and Varnishes.

We assume that you buy built-up mica insulation because you wish to utilize the high dielectric strength of mica.

It is well, therefore, to remember that commutator Micanite contains 97% to 98% of selected mica films.

On account of the small amount of binding material, Micanite is practically incompressible.

Its density and specific gravity closely approximate that of natural mica and are uniform throughout its structure.

Specify Micanite for severe service and all other service.

For Safe Cable Joints

CONDUCELL
Reg. U. S. Pat. Off.

Makes cable joints as dependable as the cable itself. Provides uniformly a predetermined amount of insulation, and makes wrapping of each conductor unnecessary.

CONDULINE
Reg. U. S. Pat. Off.

A special compound developed for use with Conducell. Assures dependable cable joints, free from voids. Viscosity is low enough to prevent cracking, yet high enough to prevent seepage.

SEND FOR BULLETINS

MICA INSULATOR COMPANY

NEW YORK
68 CHURCH ST., COR. VESEY ST.

CHICAGO
542 SOUTH DEARBORN ST.

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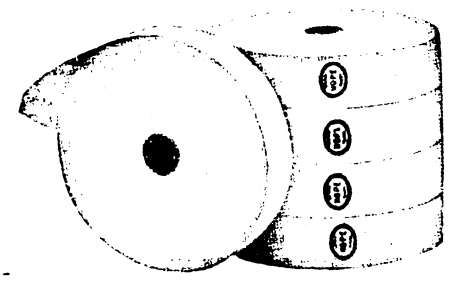
HOPE BRAND, QUALITY COUNTS

TRADE HOPE MARK

Hope Webbing Co.

Manufacturers of



Webbings
Tapes
Braids

Post Office Address: Providence, R. I.

Main Office and Works: 1005 Main St., Pawtucket, R. I.

New York Office: 396-398 Broadway

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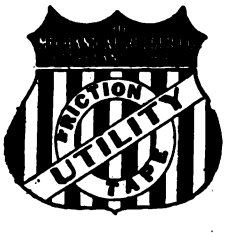
Look for this shield on the carton. It is your protection that the tape you buy is going to prove real insulating protection to your lines and equipment. We make good tapes for all trades and purposes, and you know good tapes are always economical.

Descriptive literature mailed on request



THE MECHANICAL RUBBER CO.

CLEVELAND, OHIO, U. S. A.

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Some Other Fellow Has Had to Solve the Same Problem

that is puzzling you—and you get the benefit of his experience in your Electric Railway Journal. Consider the Department of "Equipment and Its Maintenance" alone. The rush and drive of work during the day don't give you time to absorb the dozens of helpful points in every issue. Have a subscription at your home address, and make it

YOUR OWN
Electric Railway Journal

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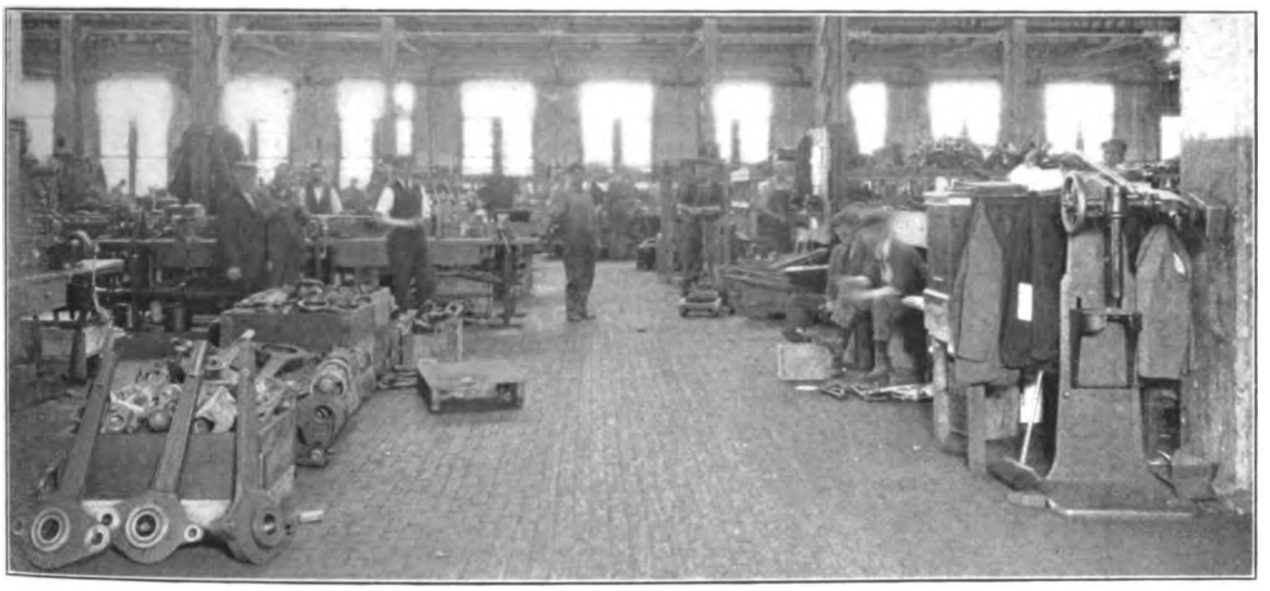
The Comfort and Health of Your Employees is an Important Asset

Don't put all the comforts of your shop overhead. Add a comfortable—and durable—floor to the other features of your shop, car-house, engine room, warehouse, etc. You will find it a profitable investment.

Wood Blocks Make an Ideal Flooring



Barber Non-Bleeding Wood Blocks

make a floor that is wear-resistant, dry and comfortable, never cold and damp.

Dustless	**Sanitary**	**Practically Noiseless**
Resilient	**Durable**	**Fire Resistant**

A flooring that the heaviest traffic will not injure.

Quickly laid on any solid surface and as quickly repaired, should it ever be necessary, a floor of

Barber Non-Bleeding Wood Blocks will make your shop pleasant and healthful to work in, the movement of heavy objects will be effected with less labor and without injury to floor surface and the periodical annoyance of floor repairs will be cut out.

Correspondence solicited; expert advice on your flooring problems free for the asking.

The Barber Asphalt Paving Company

Works: Maurer, N. J. **Philadelphia, Pa.**

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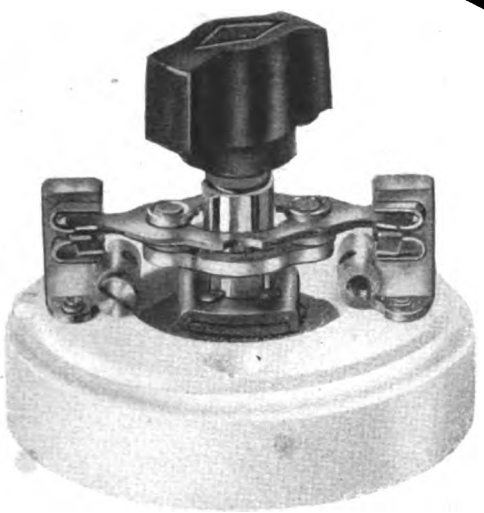

No. 501. 5 Amp., 500 V.

No. 501, with dial

"DIAMOND H" SWITCHES
For Car Lighting

Characteristics of these switches:

Long switch-blades have wide arc of travel, and give quicker break than the ordinary type.

Sheet mica insulation.

Solid brass binding posts.

Double phosphor-bronze contacts.

Steel used in mechanism is carbonized and drawn in oil—**not** case-hardened.

The most dependable switch for car-lighting ever manufactured—and up to "Diamond-H" standards in every detail.

No. 501, single pole.
No. 503, three-way.

Write for samples and prices—and let us confer with you regarding your switch equipment for car-lighting and heating.

The Hart Manufacturing Co.
Hartford, Conn.

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Section 7

Car and Truck Equipment

THIS section is devoted to the great variety of apparatus and specialties found on the electric car of today. The general classifications alone cover—

Current Collection
Heating, Lighting, Ventilating
Welding
Safety, Efficiency Devices
Fare Collection and Passenger Handling Features of the Car

While a study of each advertisement in detail will reveal the astonishing progress in the development of materials and apparatus for economical and efficient car operation such as flexible non-metallic conduit, plain and anti-friction bearings, roofings, headlinings—in fact

Almost Everything from the Trolley Wheel to the Car Wheel

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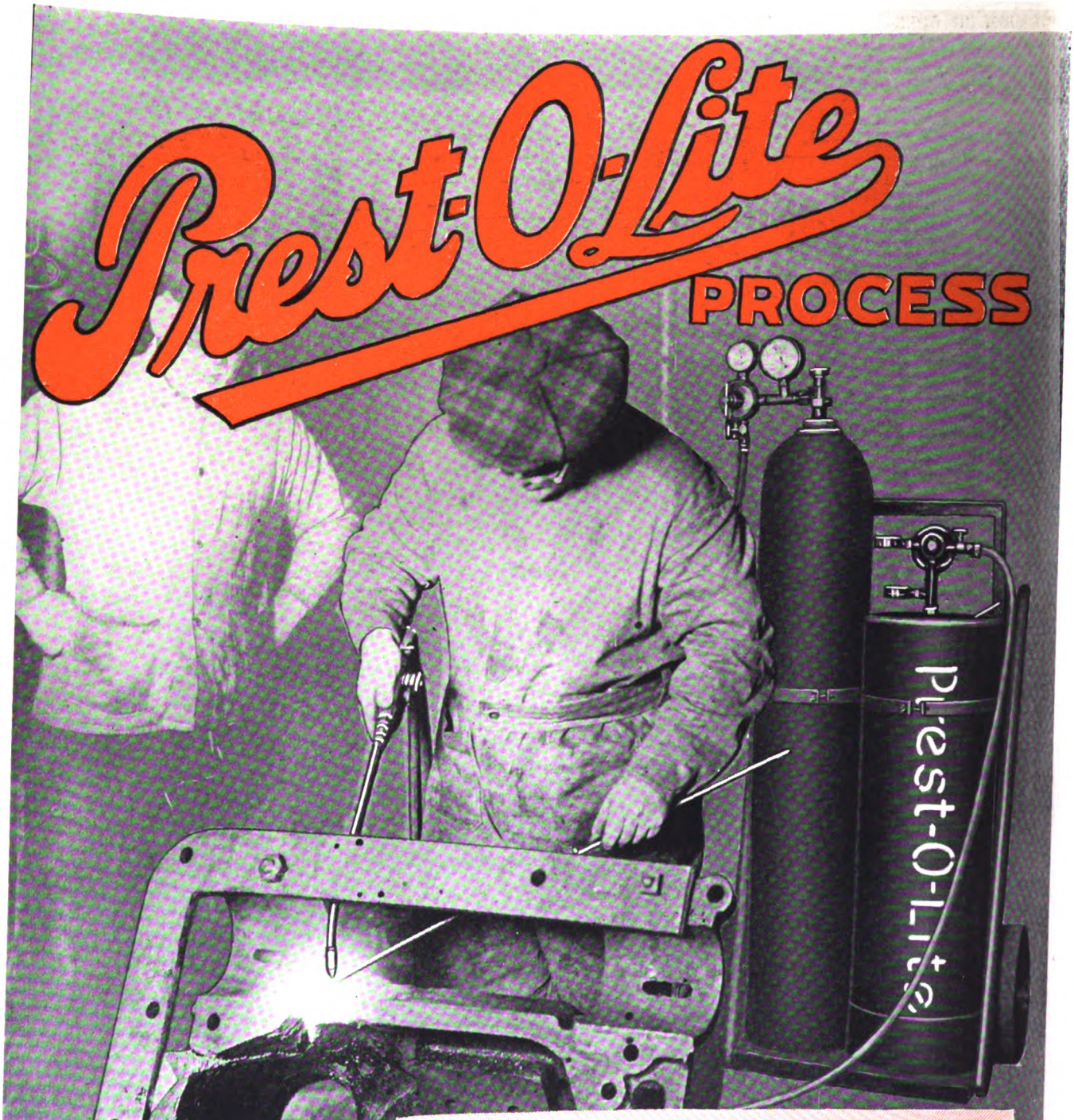
Prest-O-Lite PROCESS



THE profitable applications to be found for oxy-acetylene welding in electric railway shops, yards and on the track, for repair and construction work, are almost unlimited. This process handles—quickly, efficiently and at low cost—the largest variety of operations, many of which no other process can handle.

For "On the Spot" repairs the Prest-O-Lite welding outfit is ideal. It is perfectly portable and can be rushed to various jobs and repairs quickly effected. Costly delays, expensive dismantling and replacement are often obviated. And this same outfit will effect decided savings in time, labor and material in the manufacture of certain new equipment; also universally employed in the application of Gas-Weld rail bonds.

It will pay you to send for illustrated data today

The Prest-O-Lite Co., Inc., 805 Speedway, Indianapolis

Welding a lug on cast steel motor housing by the Prest-O-Lite Process. Total cost of operation, $3.70

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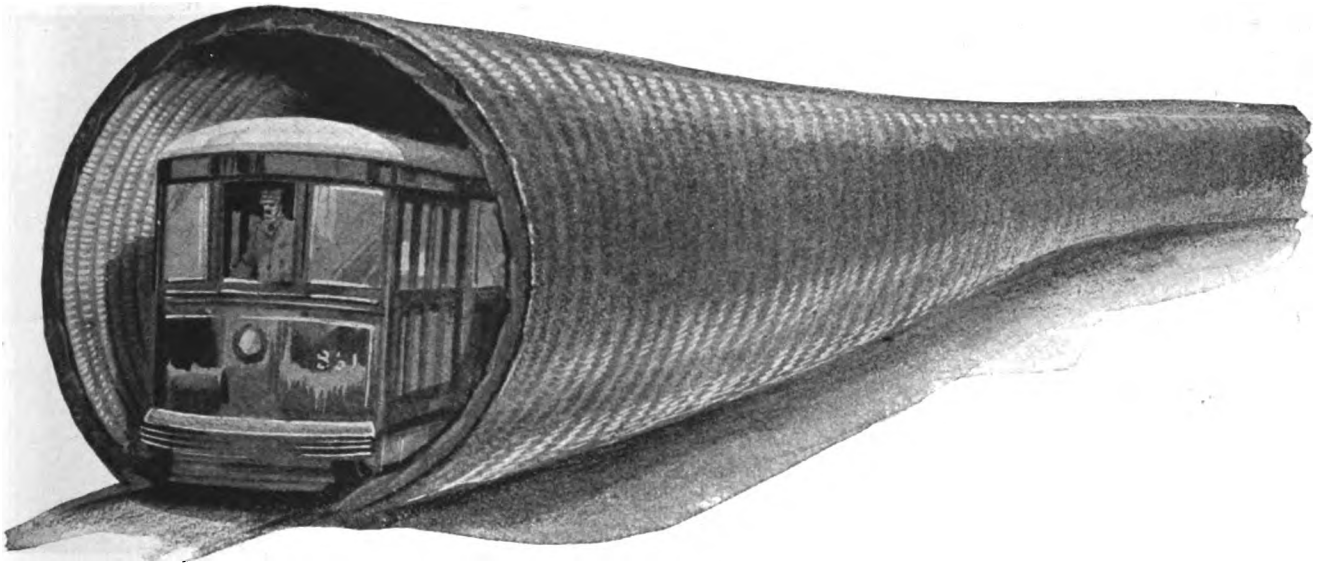

DURADUCT

Reg. U. S. Pat. Off.

The Flexible Non-Metallic Conduit with the Single Wall

Gives You Great Weight Reduction Without Impairing Safety

When you are preparing specifications for those new cars don't forget to call for the use of Duraduct to encase both your main and auxiliary wiring.

When you want to cut off hundreds of pounds of conduit weight in order to add some new specialty, replace metal with Duraduct.

When you want to rehabilitate cars not now fitted with conduit, use Duraduct.

Here Are the Reasons!

No elbows	Non-collapsible	Fireproof
No threading	Tough	Waterproof
Non-raveling	Flexible	Easy to Fish
Non-blistering		Light as a Feather

Sample upon Request

TUBULAR WOVEN FABRIC CO., *Manufacturers,* **Pawtucket, R. I.**

A. HALL BERRY, General Sales Agent

97 Warren Street, New York 9 So. Clinton Street, Chicago

Distributors for Canada: NORTHERN ELECTRIC COMPANY, Ltd.

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SAM

Sam-kalpa is the Brahmin for "intensive contemplation."

It is a custom that must preface every religious ceremony.

If the sam-kalpa is performed with due meditation, everything undertaken will succeed—its omission is alone sufficient to transform all ceremonies into acts of sacrilege which will not pass unpunished.

To accomplish a true sam-kalpa the Brahmin must think of nineteen separate, distinct subjects—in regular order and pronounce the names of governing planets. That makes him really think.

Each subject is a different angle of the one central religious thought. Looked at in a cold business light, the sam-kalpa is a mighty valuable institution.

Don't you see how the consistent thought on nineteen angles of one subject focuses the man's mind so that he can think clear and deep and right to the point?

The Morgan Cruci

TRADE MARK.

120 Liberty Street, New York

Factory, Brooklyn, N. Y.

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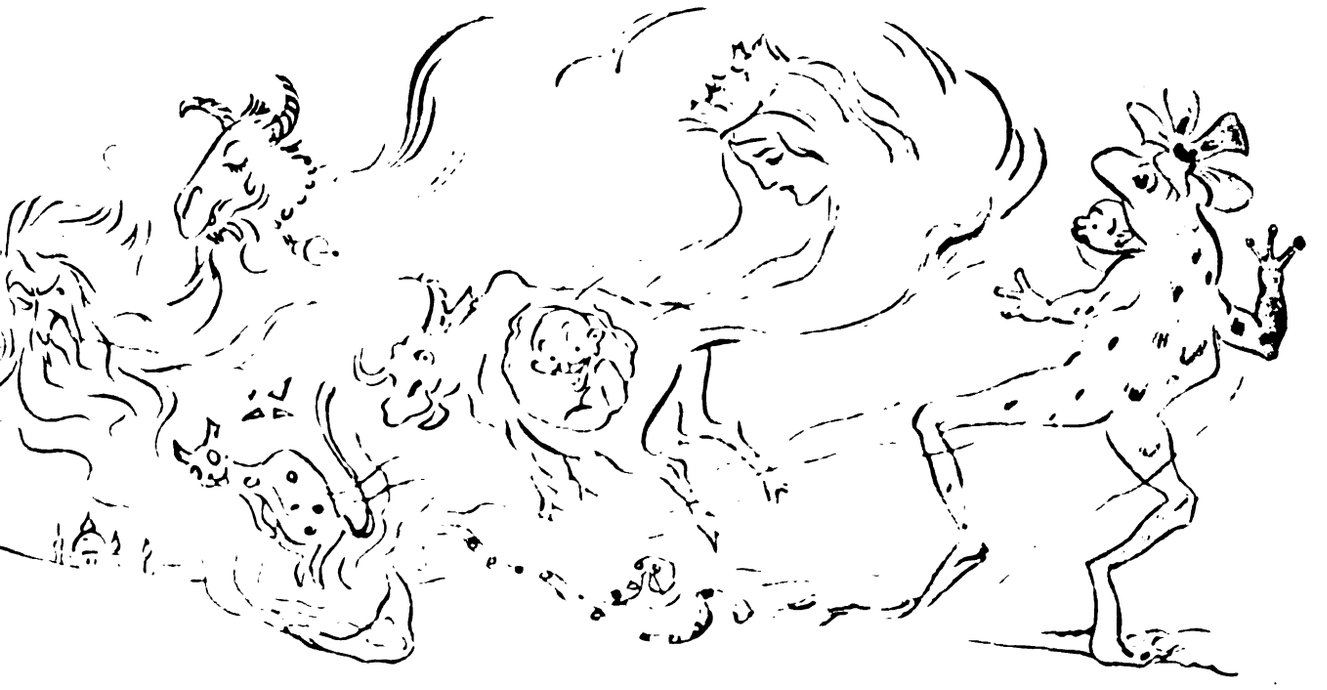

KALPA

Don't you see how much more constructive his thoughts will prove than those of, say, the railway man who is supposed to **think** right about carbon brushes but

Whose thought runs in about this groove: (1) BRUSH, (2) PRICE, (3) SERVICE.

What a pity he does not think in true Sam-Kalpa form.

There are fully nineteen angles to economical railway motor carbon brush buying and **every single one of them** comes AHEAD of "PRICE."

Fact is that in Morganite brush selling price doesn't enter at all—in its place is **brush cost per car mile.**

This, and eighteen more angles focus on the nub of **proper** brush consideration.

Together they make up a sam-kalpa you can profitably give intensive contemplation.

Do it.

le Company, Ltd.

Lewis & Roth Company, 312 Denckla Building
Philadelphia

Electrical Engineering & Mfg. Co.
First National Bank Bldg., Pittsburgh

W. L. Rose Equipment Company
La Salle Bldg., St. Louis, Mo.

Herzog Electric & Engineering Co.
150 Steuart St., San Francisco, Cal.

REGISTERED
MORGANITE
TRADE MARK

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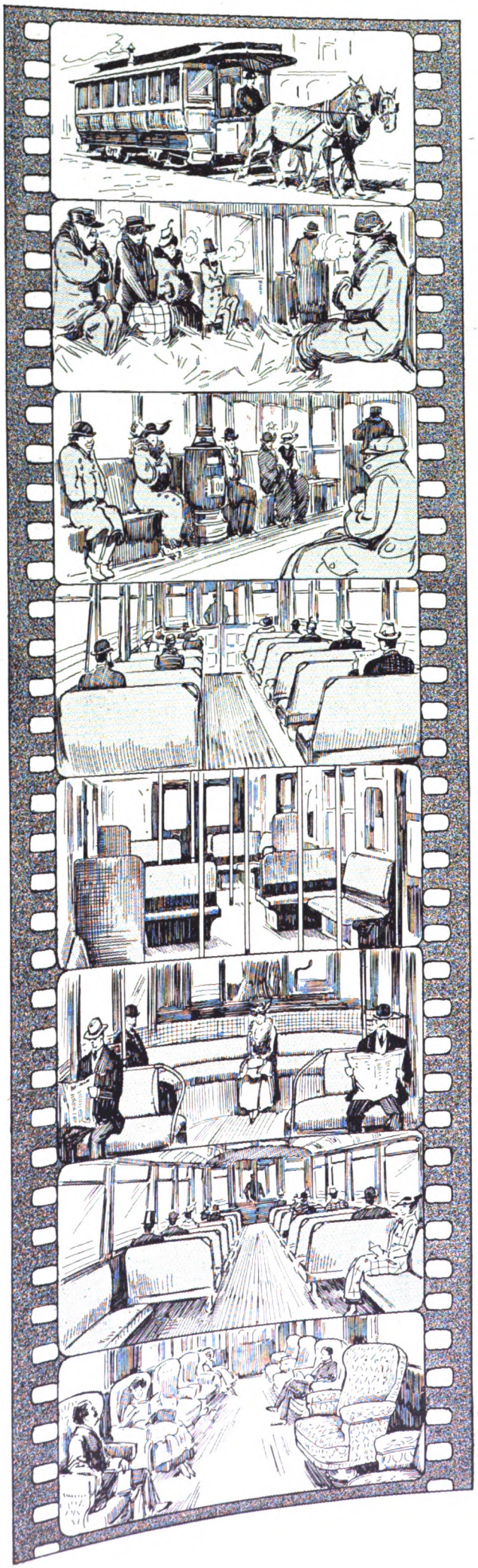

Hale &

Seat Originalit

Do you know that Hale & Kilburn have always blazed the way in producing seats of better design, materials and mechanism, so that car seating would be a real factor in promoting traffic?

Hale & Kilburn Were the First;

To design reversible cross seats for electric city cars.

To design the famous Walkover seat with non-lifting back—still an exclusive feature.

To design a shifting and tilting cushion in order to increase sitting space.

To design correct posture seats for rapid transit service—such as the longitudinal seat of the Hudson & Manhattan Railroad, the transverse seat of the New York Municipal Railway Corporation and the circular end seat of the New York State Railways—Rochester Lines.

To use pressed steel framing, including oval pedestal bases drawn as single pieces.

To use bronze or brass backbands instead of wood or leather, insuring longer wear and greater cleanliness.

To use connecting rails of angle iron, T-iron or tubing instead of space-robbing wood.

To make a detachable back as well as the three-part head-roll back for interurban cars.

To make seats for city service with diagonal corner grab handles.

To make interurban seats with single swinging automatic footrests to allow more space under the cushion.

WALKOVER

COPYRIGHTED

Philadelphia **New York**

Hale and

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Kilburn
eat Service

Hale & Kilburn originality has not been the only factor in making Hale & Kilburn seating the standard of the world.

Hale & Kilburn Service, namely, promptness, fair dealing and quality, has been the other great factor.

Hale & Kilburn Service is not a word of "sound and fury, signifying nothing"—but an expression for pleasing the customer first and counting the profit afterward. Here are just two examples of Service:

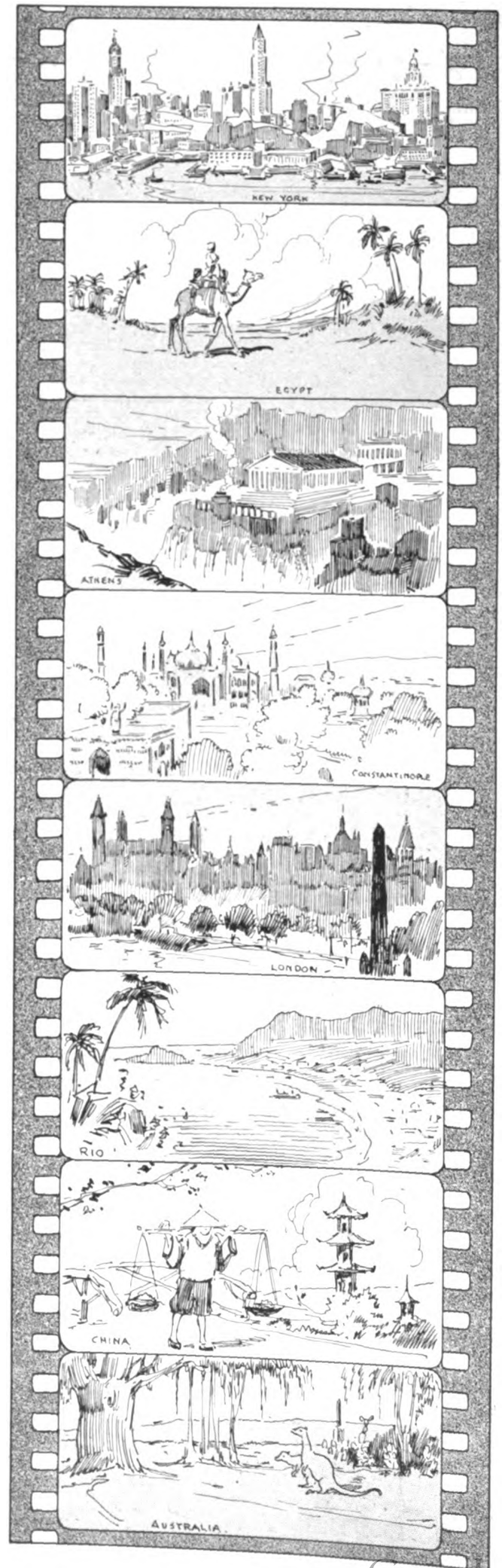
When one railway asked us to furnish rattan seats for 500 cars in an overwhelmingly short time, Hale & Kilburn put up a $50,000 building in forty days to make good.

When another railway asked us to furnish both steel interiors and seats in a hurry, Hale & Kilburn decided within five days to erect a five-story building which cost $120,000 and was ready in eighty days.

Extra patterns, new dies, night work, express shipments—these are a matter of course on any order where time is short.

Hale & Kilburn quality is demonstrated by millions of seats everywhere—in the wonderful New York subway, which has the highest seat-use factor in the world—in the heat of Africa—in the cold of Canada—in classic Athens—in curious Constantinople—in Russia, Italy, France, Portugal, England, Central America, South America, Asia, Australia.

In fact, wherever there is a railroad—electric or steam—there is the seating of Hale & Kilburn.



rn Company

) San Francisco Washington

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International Fare Co

INTERNATIONAL SINGLE AND DOUBLE CAR REGISTERS used by tens of thousands on cars where cash, tickets and transfers are registered with cords or rods through the hand or foot.

INTERNATIONAL MONEY-COUNTING FARE BOXES used on prepayment cars in connection with International Single or Double Registers.

INTERNATIONAL COIN AND METAL TICKET-COUNTING FARE BOXES adapted for use on single or double-end prepayment cars.

INTERNATIONAL COIN REGISTERS which receive and count the money with visible and audible overhead registration.

INTERNATIONAL COIN AND TRANSFER REGISTERS which eliminate registers and rods, as both registers are mounted on a column over the fare box, and transfers are registered by a pull-cord.

International Portable Registers, used at San Francisco and elsewhere, particularly at crowded terminals, by special collectors to permit prepayment loading at both ends of car simultaneously.

International Motor-Driven Combined Coin and Paper Ticket Registers, which receive both coins and paper tickets in the same hopper, count and return the coins to the conductor for use, separate, perforate and deposit paper tickets in a locked compartment.

International Motor-Driven Station Registers, which supplant the old costly and inefficient combination of ticket selling and ticket chopping. Patrons of elevated and subway lines, ferries and parks soon learn to deposit the proper coin in these boxes, while the railway company eliminates all ticket printing, selling and accounting. These machines are also made to work with turnstiles under the eye of the station cashier where traffic is too light to call for a box attendant.

International Registers and Money-Counting Fare Boxes and Coin Registers are varied to meet local practices as to registration of cash, paper and metal tickets; also as to number of coins acceptable for deposit.

There is an International Fare Mechanism that best meets your needs. If not, we will undertake to make it. Study our line at the Convention, Spaces 602-604, and consult us there.

The International

15 South Throop

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ecting Mechanisms

The International Transfer Printer

At this Convention we will display our new transfer-issuing machine, therewith rounding out our equipment to meet any conditions in city fare collection and accounting.

This first International transfer-issuing machine is not a theoretical cure-all, but a practical device made to satisfy the specific conditions set by the customer.

Some of the following features, therefore, are subject to such variations as will meet your needs:

The transfer is printed complete, to avoid obscurity from time and other important figures failing to "justify," that is, to print exactly in the spaces provided for them on partially printed transfers.

The transfer is issued from a roll in the size of 2 in. x 3¾ in. The turn of a crank exposes one transfer and forces down a notched knife, which leaves a 3-16 in. tear-off. Thus the transfer does not fall to the floor, nor can a passenger pull off unprinted paper through the machine.

The transfer supply is uninterrupted. When one roll is exhausted, a second becomes immediately available. This eliminates waste of paper caused by removing partly used rolls, because they would not provide a sure supply until the next refilling time.

The machine-made transfer cannot be manipulated because it cannot be timed ahead far enough for exchanging transfers.

Transfers cannot be issued without the insertion of the conductor's key which unlocks the mechanism.

Simplicity of setting is accomplished by the use of one knob for setting minutes. The hour A.M. and P.M. and date wheels are set automatically by the minute wheel.

One lever for setting the transfer point and direction and a crank for printing and delivering complete the operating control.

Size 7 x 8 x 3½ inches; weight 17 lbs.

See this Machine at Spaces 602-604, Atlantic City, and write us for full details.

INTERNATIONAL COIN, METAL TICKET AND TRANSFER REGISTERS, which receive coins and metal tickets in the same hopper with separate visible and audible registration on overhead dials and having attached a separate hand-operated register for transfers.

INTERNATIONAL MOTOR-DRIVEN COIN REGISTERS, which accelerate fare collection by relieving the conductor of turning the handle of the fare box and by immediate registration and return of money. The Motor-Driven type is recommended for all large cars operated through congested traffic areas.

egister Company

reet, Chicago

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On Guard at El Paso

—At Beaumont, Dallas, Houston and Fort Worth

—at Tacoma, Seattle, Jacksonville, Savannah and on practically all the Stone & Webster properties;

On the United Railways of St. Louis—the Public Service Railway of N. J.—the Third Avenue Railway of New York—The Connecticut Co.—the New York State Railways—at New Orleans—Memphis—Little Rock—Omaha—in fact, on nearly all the progressive lines throughout the country, you will find the

Johnson Registering Fare Box

What led the management of these roads to select the Johnson Fare Box?

Nothing on earth but inherent superiority—for the Johnson is **the one** fare box which can be absolutely relied upon for certainty, accuracy and economy.

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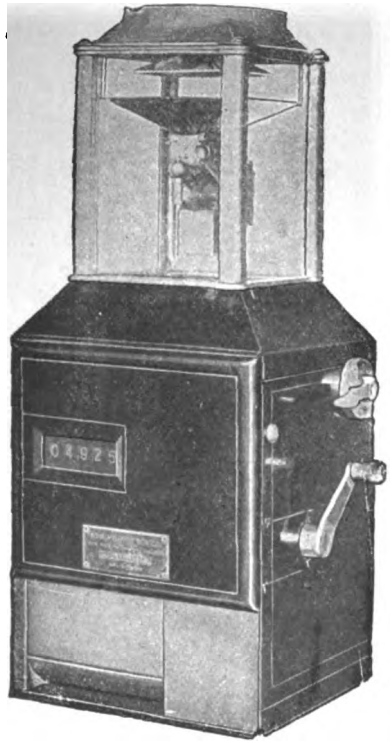

For Cash Fares

Interesting details are in the new booklet—Write for your copy

It materially increases fare receipts—divides the total passenger load into the three classes of fares collected—cash, tickets and transfers—makes it impossible to substitute one class of fare for another—gives a totalized registration of all cash and ticket fares on totalizing dial, registering metal tickets on a separate ticket dial.

Metal tickets used with the Johnson Fare Box are so designed as to prevent counterfeiting, and tickets are sold and resold on the car by the conductor. The big expense of printing and counting paper tickets is eliminated.

Wherever installed, the Johnson Fare Box has not only stopped all fare-collection leaks, but has also won the favor of both passenger and conductor, and accelerated schedules. Be sure to see our exhibit while you are at the Convention—Space 621.

Johnson Fare Box Company

Jackson Blvd. and Robey St.
CHICAGO, ILL.

REPRESENTATIVES:

U. S. Metal & Mfg. Co., New York
H. F. Keegan Company, Chicago
Grayson Railway Supply Co., St. Louis
S. I. Wailes, Los Angeles
P. F. Bodler, San Francisco

A Sentry for Your Treasury —it counts and registers both COINS and TICKETS

FOUR-DIAL FARE BOX

For Cash Fares and Tickets

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ROOKE

TO THINK STRAIGHT on this fare collection problem you must either **agree** or **disagree** with us on two basic considerations, i e.,—

(a) THE INITIATIVE IN FARE PAYMENT should not be left to the passenger;

(b) THE INITIATIVE IN REGISTRATION should not be left to the conductor.

Generally speaking, passengers will not seek out your conductor or some mute, open-hopper fare box. Collections should not be made on the wait-on-yourself, cafeteria basis. Passengers instinctively expect to be and should be singled out and served. The registering device should be conveniently **brought to the passenger. The passenger,** not the conductor, **should operate this register.** The register to serve that simple but fundamentally sound idea must be small, portable, and have unusual mechanical functions. Did you ever try a ROOKE register and note its human-like zeal in reaching for, gripping and instantly registering the coin you but slightly insert into it? It is **alive,** and not a dead gravity-operated device.

No matter what type of car is used the fixed-post idea tends to make a door-man of your conductor. It kills his initiative. He no longer **goes after** fares or feels responsible. The mute box is imposed upon or avoided. The conductor has lost that vital thing, **collection control.**

The principle of leaving the registration of fares optional with the conductor has firmly established its own bad record. No problem at all, if that method were fair to either the conductor or his employers. It simply means temptations, suspicions, known losses, guess-work and trouble-breeding in all your working relationships. THE CONDUCTOR SHOULD COLLECT. THE PASSENGER SHOULD REGISTER.

"The man *behind* the conductor's hand should supply *initiative* in fare collection. The ROOKE register *in* that hand *speeds up* even the passenger who is *ready*, while converting *both conductor and passenger initiative* into a record that cannot be *shirked* or *falsified.*"

Point 1—Adaptability.—The ROOKE register is just as adaptable to pre-payment as to inside-payment or pay-as-you-leave cars.

To center-entrance cars as to end-entrance cars.

To single-zone as to many-zone runs.

To single cars as to two-car trains.

To short platforms as to long ones.

To big cities as to smaller ones.

It fits in wonderfully well to **standardize** with.

It is not merely a **nickel** register, a **dime** register, a **quarter** register, or a ticket register.

It may be either, or a combination of several, **designed to fit your conditions.**

Point 2—Portability.—Omit comparisons with old-style portables. The ROOKE is entirely different. It **must** be portable to get results.

It gives the conductor absolute **collection control.** Anywhere he goes or extends his hand, the register can be on the job to interpose and secure **instantaneous** collection, registration, bell and cash delivery.

Instead of making the conductor one-handed, it extends the conductor's reach, convenience and increases speed. It weighs but 21 oz. It collects at both ends of the car or permits of street collection. No transfer of equipment. No cumbersome "clock" to carry if you have a break in the line. No winding up each trip. No clerk to climb in and out of cars to take readings. The conductor watches the step and serves passengers without losing collection-control. No fares rung up by excited passengers.

Point 3—Speed.—As speedy as the hand of the conductor, because it actually becomes a part of his hand, darted hither and thither wherever there is a fare in sight. It emphasizes the nickel. Less change-making is necessary. There is no later act of registration, with its attendant jostling of passengers or possible bunching of fares and substitution losses. When your conductor gets to the passenger the deal is over. No time given to ringing up or reaching for overhead cords or rods. The rule against "bunching" is no longer broken. Impossible.

Adequate speed on pre-payment and all other types of cars in meeting all collecting contingencies in large cities is not guess-work or theory. THIS RECORD IS ESTABLISHED.

Point 4—Simplicity.—The conductor is relieved of handling a lot of fare registering mechanism. No disputes with others regarding readings.

Forms of fare which simply represent statistics are quickly handled on that basis. The most direct possible auditing.

ROOKE registers are easily and safely handled in your accounting office. In no sense burdensome to the conductor. Most flexible as regards any method of handling to cover non-essentials, and **absolutely certain and positive in essentials.**

Rooke Automatic Regis

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MERITS

The ROOKE register is in a class by itself as a fare collecting device and method **adaptable to all car types.** It utilizes the initiative of the conductor in **going after fares** on the pre-payment platform. It brings to your box cars, interurban or summer cars the same uniform efficiency. It strips the conductor of all initiative and option in the matter of registering fares. **The simple fact of collection insures correct registration.**

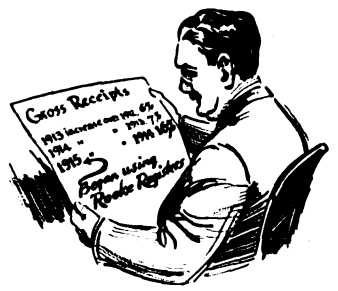
The ROOKE register is **man-equipment,** not car equipment. The register is handily brought to the passenger and **operated by the passenger.**

With the ROOKE register it is impossible to "bunch" collections or registrations. It is impossible to work substitution schemes between fare values. Your conductor can neither be "over" nor "short," and his integrity is protected against unjust suspicions.

The work of a conductor equipped with a ROOKE register is absolutely IN THE OPEN. THERE ARE NO TWO MEANINGS OR EXPLANATIONS FOR WHAT YOU SEE OR WHAT HE DOES. He simply COLLECTS. REGISTRATION CARES FOR ITSELF AUTOMATICALLY.

The ROOKE register thus becomes a **part of the conductor, a part of the passenger,** and a **part of the company.** These three factors get together the instant of fare payment. THAT INSTANT IS THE ONLY PSYCHOLOGICAL MOMENT. The transaction is always on the basis of (1st) the passenger, then (2nd) the company, then (3rd) the conductor.

"The ROOKE automatic register is the only modern fare collection device that enables you to combine the registering accuracy of an automatic mechanism with the initiative, the experience and skill of the conductor."



Point 5—Popularity.—Passengers are keenly interested in the human-like action of the ROOKE register. Its business-like grip and "tug" on the coin is a feature which causes the passenger instinctively to **know** that the company gets the nickel. No nasty emphasis on the idea that the conductor is not trusted. It is not a box. Conductor gets the money instantly. Passengers realize that a business transaction has been instantly audited in an extremely simple manner.

The passenger's accustomed physical act of payment is not much changed. It is **simply utilized.** The passenger knows there are newer and better ways of paying fares than by dropping the money into the conductor's hand.

With the conductor relieved from mental accounting and the later physical work of reaching for and operating the old overhead register hundreds of times each day, the passenger recognizes an accomplishment and **co-operates.** THE COMPANY IS COMMENDED RATHER THAN CRITICISED.

Point 6—Economy.—You are not asked to invest one dollar in equipment, or spend one cent in changing car entrances or interiors, in order to adopt the ROOKE register on **all** your cars. The ROOKE register comes on the must-make-good basis.

ROOKE registers are rented. You are more interested in financial results than in the ownership, repair and later dis-use of fare boxes or overhead registers with their transmission cords, rods and accessories.

AT AN EXPENSE OF LESS THAN ONE CASH FARE EACH DAY FOR EACH OF THE TWO CONDUCTORS OPERATING ANY ONE OF YOUR CARS, you may adopt the ROOKE SYSTEM. The ROOKE register will eliminate at least 90% of your present losses.

Point 7—Seniority.—All sorts of fare collecting devices have been booted into the scrap pile since the ROOKE register was born. The ROOKE SYSTEM makes new friends each year, and holds its old friends. It was the first coin-operated register, and is the first and only register operated without the use of hoppers or their auxiliaries to delay or defeat automatic registration. It is the only register providing **instantaneous registration by the passenger.** It was the first coin-operated register to use and classify metal tickets representing different fare values, etc., etc.

Mr. MANAGER: **You are not using ROOKE registers for FEAR OF THINGS THAT WON'T HAPPEN. Features of friction you fear *are all obviated* through our co-operation at time of installation. The things you fear may happen, WON'T HAPPEN. The advantages you desire WILL MOST CERTAINLY BE REALIZED.**

ter Co., Providence, R. I.

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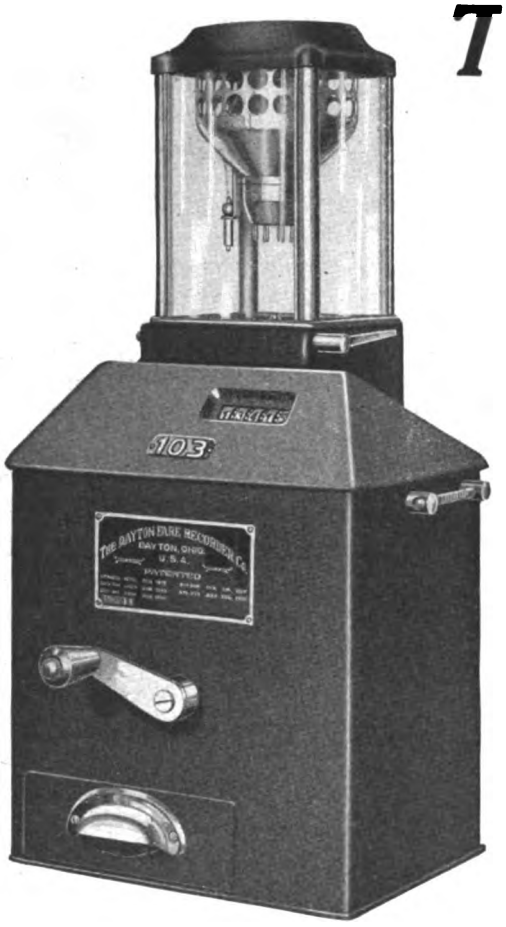
Get All Fares The Dayton Way



The Dayton Registering Fare Box

Is the Most Accurate and Reliable Registering Fare Box on the Market.

The Dayton Fare Recorder

Produces a Complete Printed Statement of Passenger Earnings and Traffic Data—Classified—Summarized and Totalized.

The Dayton Fare Recorder Co.

Dayton, Ohio, U. S. A.

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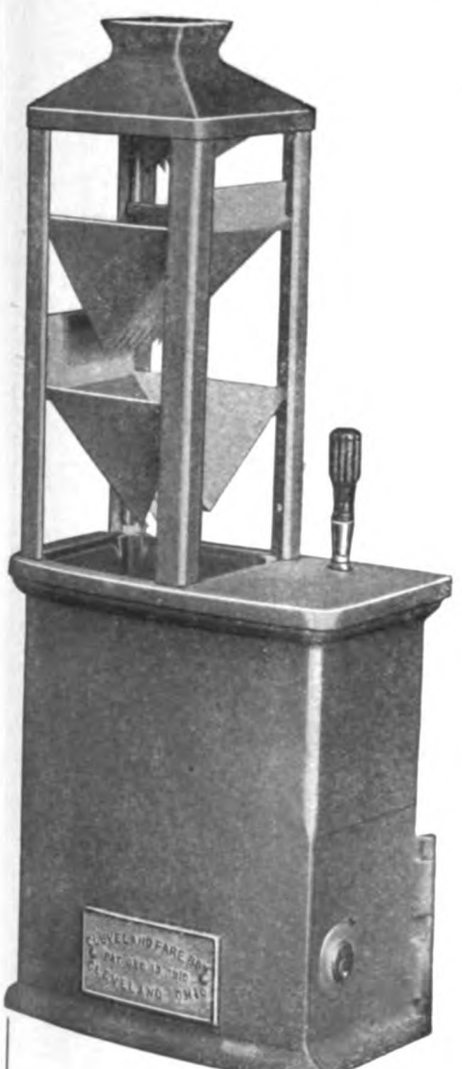
Put a Safety Deposit Box on Every Car

You keep your valuables in a safety deposit box in a vault most likely. You do it for protection.

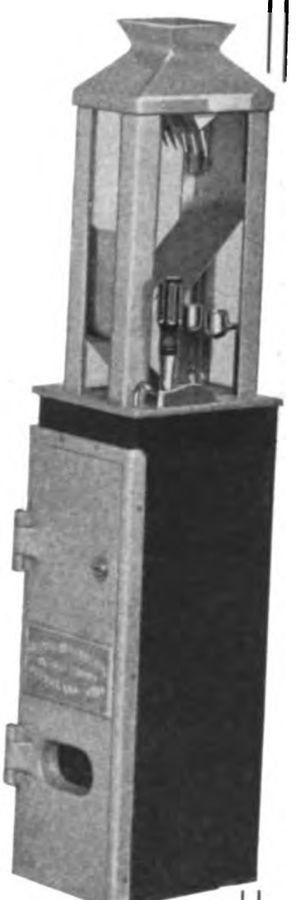
Fares are the most important valuables of a railway. Why should you let employees carry them around in their pockets? Stop many little losses and you greatly increase profits.

Cleveland Fare Boxes



are as safe as a bank vault. Once the coin or ticket is deposited in the box it cannot be removed until your authorized representative removes it. Mutilated coins will not damage the Cleveland box because there are no intricate working parts.

These locked fare boxes are made in sizes and types to meet every condition found in collecting fares.



Use These Boxes on your One-Man Cars

Whatever your requirements, we can meet them. We make special fare collection apparatus for special conditions.

Cleveland Fare Box Company

5318 St. Clair Avenue, CLEVELAND, OHIO

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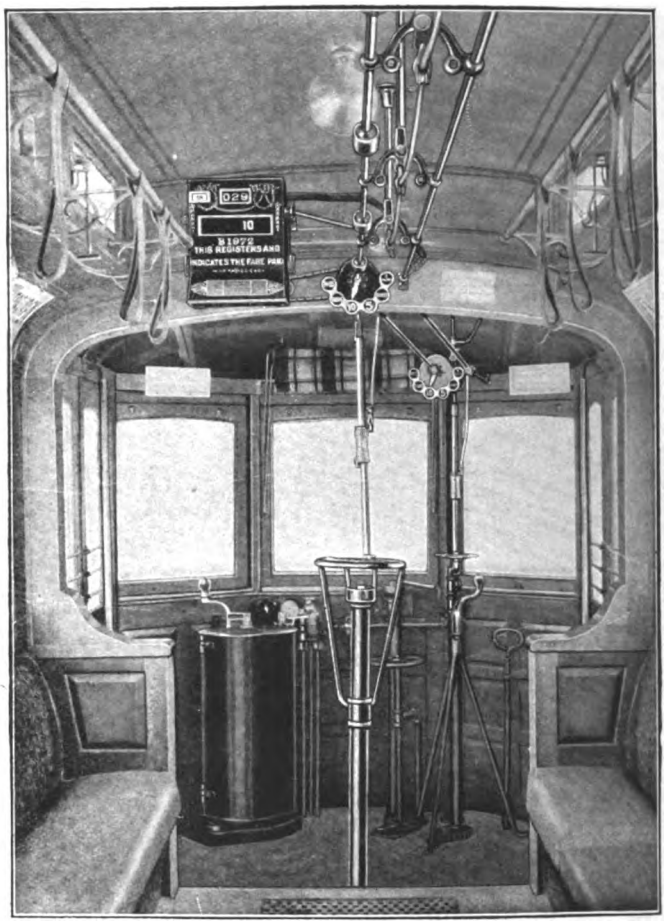
THE OHMER SYSTEM



An Ohmer Operating equipment adapted to either pay-within, pay-as-you-enter, one-man or two-man operation.

Our service meets every fare protection requirement, whether for city, suburban, interurban, pay-as-you-enter, pay-within, one-man or two-man car operation, toll bridges, ferry boats or park entrances. The flexibility of the Ohmer System and its adaptability to all conditions account in part for its increasing use. The main reasons for its success, however, are because—

It gets the fares.

It gives the management a clear insight into the characteristics of the men.

It promotes competitive efficiency.

It is based upon correct business principles.

The use of the Ohmer Fare Register opens up to the progressive manager certain very practical possibilities for the betterment of his business. The Ohmer System is the complete working out of those possibilities. Let us explain how it applies to your particular conditions.

OHMER FARE REGISTER COMPANY, DAYTON, OHIO

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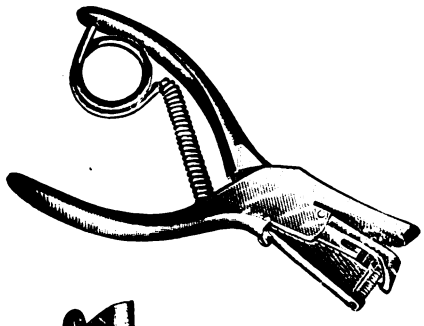
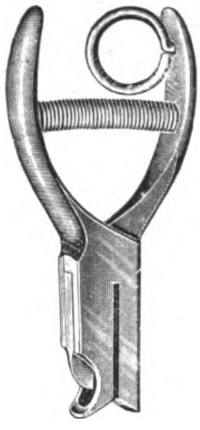
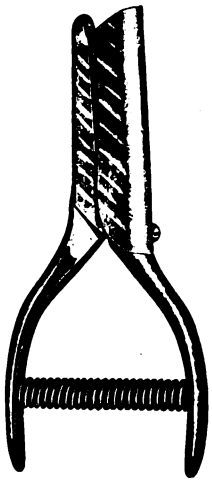
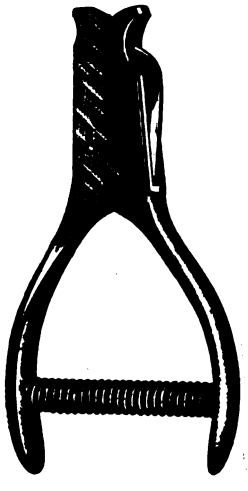



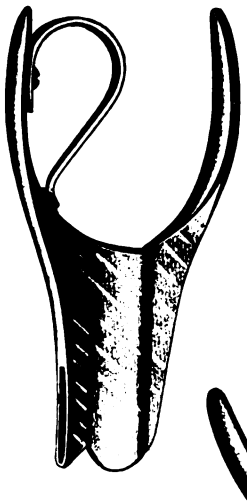
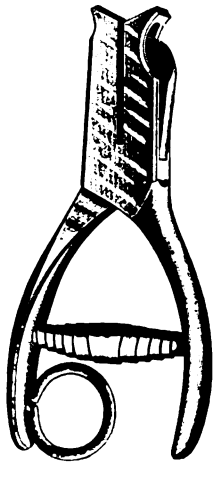



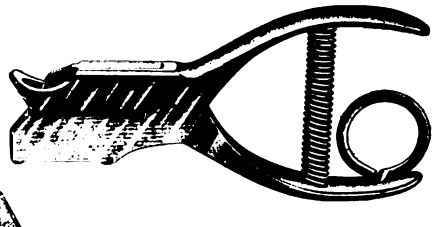
B-V
Ticket Punches

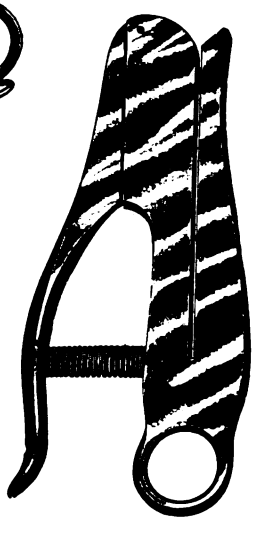
Have been adopted as Standard on the leading electric railways and steam roads in the United States and foreign countries.

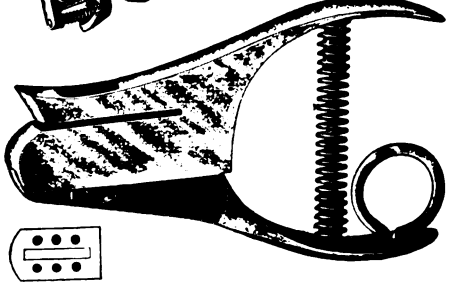
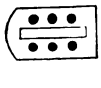
Send for Catalog.

BONNEY-VEHSLAGE TOOL CO.
124 Chambers St., New York
Factory, Newark, N. J.





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HEYWOOD-WAKEFIELD

The Lightest Seat Ever Built

for real service, with a full measure of comfort and of a construction that is easily repaired at a low cost, is shown herewith.

We specialize in reversible seats and in high grade car seating of all kinds.

A glance at this picture will indicate the value of the lifting cushion.

The upholstered spring cushion and back may be had in the same type if preferred.

We are just equipping a lot of cars with our Number 6C for the Omaha & Council Bluffs Street Railway Company.

Heywood Brothers and Wakefield Company

WAKEFIELD, MASS.

New York Boston Richmond Chicago Los Angeles San Francisco Portland, Ore.

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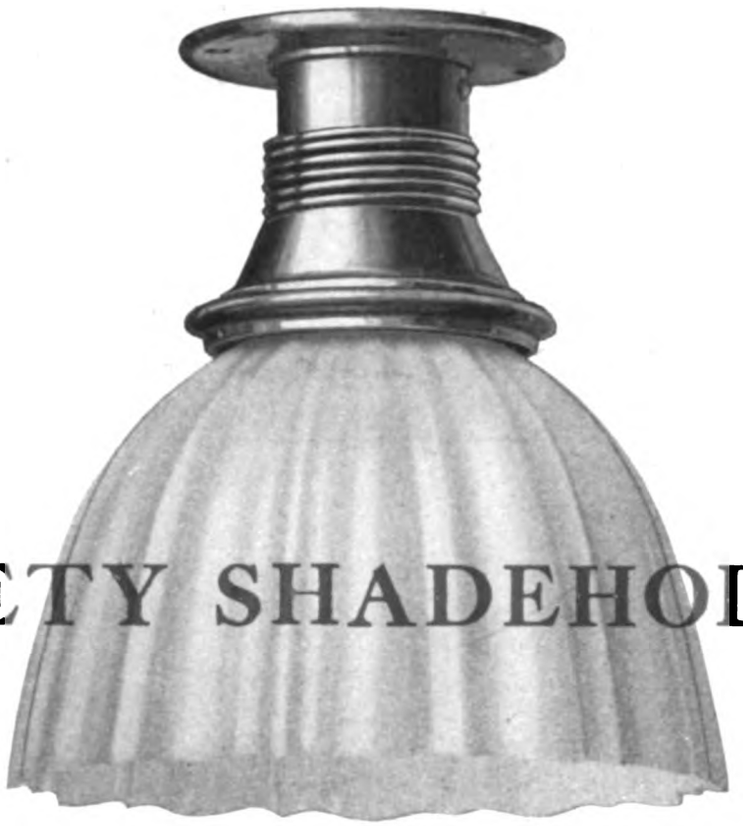

SAFETY SHADEHOLDER

150,000 Safety Shadeholders are now holding reflectors on passenger cars in service runs.

When a traction company replaces its old carbon car lighting lamps with Mazda lamps, reflectors and Safety Shadeholders it earns over 50% on the investment, and repeat orders follow.

One large traction company operating in a western city recently ordered nearly 8000 of these shadeholders to equip all of its cars after a service trial on three cars. This goes to show that the popularity of this shadeholder is founded on service facts —not on paper claims.

The Safety Car Heating & Lighting Co.

Chicago
Montreal
San Francisco

2 Rector Street, New York

Philadelphia
St. Louis
Boston

Electric Service Supplies Co., Philadelphia, New York, Chicago, Agent

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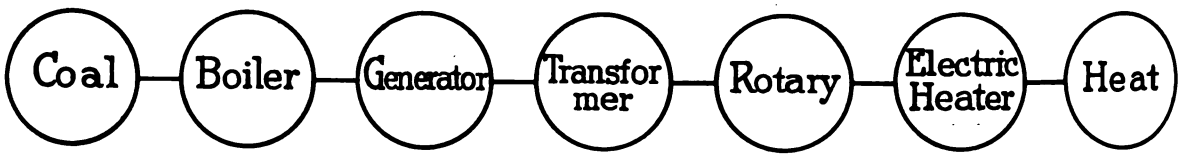
A Demonstration of the Economy of

THE COOPER

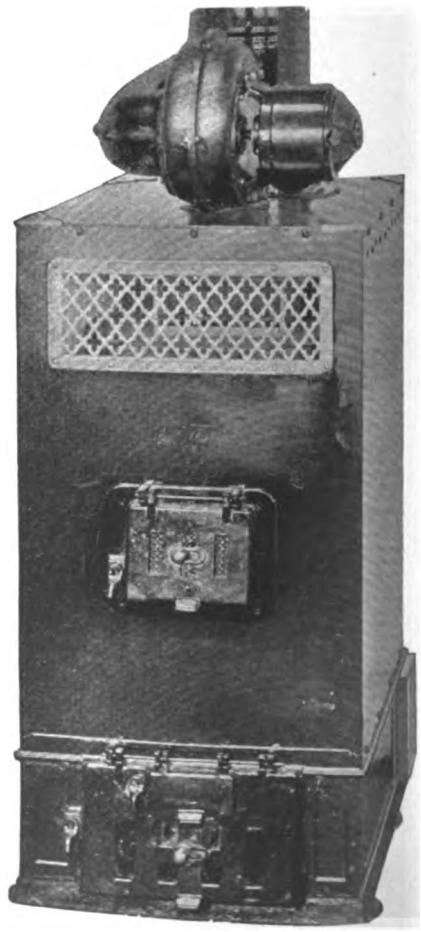
Forced Ventilation Hot Air

HEATER



Look at the above diagrams. The economy of a Cooper Heater must be apparent from them for from coal to heat is a direct process—with a Cooper Heater—one economical step.

With an electric heater the coal must pass through many steps before it is available as heat in the car. Every successive stage in the operation enters an economic loss. If you realized what this loss means to you in cold cash you would investigate the Cooper Heater without delay. Some actual cost comparison figures are yours for the asking.



The Cooper Heater Co.
Carlisle, Pa.

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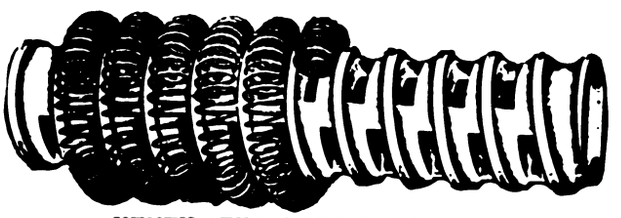
ELECTRIC HEATERS — GOLD — THERMOSTATIC CONTROL VENTILATORS

ORIGINATORS of the Ventilated Porcelain Core Its general use has proven its value



VENTILATED PORCELAIN, CORE
(Note Perforations)
Permitting a free passage of Air through the Coil

ORIGINATORS of the use of Non-Corrosive Resistance Wire in Electric Car Heaters

When we adopted the use of a **positively non-corrosive resistance wire** as standard in our electric car heaters some seven years ago, we felt sure we had found a wire that would stand up under all conditions and in any climate. Time has proven its great value in the electric heater field. Its adoption as standard by many railroads has proven its worth.

GOLD'S ELECTRIC HEATERS

Made for Service—Not Made to Fit a Price and Impracticable Weight

In the construction of our heaters we place the coils in such a position as to give perfect circulation. The case or front perforations are distributed so as to eliminate all possible heat pockets. The metal used is high grade, free from scale, admitting of a lasting finish. Our heaters have stood a break-down test of over 5000 volts, showing their perfect insulation.

Installation of
Deflector Cross Seat Heater

Our Deflector Cross Seat Heater illustrated is a radical departure from the older type Cross Seat Heaters, no extra hangers being necessary. The heater flanges themselves rest on the seat rails and are secured to them by four bolts. The cover or top of heater is secured to the heater case by the same bolts, thus forming a heat deflector, preventing the pocketing of heat under the seat cushion.

About* 20,000 HEATERS *furnished to railways in Greater New York during last season

GOLD'S THERMOSTATIC CONTROL

Saves Over 50% in Current Consumption

The economy exercised by the use of Thermostatic Control is evidenced by the fact that many roads are making it a standard. Gold's Thermostatic Control is positively vibration proof and extremely sensitive to temperature changes. Our main control switch is constructed to handle any amperage employed in the electric heater service.

GOLD'S VENTILATORS SCIENTIFICALLY CORRECT. CAN BE LEFT OPEN AT ALL TIMES

GOLD CAR HEATING & LIGHTING CO., 17 BATTERY PLACE NEW YORK

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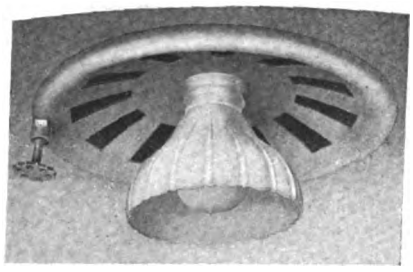
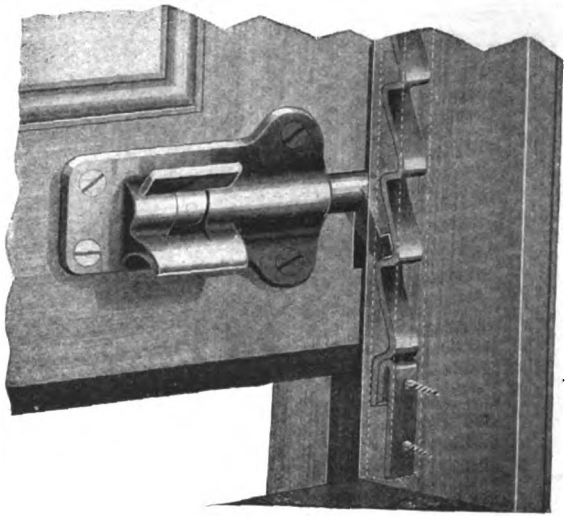
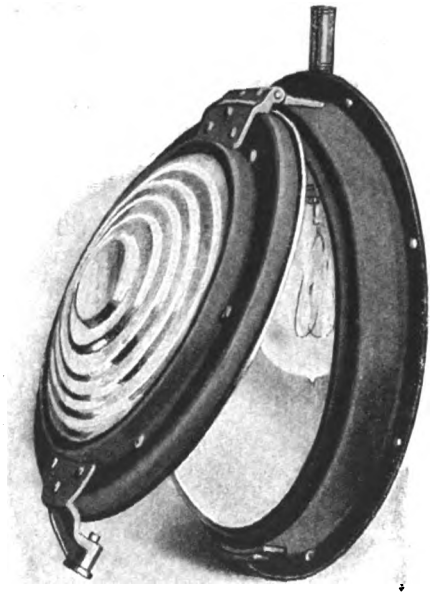
"DAYTON" FIXTURES
MAKE
STANDARD CARS



No. 173
One Light Electric Pendant and Ventilator Register (Patented).



No. 183—Sash Lock and Anti-Rattler.
No. 75—Pressed Steel Sash Stop (Cut ½ Size)



No. 1583-A—Pressed Steel Headlight with 8¾" Semaphore Lens and Enameled Reflector Body.

No. 35 — "Pittsburgh" Self-Releasing Drop Brake Handle, Polished Bronze or Malleable Iron, 14, 16 or 18" Swing.

For more than thirty years we have been developing and improving Interior Equipment and Fittings for Electric Railway Cars. "Dayton" Trimmings are standard on the largest roads.

Lighting Fixtures
Basket Racks
Sash Trimmings
Window Curtains
Brake Handles
Headlights
Washstands
Water and Dry Closets
Platform and Vestibule Trimmings
Solid Bronze and Brass Car Hardware for any use.

Specify "Dayton" Material and be Satisfied.

THE DAYTON MANUFACTURING CO.
DAYTON, OHIO

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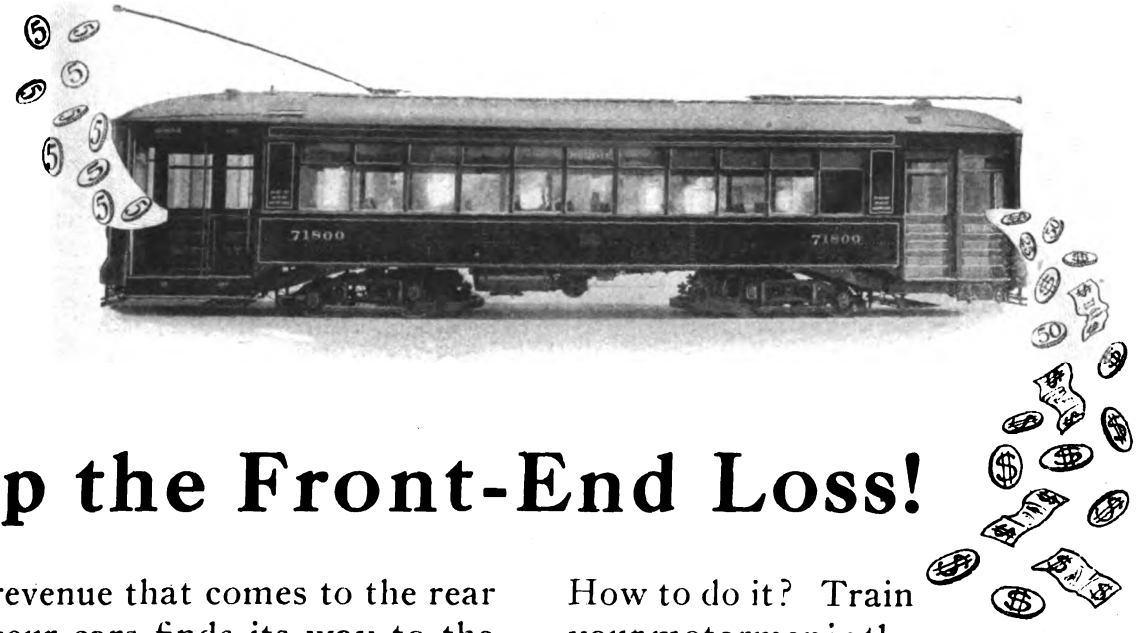
Is This the Path of Your Revenue?



Stop the Front-End Loss!

All the revenue that comes to the rear end of your cars finds its way to the company's finances. Registering devices, fare boxes and careful training of conductors aim to secure 100% efficiency.

But there's a leak at the front end. Not in actual dollars and cents, but in factors that can be **measured** in dollars and cents. Power schedules, wear-and-tear on equipment, comfort of passengers—all are dependent on the efficiency of your motormen. Raise his efficiency and you stop the leak.

How to do it? Train your motormen in the proper handling of the equipment they control. Teach them its possibilities and limitations. Employ Economy Meters to measure their efficiencies just as you use fare boxes or registers to keep check on your conductors. An Economy Meter on a car gives the motorman a check on himself and tells you just how efficient he is. Many railway systems are getting big results from Economy Meters and Economy Methods. Let us tell you about them.

ECONOMY
BUILT LIKE A WATCH
METERS

Sangamo Electric Company
Springfield, Illinois

Specialists in Meters for Every Electrical Need

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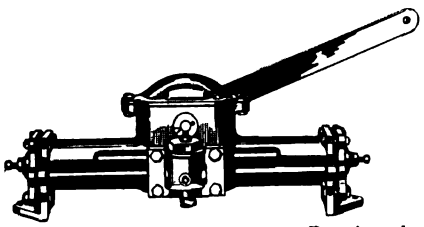
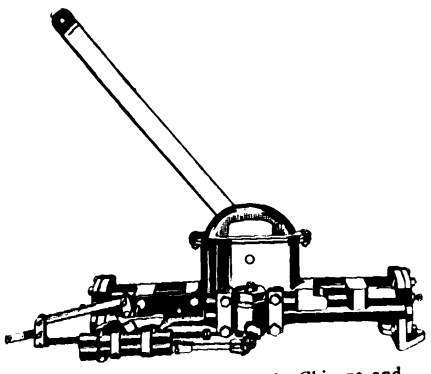
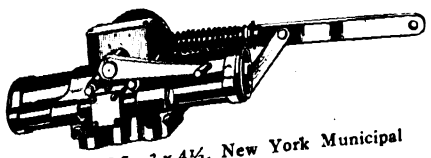
National Door and Step Control Is Now Widespread in All Classes of Electric Railway Service



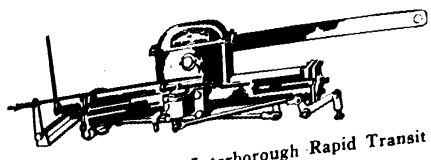
Type G-M 2⅝ x 6, as used in Detroit and Toledo



Type G-M 2⅝ x 8, as used in Chicago and Boston



Type G-E-L 3 x 4½, New York Municipal Railway Corporation



The G-M 2⅝ x 10, Interborough Rapid Transit Company, New York

More than a decade ago this company began the manufacture of door and step control that would reduce platform accidents, improve fare collection and increase schedule speed.

To a large degree these ends have been attained by National Manual control; and to a still larger degree, particularly for short-headway service, by National Pneumatic control.

Today National Pneumatic equipments are used by the thousands—not only on the great rapid transit lines of Boston, New York, Brooklyn, Newark, Philadelphia, Chicago, Pasadena, Vancouver—even to Australia—

But also in every class of surface transportation — for the articulated and center-entrance cars of Boston, the stepless cars of New York, the pay-leave motor cars of Cleveland, the trailers of Detroit.

The engines sketched here are but a few of our widely-used designs.

All have made good in the essentials of low maintenance, positive action and negligible air consumption.

If you're at the Convention come to our live exhibit in spaces 12-14-16. If you're at home, ask us to come to you.

NATIONAL PNEUMATIC COMPANY

50 Church St. New York

515 Laflin St. Chicago

Digitized by Google

National Interlocking Safety Door Control Is Reducing Accidents, Maintenance and Running Time

The grab handle, the stanchion and the rail were the first safety devices.

Then came door and step control—both manual and pneumatic.

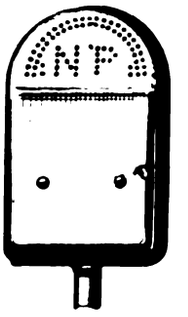
Next in order was the light signal to indicate to the motorman that all doors were closed.

But **perfect** safety arrived only with National Interlocking Safety Door Control, which starts the car automatically from the first notch of the controller as all the doors are closed.

More than a thousand cars have already been equipped with National Interlocking Safety Door Control for New York, New Haven, Boston, Albany, Erie and other cities.

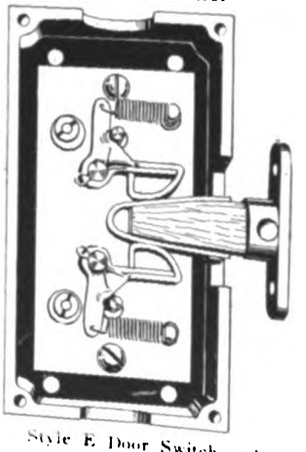
This wonderful invention has cut car standing time so appreciably that the schedule speed has been raised more than 10 per cent; it has eliminated the bell signal; it has practically abolished boarding and alighting accidents and it has reduced controller abuse and trouble to the minimum.

We have these facts directly from operation. Don't fail to provide this combination of Safety, Speed and Economy for your present and coming rolling stock.



Motorman's Light Signal

K-Controller with Interlocking Door Control


Style E Door Switch and Contact

NATIONAL PNEUMATIC COMPANY
50 Church St. New York
515 Laflin St. Chicago

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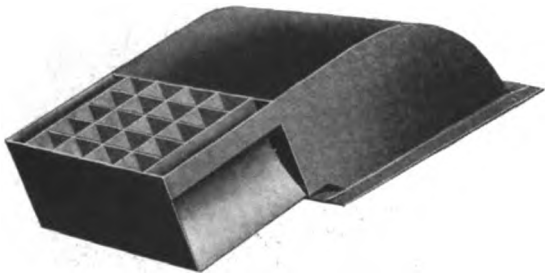
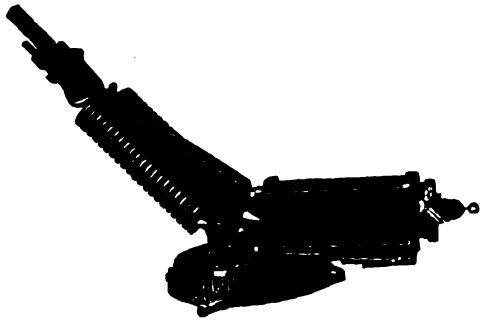


Garland

Make your passengers comfortable in well ventilated cars. The fact that more Garland ventilators are in use today on railway cars than all other ventilating devices **combined** indicates their superior efficiency.

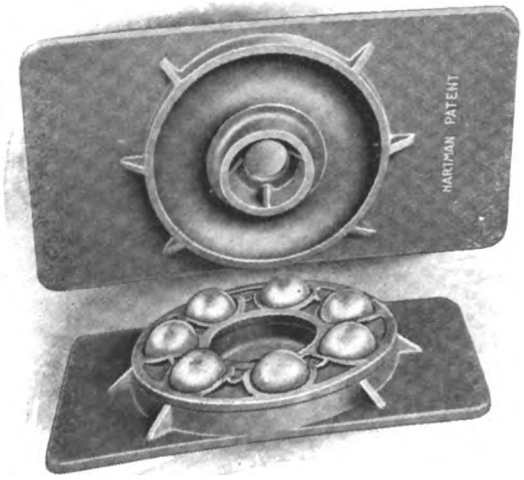
Service and laboratory tests prove that Garland ventilators pull the greatest amount of foul air from a car body. This is why they are so extensively used on sleeping, private, city and interurban cars.



Wasson

The **Wasson Air Retrieving Trolley** base prevents expensive damage to overhead caused by wild trolley poles. In case of dewirement the base forces the pole to the roof, cushions it to prevent puncturing the roof and locks it against lateral swing.

This base positively retrieves whether the pole is held by a rope or not. A sudden upward motion causes it to operate instantly. It can be placed on any car having air brakes.



Perry-Hartman

Reduce your wheel flange wear, rail wear and power consumption by using Perry-Hartman side bearings and center plates. They give you an anti-friction free-radial self-centering truck at minimum initial cost.

These bearings prevent binding between truck and body bolsters, thus decreasing danger of wheel climbing and derailments. Over 200,000 car equipments are now in satisfactory service under heavy cars.

We Exhibit A

U. S. Metal & Mfg. Company, New York
Brown & Hall Supply Company, St. Louis
C. F. Saenger & Company, Cleveland
C. E. A. Carr, Toronto
Alfred Connor, Denver

Holden

1508 Fisher Building

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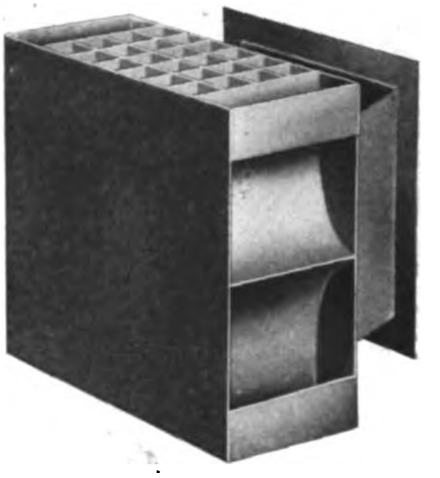
entilators



They are produced in several models for various classes of service. We illustrate here two honeycomb types for arch and monitor roof. They are absolutely storm proof and will not admit side winds or rain. They can be easily installed on old cars, attached to deck sash.

Full description of ventilators and ventilating systems in new Garland catalogue. Send for copy **today** or see full size ventilators and get catalogue at the Convention.

Bases

We announce here the **Wasson City Type Non-Retrieving** base. Railroads which purchased the air-retrieving base found it so superior as a base itself that a definite demand arose for a similar base for cars without air brakes.

Both bases offer distinct advantages, such as uniform tension on wire regardless of height, roller bearings, superior current collection, better wiring through special work. Both bases displayed at Atlantic City.

Bearings

Perry roller bearing side bearings have ten small rollers in each main roller and are entirely anti-friction. Hartman center plates have seven balls, each 2⅛ inches in diameter and carry car weight on entire surface.

They do not pit, require no lubrication, have nothing to wear out and by their self-centering action reduce wear and give an easy riding car. See these at the Convention installed on full-size truck and body bolsters.

tlantic City

White

icago, Illinois

W. M. McClintock, St. Paul
W. F. McKenney, Portland, Ore.
S. I. Wailes, Los Angeles
F. F. Bodler, San Francisco
O. H. Davidson Equipment Co., Salt Lake City

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Perry Ventilators have been Standard for 15 years on the leading Electric Railways of America

The 12 registers shown on each side of interior view New York Municipal Railway car are all controlled by a single lever—invisible mechanism.
Write for particulars.

Perry Ventilator Co.
New Bedford, Mass.
Sales Manager, F. C. Stowell
200 Devonshire Street, Boston

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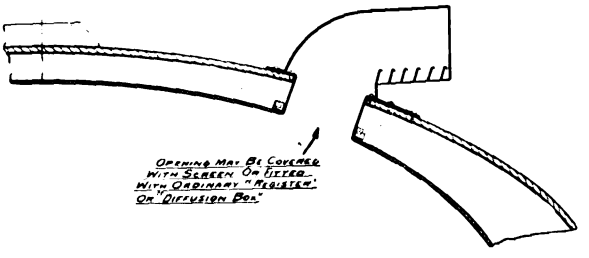
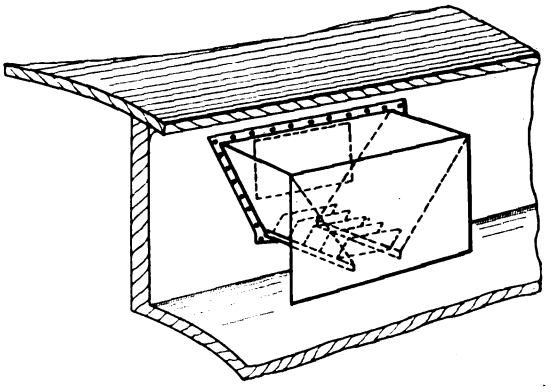
ILATORS

TYPE PRICES





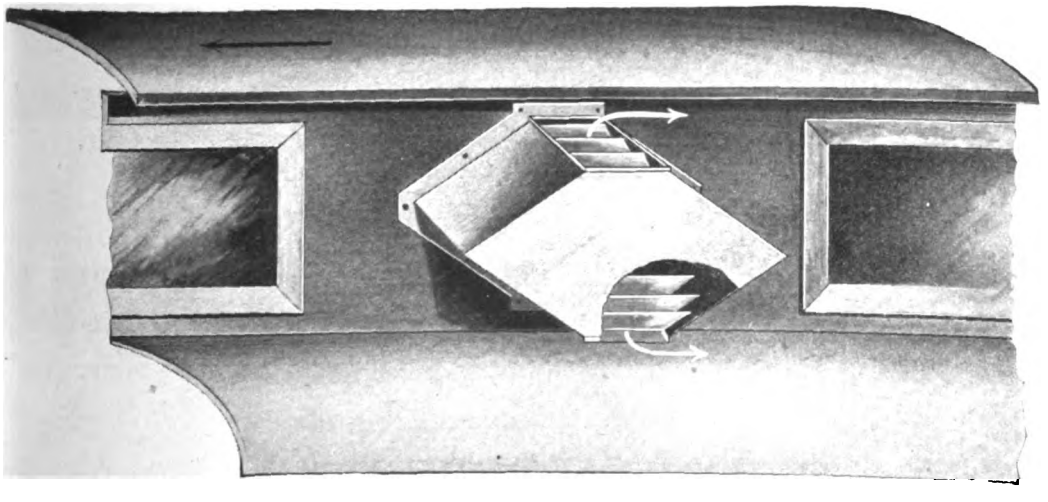
Ventilator Co.

New York, N. Y.

"EXHAUST" TYPE:

PRICES: $1.00 to $4.00 each

We have recently developed several "Exhaust" Ventilators for use where an "Intake" is not desired. These "AVCO Exhausts" are applicable to "monitor-deck" or "arch-roof" cars. They are strong in operation, simple in design, durable in construction, easy to apply, absolutely weather-proof and very low in price. They will give you good service and save you money.



"Monitor-deck" Installation of "AVCO EXHAUST" Ventilators

We have had 12 years experience in the art of Car Ventilation. Our knowledge is yours for the asking.

we will send you literature and prices.

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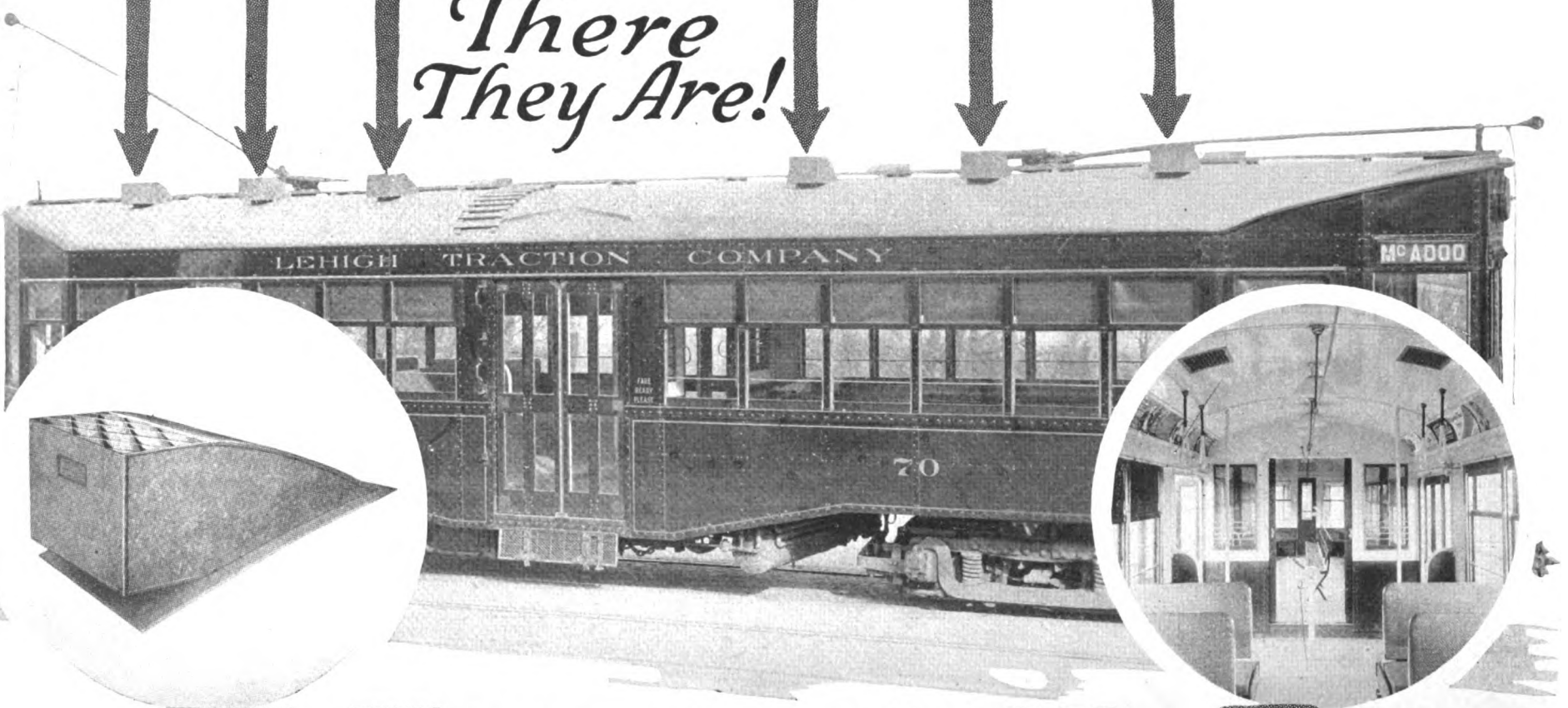
There They Are!



Twenty new steel cars operated by the Lehigh Traction Company are equipped with Utility Thermometer Control and

UTILITY

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VENTILATORS

Regardless of whether the car is moving or standing still, if it is equipped with UTILITY Ventilators, the air in the car will always be pure and fresh.

This is due to the powerful exhaust of these ventilators.

They are built on the "honey-comb" principle and are open at top and bottom. As the air currents pass above and below the ventilator vacuums are created, which cause a rush of foul air from the car. Clean, pure air naturally takes its place. In this way there is a continual change of air in the car.

You will find in this ventilator a means of adequately ventilating your cars at an installation and maintenance cost exceptionally low.

They are made for both round-roof and deck-type cars.

UTILITY Ventilators are simple in construction, durable, weatherproof and extremely easy to install. They are so designed that rain, snow, dust, dirt or cinders cannot enter the opening, but must fall through to the car roof.

The success and popularity of UTILITY Ventilators is expressed in the following partial list of installations since Jan. 1, 1916.

Reading Transit & Light Co....	15 cars
Stone & Webster Engineering Corporation	35 "
Pittsburgh Railways Co.....	15 cars
Canadian Pacific Ry.....	12 "
Chicago & Milwaukee Elec. R.R.	15 "
Binghamton Ry. Co.....	16 "
Sioux City Service Co.....	10 "
Mahoning & Shenango Ry. & Light Co.....	10 "
Connecticut Co.....	100 "
Holyoke Street Ry.....	10 "
Buffalo & Lake Erie Trac'n Co.	15 "
Illinois Central.....	94 "
Scranton Ry. Co.....	10 "
Southern Pacific Co.....	50 "
Total Installations in Four Years	5,000 cars

UTILITY Electric Thermometer Control

Ninety electric railways have equipped more than three thousand cars with UTILITY Thermometer Control. Think of the varied conditions under which they must operate and yet there has never been a serious complaint.

Actual service tests have demonstrated more than **50% saving in current consumed by heaters** on cars equipped with this method of control.

There is still **another saving** in the rush-hour loads, just the times when you need the current for car operation. In many instances this saving amounts to more in dollars and cents than the actual saving in heater current.

Every instrument sold under a positive guarantee. They will more than pay for themselves in one heating season.

The Utility Thermometer Control is the only instrument of its kind on the market covered by United States Letters Patent, in which the cutout is controlled by a relay and the relay by a mercury thermostat.

Write for complete information on UTILITY Ventilators and Electric Thermometer Control. An investigation incurs no obligation on your part and we'll be glad of an opportunity to help you in solving your problems.

See Our Exhibit at the Convention, Spaces 502 and 504

Railway Utility Co.

Chicago, 721 W. Fulton Street **New York, 1328 Broadway**

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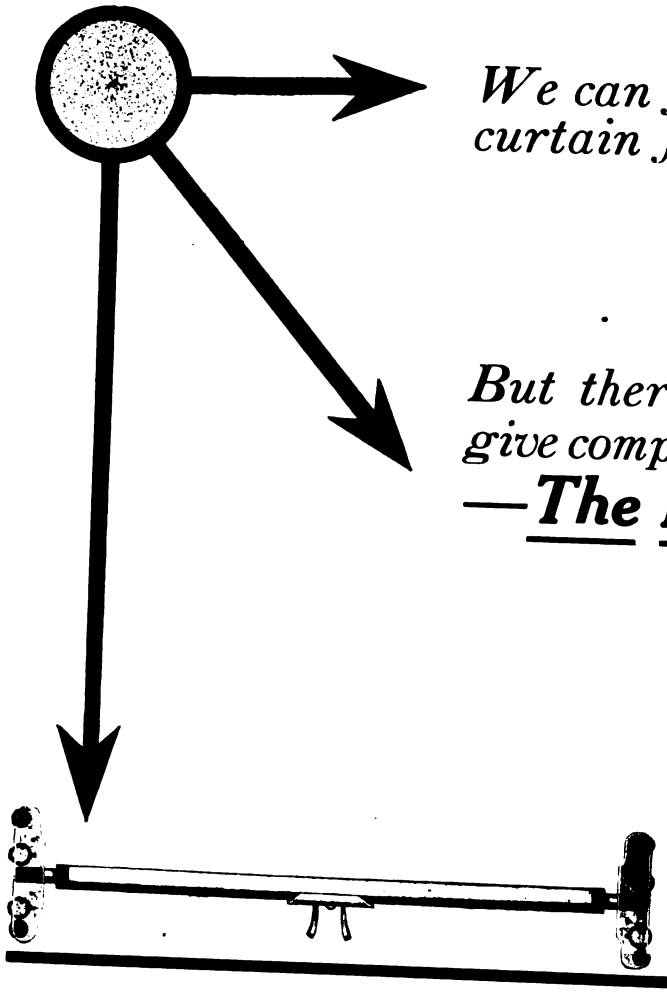

We can fill your order for any type of curtain fixture on the market

We are the originators of car curtains. We have been developing and making fixtures for 25 years. We have all standard types for sale.

But there is only one type which will give complete and continuous satisfaction

—The Ring Fixture

It stays in the groove.
It will not creep.
It stays level. It lets go when the passenger takes hold. It takes hold when the passenger lets go.
It stands the wear.

The Curtain Supply Co.
322 W. Ohio St. Chicago, Ill.

Acme Products

REPRESENTATIVES
In Attendance at Booth 577
A. E. R. A. Convention

H. U. Morton, Vice-President.
S. W. Midgley, Gen'l Sales Mgr.
W. M. Wampler, Eastern Sales Mgr.
F. M. Grigg, Southeastern Sales Mgr.
F. M. Nicholl, Eastern and Canadian Sales Rep.
R. C. Munro, Western Sales Rep.
E. B. Van Patten, Southwestern Sales Rep.

Enclosed Groove F. P. Curtain Fixtures.
Crown Curtain Fixtures (for open grooves).
Gem Curtain Fixtures (for open grooves).
Acme Fiction Roller Curtain Fixtures.
All-Metal Curtain Rollers.
Regal Revolving Steel Shade Boxes for Window Curtains.
Duplex Weatherproof Window Outfits.
Acme Improved Weatherstripping.
Sash Locks and Fixtures.
Anti-Pinch Hinge Door Shields.
Steel Doors for Passenger Train Cars.
Drawn, Pressed and Welded Steel Shapes.
Folding Tail Gates.
Gosso Sanitary Beds.
Kass Safety Step Treads.
Acme Steel Safety Step Boxes.
Acme Brass Sash and Steel Sash.
Acme Chanarch Steel Flooring.

Acme Supply Company

GENERAL SALES OFFICES AND FACTORY:
28 East Jackson Blvd., Chicago, Illinois

EASTERN SALES OFFICE:
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RICHMOND, VA., Virginia Railway & Power Bldg.

PACIFIC COAST SALES OFFICES:
SAN FRANCISCO, CAL., Monadnock Bldg.
LOS ANGELES, CAL., Hellman Building
PORTLAND, OREGON, 54 First Street

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Car with Agasote Roof—in service 5 years on Third Avenue Railway, New York

Two Products of Proven Value

for improving the finish, the appearance and the construction of cars—and for decreasing cost of car construction.

Pantasote Curtains
Agasote
Roofing and Headlining

The superior value of these three products from every view point of efficiency and economy has been demonstrated conclusively by the electric railway industry's experience with them in years of actual service.
Full data and facts regarding them are at your service.

The Pantasote Co.

11 Broadway, New York 797 Monadnock Bldg., San Francisco Peoples Gas Bldg., Chicago

In the steel cars of the Chicago Elevated Railroad

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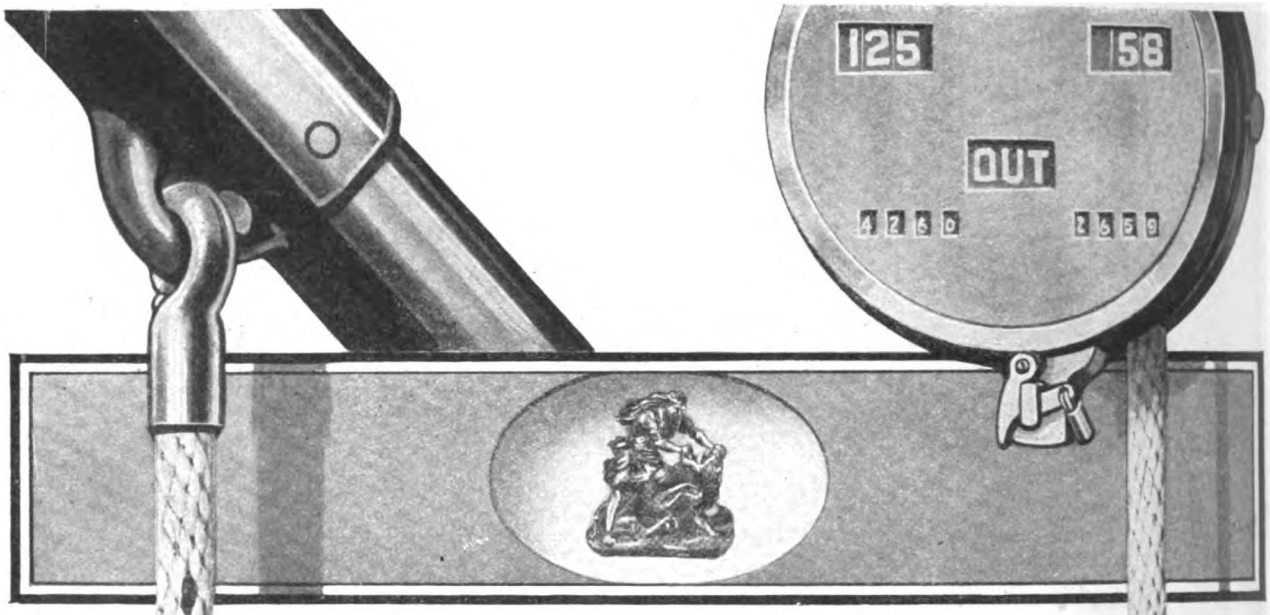

Samson Spot Trolley Cord
Waterproofed

can be distinguished at a glance by our trade mark, the Colored Spots. Stands the wear because it is made of extra quality stock, smoothly braided. Resists the action of the weather because it is firmly braided and thoroughly waterproofed.

Samson Bell and Register Cord

All sizes and colors, with wire centre if desired. Resists abrasion far longer than common rough cord. More durable and economical than any other material. Samples and prices gladly sent.

SAMSON CORDAGE WORKS
BOSTON, MASSACHUSETTS

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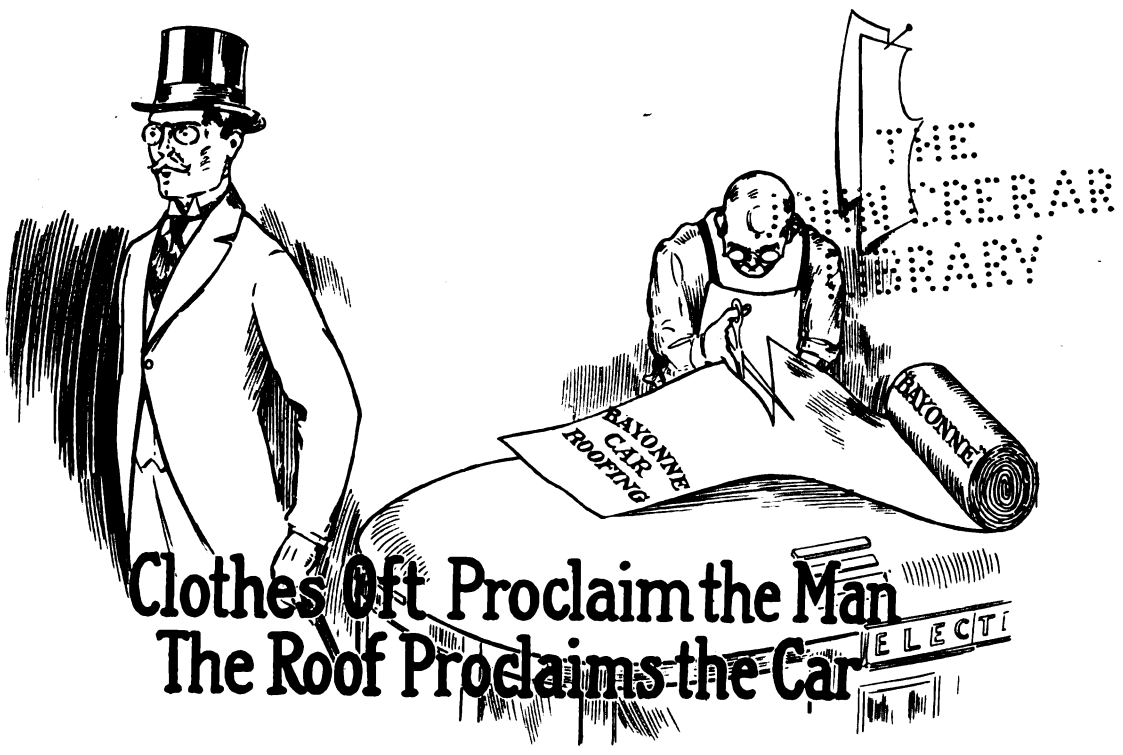

Clothes Oft Proclaim the Man
The Roof Proclaims the Car

If it is a good car it has a good roof. It is also true that a good roofing like

"Bayonne" Treated Roofing

makes a good car

After it has made a car look right by sprucing up the exterior it makes the car stay right by protecting the interior.

Bayonne Car Roofing keeps the life in and the undesirable elements out. If you could see how it was manufactured you would understand why. To start with, it is not ordinary cotton duck but a special closely woven fabric. Every fibre of it is saturated with a preservative rendering it weatherproof and rot-proof. And, mind you, this impregnation of the fibres is a mechanical process giving uniformly good results. It is altogether different from the slap-dash of a paint brush over the surface of an ordinary duck roof, and also remember it is less costly than the ordinary duck roof.

When Bayonne Roofing comes to you, it is only necessary for you to attach it to the car roof and give it *one* coat of color paint. Then you can forget it for a long, long time, for it will not deteriorate under the hot rays of the sun. It will not rot or let snow or rain seep into the car and spoil headlinings.

It is a real time and money saver both in installation and maintenance.

You should write for samples today.

Wide Cotton Duck—Largest stock and assortment in United States. Also headquarters for cheesecloth and bunting.

JOHN BOYLE & CO., INC.

112-114 Duane Street · New York City · 70-72 Reade Street

Branch House, 202-204 Market St., St. Louis, Mo.

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An American Standard

In Service From Coast to Coast From Canada to Texas

New York
Cheyenne, Wyo.
Billings, Mont.

Brooklyn
Galveston, Tex.
San Antonio, Texas

Philadelphia
St. Joseph, Mo.
Burlington, Iowa

Baltimore
Jackson, Miss.
Charleston, S. C.

Albany
Richmond, Va.
Easton, Pa.

Buffalo
Dayton, Ohio
Springfield, Ill.

Chicago
Fargo, N. D.
Bellingham, Wash.

PROVIDENCE FENDER

H-B LIFE GUARD

They Insure the Railway against heavy damage claims and the Public against serious injury

The Consolidated Car Fender Co.

Providence, R. I.

General Sales Agents, **Wendell & Mac Duffie Co.,** 61 Broadway, N. Y.

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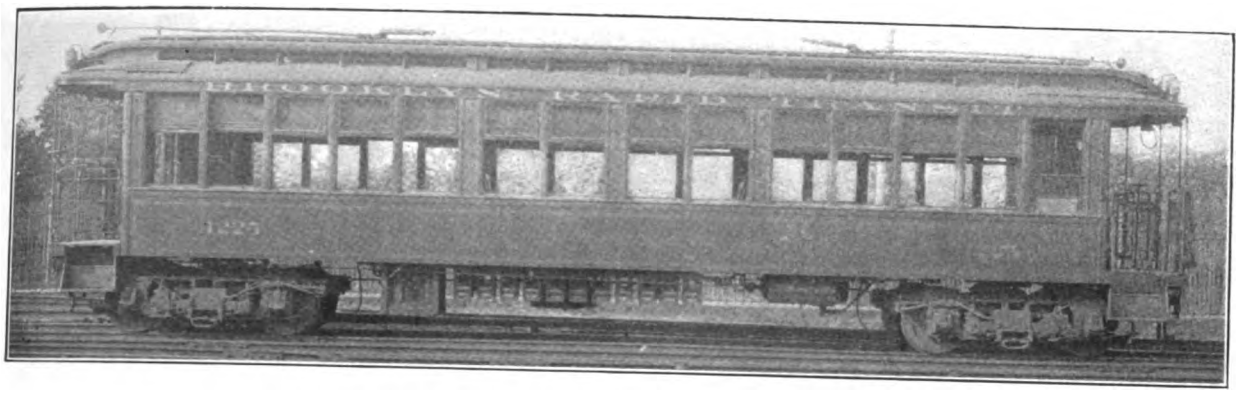
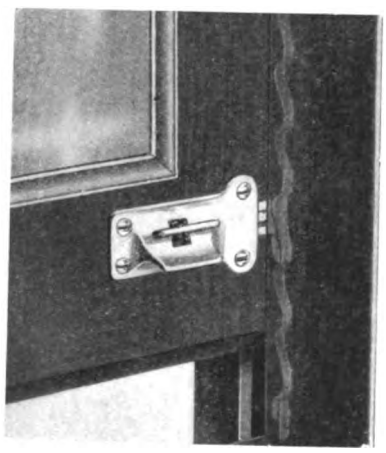


Edwards Sash Locks on the Brooklyn Elevated Cars

EDWARDS SASH LOCKS

Brooklyn Uses them for Safety as Well as Efficiency



The Brooklyn Rapid Transit System is so well pleased with Edwards sash locks that in addition to installing them on new cars it is also placing them on hundreds of other cars as a part of "Safety First" for its passengers.

Read what the Departmental Safety Committee of the Brooklyn Rapid Transit System said in the Seventh Quarterly Report of the Mechanical Department, dated April 1, 1916.

"The older style sash locks, somewhat difficult to maintain, have always been a source of concern in injuries where oftentimes children are involved. In other words, unless the sash was opened fully and the lock properly latched, the sash would jar loose and has frequently been the cause of bruised arms, fingers, or more serious injury. The new style being installed and now placed upon a good many hundreds of cars, will prevent the sash from dropping, regardless of the height to which it may have been raised."

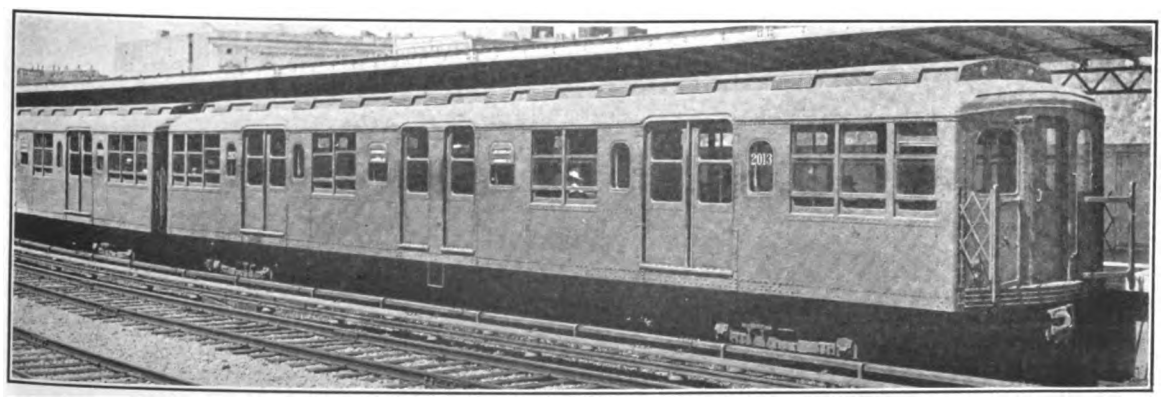
Edwards sash locks will *please* and *protect* your patrons.

The O. M. Edwards Co., Inc.

Window Fixtures
Top, bottom & side Weather Stripping
Metal Sash and Mouldings

Syracuse, N.Y.

Metal Extension Platform Trap Doors
All-Metal Sash Balances & Shade Rollers
Railway Devices



Edwards Sash Locks on the N. Y. Municipal Railway Cars

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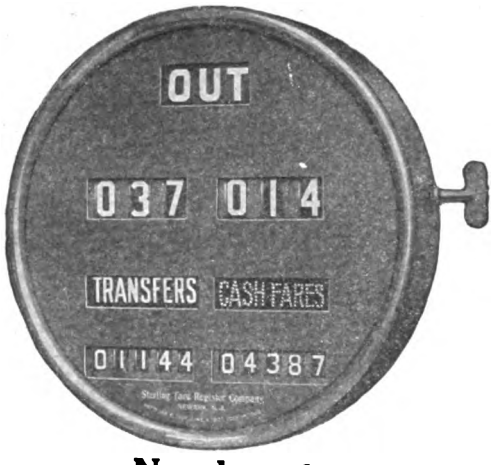
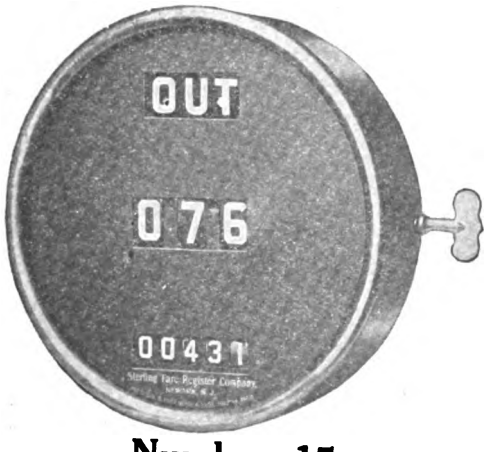
Sterling Registers



Number 16
Double, Full-Geared

Has no carrying dogs or pawls. Registration is started by throwing a Geneva gear into action with the main carrying arm, which is directly connected to the unit trip wheel and gear, which in turn are connected to the unit totalizer wheel. This assures positive registration on both trip and totalizer.

Trip Capacity, 999 for each class of fare; Register Capacity, 99,999 for each class of fare. Trip figures are 1 1/16" high.



Number 15
Single, Full-Geared

Trip Capacity, 999; Register Capacity, 99,999; Trip figures, 1 1/16" high.

All Sterling Registers are full-geared, with interlocking mechanism which cannot be upset—they cannot be operated incorrectly. Equipped with patent hammer, which prevents broken bells and hammers. Registration is positive, and is easily read from end of longest car.

Write for Catalog, which describes the complete line.

THE NEW HAVEN TROLLEY SUPPLY CO.
NEW HAVEN CONN.

A Small Detail for Railway Service

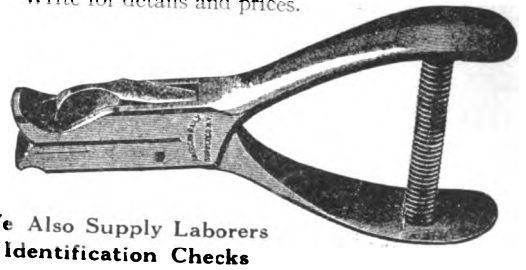
but **you can save money** on

Badges, Punches, Buttons, etc.,

by buying or specifying to your supply man

American Quality

You will be sure to get the neat clean cut serviceable kind
Write for details and prices.



We Also Supply Laborers
Identification Checks

AMERICAN RAILWAY SUPPLY CO.
134-136 CHARLES ST. NEW YORK

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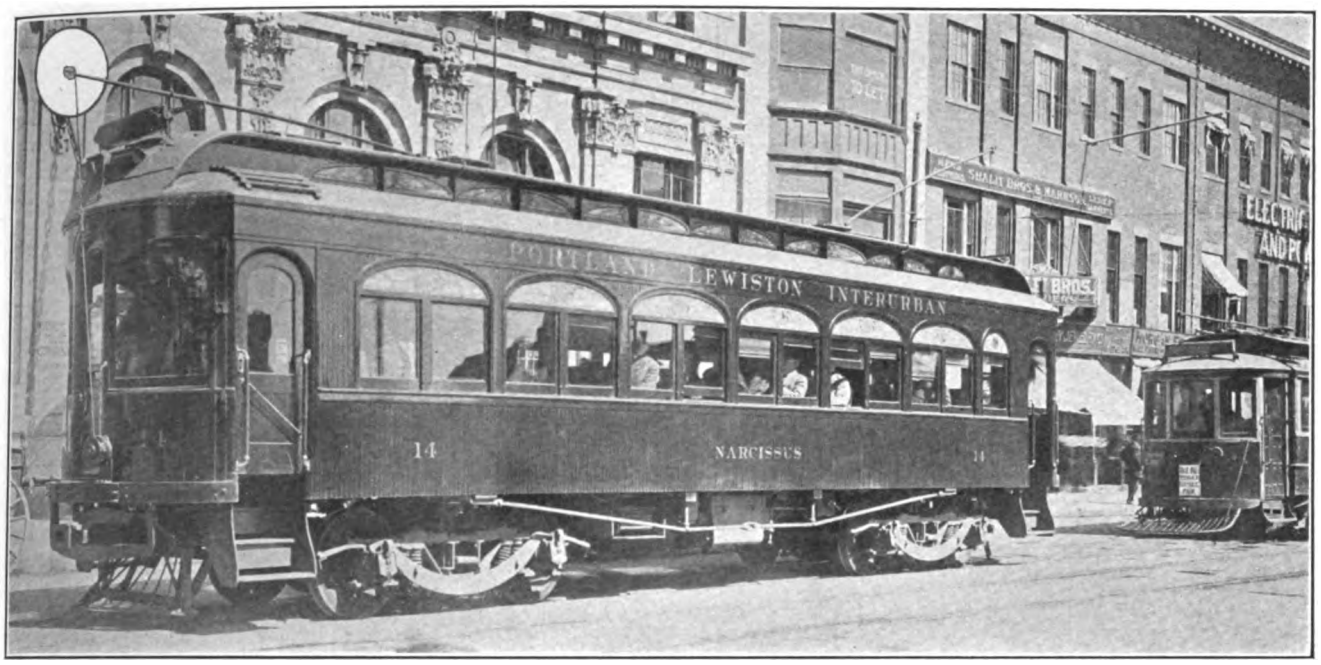

Portland-Lewiston Interurban Car Equipped with Miller Trolley Shoes

Miller Trolley Shoe

A Year's Service in Maine Demonstrates Splendid Utility

The Portland-Lewiston division of the Androscoggin Electric Company began to use the Miller Trolley Shoe about September, 1915. Passenger cars are operated up to 60 m.p.h. with a running time of 1 hr. 20 min. for the limiteds on the 35 miles between terminals. The limited cars make 350 miles a day.

The operators naturally want the best for that kind of service. Here's what they bought: 24 Miller shoes (including spares) for eight passenger cars; 6 shoes (including spares) for two freight cars; 2 shoes for one electric locomotive.

Here's the result in life under a No. 0000 catenary:

Average miles per shoe 3000 to 5000.

Maximum miles per shoe 6495 miles.

Remember that means only the replacement of the SHOE. The sides wear much longer.

Here's what a motorman said:

"We can now run at full speed around a dozen curves that used to require a slowdown. In any ordinary service *you can't* throw these shoes off the wire."

Here are a few other facts:

Absence of noise and heat is noteworthy, and wear on brake shoes is reduced because of ability to maintain full speed over a greater portion of line.

Trolley pole tension has been eased off 8 to 9 lb.

It was formerly necessary to oil trolley wheels after every trip. No oil or grease is required in Miller shoes.

A new insert can be put in in 2 minutes easily, compared with at least 5 minutes for a trolley wheel. At the ends of the shoe is a "play" of from 1.25 to 1.75 in.

The Miller shoe helps in sleet cutting, too, last winter's record proving it far better than with trolley wheels.

Away with prejudice! Write us today about equipment for your line.

MILLER TROLLEY SHOE CO.

53 STATE STREET - - - - - BOSTON, MASS.

SALES REPRESENTATIVES:

HOLDEN & WHITE, Chicago
F. F. BODLER, San Francisco, Cal.
W. F. McKENNEY, Portland, Oregon
S. I. WAILES, Los Angeles, Cal.
ALFRED CONNER, Denver, Col.
T. C. WHITE & CO., St. Louis, Mo.
W. M. McCLINTOCK, St. Paul, Minn.
C. S. SAENGER & SON, Cleveland, Ohio

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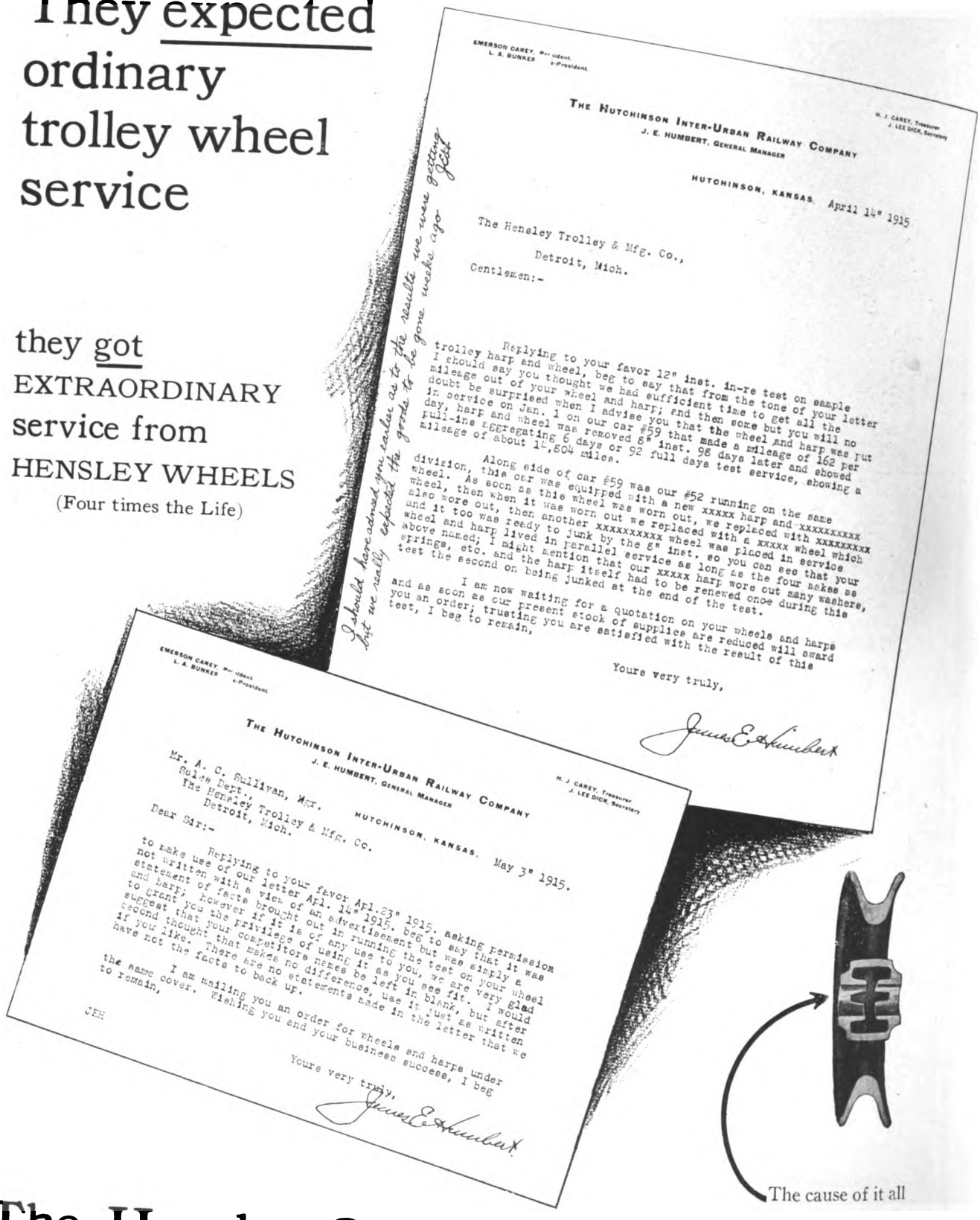
They expected ordinary trolley wheel service

they got EXTRAORDINARY service from HENSLEY WHEELS

(Four times the Life)



EMERSON CAREY, President.
L. A. BUNKER, Vice-President.

THE HUTCHINSON INTER-URBAN RAILWAY COMPANY
J. E. HUMBERT, GENERAL MANAGER

H. J. CAREY, Treasurer
J. LEE DICK, Secretary

HUTCHINSON, KANSAS, April 14th 1915

The Hensley Trolley & Mfg. Co.,
Detroit, Mich.

Gentlemen:-

I should have advised you earlier as to the results we were getting but we really expected the goods to be gone weeks ago

Replying to your favor 12th inst. in-re test on sample trolley harp and wheel, beg to say that from the tone of your letter I should say you thought we had sufficient time to get all the mileage out of your wheel and harp; and then some but you will no doubt be surprised when I advise you that the wheel and harp was put in service on Jan. 1 on our car #59 that made a mileage of 162 per day, harp and wheel was removed 6th inst. 98 days later and showed full-line aggregating 6 days or 92 full days test service, showing a mileage of about 11,804 miles.

Along side of car #59 was our #52 running on the same division, this car was equipped with a new xxxxx harp and xxxxxxxxxx wheel. As soon as this wheel was worn out we replaced with xxxxxxxxx wheel, then when it was worn out we replaced with a xxxxx wheel which also wore out, then another xxxxxxxxx wheel was placed in service and it too was ready to junk by the 6th inst. so you can see that your wheel and harp lived in parallel service as long as the four sakes as above named; I might mention that our xxxxx harp wore out many washers, springs, etc. and the harp itself had to be renewed once during this test the second on being junked at the end of the test.

I am now waiting for a quotation on your wheels and harps and as soon as our present stock of supplies are reduced will award you an order; trusting you are satisfied with the result of this test, I beg to remain,

Yours very truly,

James E. Humbert

EMERSON CAREY, President.
L. A. BUNKER, Vice-President.

THE HUTCHINSON INTER-URBAN RAILWAY COMPANY
J. E. HUMBERT, GENERAL MANAGER

H. J. CAREY, Treasurer
J. LEE DICK, Secretary

HUTCHINSON, KANSAS, May 3rd 1915.

Mr. A. C. Sullivan, Mgr.
Sales Dept.,
The Hensley Trolley & Mfg. Co.
Detroit, Mich.

Dear Sir:-

Replying to your favor Apl. 23rd 1915, asking permission to make use of our letter Apl. 14th 1915, beg to say that it was not written with a view of an advertisement but was simply a statement of facts brought out in running the test on your wheel and harp; however if it is of any use to you, we are very glad to grant you the privilege of using it as you see fit. I would suggest that your competitors names be left in blank, but after second thought that makes no difference, use it just as written if you like. There are no statements made in the letter that we have not the facts to back up.

I am mailing you an order for wheels and harps under the same cover. Wishing you and your business success, I beg to remain,

Yours very truly,

James E. Humbert

JEH

The cause of it all

The Hensley One-Piece Trolley Wheel

There are good logical reasons why the Hensley trolley wheel gave four times the life of other wheels—why you can bank on similar service.

The patented slotted hub cavity means a positive "forced-feed" lubrication, thus reducing friction and the consequent slippage to a minimum. This cavity can be filled in a few seconds—no bushings being necessary.

It is made of Resisto Bronze, which is a tough, durable metal offering little wear to the wire.

The method of manufacturing guards against imperfections and assures proper balance, thereby eliminating arcing and the consequent pitting.

All sizes—all types.

Hensley Trolley & Mfg. Co., Detroit, Mich.

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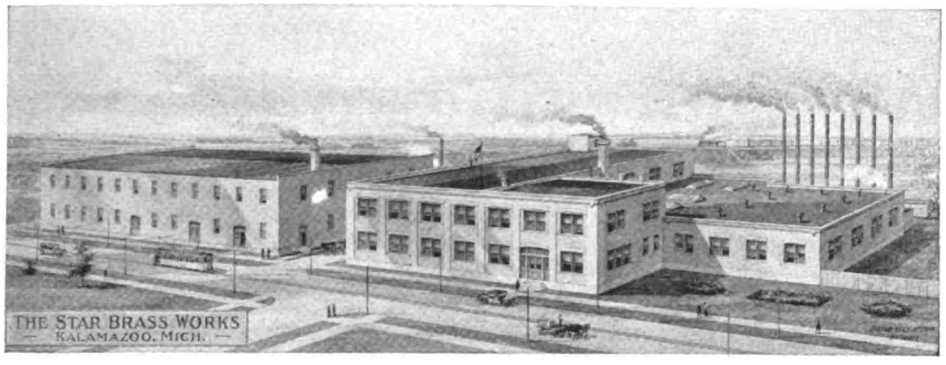

Specialization Spells Superiority

Devoting twenty-odd years to the exclusive manufacture of trolley wheels and harps is double concentrated specialization. It has *earned* for Kalamazoo products the designation of superiority and the lion's share of America's trolley wheel and harp business.

That specialization is reflected in all Kalamazoo wheels, which are made of pure lake copper, of the highest conductivity. They are easy on the wire, hard to wear out, stand the strain on curves, and run in sleet longer than any composition wheel. They are self-oiling and perfectly balanced. Service has proved them.

KALAMAZOO

Trolley Wheels—Trolley Harps

It's the same with Kalamazoo arcless harps—harps of perfect and continuous contact. Only *one* cotter pin to remove to change wheels. Thick washers with lugs to hold them in place when putting in wheels. Protected springs, protected cotter pins—it's true

Kalamazoos Cut Costs

we'll be glad to send you our catalog
You'll be glad you wrote

STAR BRASS WORKS

KALAMAZOO, MICHIGAN

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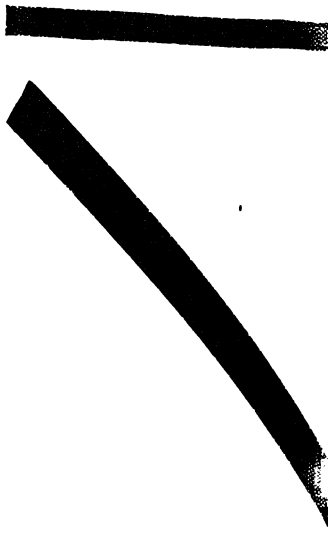
We are trying to keep this space as clean as the records of



All genuine graphited "Oil-less Bearings" have always been made at Bound Brook, N. J., in the United States of America, by the

Bound Brook Oil-le

Formerly the Graph

Digitized by Google

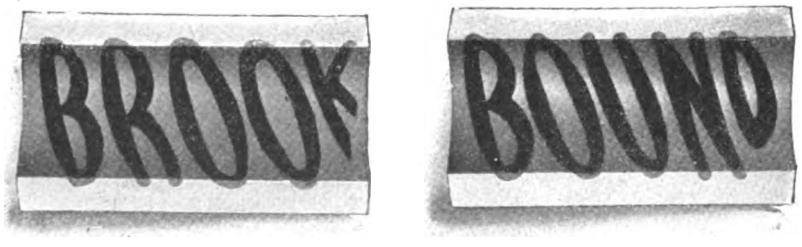
"NIGRUM"

Trade Mark Reg. U. S. Pat. Off.

Impregnated Wood Bearings

"Nigrum" Impregnated Wood Bearings Are Made for Conditions Where Insulating Qualities Are Required.

Full Data on Request



Trade Mark Reg. U. S. Pat. Off.

Trolley Wheel Bushings

s Bearing Company

e Lubricating Co.

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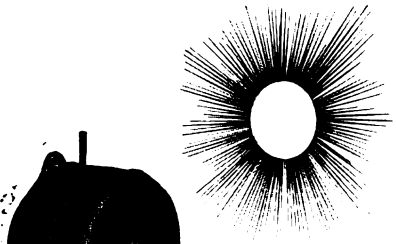
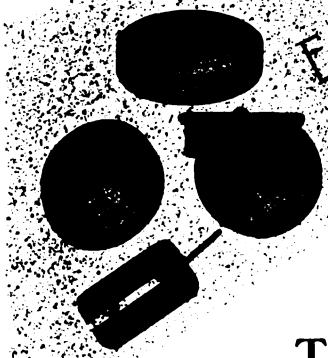
Eclipse Trolley Retriever

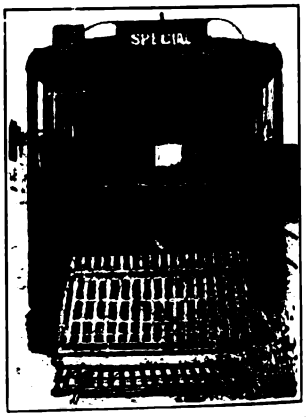
A retriever of half the usual number of parts. A mechanism of quick action suitable for any range of service. Thumb nut control of weak spring tension from outside of casing. Knot the rope if you will; it won't hurt the Eclipse. It is a real retriever and has made good. Send for a sample on 30 days' trial.



Eclipsing them all



Eclipse Life Guard



The guard of positive safety. If you would protect your public and protect your earnings you could not do better than to equip your cars with Eclipse Life Guards. Eclipse Fenders are completely successful up to thirty miles per hour. Write for details.

Manufactured by

The Eclipse Railway Supply Co.

4909 Luther Avenue **Cleveland, Ohio**

Root Spring Scrapers

Are now standard on more than one thousand railways in the U. S. and Canada. The scrapers are made on the spring principle, which enables them to yield and pass safely over bad pavements, switches, crossings, etc. Made for both hand and air operation and in types to fit any car. More than 15,000 in use.

The No. 7 scraper, our latest, is designed specially for low cars. Requires little attention from motorman. Works backward equally as well as forward.

Scraper No. 6

Scraper No. 6 is a real heavy-snow fighter. It can be made in lengths from 9 to 12 feet. Will clear snow in middle and sides of track level with top of rails. Will handle any amount of snow better and at 1/10th the cost of a sweeper. It's the last word as a snow fighter. Many prominent roads have proven this and adopted it.

Let us quote you prices on our standard or special types of scrapers.

ROOT SPRING SCRAPER COMPANY, Kalamazoo, Mich.

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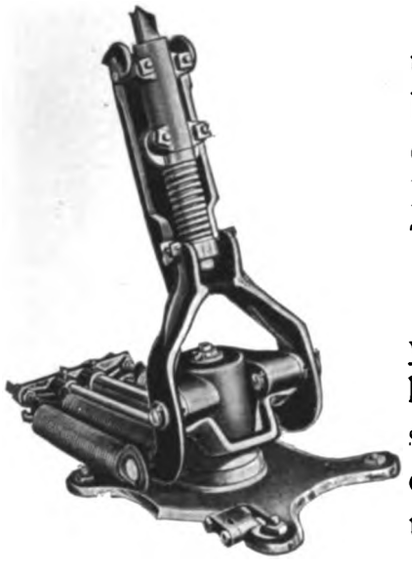
High Trolley Maintenance Costs Flee Before

THE BAYONET

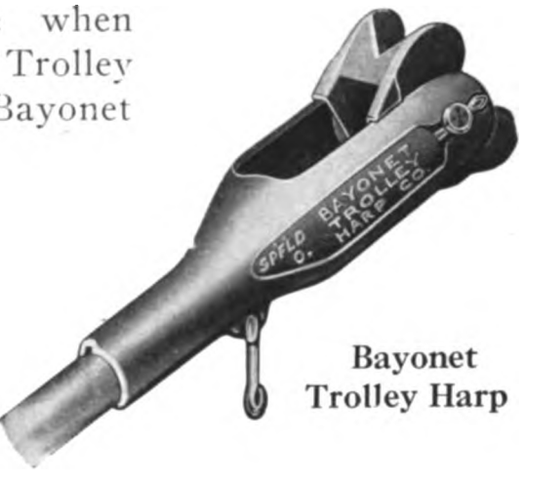
Many leading electric railways are saving as much as 33⅓% in trolley maintenance costs by standardizing on

BAYONET TROLLEY EQUIPMENT



You not only save money on trolley wheels, harps and bases, but considerable time when changing a Bayonet Trolley Harp or a pole if the Bayonet Trolley Base is used.

Ten seconds—with your hands—and the harp is changed. Sixty seconds is sufficient for changing a pole. No tools required.



Bayonet Trolley Harp

The Bayonet Trolley Base

assures you of perfect alignment of trolley wheel. Roller bearings practically eliminate friction. Uniform pressure on wire is maintained at *any pole angle* at all times. There are other features which a trial will demonstrate—let us send a set, Base, Harp and Trolley-wheel, to test on one of your cars *at our risk*.

If, after two months' use, you are not satisfied that *Bayonet Equipment* is better than any other, return to us at our expense.

75 Styles, Sizes or Combinations of Bayonet Harps

Write now for catalog describing fully each of these devices.

See our Exhibit, Space 541, The Annex, A. E. R. A. Convention

Bayonet Trolley Harp Co., Springfield, Ohio

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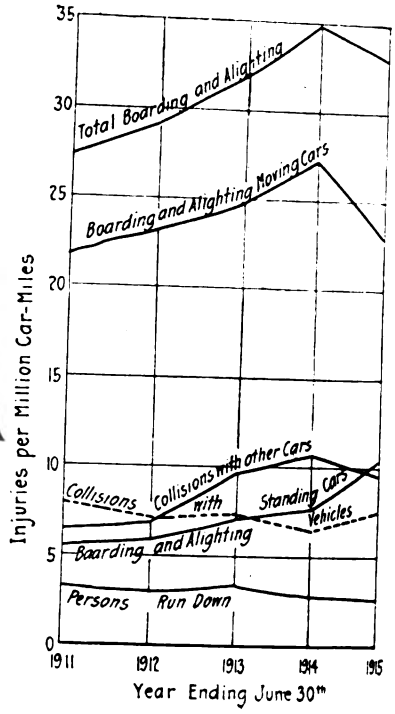
The Mason Safety Tread

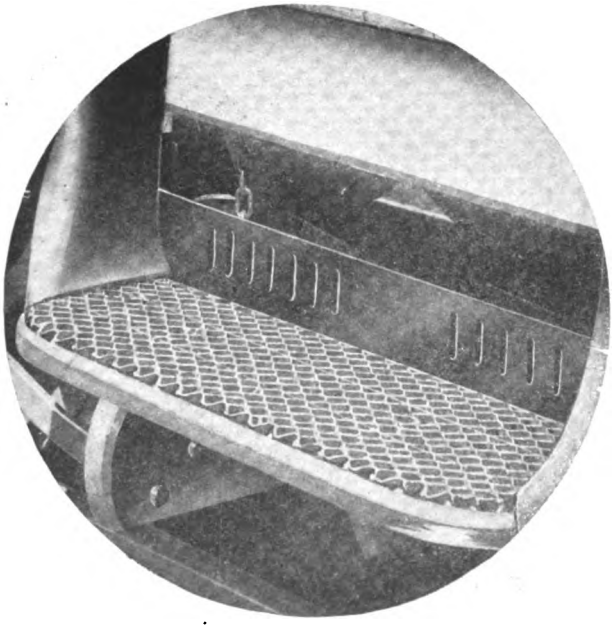
Reduces Boarding and Alighting Accidents

"Boarding" and "alighting" accidents are the most frequent types. The public, despite all safety-first campaigns, is **not** careful in stepping on and off of cars. The Mason Safety Tread minimizes such accidents by putting a non-slip surface under the passenger's feet. It is long lasting and reasonable in cost. Used also on platforms, station steps and inclined runways—wherever a specially safe footing is required.



Accidents on an Eastern Railway
—Electric Railway Journal, July 1, 1916

Mason Tread—Cross Section—Full Size



STANWOOD Car Steps

Safe and Clean in Any Weather

Formed of steel strips bent into a "honeycomb" surface which allows snow, mud and dirt to slip through; the surface is kept clean and the slip-preventing qualities are never impaired. The tread strips are high carbon steel—practically everlasting. Single, double, triple and folding types.

Write for particulars about these two specialties and also about KARBOLITH, the lightweight sanitary and fireproof car flooring.

American Mason Safety Tread Company

MAIN OFFICES: LOWELL, MASS.

BRANCH OFFICES: Boston, New York, Philadelphia, Washington, Chicago, Cleveland, St. Louis, Kansas City

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Anderson Canopy Switches

Superseding car circuit breakers.

Long, positive, quick break eliminates injurious arcing. Vulcanized fibre housing. No sticking of switch blade in clips—no parts to jar loose. Simple, rugged unobstructive.

Trolley Wheels and Sleet Cutters

Perfectly designed. Perfectly balanced. Spoked and solid types, with or without oil well. Harps of steel or malleable iron. Anderson quality. You know what that means

Ajax Lightning Arrester

Offers unfailing protection. Constant spark gap and freedom from mechanically operated parts are among its points of superiority.

Anderson "Boston" Trolley Bases

Are the choice of many railways abroad and at home. Insure an even pressure of the wheel against the trolley wire regardless of pole angle. Easy adjustment. Tension 25-45 lb.

Lindall Brush Holder

Gives better commutation and reduced motor flashing, due to perfect constant brush pressure. No pigtails. Easy inspection and renewal of brushes. Designed by Mr. John Lindall, Supt. of Equipment of the Boston Elevated Railway Co.

Aetna Insulation Line Material

Aetna means breakdown proof. Third rail insulators, poles, frogs, crossings, section insulators and switches. Write for catalog No. 8.

Albert & J. M. Anderson Mfg. Co.

289-293 A Street — (Established 1877) — Boston, Mass., U. S. A.

BRANCHES:
New York, 135 Broadway
Chicago, 105 So. Dearborn Street
Philadelphia, 429 Real Estate Trust Bldg.
San Francisco, 613 Postal Telegraph Bldg.
London, E. C., 48 Milton Street

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CONTROLLER PARTS

Our new bulletin on controller parts is now ready. We make all types and designs and can **ship promptly.** Special parts made to order.

We also have ready bulletins on trolley wheels and line material. Ask for them.

THE EUREKA COMPANY

NORTH EAST PENNSYLVANIA

We also manufacture—Commutators, Commutator Bars, Brush Holders, Copper Leaf and Gauze Brushes, Bearings and Bushings, Soldering Coppers, Copper Hammers, Drop Forgings, Copper, Bronze and Brass Castings.

Ideal Catchers Cost an Average of 7 Cents a Year for Maintenance

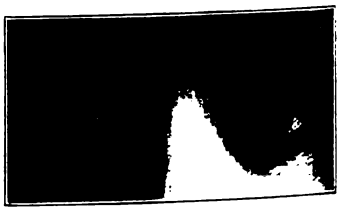
over a period of six years. These figures aren't based on imagination—they are taken from the books of several big, up-to-the-second railways, and will be verified at your request.

This low maintenance cost was not due to any special local conditions, for the roads selected are scattered all over the country.

Ideal Catchers cannot clog with snow or ice, because the large openings at top and bottom give perfect drainage, besides allowing free action after a knot has been tied in the trolley rope. Easily dismantled for inspection or repair by simply removing the center shaft bolt—no other bolts, screws or cotter pins are used.

The Trolley Supply Co. Canton, Ohio

LOOK



at the line we represent

SOME OF OUR LEADERS

Steel Tubular Poles
Overhead Line Material
Shaw Lightning Arresters
Earll Catchers and Retrievers
Holland Trolley Bases
Automatic Trolley Guard
Shelby Seamless Trolley Poles
Adamantine Trolley Wheel Bushings
Anti-Slip and Universal Treads
Van Dorn & Dutton Gears and Pinions
Salamander Asbestos Covered Magnet Wire
Eureka Bars and Assembled Commutators

THE W. R. GARTON COMPANY CHICAGO, U.S.A.

We Can Save You Money

The W. R. Garton Company

Representing Manufacturers of Electrical Equipment for Street Railways,

15 So. Desplaines Street, Chicago

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STANDARD for a THIRD of a CENTURY

Hard—Tough—Cool-running

The Ideal Armature Metal

It will pay you to investigate

E. L. Post & Co., Inc., Sole Manufacturers
50 Cliff St., New York

Why take a chance on imitations when you know "Tool Steel" gears are BEST

Practically non-breakable

Mileage 7 to 10 times as great as Untreated gears and 2 to 3 times as great as the **best** other "Specials".

Equip with "Tool Steel" gears and pinions and gear-change labor costs vanish.

These claims have been **proven** through nine years of grilling tests.

THE TOOL STEEL GEAR AND PINION CO.
CINCINNATI, OHIO

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Considerable **time** is spent in babbitting bearings. The better the **material** used in babbitting the less often will come the necessity for re-babbitting, consequently the more time will be saved. Hardy's S. S. Metal has demonstrated its superiority over all other bearing metal alloys in actual service. As to its economy consider points 2 and 5 of its many advantages.

1 Compressive Strength

COMPRESSIVE STRENGTH — 12,095 lb. per sq. in., far beyond any mechanical demand.

2 Specific Gravity

SPECIFIC GRAVITY—7.32, the lightest of any known anti-friction metal. In filling a bearing FIVE to FORTY per cent less is used according to the mixture of other bearing metal alloys.

3 Shrinkage

SHRINKAGE—5/64 in. to the foot when poured into an iron mold.

4 Melting Temperature

MELTING TEMPERATURE—316°C. or 600°F. It is fluid and in condition to pour well at 454°C. or 850°F.

5 Anti-Friction Qualities

ANTI-FRICTION QUALITIES — Runs cool under pressure that would crush many anti-friction metals; will not cut or score a shaft under any circumstances.

Correspondence solicited

WILLIAM A. HARDY & SONS CO.

FITCHBURG, MASSACHUSETTS

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Three Outstanding

AJAX

Advantages

1. **The Service** The Ajax plants make more non-ferrous metal than any other foundry of like character in the world. This reflects tremendous manufacturing capacity and, with patterns of practically every type of electric railway bearing in use, insures quick and accurate delivery of any type of car brass. Where a pattern should not happen to be in stock it will be made on receipt of order. *This pattern service is absolutely free.*

2. **The Metal** Ajax Car Brasses are made of either Ajax plastic bronze or Ajax car bearing bronze "A." These are in themselves among the most effective and longest-wearing anti-friction metals. They have just the right plasticity to adapt themselves, without heating, to the irregularities of the service. They are very homogeneous in structure and can be used with or without babbitt lining.

3. **The Reputation** Ajax car brasses are standard on many electric and steam railroads. The tremendous Ajax production is the most conclusive evidence of the attitude toward them of electric railway men.

Our engineers and metallurgists will gladly co-operate with electric railway men in devising bearing alloys where our standard formulae do not meet existing conditions fully.

For Lining Car Brasses

Long Wear—high compressive strength! These are the two exceptional properties of Ajax Bull Babbitt.

The process by which this babbitt is made—exclusively Ajax—brings forth the metal with almost entire absence of dross.

So, with equal weights, this absence of dross makes just so much more usable *babbitt* available. It actually amounts to *more* babbitt per *pound, more babbitt per dollar!*

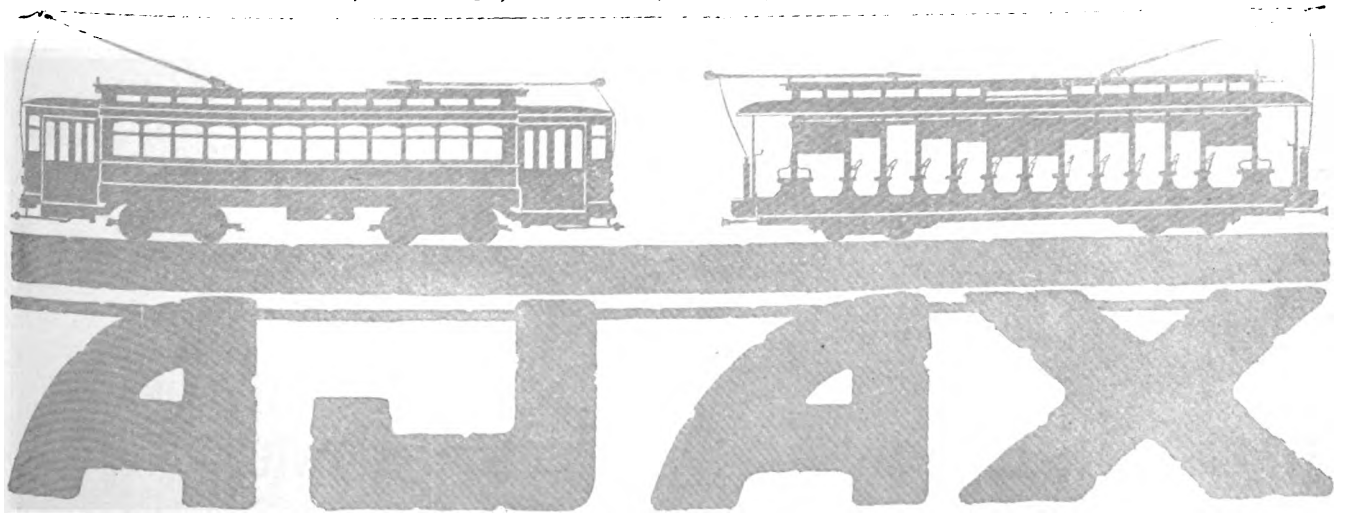
Electric railway men, by constantly recurring purchases, during the last 20 years have made Ajax Bull Babbitt one of the most extensively used bearing metals in the field.

Is your road enjoying the economy and reliability that always follow where Ajax Bull Babbitt is used?

MOTOR AND AXLE BEARING

AJAX METAL COMPANY, Philadelphia

NEW YORK, BOSTON, PITTSBURGH, WASHINGTON, CHICAGO, ST. LOUIS, SAN FRANCISCO, DETROIT



AJAX

CAR BRASSES

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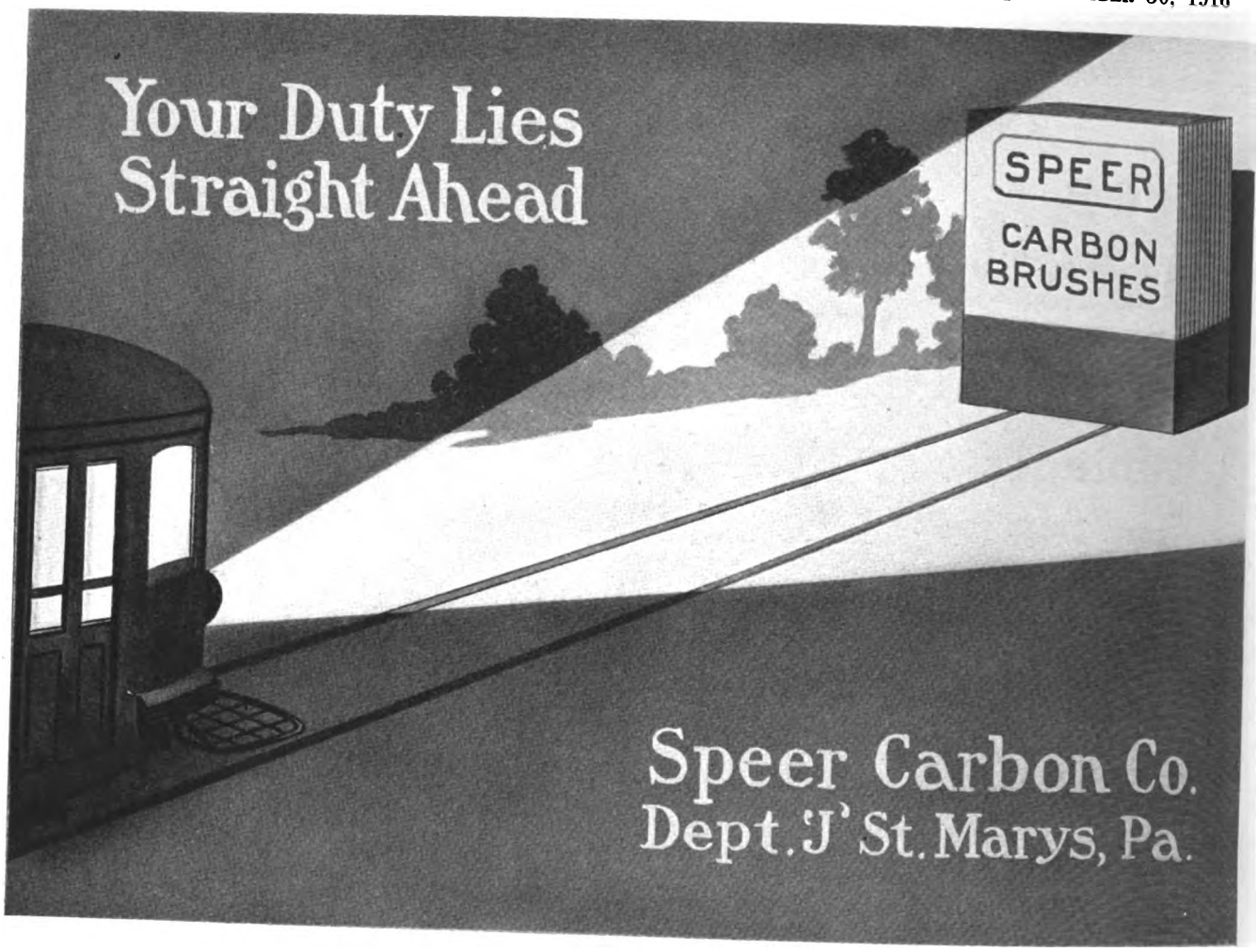

THE AMERICAN AUTOMATIC SLACK ADJUSTER

Promotes maximum brake efficiency by maintaining uniform piston travel.

Saves wear on compressor by economizing air.

Saves time by eliminating the necessity of hand adjustment.

Saves money by reducing cost of maintenance.

THE AMERICAN BRAKE COMPANY
1932 North Broadway, St. Louis, Mo.

Southern Wheel Company
St. Louis, Missouri

FOUNDRIES
St. Louis Birmingham Atlanta Savannah

MANUFACTURERS OF

The Special Chilled Iron CAR WHEEL

FOR

STREET AND INTERURBAN SERVICE

ONE WEAR LONG WEAR

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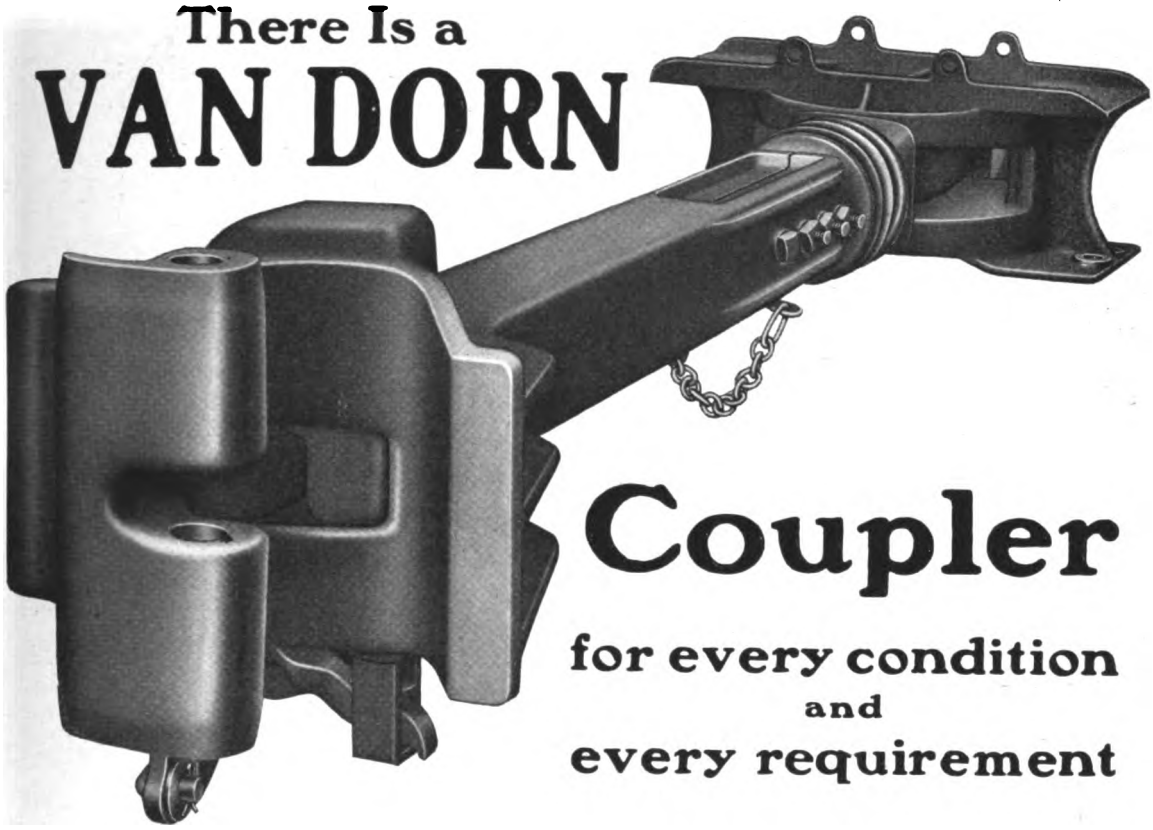
There Is a
VAN DORN

Coupler
for every condition
and
every requirement

The Van Dorn Radial M.C.B. Coupler
is shown above

It has a positive lock, lock-set, and knuckle throw.

Couples by impact and uncouples from side of car.

Has extended guard arm and butting wall.

Greatly facilitates coupling and prevents buckling.

Head has deep knuckles which permit wide vertical movement.

Radial carrier eliminates binding even on 30-ft. radius curve.

Van Dorn couplers are made in various types and sizes, each having special patented features. Combined with Van Dorn draft riggings they meet the particular problems of every class of service.

Van Dorn M.C.B., Pin and Link, Car and Air couplers are safe, strong, light and durable.

Write for blueprints and additional information

Van Dorn Coupler Co.
2325 So. Paulina St. Chicago, Ill.

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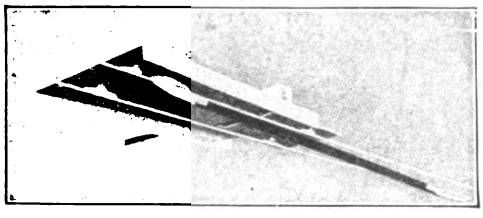
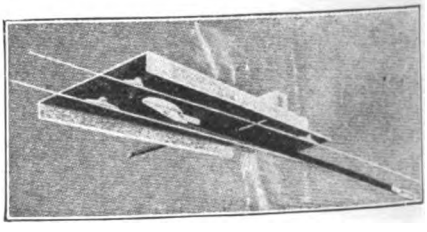


THE RYMCO



HIGH SPEED TROLLEY SWITCH AUTOMATIC

FOR INTERURBAN ROADS

Operates Simultaneously and Automatically with Track Switch and can be installed with any style of

OVERHEAD CONSTRUCTION

See Our Exhibit, Space 535 A. E. R. A. Convention, Atlantic City

The systems on which this device has been adopted as Standard include the following:—

Illinois Traction System
Peoria Railway Terminal Co.
Interstate Public Service Co.
Evansville Railways Co.
Ft. Wayne & Springfield Railway
Toledo & Chicago Interurban Traction Co.
Springfield, Troy & Piqua Railway Co.
Toledo, Bowling Green & Southern Traction Co.
Chicago, Ottawa & Peoria Railway
Bluffton, Genoa & Celina Traction Co.
Youngstown & Ohio River Railroad
Dayton & Troy Electric Railway
Toledo, Fostoria & Findlay Railway
Northern Ohio Traction & Light Co.
Cleveland, Southwestern & Columbus Railway
Toledo & Western Railroad Co.
Salt Lake & Utah Railway
Stark Electric Railroad Co.
Ft. Wayne & Northern Indiana Traction Co.
Indiana Union Traction Co.
Chicago, South Bend & Northern Indiana Traction Co.
Des Moines Interurban Railway
East St. Louis & Suburban Railway
Cedar Rapids & Iowa City Railway & Light Co.
Kentucky Traction & Terminal Co.
Winona Interurban Railway
Lake Shore Electric Railway
Ohio Electric Railway
Columbus, Delaware & Marion Railway
Muncie & Portland Traction Co.
Marion, Bluffton & Eastern Traction Co.
Kokomo, Marion & Western Traction Co.
Kansas City, Clay County & St. Joe Railway
Ogden, Logan & Idaho Railway

THE RAILWAY MATERIALS CO.

Railway Exchange, CHICAGO **Singer Building, NEW YORK**

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The Best Babbitt is Always the Cheapest

Babbitt metal bought on a price basis alone is short-sighted economy. It hasn't the wear. Frequent re-babbitting is necessary and there's the chance of sudden failure that means stripped armatures and all the expense of re-winding.

More-Jones Armature Babbitt Metal

is used by a majority of the leading electric roads in this country and abroad because they have found by exhaustive tests that it shows a lower net cost per mile than any other babbitt.

MORE-JONES ARMATURE BABBITT METAL is the product of specialized laboratory study and forty years' experience in compounding alloys. Its quality has been proved by many trials over long periods in the severest service. This babbitt contains only tin, copper, nickel and antimony—NO LEAD—and possesses the lowest co-efficient of friction and the greatest durability.

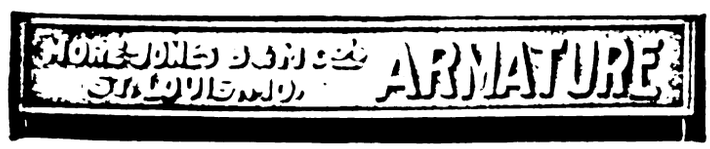
Further information and prices on application

More-Jones Brass and Metal Co.

ST. LOUIS, U. S. A.

Manufacturers of

Trolley Wheels and Harps, Contact Springs, Motor Axle Bearings, Armature Bearings, Truck Journal Bearings, Air Compressor Bearings, Armature Babbitt Metal and similar products



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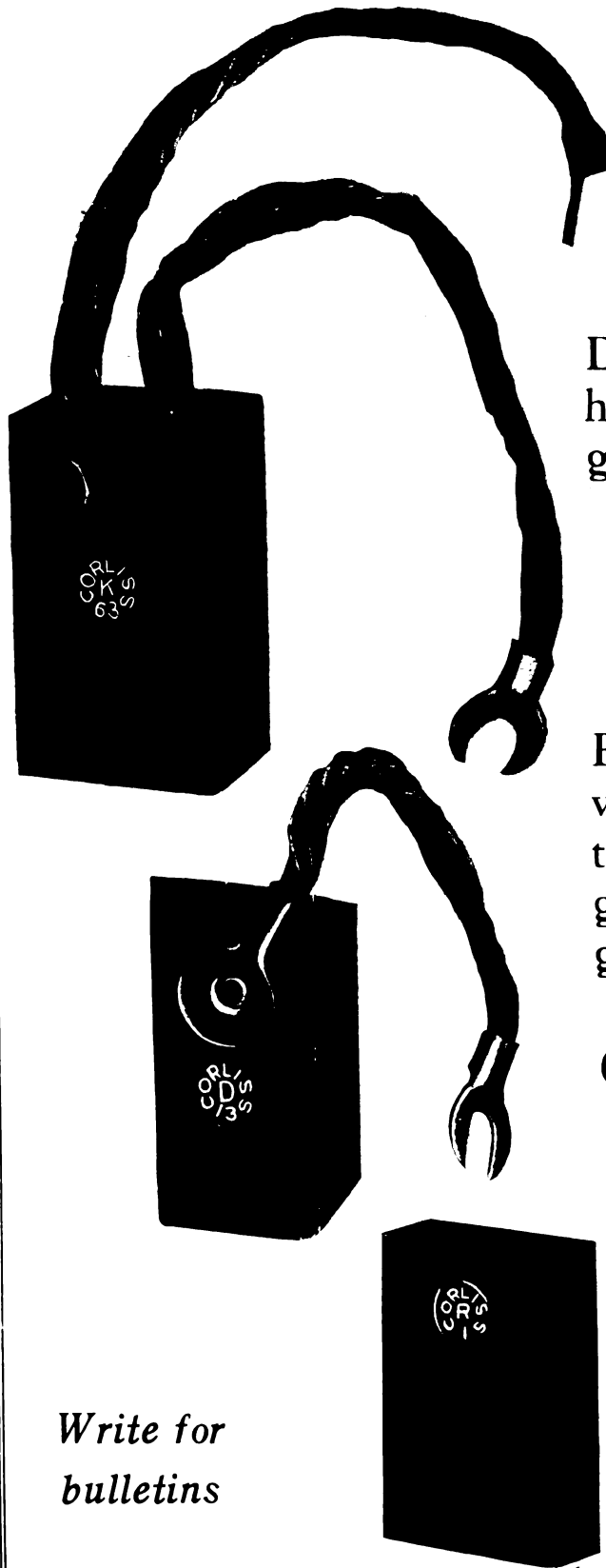
CORLISS CARBON COMPANY

BRADFORD, PENN.



Metal Slip Ring Brushes

Designed for both soft and hard rings. Twelve different grades for various conditions.

Corliss Rotary Brushes

Built for the highest peripheral velocities. Excellent commutation characteristics. We are glad to recommend the proper grade.

Corliss New Railway Motor Brushes

for interpole Railway Motors.

Grades R-1 and R-2

Highest quality at a

NEW Price

Write for bulletins

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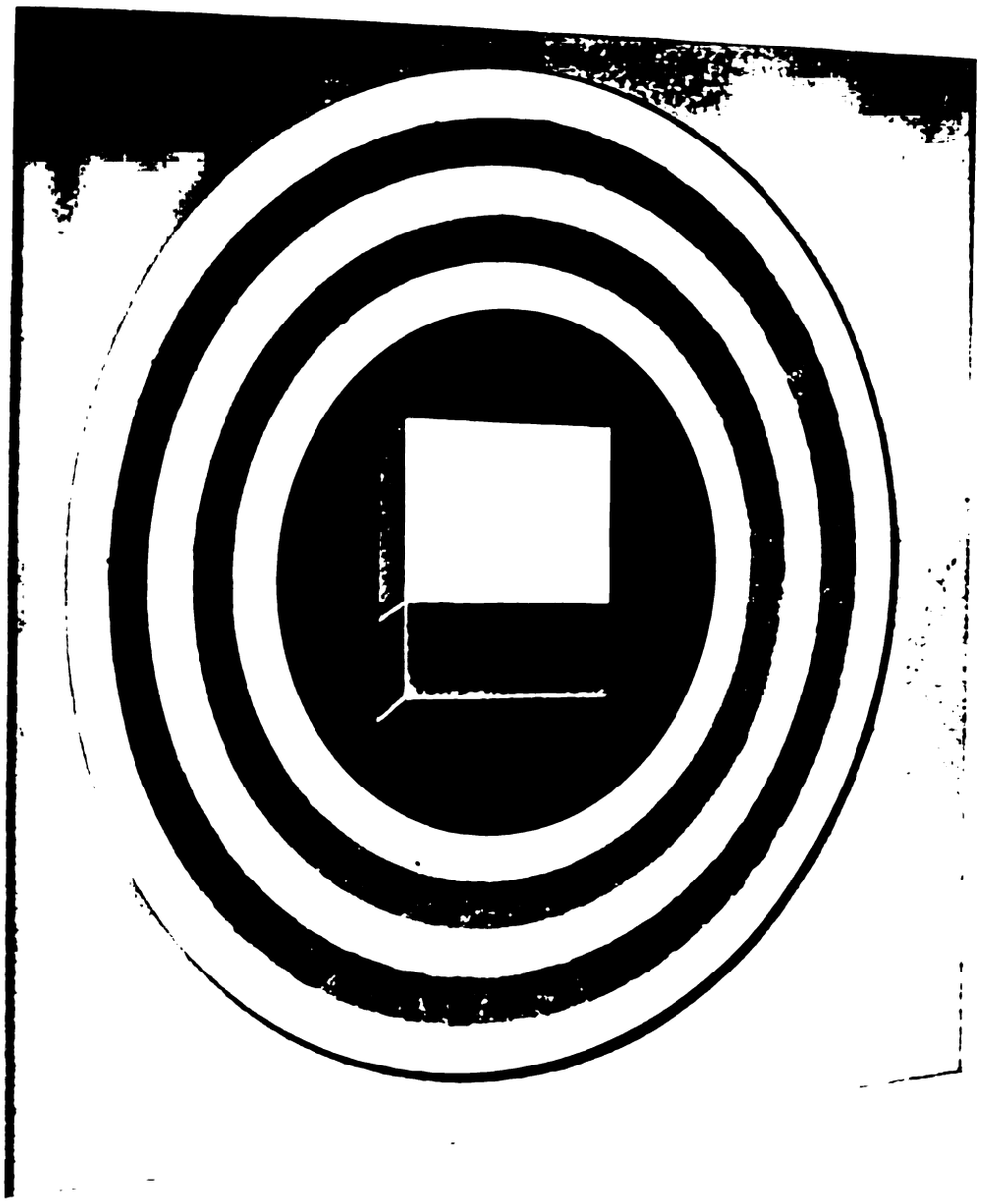

Hitting the Bull's-Eye Every Time That's the Basis of Le Carbone Superiority

When the **average** marksman hits the bull's-eye, that particular shot is just as good as any shot the expert sharpshooter can make. But the average marksman will never hang up the steady score of the sharpshooter.

You can find individual sets of Carbon Brushes—lots of them—which will give just as good service as any individual set of "Le Carbone." But when it comes to the steady, **continuous** delivery of high efficiency, "Le Carbone" Brushes show a very different final record.

"Le Carbone" Brushes are absolutely uniform.

What you want and need in carbon brush service, is to have the brushes and commutators working together at the highest efficiency and with the least wear on both **all the time.**

The remarkable records of economy established by "Le Carbone" Brushes are due to the fact that they deliver continuously reliable, uniform service.

Not just some of the time—**all** the time.

W. J. Jeandron

173 Fulton St. New York

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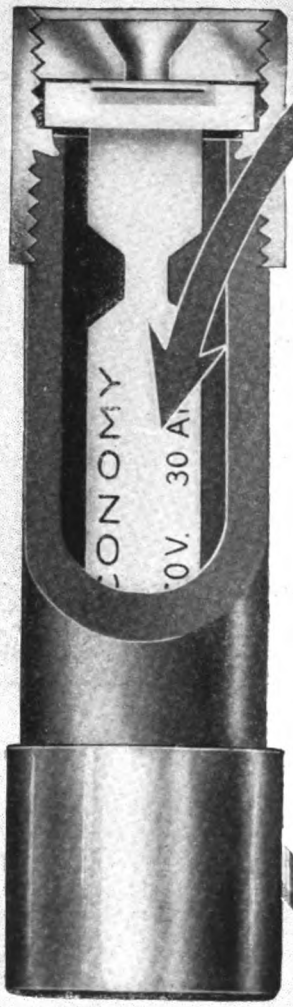

The heart of an

ECONOMY

renewable cartridge

FUSE

is the "Drop Out" Renewal Link. It is the only thing you have to replace in order to renew a blown Economy Fuse. The expense is trifling, compared to the utter extravagance of discarding an entire fuse after it has operated.

Use Economy Fuses wherever cartridge fuses are required to protect power and lighting circuits and by their use cut yearly fuse maintenance bills a full eighty per cent.

Write for Free Samples. Test them. Let the results speak for the economy and safety of Economy Fuses. Be sure to ask for Catalog 17.

ECONOMY FUSE & MFG. CO.

Kinzie and Orleans Sts.

CHICAGO

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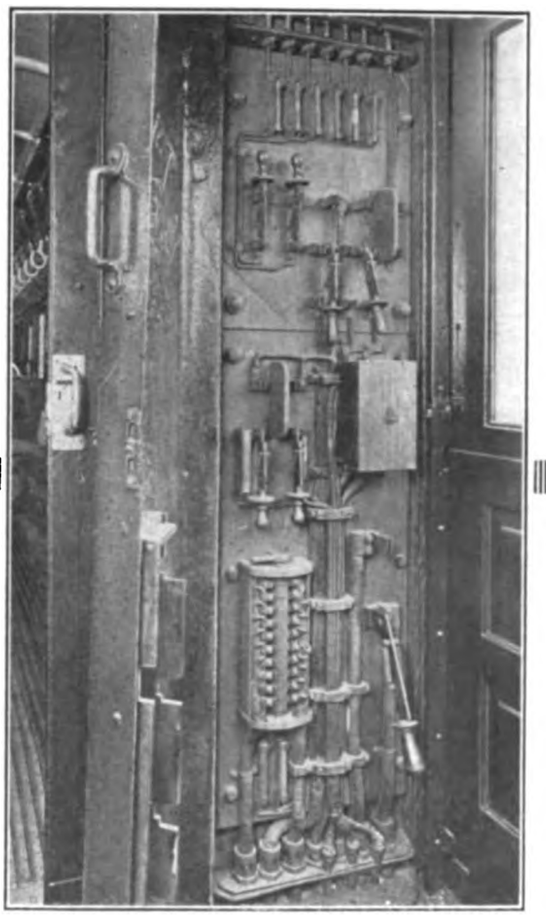

Panel board of D & W Fuses on latest type of Interborough Subway Car

100 Per Cent Confidence in D & W Fuses

The Interborough Rapid Transit Company, New York, operates the fastest subway and elevated system of the world.

The fuses installed on its cars vary in capacity from 1 amp. for the coasting clock circuit to 600 amp. for the third-rail collector shoes.

The number of fuses installed on each class of passenger car and the number of each class of cars follow:

23 fuses on each of 1023 electric motor cars	23,529
9 fuses on each of 751 elevated trailers	6,759
31 fuses on each of 665 high-voltage control subway motor cars	20,615
17 fuses on each of 291 high-voltage control subway trailers	4,947
28 fuses on each of 124 low-voltage control subway motor cars	3,472
15 fuses on each of 62 low-voltage control subway trailers	930
	60,252 Fuses

And Every One a D & W!

D & W FUSE CO.

Providence, R. I.

A. HALL BERRY, 97 Warren St., New York

Agents—Pettingell-Andrews Company Western Electric Company Central Electric Company

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Personal Mention

T. G. Kelly, who has been appointed superintendent of transportation of the Fort Smith Light & Traction Company, Fort Smith, Ark., entered electric railway work with the United Railroads, San Francisco, Cal., in April, 1908. He worked for the company for some time as a motorman and then went to Fort Smith, where he entered the service of the Fort Smith Light & Traction Company as a motorman. On July 10, 1911, he was promoted to inspector. He also acted as trainmaster and assistant claim agent of the company.

Ever Analyze This Department of The Electric Railway Journal?

Ever stop to think where future general managers, superintendents and other executives are coming from?

You can bank on it that they are NOT coming from the dry goods trade, nor the meat-packing business, nor from anywhere outside the electric railway field. They **are,** in all human probability, going to rise from the ranks—from the track crew—from the repair shop—from the controller and the fare-box.

You may, or may not, have a general managership concealed about you—but you owe it to yourself to try yourself out; to see how far you can fit yourself for bigger, more important work!

And a chance to do just that is what the Electric Railway Journal offers you. To the man who skims through its pages and then tosses it aside, without securing the vital information which it contains, the Journal isn't worth a jitney a year—

But the man who appreciates what the Electric Railway Journal **is,** and what it **can** do **for him**—

That man uses the Journal as a tool for carving out his progress.

Don't skim through the office or shop copy of the Electric Railway Journal—you can't get its full value that way.

Have your own personal copy sent to your home. And **read** it—put it to work for **your** benefit.

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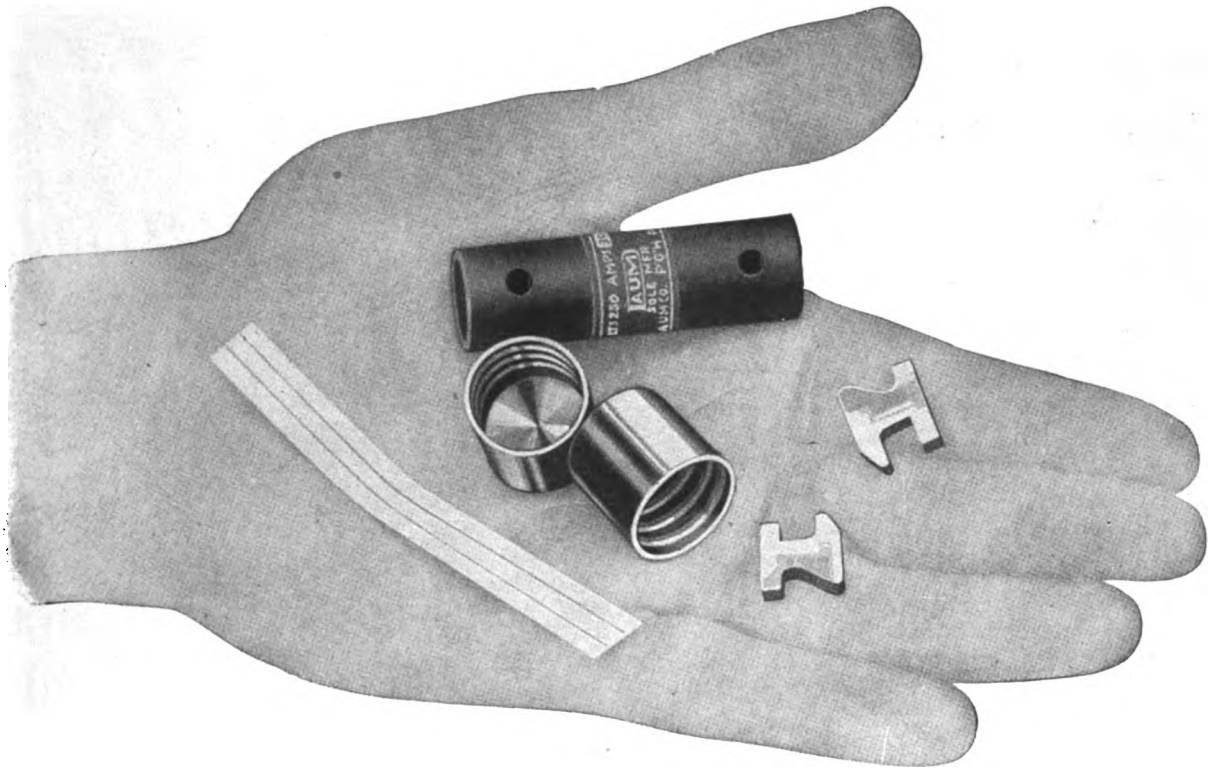


SIMPLICITY ITSELF

Four metal parts, a fibre shell, a section of fuse strip, assembled and renewed without tools, that's a

TRADE AUM MARK RENEWABLE FUSE

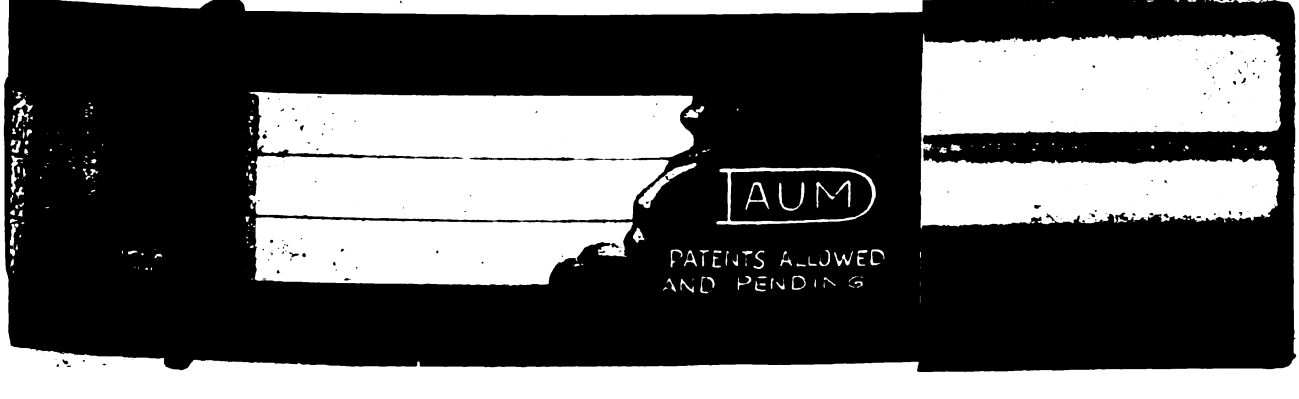
Complete electrical protection of power, heat and lighting circuits at a saving of *60 to 80 per cent* over the cost of using non-renewable fuses. When a TRADE AUM MARK fuse blows, you break a new fuse element from the TRADE AUM MARK Renewable Fuse Strip of the right length and right amperage, and renew the fuse in a few seconds.

Free Samples for Convincing Proof. Write for them.

A. F. DAUM Sole Manufacturer PITTSBURGH, PA.

Representatives:
WILLIS C. SQUIRE & CO.
Western Union Bldg., Chicago
GEO. H. TRASK
76 Sacramento St., San Francisco

Form No. 4. 3-60 A. 250-600 V.



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Union Service plus Recognized Quality

Here are six leaders in their respective fields—recognized as standard equipment by the leading systems and manufacturers.

Nuttall Gears, Pinions and Trolleys

Nuttall gears and pinions are made in three grades—each without equal in its respective field. These grades are B. P., Case Hardened and Standard. Detailed information and data will be furnished on request.

Crouse-Hinds Headlights

As recognized equipment on a large percentage of the street railway and interurban lines of the United States—these headlights have proven themselves to be without equal from both an economical and an efficiency viewpoint.

Chillingworth Gear Cases

These seamless, drawn steel gear cases with their perfected bracket that cannot shear off are specified and used by the largest electrical manufacturing companies and street railway systems. Their lightness in weight has been a great factor in their success.

G-E Rail Bonds and Line Material

These essentials are too well known for comment, being the standard equipment on the great majority of electric systems in the United States.

International Registers and Fare Boxes

The progressive roads of the country are fast adopting the up-to-date systems inaugurated by the International.

The Motor Driven Coin Register has proven that it will speed up schedules and take all chance out of fare collections.

Locke Insulators

A synonym for Best to the experienced lineman and operating man.

They have absolutely no equal in their field.

WRITE FOR OUR NEW LOCKE CATALOG.

UNION ELECTRIC

UNION ELECTRIC COMPANY

TERMINAL WAREHOUSES

PITTSBURGH, PA.

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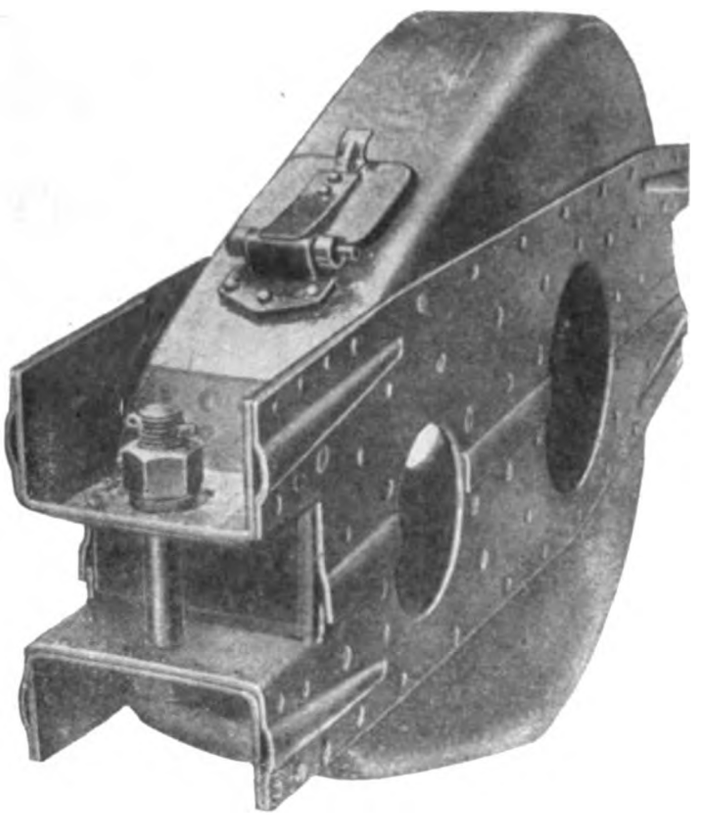

Chillingworth Drawn Steel Seamless and Rivetless Cases

No railways can afford to haul a heavy malleable iron gear case. They know too well that such a case only adds excess weight and cost to the car without affording any advantage. Moreover, they also know it costs more to buy.

You can figure on saving about 40% in weight and a proportionate amount in cost, by using Chillingworth Cases.

THAYER & COMPANY, INC.

Selling Agents in U. S. and Canada

111 Broadway, New York

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Flexible Gear; Cover Plate Removed

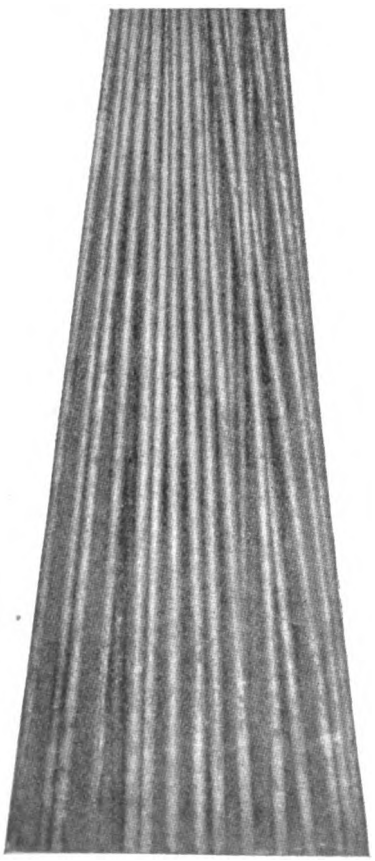
Flexible Gears
For Heavy Service

They absorb shocks due to rough track, brake applications, power applications, motor characteristics or any other cause.

They prolong life of bearings, commutators, brushes, brush rigging, armature windings and insulation, truck framing and running gear.

The centers, springs, cover plate, etc., are permanent and the high grade rims renewable. All internal wearing parts case hardened and ground.

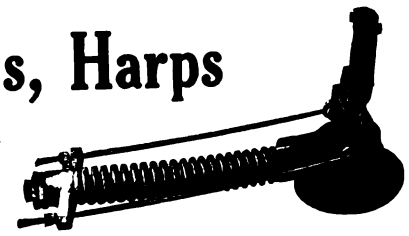
They will solve your heavy service gear problem



Trolley Poles

An unlimited supply of butt welded trolley poles, not gas pipe, stand ready for your needs.

Trolley Bases, Harps and Wheels



These Nuttall products are standard for all classes of electric railway service.

There is

A Nuttall Gear and
A Nuttall Trolley

for every service application

Nuttall - Pittsburgh

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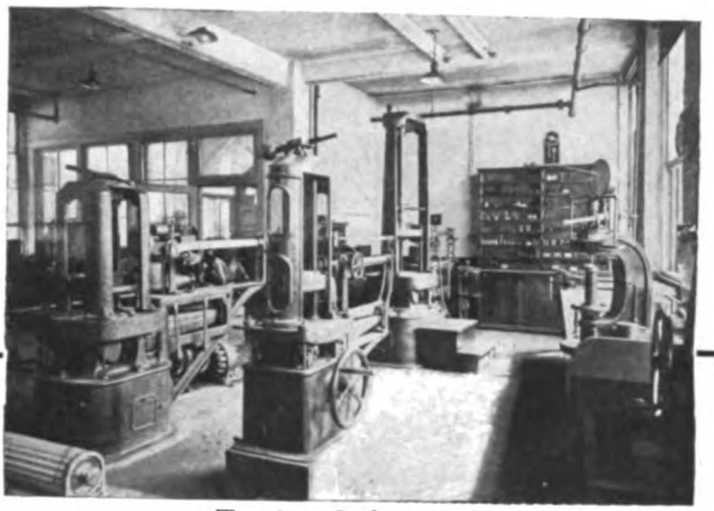


Testing Laboratory

Nuttall Tests

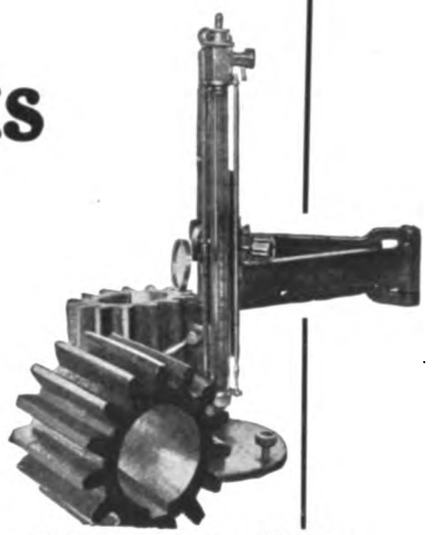
are your

Guarantee

Brinell Machine for Testing Structural Hardness

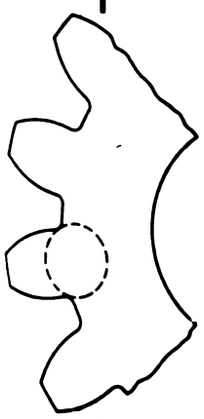
A well-equipped chemical laboratory is maintained to determine the chemical analysis of all steel being heat treated for Nuttall Gears.

After heat treatment the gears and pinions are tested with a Brinell Machine to determine the structural hardness; while a Sclerescope is used to find the surface hardness.

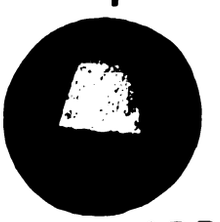


Sclerescope for Testing **Surface Hardness**

BP Gears



are solid only, of forged steel of medium carbon content, heat treated and giving a material having exceptionally good refinement of structure, great strength and toughness, which owing to the close, dense grain of the metal after treatment greatly increases its resistance to wear. The great strength of this gear makes it applicable to severe service conditions.



Structure of B P Gear Teeth

Nuttall - - - Pittsburgh

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Catskill

Heat-Treated

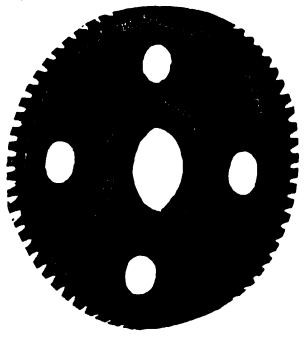
Gears and Pinions

Star Brand

A new type of gear and pinion especially prepared and heat-treated by a process of our own. The finest quality of rolled steel blanks are used for material.

The gears and pinions are cut true to pitch, and next are put through a special heat-treating process which gives them exceptional tensile strength. This process insures the gear and pinion a wearability of three to five times that of the ordinary gear and pinion. Prices are reasonable, and when durability is considered—very low indeed.

Ask us for the complete Data



W. R. Kerschner Co., Inc.

50 Church Street, New York

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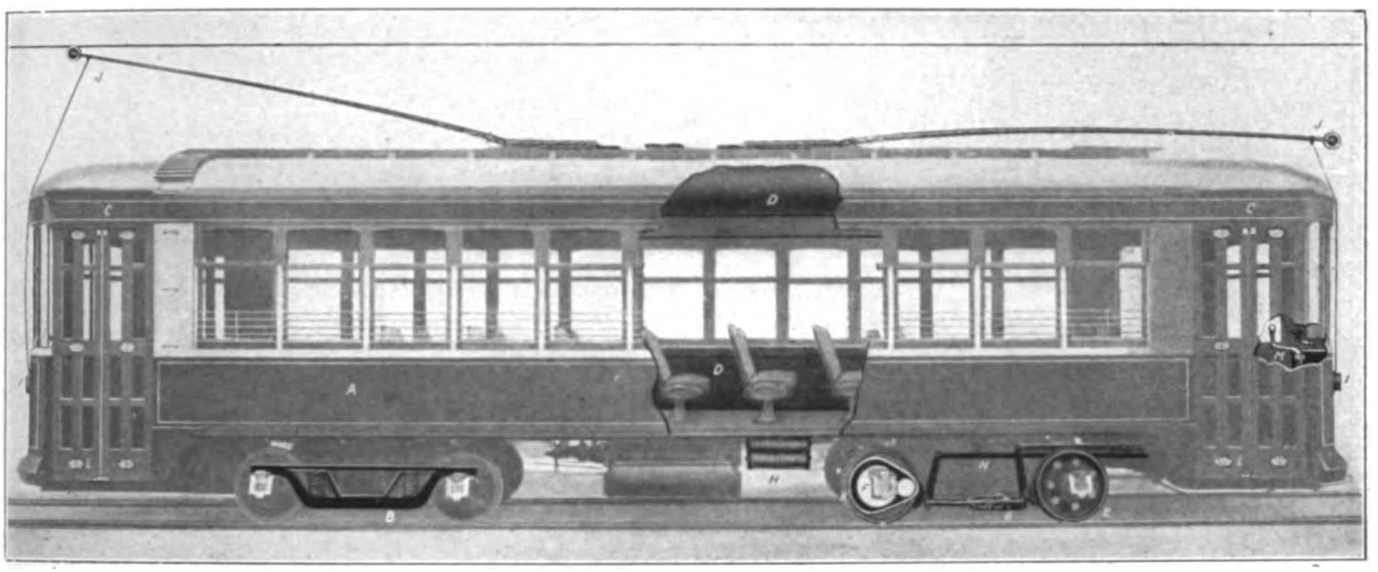
This Is an All-Kerschner Car From Car Wheel to Trolley Wheel



This sketch has been prepared to show you what an important part Kerschner Service plays in making up a modern car. Let's list the items indicated on the drawing:

A—Car body.....Cincinnati Car Company
B—Trucks.....Cincinnati Car Company
C—Door operating mechanism....Cincinnati Car Company
D—Headlining and panels.....Nevasplit (Keyes Product Co.)
E—Car wheels (chilled).....Albany Car Wheel Co.
F—Gears and pinions.....Catskill Foundry & Machine Wks.
G—Brake-slack adjusters.....Smith-Ward Brake Co., Inc.
H—Grid resistors.....Columbia Machine Wks. & Malleable Iron Co.
I—Catchers and retrievers.....C. I. Earll
J—Poles, harps and wheels.....Columbia Machine Wks. & Malleable Iron Co.
K—Gear cases.....Columbia Machine Wks. & Malleable Iron Co.
L—Car Trim.....Cincinnati Car Company
M—Controller and brake handles..Columbia Machine Wks. & Malleable Iron Co.
N—Brake rigging.....Columbia Machine Wks. & Malleable Iron Co.

Keep this page before you whenever you are buying cars or adding any of the specialties named.

W. R. Kerschner Company, Inc.

50 Church Street, New York

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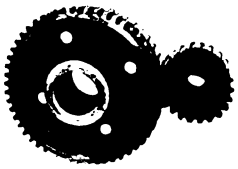

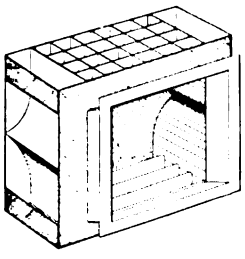

RAILWA

Special agents for

TOOL STEEL GEARS AND PINIONS

Favored for the heaviest service both here and abroad.

Special agents for

JOHNSON FARE BOXES

A registering fare box that has proved closest to perfection in mechanism and operation.

Special agents for

HARTMAN CENTERING CENTER PLATES and PERRY SIDE BEARINGS

A combination that prevents nosing and sharp flanges, besides saving much energy.

Special agents for

GARLAND VENTILATORS

A Pullman Standard, indispensable for the modern electric car.

THE GENESCO

GENESC

U. S. Metal & Manufa

Chicago

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SUPPLIES

Southern and New England agents for

CHILLINGWORTH SEAMLESS GEAR CASES

A sheet steel case of remarkable strength for its unbelievable lightness.

Exclusive agents for

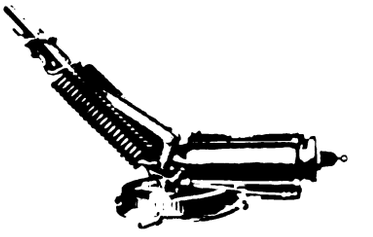
ANGLO-AMERICAN VARNISH CO.

Manufacturers of railway varnishes of maximum durability and brilliancy.

Special agents for

WASSON TROLLEY BASES

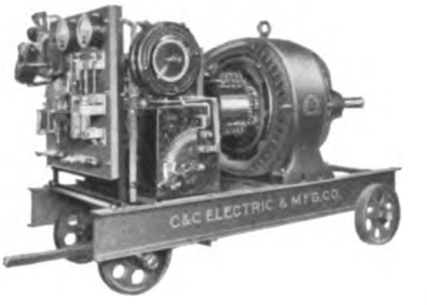
The air-operated trolley base that embodies retrieving features.



Special agents for

C & C ELECTRIC ARC WELDERS

Motor-generator sets that give exactly the right amperage without waste in resistors.



CORPORATION

PAINT OIL

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Washington, D. C.

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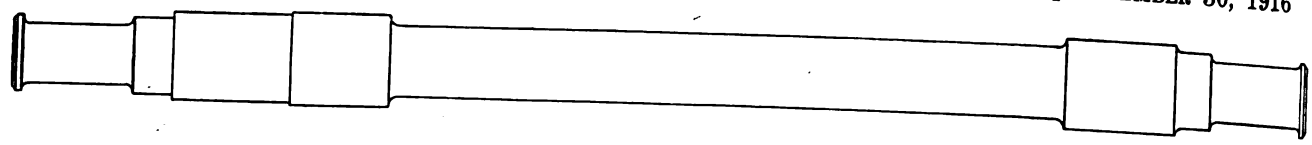


Heat Treatment of Axles Revolutionized

We all realize the value of heat-treated axles in reducing weight, increasing axle life and eliminating breakage.

From your experience you know that the first requisite of a heat-treated axle is **reliability.**

The usual method used in heat treating of axles is to heat them in a furnace and quench them on their side, drawing the temper in a furnace and testing one axle selected from each lot.

It is extremely difficult to heat steel uniformly in the usual type of furnace and very hard to determine properly the temperature of the steel being heated. Quenching on the side sets up serious internal strains which are not always relieved in tempering.

The Vasco Way

Vasco axles are heated in a molten bath.
All parts of a molten bath must be the same temperature, so any axles in that bath are bound to be treated uniformly throughout, to the temperature of that bath. The determination of temperature is simple and positive. The control absolute.

Vasco axles are quenched on end.
By quenching on end any strains set up in quick cooling are greatly minimized.

Vasco axles are drawn or tempered in a molten bath.
This insures a thorough tempering and the elimination of all internal strains.

Each individual Vasco axle is tested.
Each axle after heat treating is Brinelled and a record kept of the ultimate tensile strength of each axle as shown by the Brinell reading.

Each axle can be shock-tested also if desired.

Reliable, Safe, and Uniform axles guaranteed.

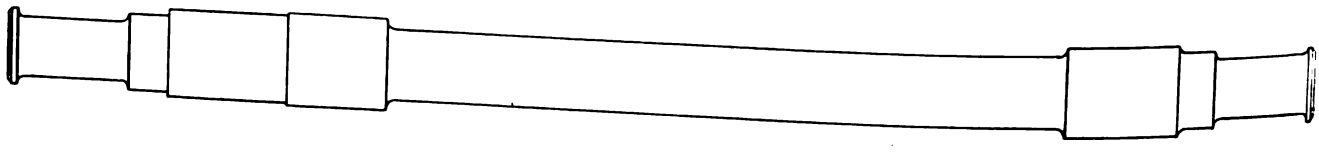
Many of the most prominent railways in the country are purchasing their axle requirements from us. Write us and let us tell you more about our product.

VALLEY STEEL COMPANY

GENERAL OFFICE AND WORKS

EAST ST. LOUIS, ILLINOIS

Southern Railway Supply & Equipment Co., St. Louis
H. F. Keegan, First National Bank Bldg., Chicago
G. E. Watts, Candler Bldg., Atlanta
F. F. Bodler, San Francisco
S. I. Wailes, Los Angeles
W. F. McKenney, Portland



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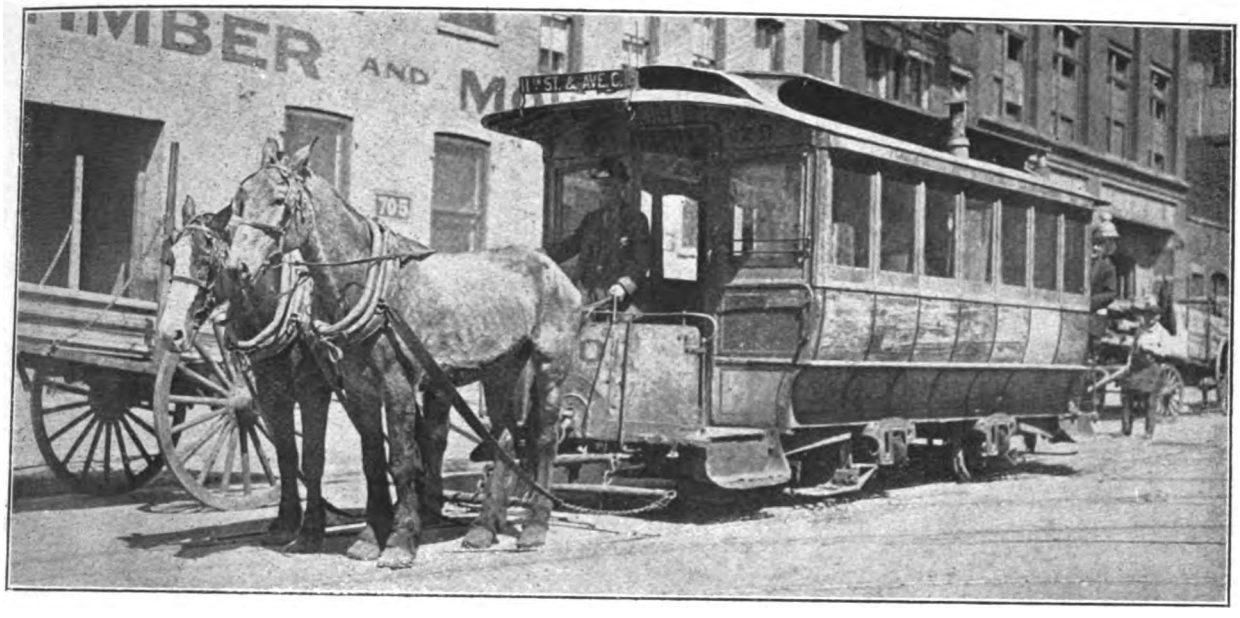


Keeping Pace with the Developments of Two Generations

Horse-car days.

We can all remember the frail little "match boxes" jerking and bouncing along a narrow-gauge "snake-trail" track behind one or two old broken-down cab horses. They tipped the scales at only one or two tons when loaded to capacity, and the speed seldom reached the hair-raising rate of 6 miles per hour.

Yet within this short space of years we have seen the electric car develop into a 60-ton palace, riding as smoothly as thistledown in the air at speeds as high as 70 miles per hour.

Do you fully appreciate the changes of the last 30 or 40 years?

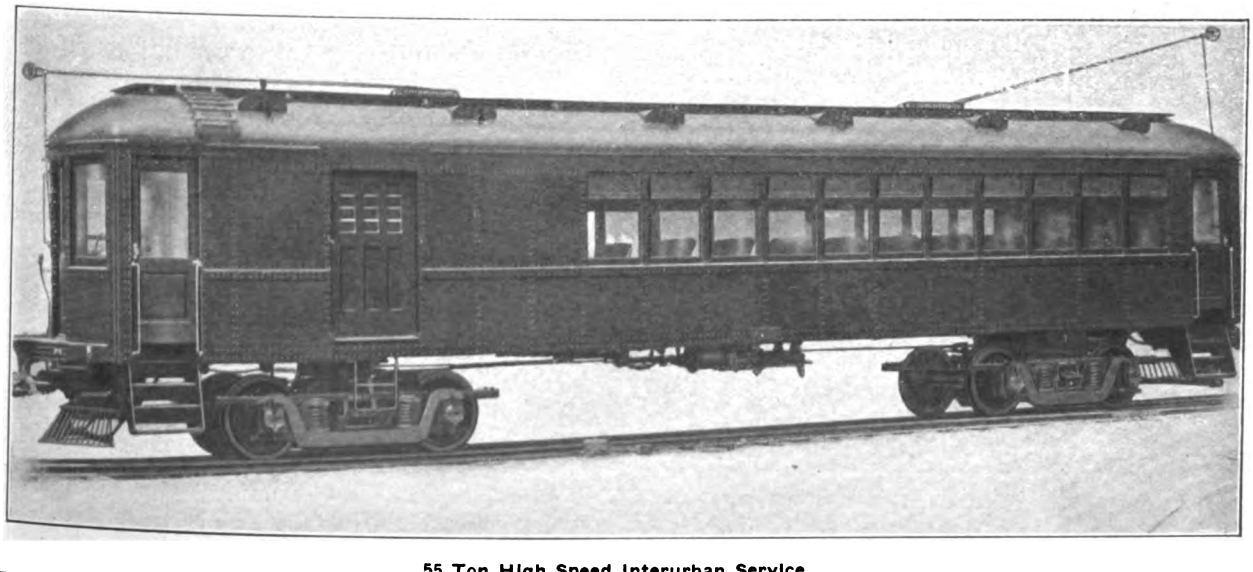
Can you comprehend what this ever-increasing service has demanded of the car wheel manufacturer?

Although the pace has been a hot one, we have never lost our stride, never lagged behind. The Wonderful Single-Service Chilled Iron Wheel was standard in the days of the "hobbie-horse" car, and is standard today with over 90% of the street-car companies of the United States and Canada which operate 100 cars or over.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

1228 McCormick Building, Chicago, Ill.

Representing Forty-eight Wheel Foundries Throughout the United States and Canada. Capacity 20,000 Chilled Iron Wheels Per Day



55 Ton High Speed Interurban Service

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GRIFFIN F.C.S. WHEELS

A one-wear wheel, particularly adapted to all classes of heavy service, and will not wear eccentric through imposition of heavy loads.

If operating conditions other than ordinary, our Engineering Department will analyze them, and design wheels for any special or particular service.

Moderate First Cost
Low Maintenance Charges

Safety in Operation
Brake Shoe Economy

Griffin Wheel Company
McCormick Building
Chicago, Ill.

Foundries:
Chicago, St. Paul, Detroit, Denver, Kansas City, Los Angeles, Boston, Tacoma

Are Your Cars Ever Stalled by Frozen Air?

This Rectifier Will Prevent It

ELIMINATES "FROZEN AIR"

Alcohol supplied in just the right proportion keeps the air from freezing and softens the accumulated grease, gum and oil, thereby increasing the efficiency of the air system and making brake operation more dependable.

Air passing through the air line draws alcohol spray from the container into the air system. Not a moving part in the entire unit, yet just the correct amount of rectifying fluid is supplied to the air line.

Service tests have demonstrated its efficiency. It will free your cars of frozen air trouble and increase the dependability of your brakes and other air-operated equipment.

Easily and quickly installed in the main air line on either old or new cars and without the need of special fittings. Better, lighter in weight, and less expensive than extra air reservoirs or other cooling systems.

Now's the time to prepare for winter trouble—so write today. Let us send you literature, prices, and any special information that you may desire.

See Our Devices in Lord Manufacturing Co's Booths A. E. R. A. Convention, Spaces 380 and 381 at Atlantic City

National Safety Device & Man'f'g Co., Chicago

Lord Manufacturing Co. 105 West 40th St., New York

Sole Electric Railway Agents for New England States and New York, Pennsylvania, New Jersey, Delaware, Maryland, and the District of Columbia.

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Davis Steel Wheels

ONE WEAR—NO TURNING

THE only steel wheel which gives large mileage without being turned down. The flange and tread are of hard, tough manganese steel which blends into a soft, ductile steel plate and hub.

The manganese tread and flange of the Davis Cast Steel Wheel are especially adapted to resist the shock incident to frequent cross-overs and the abrasion caused by sharp curves. The flange strength is eight times that of the cast iron wheel. It is pre-eminently a "safety-first" wheel.

Rims of Davis Wheels are ground to contour, insuring rotundity of wheels. Slid-flat spots are therefore greatly reduced. Furthermore, a perfectly round wheel produces less vibration in the car body and track, and easier riding cars.

Thorough tests have shown that the co-efficient of friction of the Davis Wheel and the steel rail is from 9 to 48% higher than that of other wheels. Therefore, with high starting accelerations, there is less slippage with the Davis Wheel than with any other type of wheel in electric railway service.

Davis Steel Wheels save approximately 20% in weight over other wheels for average service on electric lines, and at the same time provide greater strength. This saving in weight means conservation of energy at the power house.

Records of lines using Davis Steel Wheels show that the cost of maintenance is lower than that of any other type of wheel. Davis Wheels will decrease *your* wheel costs.

They are furnished for all classes of electric line service. Send us blue-prints of your present wheel. An estimate and design to meet your requirements will be cheerfully furnished.

Space 409 on the Pier

American Steel Foundries

1100 McCormick Building CHICAGO

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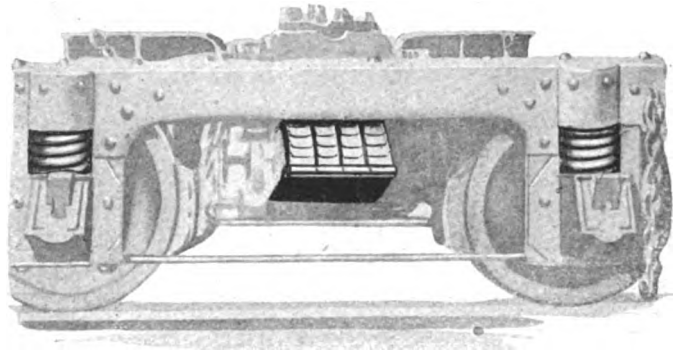

FOR LONG LIFE

AND EASY RIDING

COIL and ELLIPTIC

M. C. B. Pressed Steel Journal Box Lids

Kensington Pressed Steel Journal Boxes

Steel Castings

Union Spring & Mfg. Co.

General Office, Pittsburgh, Pa.

Works: New Kensington, Pa.

50 Church St., New York. Fisher Bldg., Chicago, Ill.
Todd Bldg., Louisville, Ky.
Mutual Bldg., Richmond, Va.
Wilkins Bldg., Washington, D. C.

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"GURNEYIZE YOUR ROAD"

A BOOK agent was trying to sell a book to a farmer out in Iowa. Meeting with refusal he asked his prospect why he wouldn't buy. "I can't read no more 'cause of my poor eyesight"—"Well, that's too bad, but maybe your wife would enjoy reading this book?"—"She's visitin' with her sister down in Kentucky"—"How about your daughter?"—"She can't read, she ain't

GURNEY BALL BEARING CO.

CONRAD PATENT LICENSEE

JAMESTOWN, NEW YORK

CHICAGO, ILL. NEW YORK CITY

ON EXHIBITION, SPACE 377-379

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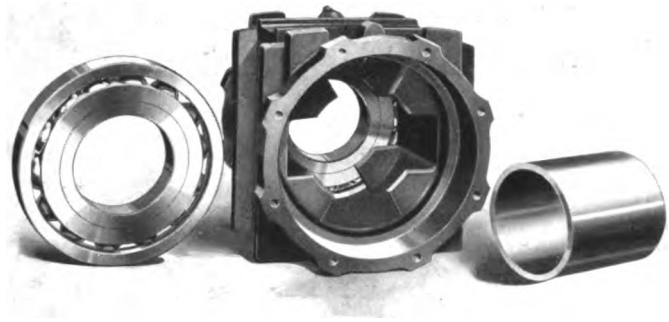

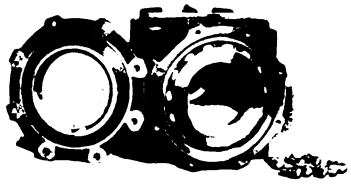

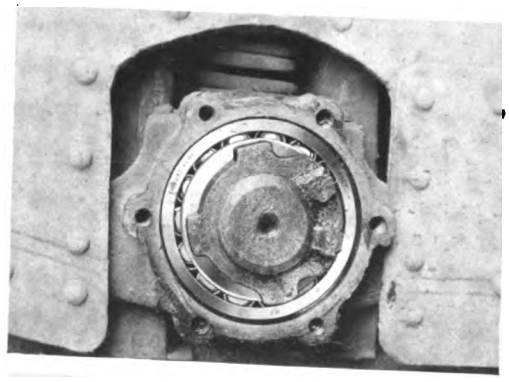

goin' t' school yet"—"Haven't you got any older children?"—"Yes, I've got a boy"—"How old is he?"—"He's goin' t' be sixteen next spring"—"Well, now he ought to read this book"—"No-o-o, he don't need one, he's got a book."

We are sorry that we cannot claim copyright for this story. We have been too busy making ball bearings and studying Electric Railway bearing problems. But we do claim the right to apply the lesson of this story to conditions which we find only too frequently. Of course, you have bearings in your journal boxes and motors. But are they the last word in economy, efficiency and service?

How much do you pay now for maintenance and inspection of journal and motor bearings? How much for relining those bearings and for repairing stripped and burned-out armatures? How many cars are laid up and out of

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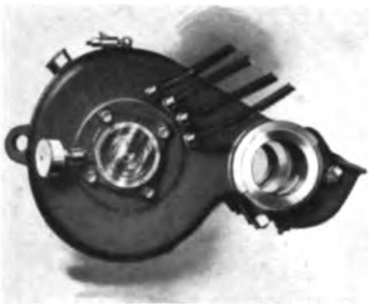
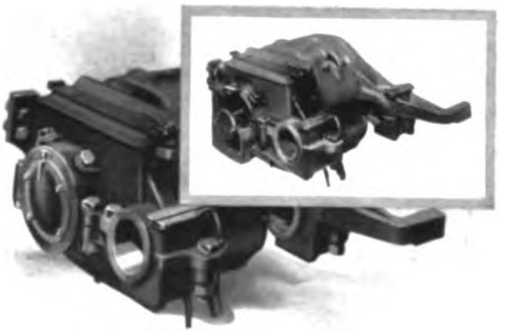
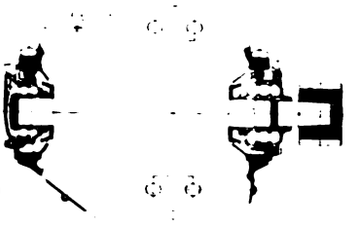




GURNEY



service every month because of trouble of this kind?

You may argue that plain bearings if given proper care cause no trouble. Let us forget for the moment the item of expense at which this could be accomplished. Is not the class of help available for this kind of work an exceedingly uncertain element on which to depend for the proper maintenance of your equipment under such exacting requirements?

Do you know that Gurney Bearings will run on a charge of lubricant *and stay in service* for weeks and months without requiring the least attention of any kind? Just stop to think how simple becomes your maintenance problem of to-day.

And then imagine hardly ever having to pull out a motor because of a hot box nor to have to change journal boxes for the same reason. Imagine

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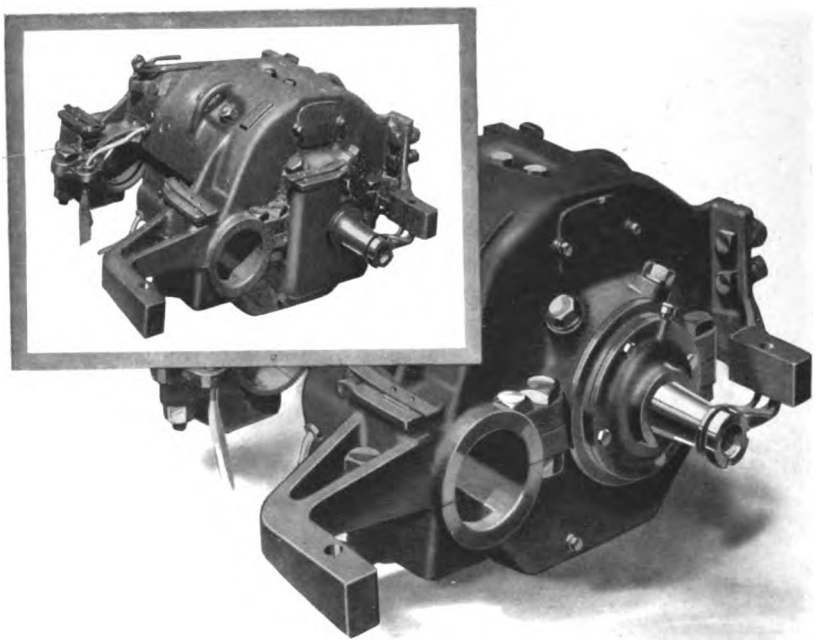
"GURNEYIZE YOUR ROAD"



having one man doing the work of three or four oilers and inspectors. Imagine all those cars running during rush hours which now are laid up and waiting for bearings to be re-lined. Imagine besides all this the great saving of current in operating these cars.

No, don't *imagine* these economies. Gurneyize Your Road and *have* them.

Don't say you've got a book.

GURNEY BALL BEARING CO.

CONRAD PATENT LICENSEE

JAMESTOWN, NEW YORK

CHICAGO, ILL. NEW YORK CITY

ON EXHIBITION, SPACE 377-379

THE MATTHEWS-NORTHRUP WORKS, BUFFALO, CLEVELAND AND NEW YORK

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Service

You get more than simply BRAKE SHOES when you use our Product.

You get the advantage of our constant effort to improve our product for your service.

You get the earnest co-operation of our engineers to assist you in getting the full quota of service from each Brake Shoe applied.

Miles of service from the Brake Shoe are more to be desired than pounds of scrap.

All of which means increased efficiency and decreased cost of Brake Maintenance.

American Brake Shoe & Foundry Company

30 Church St., New York

Chicago, Ills. **Chattanooga, Tenn.**

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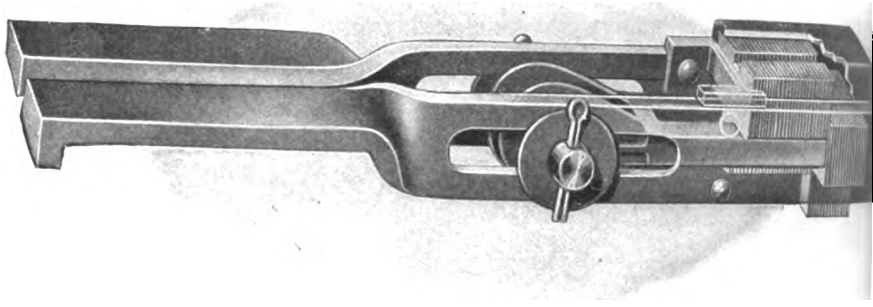
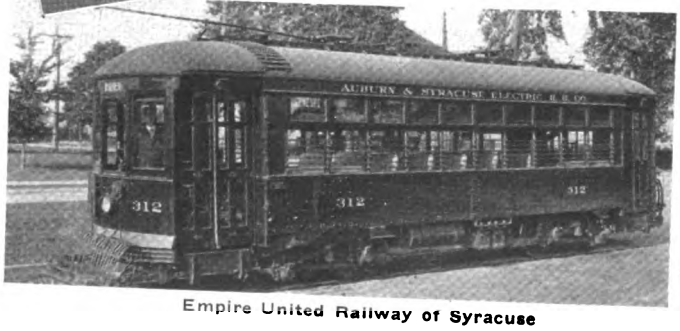
SMITH-WARD BRAKE

Some typical installations of S-W Shim Slack Adjusters



Bay State Street Railway

New York Municipal Railway



Empire United Railway of Syracuse

S-W Automatic Shim Slack Adjusters

Are extremely practical—they fit any truck. Extremely simple—just small metal shims which drop beneath the fulcrum of the brake lever and take up the slack. Their very simplicity makes them the more practical.

Their **automatic** adjustment of slack at the moment the slack occurs means:

Increased Safety in Operation

Reduced Carhouse Labor

Longer Life of Brake Shoes and Rigging

Mitigation of Irregular Wheel Wear

Reducing Flange Troubles

Let us prove it.

Smith-Ward Br

17 Battery Place

W. R. Kerschner Co., Inc., Eastern Sales Agent

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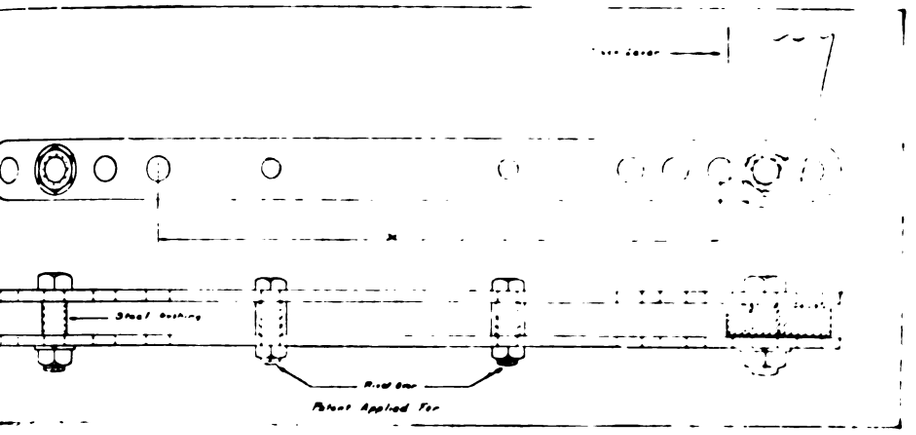
SLACK ADJUSTER



Some more typical installations of S-W Shim Slack Adjusters

The Smith-Ward Brake Lever Strut

HAS

NO	Cotters Loose Pins Broken Pins Hardened Pins	NO	Wear Rattle Lost Bushings Loose Bushings

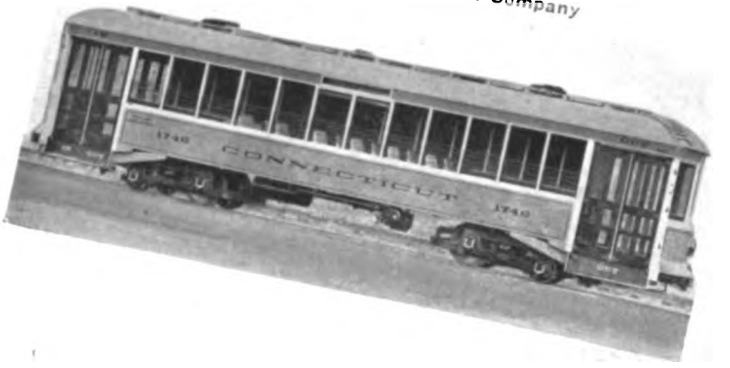
Can be adjusted in ½" steps for 6 inches or more. Wear is transferred from pin to bushing.

Does away with multi-bushed types. Only 2 bushings are needed.

Cost, both original and maintenance, is less. With S-W-B adjusters creates a Super-Ideal Condition on Brill 27-G or Standard O-50 Trucks. See it and the other new S-W-B specialties in space 555, Atlantic City, or get the folder by mail.

Union Traction Co. of Anderson, Ind.

The Connecticut Company



Wilkes-Barre & Hazelton Railway Co.

ke Company

ew York City

S. W. B. Adjusters, 50 Church Street, New York City

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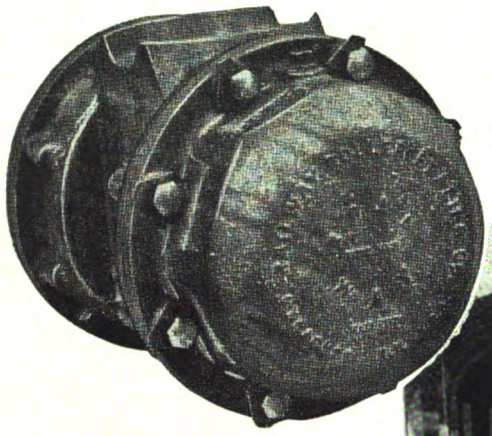
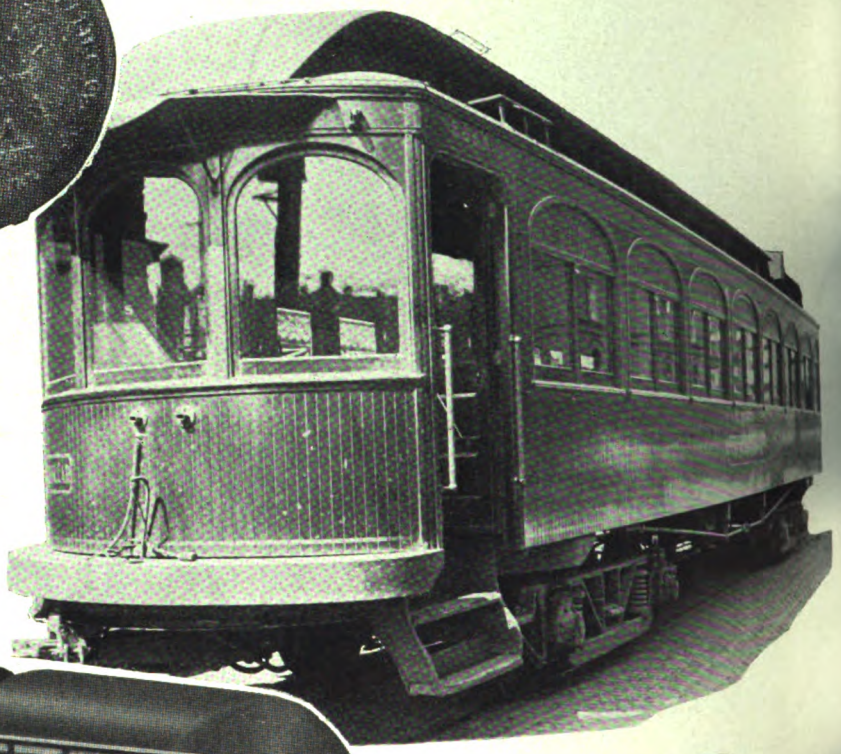
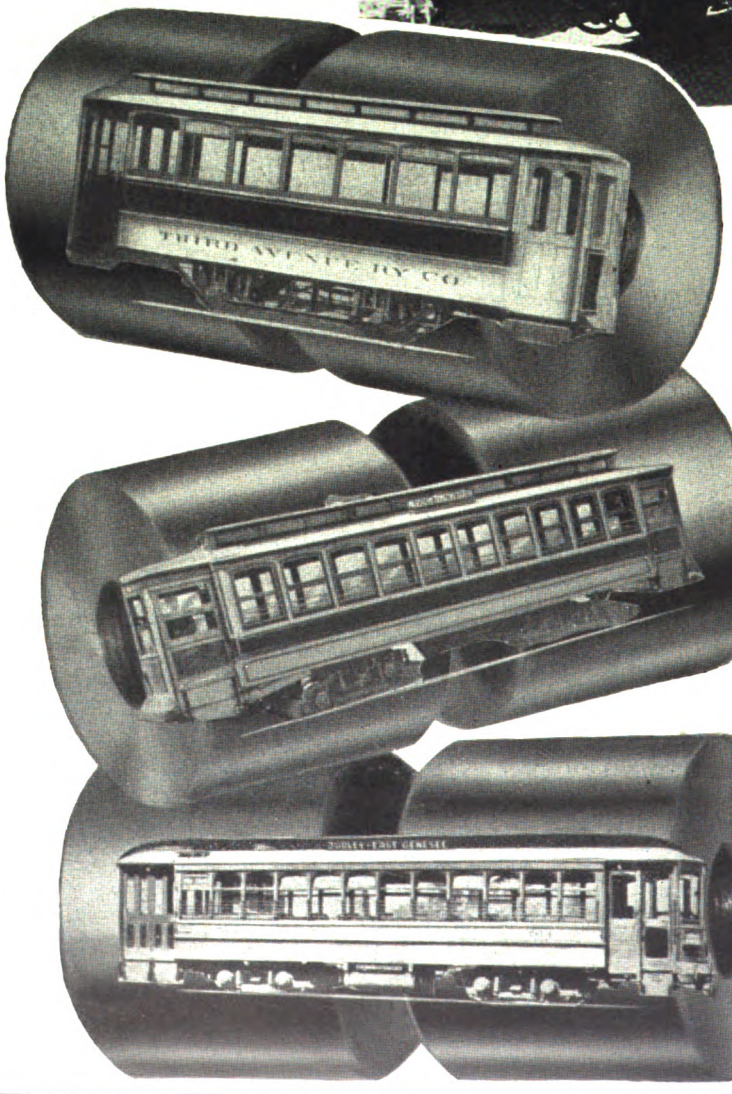
ROLLWAY







Proved In Every Kind

Rollway Bearing efficiency runs the gamut of railway operation from the slow speed, frequent stop, light weight car conditions of city service, to the high speed, few stop, heavy weight car conditions of interurban operation.

The savings which Rollway Bearings are effecting vary with the character of service but in every case they are real and worth while.

Rollway Bearings may save you from buying extra cars as they will raise the rate of acceleration and thus permit better schedules.

The Railway

Syracu

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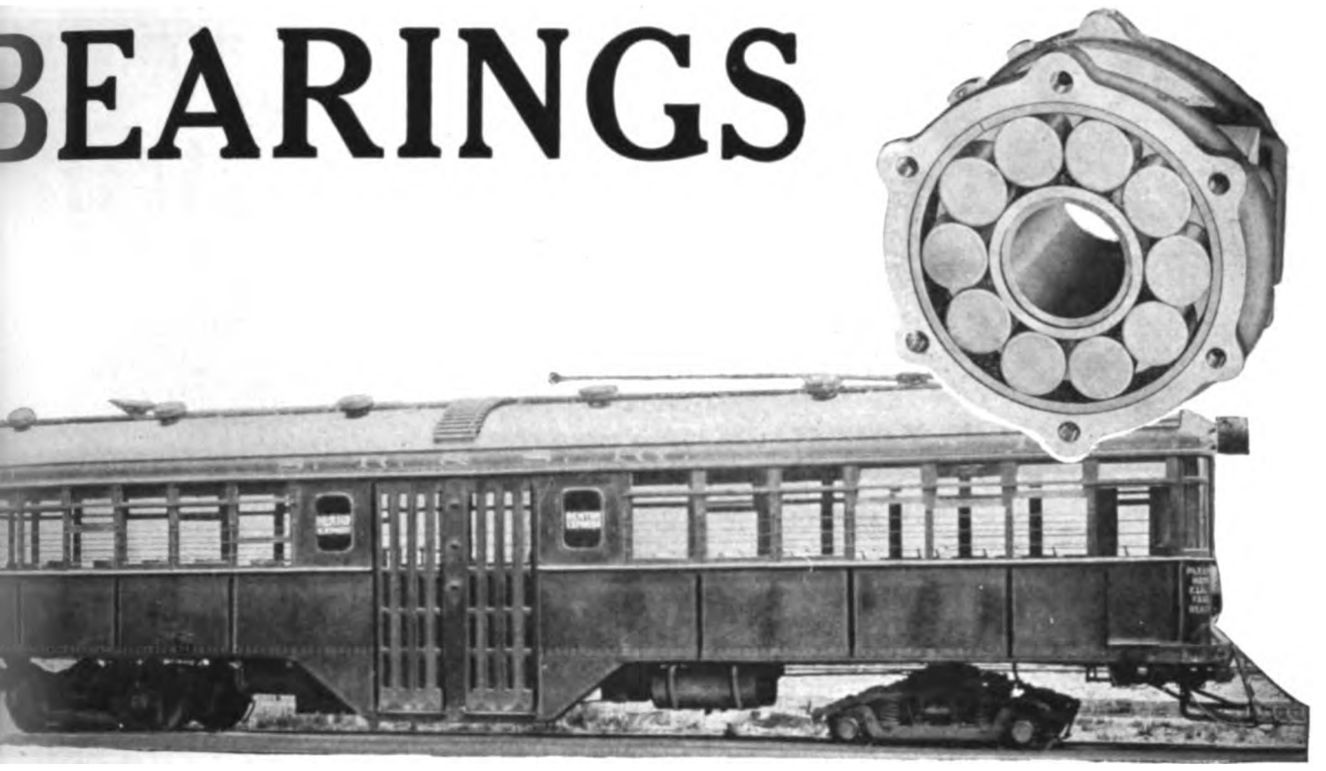
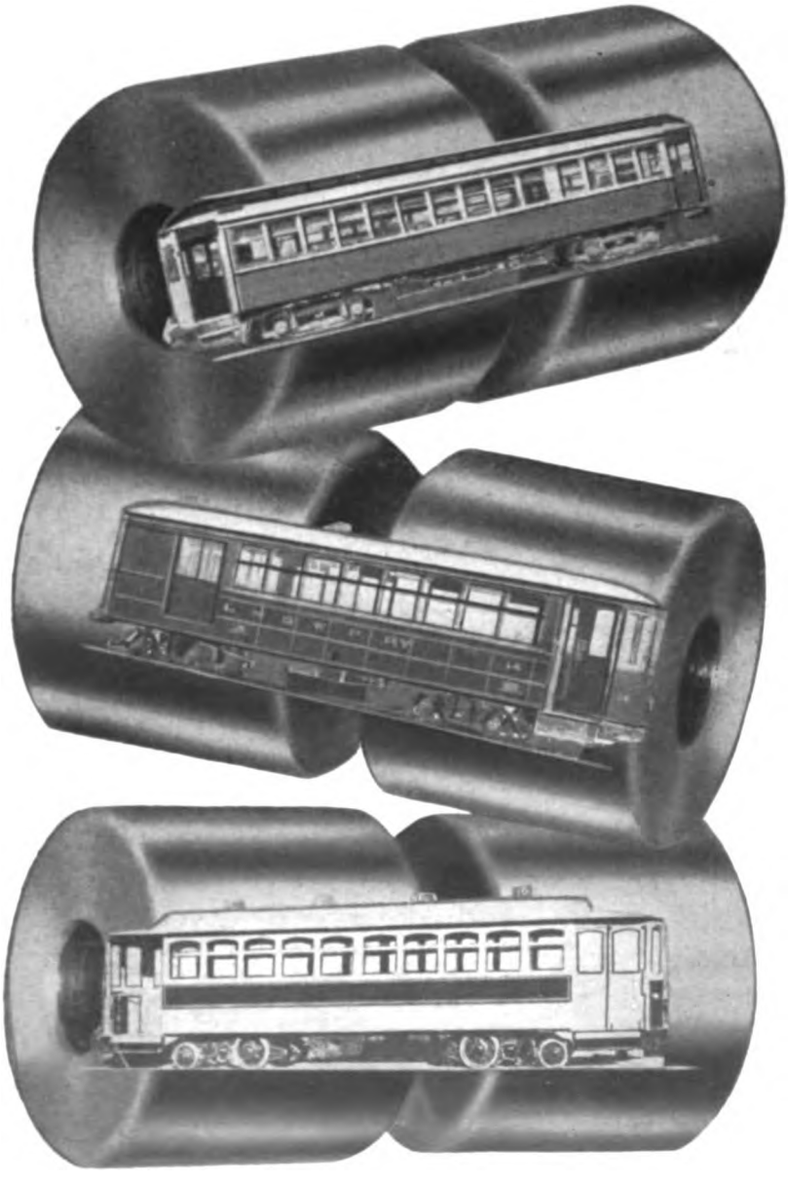
BEARINGS





Efficiency of Service

Rollway Bearings will put off costly increases in power plant capacity. A 15% saving of energy consumption is not unusual.

Rollway Bearings will simplify the problem of journal lubrication and make hot boxes impossible. They will reduce brake-shoe wear, too.

Rollway Bearings are simple to install, easy to maintain and help to keep the car on the line earning money.

Ask us for the data sheet which will enable you to order exactly the right Rollway Bearing.

r Bearing Co.
ew York

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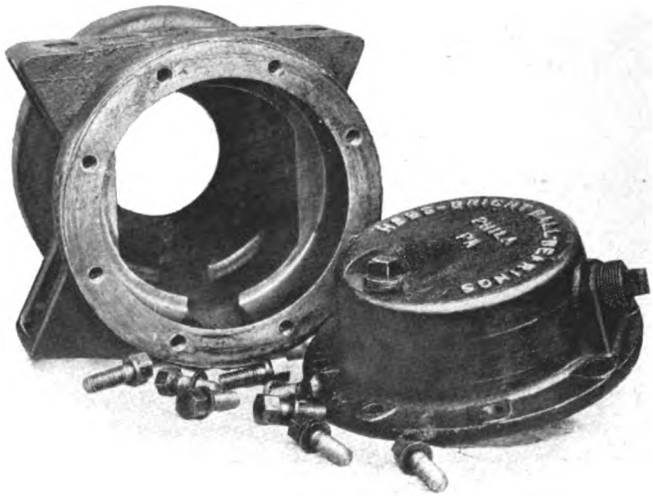
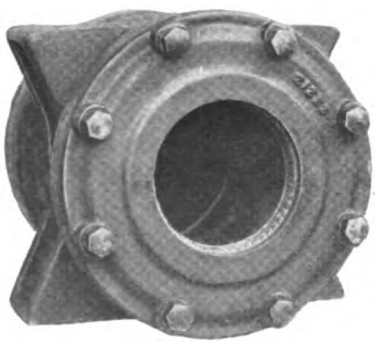
All the Electric Railway World Will Soon

HESS-BRIGHT Journal





The 400 Hess-Bright Ball-Bearing Journal Boxes for the new fifty Pay-Leave or "Car Rider" Cars of the New York State Railways—Rochester Lines—

Are now being installed on the Baldwin Type 62-18-C Arch-Bar Trucks selected for these cars.

Note that these Hess-Bright Boxes are going on a **standard** Baldwin truck—in fact they are absolutely interchangeable with Baldwin Type 37 Electric Trailing Boxes!

This interchangeability is characteristic of Hess-Bright design for any modern truck! A little incidental machining of the axles is practically all the difference between the use of plain journals and Hess-Bright journals.

TRADE MARK
HB DWF
HESS-BRIGHT
THE INIMITABLE BEARING

The Hess-Bright

Front Street and Eri

Hess-Bright Conrad Paten

Digitized by Google

e Watching the Performance of These

Boxes for Rochester!

¶ No need for you to duplicate Rochester's long and thorough tryout of Hess-Bright Ball Bearings.

¶ Go to it directly by asking us to submit a quotation to equip your present and your proposed cars with Hess-Bright Ball Bearings.

¶ If you'll answer these questions, we'll do the rest:

Weight of car empty, including brake rigging but excluding trucks.

Maximum number of seated passengers.

Maximum number of standing passengers.

Total weight of trucks, excluding motors.

Weight of motors and number per truck.

Assembly drawing (plan, front and side elevation) of a truck equipped with plain bearings.

Detail drawings of the axle, wheels and present journal box.

And remember that Hess-Bright Ball Bearing Journal Boxes can be designed to interchange with plain bearing boxes.

Manufacturing Co.

venue, Philadelphia, Pa.

e Thoroughly Adjudicated

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Tough Stuff!

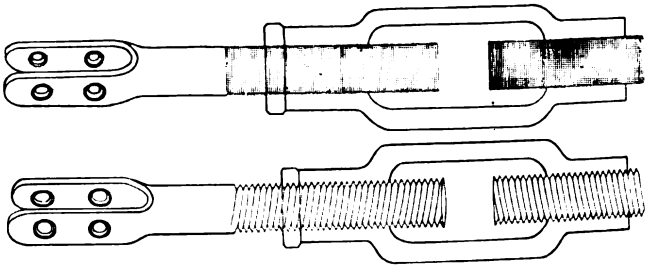
You'd have to wait too long to note the wear on

BOYERIZED PRODUCTS

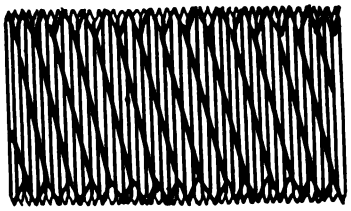
if you installed them on your trucks today

So take a hammer, a saw, a file and a chisel and do your best to worst a Boyerized brake pin. It can't be done. Boyerized pins are tough all the way through and case hardened 1/16" deep. Smoothed to a true diameter, they will keep your trucks out on the line earning profits. There are 40 different sizes of them in stock ready for prompt delivery to the railways who want the best pins for the least money. The same processes that made Boyerized pins such a great success are carried out in the manufacture of Bemis manganese brake heads, transom plates, center plates and body bushings.

The New Fine-Thread Bemis Turnbuckle



The Old Coarse-Thread Turnbuckle



Note the Difference Between Old Thread and New!

We are now ready to supply a turnbuckle having more than twice the usual number of threads, thus assuring finer adjustment, minimum wear and greater strength for the same diameter rod.

Another most important advantage is that the nuts will stay tight once they are jammed.

BEMIS CAR TRUCK COMPANY Springfield, Mass.

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Section 8

Rolling Stock

THIS section is devoted to the car and truck, more particularly to—

Recent All-steel Passenger Car Construction

Radial Axle Trucks to Allow Longer Single-truck Bodies

Electric Trucks for High-speed Service

And to latest designs for the better interchange of passengers and quicker fare collection.

Digitized by Google

We Will Help You

When you make a Galena Contract, you unload your lubricating troubles on us, and we immediately supply you with **the best** oils for each service and take steps to eliminate all lubrication and allied troubles. Naturally, this results in a lower cost, and in any event our guarantee protects you.

Galena-Signal Oil Co.

Franklin, Pa.

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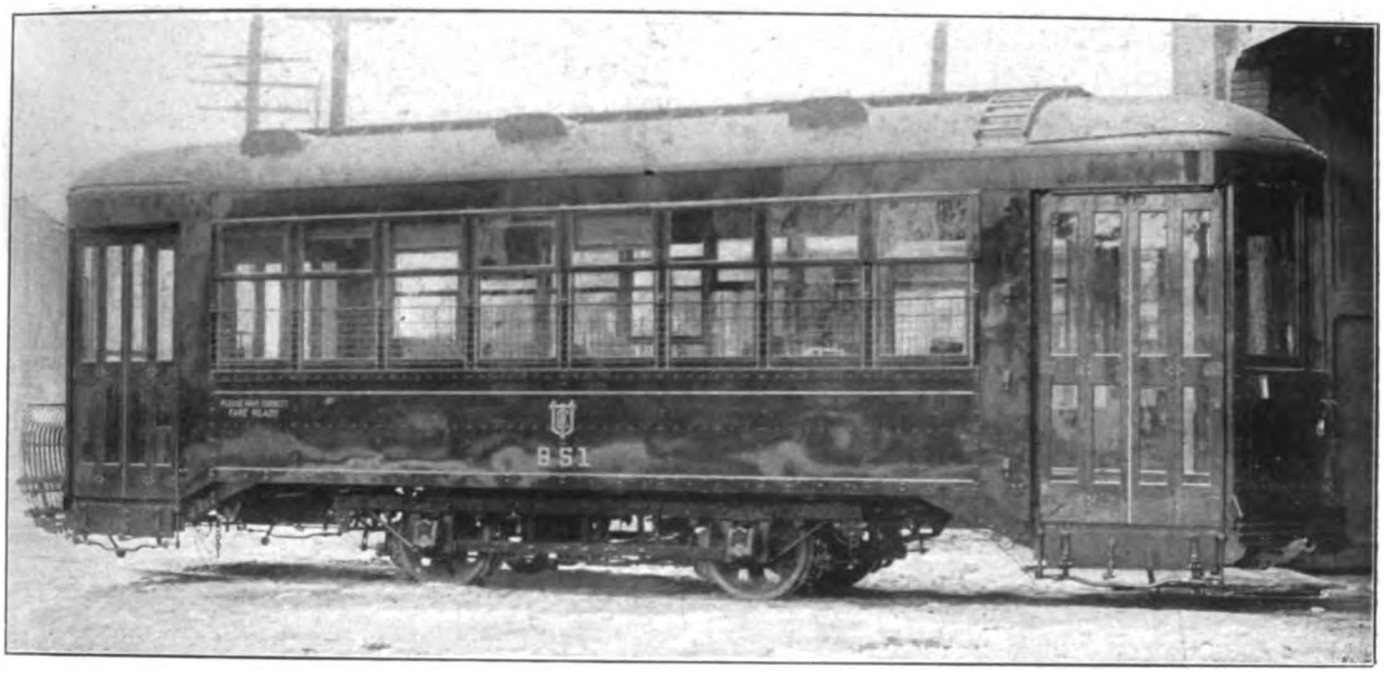

United Traction Co. (Albany, N. Y.) Steel Cars 33′ 4″ long, successfully operated on TAYLOR E. H. SINGLE TRUCK 8′ 0″ wheel base, without END-OSCILLATION.

"Taylor-Made"

Trucks are *fitted* to your requirements

Light in weight, strong in construction, simple in design, and properly proportioned.

They give easy and noiseless riding, prevent wear and side oscillation of cars, reduce maintenance, motor and wheel flange wear, and save power.

Every part of a Taylor Truck is readily accessible and simple in construction.

The brakes on a Taylor Truck will not chatter, and the Taylor E. H. Truck is absolutely non-teetering.

All Taylor Trucks are designed, built and inspected in our own shops from foundation framing to springs and journals.

Your inquiries for new or replacement work are solicited.

NOTE:— We carry in stock a large amount of wear and tear parts, and supplies for all types of Taylor Trucks, and make immediate shipment, thus obviating your investing in a large stock of supplies, as you are obliged to do with other makes. We also manufacture T.M.C. Steel Tired Wheels and TAYLOR MADE springs for all makes of Trucks. Let our shops be your stock room.

TAYLOR ELECTRIC TRUCK CO.

Established 1892

TROY, N. Y.

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Storage Batteries
in
Electric Railway Service

LOAD REGULATION

For carrying peaks and fluctuations of load, especially in connection with water-power developments or where power is purchased on the basis of maximum demand, the "Chloride Accumulator", or the "Tudor Accumulator" is adapted.

LINE REGULATION

Due to the present high price of copper there are cases where the use of a battery for maintaining voltage is more economical than the purchase of copper for feeders. The "Chloride Accumulator" has been largely used in this service by many railways.

STANDBY SERVICE FOR EXCITER BUS

It is standard practice to install a storage battery connected to the Exciter Bus to prevent interruption in the supply of current for field excitation. Either the "Chloride Accumulator," the "Tudor Accumulator" or the "Exide" Battery can be used.

OIL SWITCH SERVICE

Storage batteries are used in power houses and sub-stations for the operation of oil switches and supplying current for pilot lamps and emergency station lights in case of failure of the power supply. For this service the "Chloride Accumulator," the "Tudor Accumulator" and the "Exide" Battery are used.

STORAGE BATTERY STREET CARS

For infrequent service or for conditions where trolley wires are prohibited, storage battery cars offer the most economical and profitable solution of the transportation problem. The "Hycap-Exide" Battery has been largely used in this service. In New York City alone there are in operation nearly 200 storage battery cars equipped with "Hycap-Exide" Batteries.

MULTIPLE-UNIT CONTROL

The "Exide" Battery and the "Tudor Accumulator" are used by a number of railways for furnishing a supply of low voltage current to be used in connection with the operation of multiple-unit control systems.

INTERURBAN CAR LIGHTING

A number of interurban electric railway companies have installed batteries on their cars to maintain steady illumination and to overcome fluctuations caused by changes in line voltage, interruptions in third rails at crossings and switches or by temporary failure of power supply. For this service the "Exide" Battery is particularly adapted.

HEAD AND TAIL LIGHTS

The "Exide" Battery is being used in connection with head lights and tail lights for furnishing current in case of interruptions in power supply.

Detail information on batteries for any of the above services can be secured from any sales office of the company.

THE ELECTRIC STORAGE BATTERY CO.

Manufacturer of
The "Chloride Accumulator", The "Tudor Accumulator",
The "Exide", "Hycap-Exide", "Thin-Exide" and "Ironclad-Exide" Batteries

New York Boston Chicago Washington **PHILADELPHIA, PA.** Rochester Detroit St. Louis
Cleveland Atlanta Pittsburgh **1888-1916** San Francisco Denver Toronto

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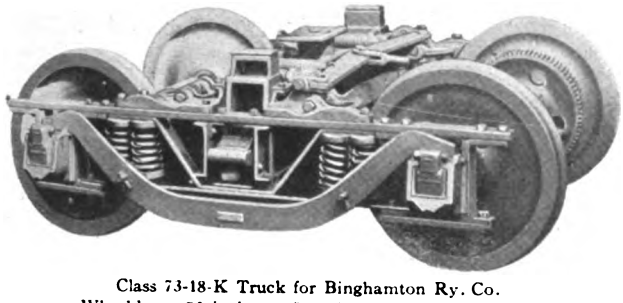
BALDWIN

The equalized pedestal type of truck is the Baldwin standard for heavy electric railway service.



Class 73-18-K Truck for Binghamton Ry. Co.
Wheel-base, 73 inches. Carrying capacity, 22,000 lbs.

There are three principal classes of this type.

The "K", for suburban service;

The "A", for interurban service with medium weight cars.

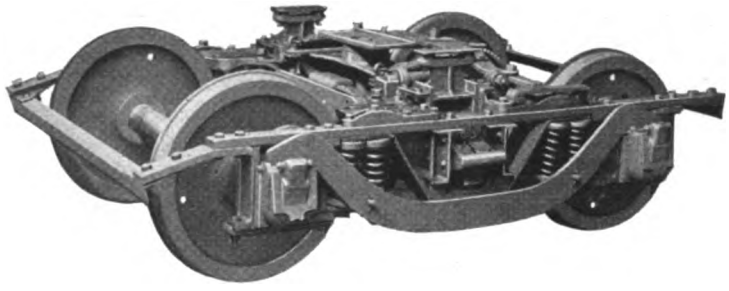
The "AA", for heavy high-speed interurban service.

Among the many excellent features of these trucks are the following:

Light weight in proportion to carrying capacity, combined with ample strength for the service requirements.

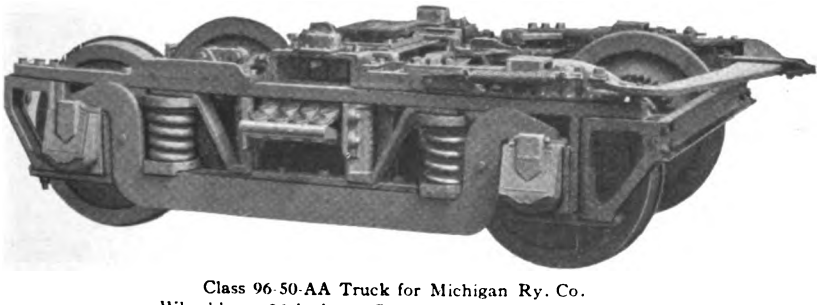
A rigid frame, reenforced by transom gussets so designed as to prevent "diamond pointing."

Superior riding qualities, secured by a combination of coil equalizing beam springs and full elliptic bolster springs.



Class 75-25-A Truck for St. Paul Southern Electric Ry. Co.
Wheel-base, 75 inches. Carrying capacity, 25,000 lbs.

All Baldwin trucks are built of tested materials, with the principal parts designed from a stress diagram, and held together by turned bolts in reamed holes. The brake work parts are bolted together, instead of pinned; and the bolts are fitted with compression springs to prevent chattering. The work throughout shows the same thoroughness that characterizes Baldwin locomotive construction.



Class 96-50-AA Truck for Michigan Ry. Co.
Wheel-base, 96 inches. Carrying capacity, 50,000 lbs.

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA, PA.

REPRESENTED BY

F. W. Weston, 120 Broadway, New York, N. Y.
Charles Riddell, 627 Railway Exchange, Chicago, Ill.
C. H. Peterson, 1210 Boatmen's Bank Bldg., St. Louis, Mo.
George F. Jones, 407 Travelers' Building, Richmond, Va.
A. Wm. Hinger, 722 Spalding Building, Portland, Ore.
Williams, Dimond & Co., 310 Sansome St., San Francisco, Cal.

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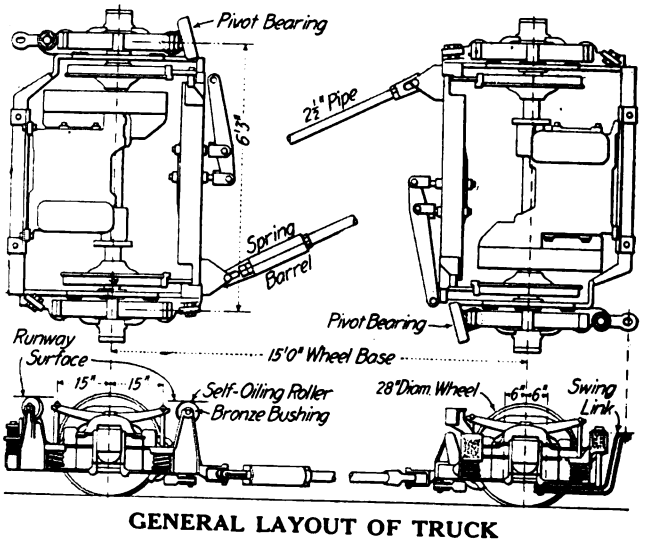
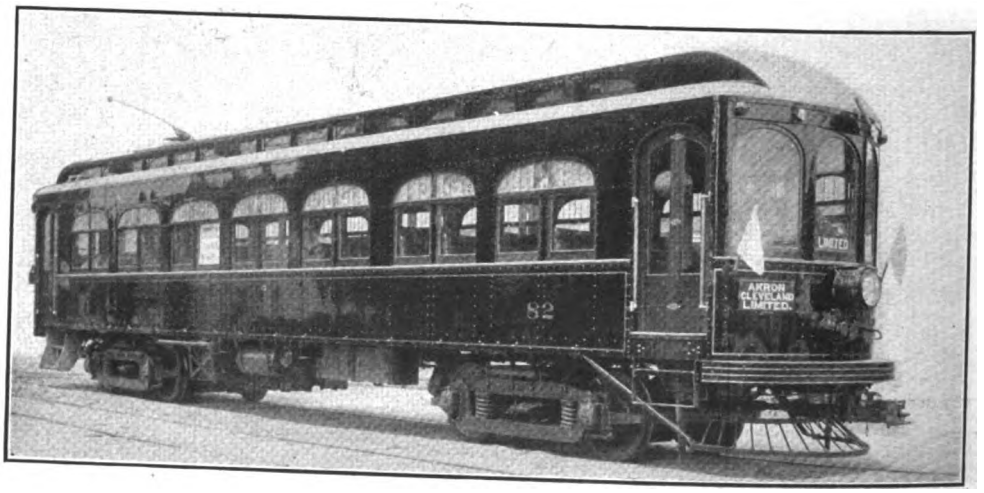


GENERAL LAYOUT OF TRUCK

Our Radial Trucks are unequalled by any other flexible truck for lightness, simplicity, length of wheel-base, and conformity in details to Association standards.

Particulars gladly furnished.

Philadelphia Holding Co., 505 Chestnut St., Philadelphia



One of fifteen new

Jewett Steel Cars

Ordered by the Northern Ohio Traction & Light Co.

Seven of them have baggage compartments—eight have smoking compartments. All have spacious white enameled saloons with running water, etc. Pressed steel posts—steel plates throughout—steel grained mahogany interior finish—chanarch and composition flooring with battleship linoleum in aisles—these are some of the details of these "cars of character."

Let us bid on your specifications.

THE JEWETT CAR CO., Newark, Ohio

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Crane Runway for Rail and Water Connections

LACONIA

A Modern Plant for Modern Cars

You are invited to examine these pictorial proofs of our ability to produce to your satisfaction any type of modern electric rolling stock from the simple body or truck to the completely equipped car ready to run.

You are also invited to note that these facilities are at your disposal for the manufacture of anything you may require in wood or metal car details.

LACONIA CAR COMPANY

EXECUTIVE OFFICES,
BOSTON, MASS.

WORKS,
LACONIA, N. H.

A Portion of the Fabricating Shop

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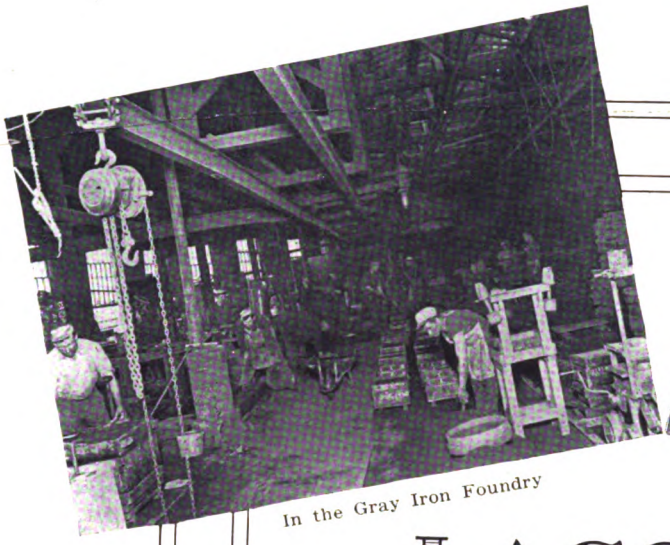
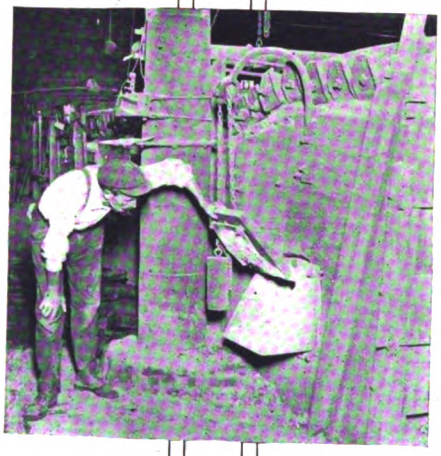


In the Gray Iron Foundry

In the Malleable Iron Foundry

LACONIA

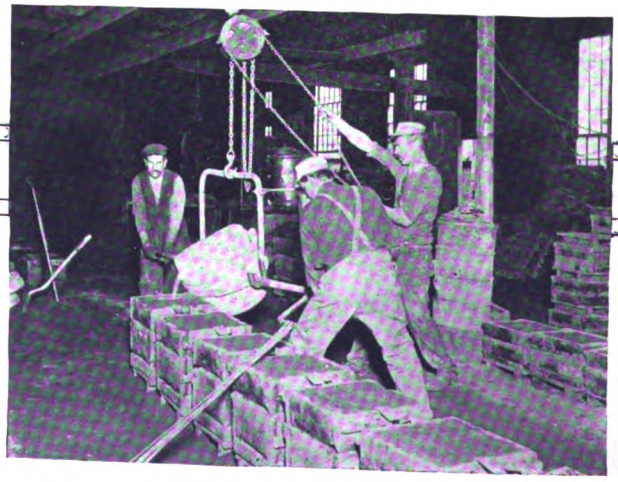
Facilities for Car Supplies



A Battery of Air Furnaces

Both our gray iron and malleable iron foundries are of ample capacity to handle outside work expeditiously in addition to that for car orders. Brake rigging, brake-shoe hangers, truck parts, bolsters, truss rods, window grills, etc., are standard products of our foundries and forge shop.

A "One-Man" Pour



Making a 400-Pound Pour

LACONIA CAR COMPANY

EXECUTIVE OFFICES
BOSTON, MASS

WORKS
LACONIA, N.H.

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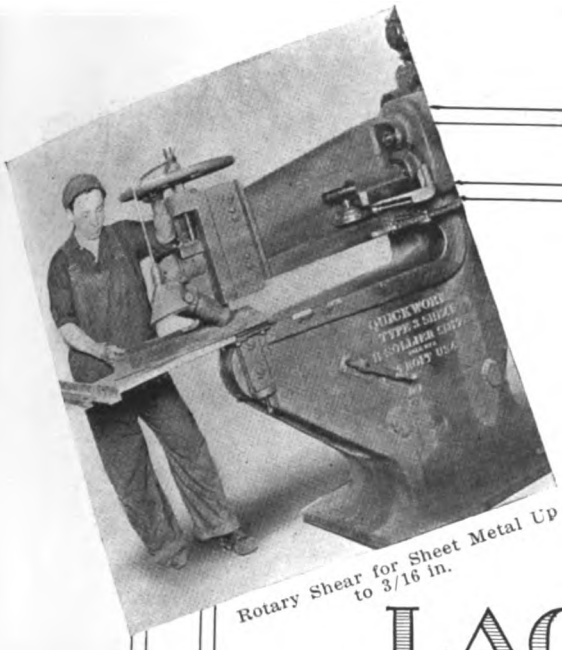
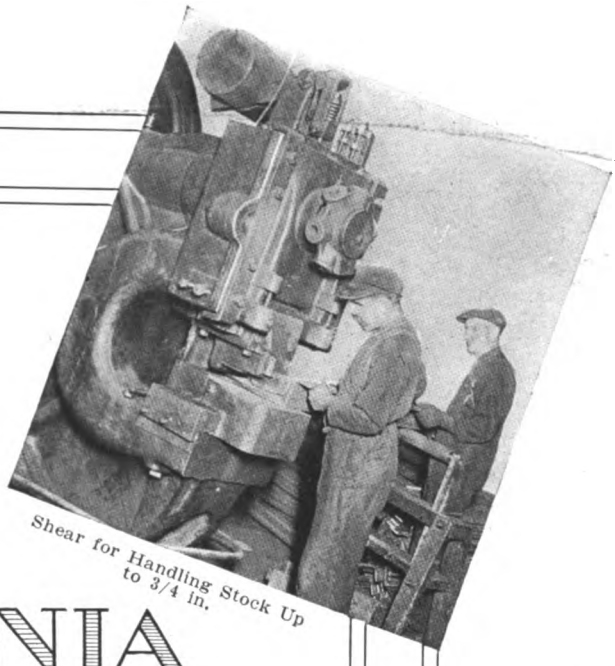


Rotary Shear for Sheet Metal Up to 3/16 in.

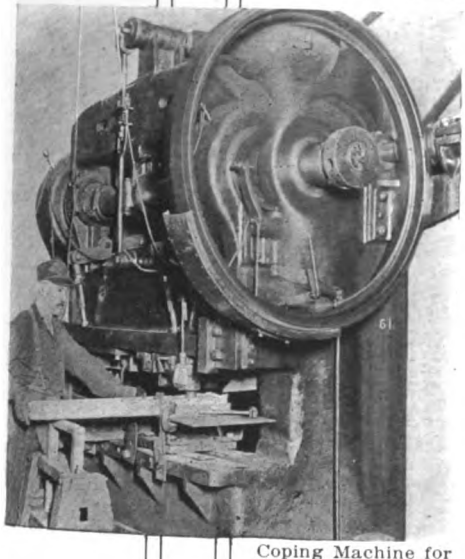


Shear for Handling Stock Up to 3/4 in.

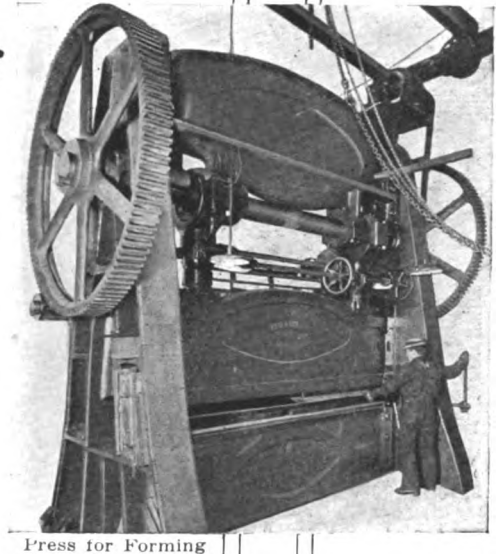
LACONIA

Facilities for Steel Cars

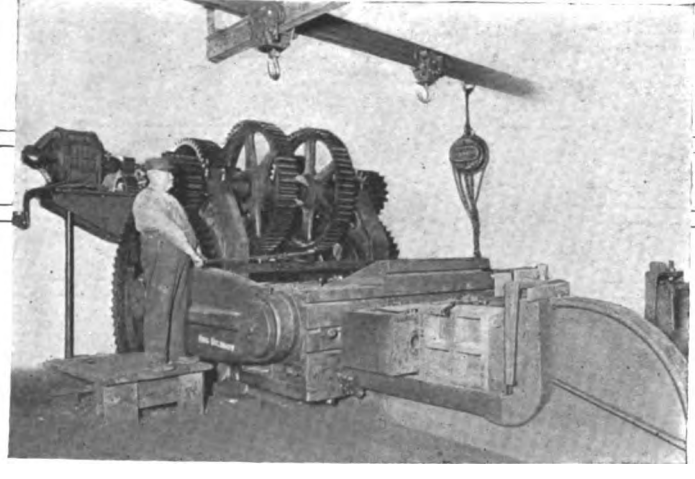
These machine tools are typical of the modern apparatus used by this Company for the accurate and efficient construction of steel cars. The bulldozer is the largest of its kind, while the machine for coping is but one example of Laconia up-to-date shop equipment.



Coping Machine for Plates and Structural Work



Press for Forming Steel Shapes and Moldings



"King Solomon," the 500-Ton Bulldozer

LACONIA CAR COMPANY

EXECUTIVE OFFICES
BOSTON, MASS

WORKS
LACONIA, N.H.

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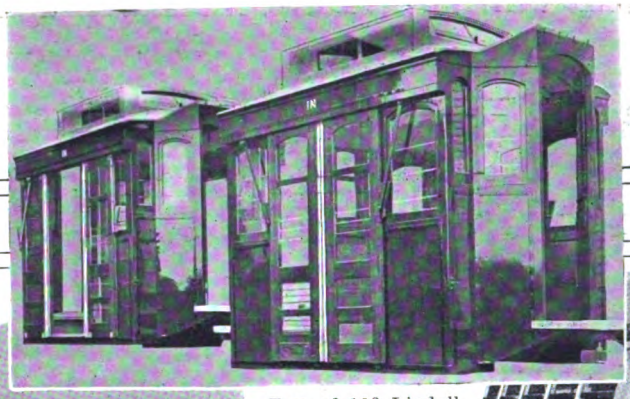
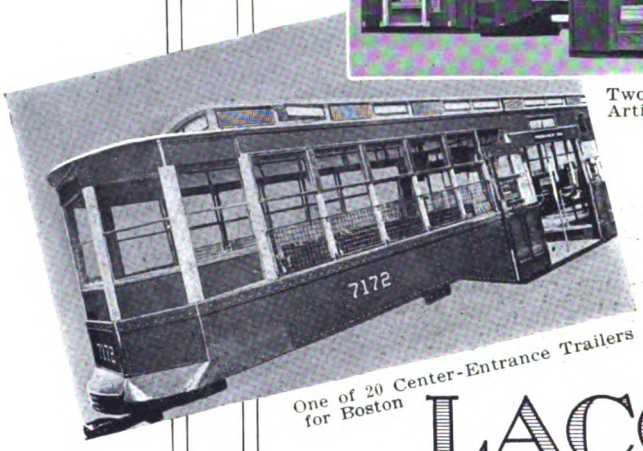
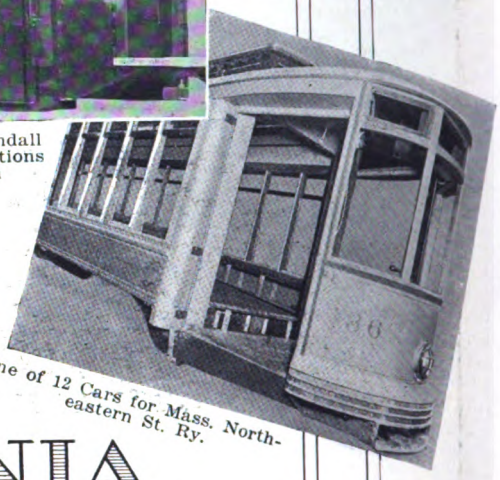


Two of 102 Lindall Articulated Sections for Boston



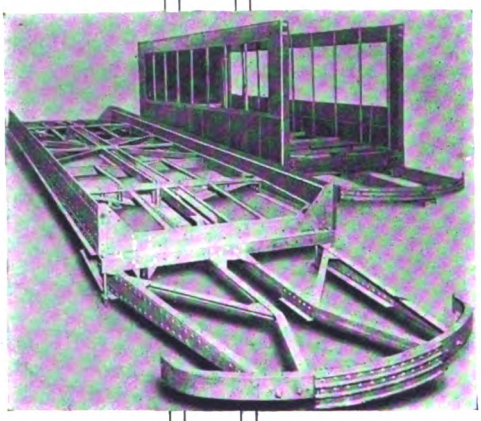
One of 20 Center-Entrance Trailers for Boston



One of 12 Cars for Mass. Northeastern St. Ry.

LACONIA

Cars in the Making

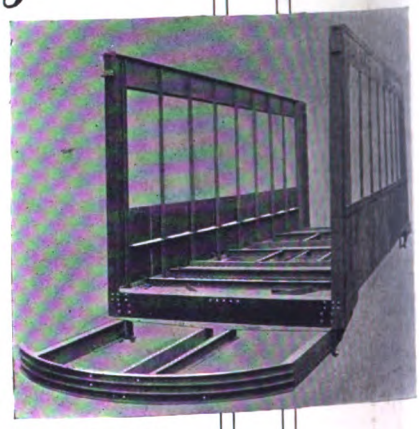


One of 5 Underframes for Holyoke

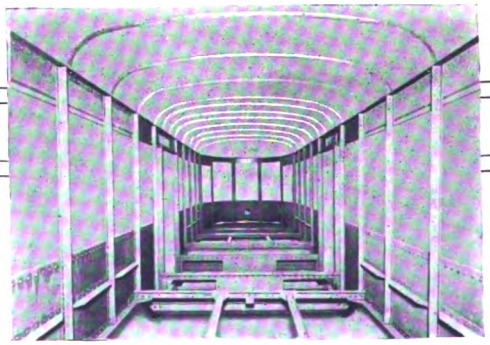
During the first nine months of 1916 this Company has received orders for nearly 500 electric cars and over 300 sets of trucks.

These orders represent almost the entire range of service—for end-platform motor cars, center-entrance trailers, center-entrance motor cars and for Lindall articulated sections.

We solicit your patronage in the knowledge that we have both the means and the will to give you the best obtainable in car design and construction.



Underframe and Side Frame for Albany



One of 3 Laconia Center-Entrance Motor Cars for Bangor

LACONIA CAR COMPANY

EXECUTIVE OFFICES
BOSTON, MASS

WORKS
LACONIA, N.H.

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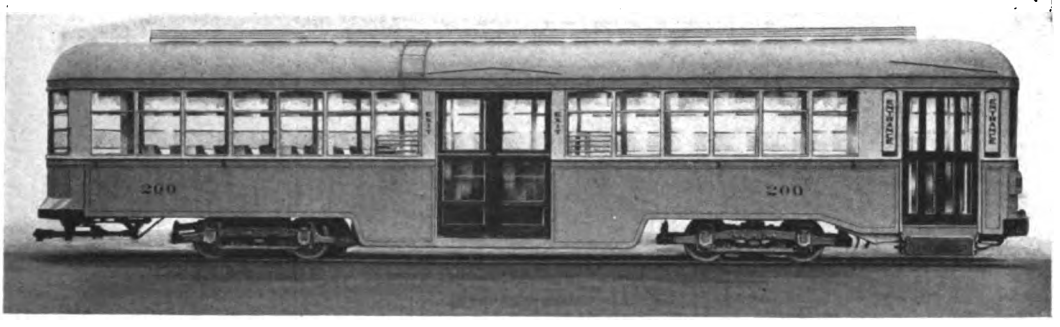
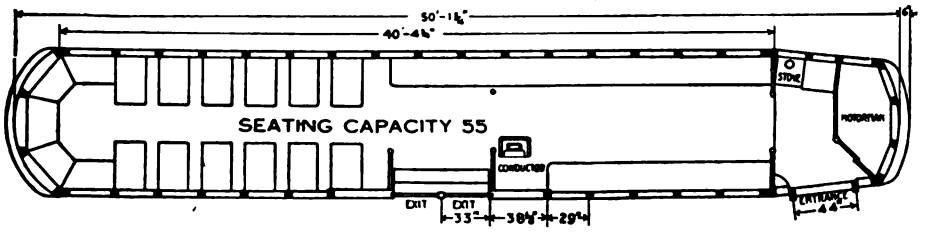
The Car Rider's Car



SIMPLY a front-entrance, center-exit car with the conductor at the center collecting prepayment fares from passengers who pass him and go to the rear and collecting fares from those in the front section as they leave the car. No waiting on the platform or in the street for passengers ahead to pay their fares. No holding up of the entire line by large groups of passengers at busy points passing one at a time into the cars and paying their fares as they



enter with many delays due to getting change, transfers, tickets, and having their questions answered. Passengers board the car two at a time with no holdup and under the eye of the motorman who controls the entrance by his control of the folding doors and step. In less than half the usual time all are aboard and while the loading is swiftly progressing in front unloading is going on at the center exits.

One hundred and fifty-six of these cars are in operation in Cleveland. Sixty are being built for Toledo, fifty for Rochester, twenty-five for Syracuse, ten for Utica and ten for Schenectady.

PETER WITT, 630 Leader Building, Cleveland

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St. Louis Car Company

Light-weight Units have come to stay. We have designs for single end and for double end operation. We have built light-weight cars with various methods of door operation. Weight of St. Louis Light-weight Units range from 10,000 lbs., to 14,000 lbs., complete. A sample of our "Bantam" car and truck can be inspected at the Convention.

Don't fail to see it.

St. Louis Car Company

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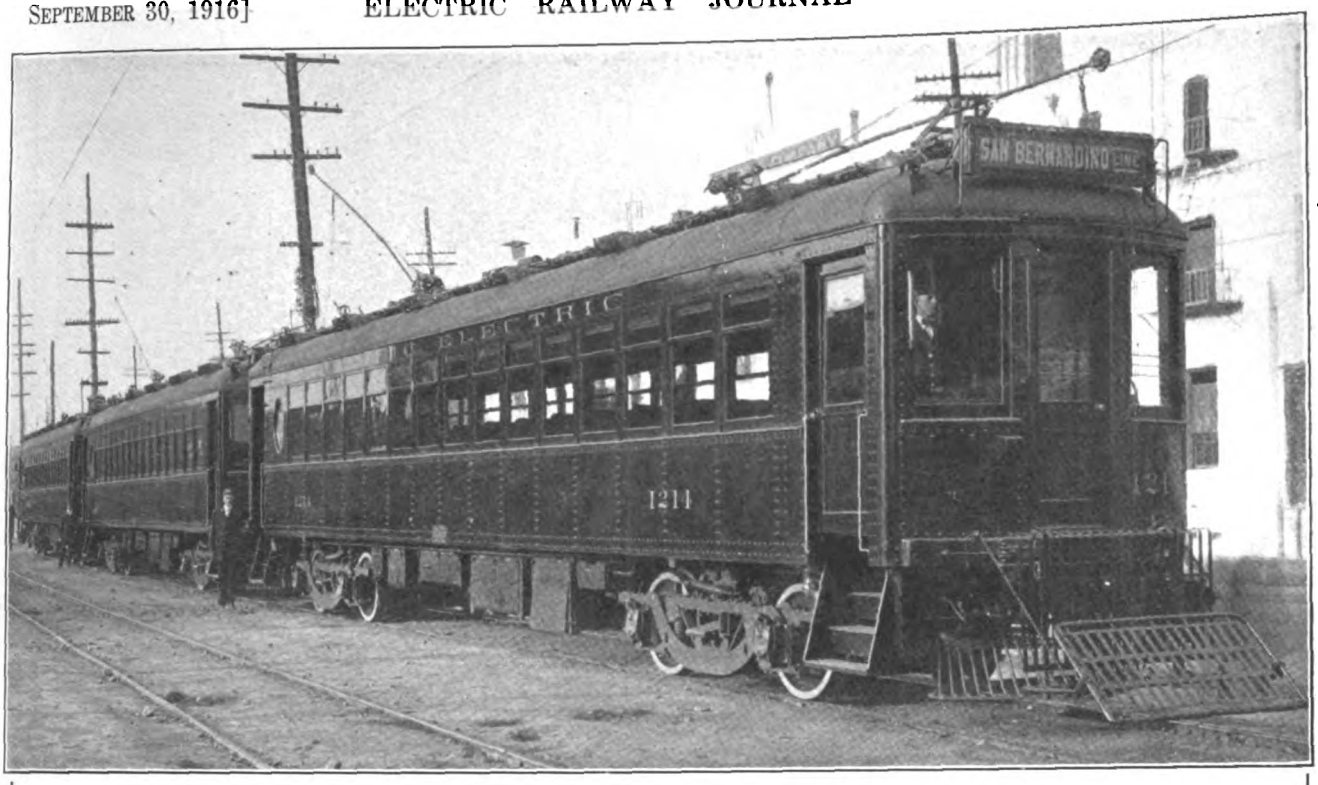

Steel Cars

First for Safety and Traffic Promotion

Three hundred and fifty thousand pounds (350,000 lbs.) is the approximate weight of this three-car train when carrying its full load of 180 seated passengers.

Sixty miles an hour (60 m.p.h.) is the rate of speed at which this train is propelled over most of the 63-mile run.

Between Los Angeles and San Bernardino

This is the latest and best-equipped line of the Pacific Electric Railway. It was built not only to bring San Bernardino into closer touch with Los Angeles, but to attract high-class tourist travel.

The twenty-five (25) steel cars which we have furnished for this magnificent line have now been in operation almost a year, giving that safety and comfort that spell BETTER BUSINESS and a Pleased Public.

Write our nearest office about your needs in non-burning, non-telescoping cars.

Pressed Steel Car Company

New York Pittsburgh Chicago Washington, D. C.

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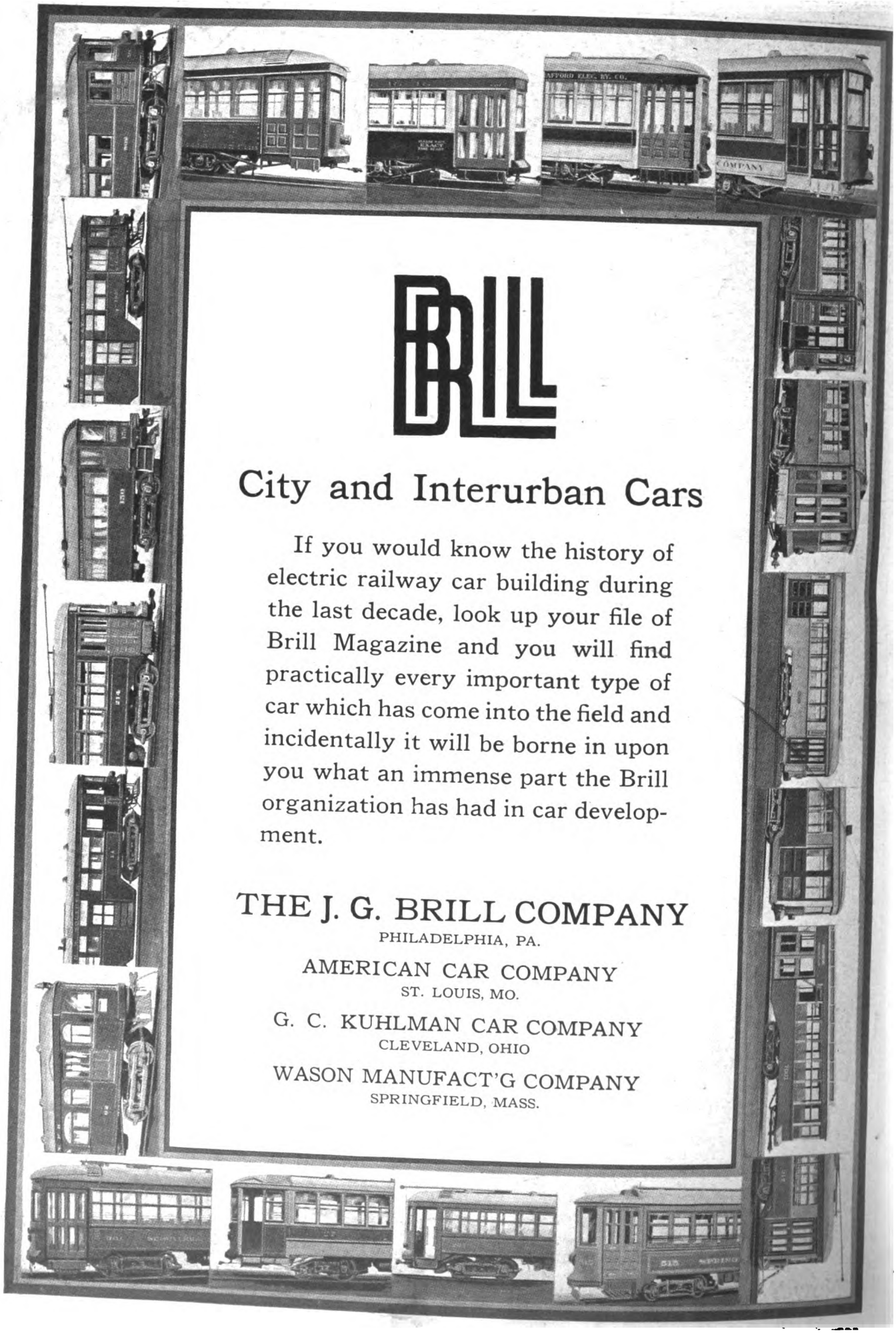

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BRILL

Car Trucks and Specialties

As for truck development—the modern single-motor type and the "Radiax" among other Brill trucks; the Graduated Spring System, the Bolster Guide, the Side Swing Dampener, the Half-Ball Brake Hanger, and other features have been introduced in recent years and together they mark the progress of safety, easy riding, and the reduced cost of maintenance.

THE J. G. BRILL COMPANY

CABLE ADDRESS: "BRILL" PHILADELPHIA

LONDON OFFICE; 110 Cannon St., E.C.
CABLE ADDRESS: "AXLES" LONDON

CIE J. G. BRILL, 49 Rue Des Mathurins, PARIS
CABLE ADDRESS: "BOGIBRIL" PARIS

AGENCIES IN
BELGIUM, HOLLAND, ITALY, AUSTRALASIA, ARGENTINE, URUGUAY, NATAL, TRANSVAAL and ORANGE RIVER COLONY

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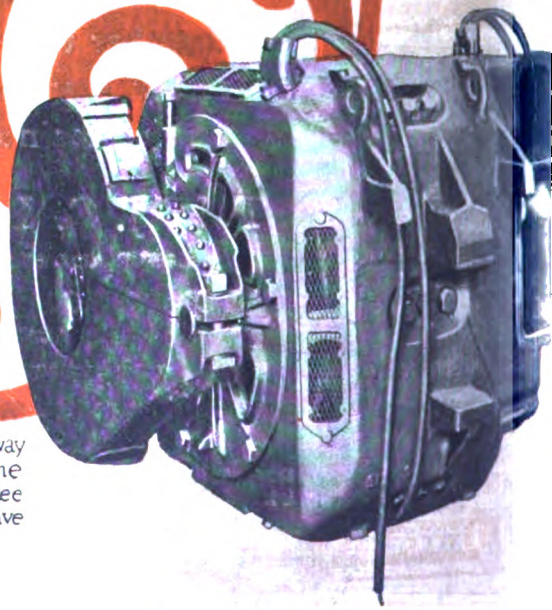
The G-E Ventilated Railway Motor

was first introduced at the 1911 Atlantic City Convention.

It was a pioneer then; it is the standard of excellence for the entire range of electric railway operation now.

G-E Ventilated Railway Motor used on one-man cars



G-E Ventilated Railway Motor used on the Chicago, Milwaukee & St. Paul Locomotive

General Electric Company

General Office: Schenectady, N.Y.

Sales Offices i all large citie

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Kansas City Railway Gains Public Favor

An Account of the Steps Taken by the Kansas City Railways to Change Adverse Public Opinion, Bring About Political Peace and Establish Conditions Which Would Permit Refinancing on a Sound, Permanent Basis

AFTER a five-year storm of querulous criticism and destructive regulation the Kansas City Railways, of Kansas City, Mo., and Kansas City, Kan., emerged practically over night into the sunshine of public favor and political peace. Broadly, the change was due to the fact that the public had grown tired of the chiding of the press and the fault-finding of the politicians. Business interests also found that the abominable treatment accorded the outside capital invested in Kansas City's public utilities had spread broadcast and that the financing of any project in or about Kansas City had become almost impossible. And so the story goes, as it has gone, and is going, in a number of other communities bound upon destroying the investment in their public utilities. While it is impossible to outline in minute detail how this radical change in sentiment was brought about, the salient features of the process of evolution are presented in this article.

HISTORY OF THE CONTROVERSY

Early in 1909 maturing bond issues of the subsidiary companies of the Metropolitan Street Railway compelled the management to negotiate for a new blanket franchise in order to make complete refinancing possible. Although the existing franchise would not have expired until June, 1925, or sixteen years later, it was impossible to negotiate on reasonable terms the sale of new bonds which would mature with the existing franchise. In April, 1909, at the suggestion of the railway management, the City Council and the City Utilities Commission employed expert accountants to investigate the railway's financial condition and to determine the amount of money that was being expended for operation, and that necessary to provide for equipment and accommodations to insure comfort, convenience and service for the public.

Immediately upon opening these negotiations there sprang up opposition to granting an extension to the franchise which had sixteen years to run. In the months that followed, however, a franchise agreement was drafted which was satisfactory to the business interests of Kansas City, and the railway company. The terms of this ordinance were bitterly fought by some of the local newspapers, but to combat their position, Bernard Corrigan, then president of the Metropolitan Street Railway, had the franchise contract printed in pamphlet form and distributed to the public He accompanied this pamphlet with a summary of the benefits to the city, which included a reduction in fares. The city was to receive 50 per cent of the net earnings; it was given the right to audit and regulate the salaries of railway employees, to control additions to capital account, and to purchase the property at the expiration of the existing franchise. There were many other advantages to the city in the way of track extensions and the purchase of rolling stock. Certain newspapers continued to impugn the motives of the company and the controversy, which was to continue for a period of five years, was begun in earnest. Later the ordinance was introduced in the City Council, where it was amended in an acceptable manner and submitted to the voters on Dec. 16, 1909. Although the franchise had been passed by the City Council and approved by the Mayor, the opposition of the press caused its rejection by a large majority in a heavy vote.

With the possibility of obtaining a new franchise definitely settled, the management was still confronted with the problem of refinancing. While the earnings at that time permitted maintenance and operation to continue, extensions and improvements could not be financed. Chafing under the continued attack of the press and a public disgruntled by the failure to make needed improvements and extensions of service, the railway company lapsed into a deplorable state both financially and physically. In June, 1911, it became apparent that the requirements of the existing franchise would not meet the demands of the public in regard to service and improvements. Much new capital was necessary to make extensions to provide for the phenomenal growth of both Kansas City, Mo., and Kansas City, Kan. The government census of 1910 showed that the population of these two cities had increased approximately 52 per cent over what it was in 1900, and every indication pointed toward a continued growth in the same proportion. Since modifications in the existing franchise were absolutely necessary, as well as an extension of the time limit to make it possible to obtain money for these improvements, and the city had refused to grant a new contract, a receivership offered the only recourse. Upon the petition of the Kansas City Railway & Light Company, the holding company of the railway and light properties, receivers were appointed June 30, 1911. This action disclosed the financial difficulties of the company and prevented an immediate foreclosure of the various underlying mortgages, with the consequent probable disintegration of the whole system. This situation, of course, also made it impossible to furnish adequate service and the system continued in disfavor with the public.

The foregoing outline of the Metropolitan Street Railway's vicissitudes brought it up to the turning point

Brighten the City Where You Are!

Billy Sunday says:

"Bless the Street Car men.

"I've noticed how quickly the tabernacle is filled I've noticed how quickly the crowds are carried away after a meeting.

"I'm glad for this spirit of co-operation by the Street Car Company.

"The Street Car SERVICE is the BEST I've ever seen in ANY city where I have held meetings!"

And Mr. Sunday has held great meetings in practically every big city in this country. So he KNOWS what he is talking about. He KNOWS good service,

GAINING PUBLIC FAVOR—WHAT AN ADMIRER SAYS OF KANSAS CITY SERVICE NOW

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CAR COMPANY HAULS 16,000 PERSONS FROM THE TABERNACLE IN 20 MINUTES

Ingenuity of Traffic Experts Taxed to Have Rolling Stock at Right Time; Electric Button Solves Problem.

Speaking of records—

It took the Kansas City Railways company 20 minutes to haul away 16,000 persons from the Billy Sunday tabernacle last night. It cost the 16,000 who rode the street cars $1,600 to attend the meeting. There were 5,000 others who couldn't get in, which made $500 more spent for car fare.

To handle the crowd the ingenuity of the railway officials has been taxed.

It fell to the lot of W. C. Harrington, superintendent of transportation, to solve the problem. [illegible] Harrington didn't leave Eighth

GAINING PUBLIC FAVOR—A NEWSPAPER TRIBUTE TO KANSAS CITY'S PRESENT RAILWAY SERVICE

of one of the bitterest controversies in utility history. At the time receivers were appointed it appeared that Kansas City publicly and politically was bent upon the complete destruction of its one-time prosperous public utility. Despite the fact that the railway system was in the federal court it was still subject to bitter attacks by some of the newspapers and the public which had fought it for years. These newspapers demanded over and over again that the property be taken out of the hands of the receivers and that the company be compelled to transact its business without a franchise. One of the first moves made by the Federal Court was to determine the railway's capital requirements to meet the public demands. The service had retrograded, the cars were in need of repairs and the lines in various parts of the city needed rehabilitation. In the outlying districts people were clamoring for extensions because

GAINING PUBLIC FAVOR—CARTOONIST'S IDEA OF FRANCHISE OPPOSITION IN KANSAS CITY

they, for the most part, had built their homes in the belief that the railway lines would be extended into their districts.

As the result of all this, Federal Judge Hook gave an opinion in January, 1912, that the physical rehabilitation of the street railway property was impossible without a financial rehabilitation. It was also pointed out by the Court that money could not be obtained to make the extensions demanded, to purchase new cars and remodel the old ones, to build up the trackage, to assist in the construction of viaducts, and to do much other building work unless arrangements were made to secure outside money. It was also the opinion of the Court that outside capital could not be obtained without new contractual relations with the city. The Court then directed the receivers to open negotiations with the city, and it, in turn, agreed that a new contract was necessary, but that a revaluation of the property should be made before the preparation of a new franchise would be undertaken. These negotiations were in progress at a time when the public had become more or less apathetic, although the antagonistic press continued to find fault.

Accordingly a physical valuation of the property was made in 1912 and accepted after some delay by both the city and the receivers, and immediately the work of preparing the form of contract was undertaken. It was not until the spring of 1914, however, that this ordinance assumed practically final form, and during its preparation a policy of fullest publicity was adopted which had much to do with regaining public confidence. In the past the railway company had made the mistake of taking an active part in politics and of conducting its operations behind closed doors. During the negotiations a municipal election was held, and as an indication of the then existing pulse of the public, the officers, who had practically perfected the new public utility contract ordinance, were returned to office by the greatest plurality in the history of the city. In June, 1914, the ordinance was completed and passed almost unanimously by the City Council, and in the July following it was approved by a large majority vote of the people. This vote of public confidence disarmed the antagonistic press and the remaining opposition and began the era of satisfactory public relations which the present management is making every effort to maintain.

The explanation of this practically over-night change in public sentiment is somewhat difficult. To begin with, the public, which had followed the leadership of certain local politicians and the press, both bent on ruining the railway company, had grown tired of the senseless controversy. To convert completely those who were in this frame of mind the railway's first important step in the way of publicity was to convince them that improvements and extensions could not be made unless a new franchise was granted. To give further force to this suggestion the business interests had found that it was practically impossible to obtain outside capital to promote a new project because of the treatment the city had accorded the investments in its public utilities. The public utilities securities were held broadcast and Kansas City's reputation for destroying invested capital had been spread by these security holders. Aside from the publicity given to the effect that this long-drawn controversy had had on obtaining capital, the active co-operation of all commercial associations was sought, and their support was an important factor in molding public opinion. These associations were convinced that the interests of the community and private business were one with the interests of the public utilities, and if Kansas City expected to restore confi-

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dence in the minds of outside investors it would have to come to the aid of its practically ruined public utility property.

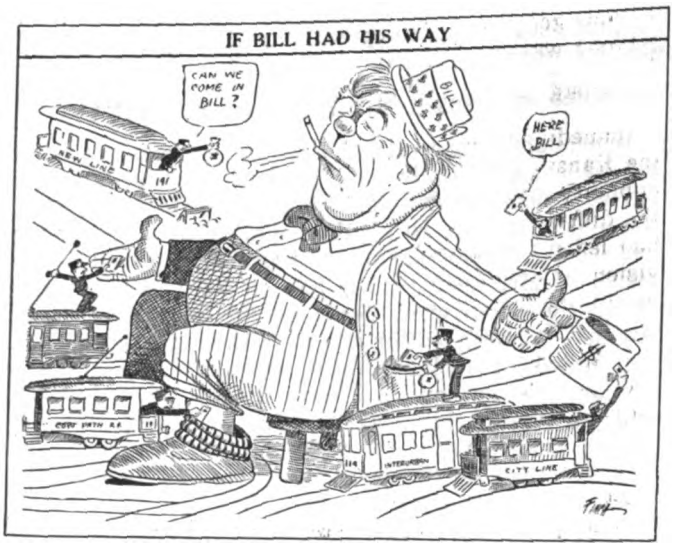
PUBLICITY CAMPAIGN PRECEDING FRANCHISE ELECTION

For the six weeks prior to the vote on the franchise, which was held on July 7, 1914, a most active campaign of publicity was conducted. This was necessary to refute the arguments of the Kansas City *Star* and *Times*, which had led the opposition through the five-year controversy. The plan of publicity followed during this campaign was along two lines, one through the agency of two of the local newspapers that championed the cause of the street railway, and the other through speech-making tours through the various voting precinct headquarters. The newspaper campaign took the form of challenging every statement made by the opposition papers and refuting every argument made by opposition politicians. It also constructively presented the case of the street railway company from the standpoint that the city's credit among outside investors had been greatly injured and the city could not expect to make marked industrial progress until its reputation for fair dealing had been vindicated by establishing the right relations with its public utility. This publicity campaign was conducted in the form of advertisements, editorials and articles. The speech-making campaign in the 200 or more voting precincts extended over practically the same period and these two lines of activity soon began to produce results.

One of the most compelling arguments in favor of voting for the prposed franchise was that it included extensions and additions to the property which would cost more than $2,000,000. This, of course, was of particular interest to the laboring classes. Furthermore, the adopting of the franchise was the first step toward municipal ownership, because under the amortization provision of the new ordinance the city would ultimately own the property. Aside from the direct and indirect arguments for the franchise the newspaper champions of the railway company published from day to day the names of business men, professional men and men in any walk of life who had announced themselves as favoring the franchise. This appeared under the title of an honor roll and it was of great value in influencing public opinion for the franchise. In connection with this campaign it is also interesting to note that as many as six or eight columns of material for and against the franchise appeared in each issue of the local newspapers. At the close of the six week's campaign the public had had its fill of the street railway franchise controversy and it was more than glad to cast a favorable ballot in order to get the question out of politics and the newspapers.

RAILWAY TAKEN OUT OF POLITICS

When Philip J. Kealy assumed the office of president of the Kansas City Railways he gave out a public statement to the effect that the ownership of the street railways had changed and that the company and the city had taken charge as partners. Quoting further from this statement, Mr. Kealy said: "It means a new order in Kansas City street railway affairs, built upon the recognition of mutual interests of the city and the company in the operation of the company. There will be no dodging of issues nor quibbling over demands or orders of the Missouri or Kansas public service commissions as to service." * * * * "It is planned to conduct the street railway property in as economical a manner as the needs of the traveling public and the welfare of its employees will permit. As to the welfare



GAINING PUBLIC FAVOR—ONE NEWSPAPER'S VIEWS OF FORMER TRACTION POSSIBILITIES IN KANSAS CITY

of its employees—it plans to have much to say in the future. As the company grows, so shall they grow.

"Of that which is history in street railway affairs, this company had naught to do. Situations arose upon which men justly agreed and disagreed. But they are of the past. Surely, resentment because of this cannot be cherished against the incoming management. Such conditions shall not arise under the present control, which will regard every person in Kansas City as friendly and refuse to believe otherwise until the contrary is proved.

"The Kansas City street railway system is an intricate one. Situations may arise in the immediate future that will try the patience of the company as well as of the public. Time will be required in perfecting complete reorganization and carrying out plans for betterment. Until they are perfected the management can only ask the public to wait. As rapidly as a definite plan has been arranged for the betterment of the public or employees it will be made public. The management wants the co-operation of the press, the business interests through the Commercial Club, the police department and the people as a whole in an effort to make

GAINING PUBLIC FAVOR—THE KANSAS CITY VOTER ABOUT TWENTY-SEVEN MONTHS AGO

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Kansas City's street railway system the best in the land. As time goes on this co-operation will be sought in more detailed ways."

WORK OF PERMANENT PUBLICITY DEPARTMENT

Immediately upon completing the reorganization of the Kansas City Railways President Kealy organized a publicity department solely for the purpose of obviating the difficulties into which the policy of the old company had led it. This department is under the direct supervision of Mr. Kealy and it has the active co-operation of all the department heads of the company. E. B. Atchley, formerly editor of one of the local newspapers, was appointed publicity agent, and associated with him are an assistant and a stenographer. The formation and purpose of this department were announced in all of the local newspapers, and since its organization all reporters call on the publicity agent for all the news regarding railway matters.

Shortly after the organization of the publicity department it began the publication of a monthly employees' paper, and, as outlined in the first issue: "It is intended to be the medium for the interchange of ideas between the men who constitute the brains, the bone and the sinew of this company; it is to be their paper; it is intended that each employee shall receive a copy of each issue, and it is hoped he and his family will read it carefully." Correspondents to the *Railwayan*, as this publication is known, have been appointed in every department headquarters, and they are paid $5 a month for furnishing personal news regarding the employees in their departments. Copies of the publication also are sent to all the school teachers, to the public library and its branches, and to every public reading room. Although there is some material included of interest to the general public, the *Railwayan* is intended primarily as a railway family newspaper.

From its inception it has been the policy of the publicity department to supply the newspapers and the public with all the information either may care to know about the operations of the company. Every corporate affair is of public interest under the new franchise. Operation is under joint control and five of the eleven directors are representatives of the city, hence it is especially appropriate that the outside door of the publicity department should be always open to the public. Although at first some of the newspapers were skeptical of this plan of publicity, they have gradually learned that there is nothing secretive about the publicity department and that they may depend upon it for everything in the way of railway news. All changes in service are advertised prior to their becoming effective, and from time to time feature articles are prepared and furnished to the newspapers regarding construction work, cost of improvements, etc. Recently President Kealy made an extensive study of the future development of traction facilities in Kansas City, and this was put into shape for the local newspapers which ran it with illustrations as a feature article. Experience has so far demonstrated that there are innumerable human interest stories regarding the Kansas City street railway operations and that it only requires a newspaper "nose for news" to unearth them.

In connection with accidents the publicity department makes it a point to see that reports of all the facts are accurate. In many instances it has been found that had the reporter been left to obtain his information from general sources, an account of the accident would have been published which would have been decidedly detrimental to the railway's interests, when, as a matter of fact, it was not to blame in the least. Moreover, the department has been able to guide public opinion where it's and the public's interests were in common, but it always makes a practice of giving both sides of any case. In other words, the publicity department sees that the newspapers and the public receive first-hand information and not rumors or hearsay, as nothing is kept from them.

WELFARE WORK IN THE ORGANIZATION

While much time and attention are being given to maintain that public confidence which was so apparent at the franchise election, President Kealy has not neglected the welfare of the company's employees. The *Railwayan* has in a large measure built up a fine spirit of goodfellowship among the employees in that it has formed a clearing house for ideas and the means of transmitting wholesome news items that occur in the departments of every railway system. Through it such questions as public good will, courtesy and the railway problems are presented from time to time for the information of employees, thereby fortifying them in their discussions with the public. The departmental baseball league and a season's schedule of games afford a means of contact for those who are enthusiastic about athletics. A fraternal aid and protective association organized among the employees provides for them and their families in case of illness or death.

One of the latest moves in the way of welfare work was the establishment of a loan bureau through which employees are loaned money without interest, and the appointment of a lawyer whose services are at the disposal of all the company's employees without cost to them. It is this attorney's duty to see that their legal rights are respected and that they are not imposed upon by unscrupulous lawyers or harassed by trumped-up demands. It is not the intention of the company to aid its employees in avoiding just debts, but it is its purpose that the attorney work out a satisfactory settlement or arrangement for payment. Shortly after this attorney's appointment it was discovered that there were numerous cases where the necessities or misfortunes of employees had compelled them to borrow money from ruthless money lenders. In order to obviate this in the future, the establishment of a fund has just been announced from which deserving employees in times of financial stress, may borrow money without interest.

Other activities which have been developed among employees of the railway company include a company band, and only recently a family jubilee of all the employees was held at the railway's expense. The spirit of the employees and the way they are receiving the welfare work undertaken by the management, was amply expressed by the fact that 11,000 persons attended this family jubilee. As matter of fact this response to the company's invitation literally swamped the committee on arrangements. Every department head has taken hold of this welfare work with zest and the response with which it is meeting among the employees has been a great satisfaction to the management. Moreover, this spirit among the employees has been of great assistance in maintaining the proper kind of public relations.

The street railways of Germany, according to the *Zeitschrift für Kleinbahnen*, have taken a very active part in the handling of troops of all kinds since the outbreak of the war, acting as feeders to the State railways. Although only about 3100 miles of track is included by the 300 street railway companies in Germany, more than one-half of the 52,000 street railway employees were called to arms before December, 1915, so that the substitution of platform men could be made in only a limited manner.

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Boston Elevated Seeks Financial Relief

Hearings Begun by Special Commission to Investigate Need of Additional Net Revenue—Proposed Remedies Look Toward Assurance of 6 Per Cent Dividends on Stock

PROBABLY the most important set of hearings in the operating history of the Boston (Mass.) Elevated Railway opened at the State House, Boston, on Sept. 25, for the consideration by a special recess commission of the company's plea for financial relief as advanced in a letter to Governor McCall May 22, 1916. The commission is composed of Lieut.-Gov. Calvin Coolidge, presiding; the president of the Senate, the speaker of the House, six members of the Legislature, and the members of the Massachusetts Public Service Commission and of the Boston Transit Commission. Frederic E. Snow of Gaston, Snow & Saltonstall, Boston, opened the case for the company, presenting an eighty-six-page brief and about thirty exhibits. It is expected that the hearings will occupy several weeks. The commission is required to report its findings to the Legislature by Jan. 15, 1917.

INVESTMENT OF THE COMPANY

The Boston Elevated Railway was incorporated by Chapter 548, Acts of 1894, and in 1897 it leased the West End Street Railway. Since that time it has operated the entire street railway system of Boston with the exception of the lines belonging formerly to the Lynn & Boston, and now to the Bay State Street Railway. The permanent investment in the system on June 30, 1916, according to the company's brief, amounted to $116,022,060. This means the cost of physical property only, such as railway, equipment, land, buildings, etc. It includes not only the property owned by the Boston Elevated and the West End lines, but also the subways and tunnels owned by the city of Boston. On the same date, June 30, 1916, the capital investment, exclusive of premiums, was $113,832,145, this being the par value of the stocks and bonds of the Boston Elevated and the West End companies, as well as the expenditures by the city for subways and tunnels and the value of leased lines.

The city of Boston furnished the capital for all the subways and tunnels except the Cambridge subway, and leased them to the company for a rental intended to be sufficient to pay the interest on the investment, and ultimately, by means of a sinking fund, to repay to the city the original cost. The capital for additions to the surface lines, with the exception of the lines leased from the Bay State Street Railway, was provided by the sale of bonds and stock of the West End company, upon which the elevated company pays the interest and dividends under the terms of its lease. The capital for the construction of the elevated lines, the Cambridge subway and the East Cambridge extension, and for the equipment of these as well as of the subways and tunnels owned by the city, was provided by issues of bonds and stock of the elevated lines.

SUGGESTIONS FOR RELIEF

An increase in fare.

Adoption of zone system of fares.

Charging for transfers.

Establishment of inclosed areas at transfer points where practicable, so as to reduce number of paper transfers.

Elimination of 8-cent check.

Purchase of Cambridge subway by the State and its rental to the company.

Temporarily charging off depreciation against premiums paid in on stock and bonds.

Return of $500,000 deposited with the State, so that it will be available for ordinary capital purposes.

Reimbursement for subway rentals.

The above-stated amount of the capital investment, the brief says, does not include a single dollar of water or any allowance for franchises or other public rights. It represents the actual cost of the property devoted to the public use. As far as the outstanding bonds and stock of the West End Street Railway and the Boston Elevated are concerned, the issue of every bond and every share of stock has been approved by the Public Service Commission, or its predecessor, the Railroad Commission, and, with the exception of the $6,400,000 of preferred stock issued by the West End in 1887, every share of stock has been approved by the Public Service Commission, or its predecessor, the Railroad Commission, and, with the exception of the $6,400,000 of preferred stock, every bond and every share of stock has been paid for in cash, and the proceeds expended with commission approval.

LIMITATION ON NEW CAPITAL ISSUES

According to the brief, the elevated system requires in the near future from $5,000,000 to $7,000,000 of additional capital to pay for additions and improvements which have already been made or are in contemplation. Up to June 30, 1916, the company had expended for capital purposes $2,049,351 in excess of the amount for which capital has been authorized. The money for this expenditure was borrowed temporarily and should be capitalized.

The brief states that on June 30, 1916, the outstanding elevated bonds amounted to $26,586,000. The par value of the outstanding capital stock was $23,879,400 and the premiums paid in thereon by the stockholders were $2,707,428, making an aggregate of $26,586,828, or only $828 more than the outstanding bonds. The company cannot, it is said, under the laws of the State, issue any more bonds until it has issued additional stock, and it cannot issue any additional stock because it cannot issue stock at less than par. The present market value of the stock is only $73 a share, although it sold in 1901 as high as $190, and in the last ten years has ranged from $159 to $65.50.

As before stated, the company now requires additional capital, but unless it can obtain the money by short term loans it has no course open. It is deemed impossible to obtain sufficient money by this method, but even if this could be done it would probably be at an excessive cost, and would leave the company at the mercy of changing financial conditions. Such a method of financing was disapproved by the Public Service Commission in the Middlesex & Boston rate case.

The company takes the point of view that to enable it to furnish such adequate transportation facilities as the public may reasonably require, its stock should be

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salable at not less than par, and there is no reason to suppose that its stock will be salable at that price unless its earnings are sufficient, after making such provision for depreciation as the Public Service Commission may determine, to pay dividends at the rate of at least 6 per cent per annum, which is only 5.3 per cent on the money actually paid in by the stockholders on account of the premiums. Further, there must be some reasonable assurance that no additional burdens or requirements will be placed upon it which will jeopardize the payment of such dividends.

For many years the stock of the elevated company sold far above par, though paying only 6 per cent dividends, but the high price during that period was due to a large extent to the expectation that the future earnings would warrant dividends in excess of 6 per cent. The possibility of dividends in excess of 6 per cent, however, is said to be at the present time too remote to have any effect on the value of the stock. The company has never paid dividends in excess of 6 per cent, and in the last three years the payments were 5, 5.5 and 5 per cent.

Dividends at the rate of 6 per cent mean a return of only 5.2 per cent on the par value of the bonds and stock of the Boston Elevated and of less than 5 per cent on the cash actually paid in by the bondholders and stockholders. That is, a full year's interest on the bonds outstanding on June 30, 1916, would be $1,195,300, while 6 per cent on the stock would require $1,432,764, making a total for interest and dividends of $2,628,064, which is 5.2 per cent on $50,465,400, the par value of the outstanding bonds and stock, or slightly less than 5 per cent on $52,844,423, the amount of cash actually paid in. This rate of return, the company notes, is substantially less than the rate which has been generally recognized as fair or which is essential to attract new capital. It adds that hitherto Massachusetts corporation stocks have sold at a price yielding a relatively low income return because they were non-taxable, but this advantage has been removed by the 1916 income tax law. This reduced the differential of from 1.75 to 2 per cent in favor of Massachusetts stocks to 0.6 per cent, which means that the purchaser of Massachusetts stocks will insist upon a higher income yield than formerly.

CAUSES OF PRESENT FINANCIAL CONDITION

The company's present financial condition is due principally to three causes: (1) The increase in the cost of labor and materials; (2) the enormous increase in the permanent investment at a much greater rate than the growth of business warranted, and (3) the extension of the length of rides in connection with the free transfer system, with a disproportionate increase in revenue.

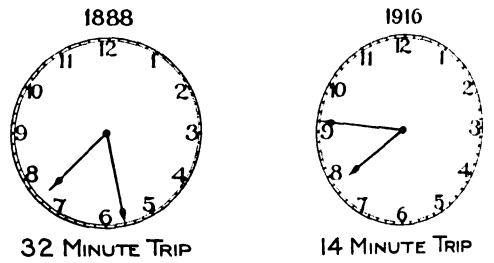
1. *Increased Operating Costs:*

For the year ended June 30, 1916, the gross revenue of the company was $18,781,327, which was paid out as follows:

For operating expenses	$12,079,996
Taxes	1,043,042
Fixed charges or return on investment, including railway and subway rentals, interest and dividends at 5 per cent on elevated stock	5,634,644
Miscellaneous items	13,846
Total	$18,771,528

This left a surplus of about $10,000, and the company failed by $228,000 to earn its dividend of 6 per cent. Compared with 1915, the gross income increased $894,778 and taxes decreased $26,147, making a total gain of $920,925. This was offset, however, by an increase in operating expenses amounting to $792,012 and in fixed charges of $129,965, which included the dividend at the reduced rate of 5 per cent, or a total of $921,977. The increase in gross income was mainly due to the fact that the company carried 17,160,457, or 4.955 per cent, more revenue passengers in the 1916 fiscal year than in 1915. This increase was much greater than the average rate, and represents a total of but 110.645 per cent over 1897. The increase in population since 1897 has been from 831,608 to 1,244,645, or 49.667 per cent.

There is no likelihood, the company's brief states, of any substantial reduction in relative operating costs under conditions as they now exist. Every effort has been made by the management to secure the greatest economy and efficiency of operation possible. To a very considerable extent the road is operated subject to the supervision of the Public Service Commission, and so far as that body has deemed it consistent with the rendering of proper service, it has co-operated with the management for the reduction of expenses, in some cases even making suggestions to that end. In the Bay State rate case, the Public Service Commission held that the company "must satisfy the commission that the needed income cannot be secured through more efficient management and operation." Along this line the Boston Elevated Railway in its brief describes the many efforts it has made to secure improved methods and increased efficiency, explaining each point in detail and often with supporting exhibits. One of these exhibits, in the matter of time saving, is reproduced in part herewith. The lines along which the company has secured increased efficiency, as noted before from time to time in the ELECTRIC RAILWAY JOURNAL, concern the following: Traffic, car operation and construction, power, tracks and roadbed, yards, electric switches and signals, revenue collection, handling sand, freight and safety work.



BOSTON ELEVATED—EXAMPLE OF CLOCK DIAGRAMS USED IN BRIEF TO SHOW TIME SAVED ON PRESENT SYSTEM AS COMPARED WITH SURFACE LINES IN 1888

In regard to the higher cost of materials, the brief states that it is difficult to give specific unit cost prices for 1916 compared with prices for periods ten to twenty years ago, owing to the fact that substantially all material used by a street railway is in more or less manufactured form and the material used to-day is of a higher grade of manufacture than that used some years ago. The difficulty lies in trying to segregate the increase in price into that part which is due to the actual increase in the raw material and that part which is due to the higher quality of manufactured article.

Evidence of this is noticeable, for instance, in track special work. Crossings, branch-offs, switches, etc., used by street railways ten years ago would not to-day withstand the wear and tear to which present equipment subjects roadbed and track. But if the same construction were used to-day the increase in cost would approximate 30 per cent, whereas the actual cost when

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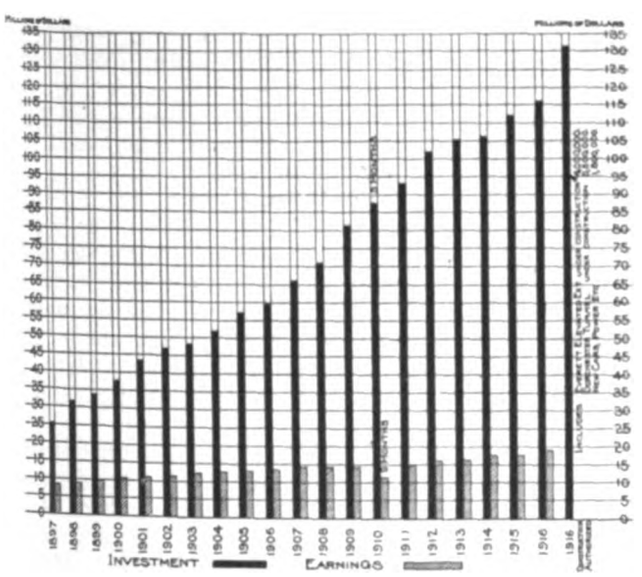
improvements are included averages an increase of 60 per cent. This difficulty is further evidenced by the fact that ties, for instance, ten years ago were in practically no cases treated, while the ties used to-day are subjected to a treatment resulting in a material extension in their life. The company is paying in 1916 62.2 cents for the same grade of ties that cost 50.6 cents in 1905, an increase of 11.6 cents, or approximately 23 per cent advance, whereas the actual cost on account of using treated ties for 1916 is 68 per cent higher than in 1905.

All material used in the repair of equipment shows an increase in cost of the particular items necessary for such work, but in substantially every instance the design and quality of the manufactured article is likewise improved and the same difficulty exists in trying to divide that portion which is chargeable to basic material cost and that portion which is properly chargeable to increase due to improved manufacture. In connection with the increase in price of manufactured articles there enters not only the increase in price of raw material and the increase due to the higher grade



BOSTON ELEVATED—CHART OF INVESTMENT AND EARNINGS

of manufactured article, but also the increased cost of labor used in the manufacture of such articles.

The brief concludes, however, that if it were possible to secure identically the same material as was used ten years ago, it would be found the unit price for same had increased very materially. Moreover, while it is impossible to prophesy what prices for materials will prevail for the next one, two or more years, there is no indication at the present time of any reduction in the cost of materials used in street railway operation for the next few years as compared with the costs for the last twelve months, and there is every reason to believe that the prices prevailing to-day will at least continue for the ensuing year.

In regard to higher labor costs, the brief notes the recent three-year arbitration award, covering the period from May 1, 1916, to May 1, 1919, which means higher wages for labor. It is estimated that the increase in rates of wages and changes in other conditions will result in an increased labor cost for the same service over the year ended May 1, 1916, for the year ending May 1, 1917, of $400,000; for the year ending May 1, 1918, of $600,000, and for the year ending May 1, 1919, of $800,000.

Other operating items mentioned by the brief are accident, paving and depreciation charges. In the cost of accidents and injuries it has been impossible to effect any substantial reduction, owing principally to adverse legislation, court decisions interpreting the law more favorably to claimants, the greater liberality of juries, and the rise and growth of the ambulance chaser. As for paving, if the present program, particularly in Boston, is carried out, the company will be put to a very considerable expense, the estimated aggregate to the end of 1917 being $566,392, as compared with $61,153 in 1916 and $51,925 in 1915. There is no doubt, therefore, that the operating expenses will be relatively larger for the year ending June 30, 1917, than they were for the year ended June 30, 1916, and added to this is the possibility of having to make some additional provision for depreciation. If, as was tentatively suggested in the Middlesex & Boston case, a street railway should be required to charge as an operating expense 20 per cent of its gross operating revenue to cover maintenance and depreciation, the Boston Elevated's operating cost for the year ended June 30, 1915, would have been increased $926,804, and for the year ended June 30, 1916, $679,050.

2. *Increase in Permanent Investment:*

The company's brief reviews at length the growth of its permanent investment, including detailed exhibits of outlays for the various subway, tunnel, elevated and surface lines. The management of the road has for several years foreseen the danger arising from the abnormal increase in the permanent investment and has repeatedly called the attention of the Legislature and of public commissions to the subject. As before stated, the permanent investment of the system on June 30, 1916, was $116,022,060, while the comparative investment on Sept. 30, 1897, when the Boston Elevated assumed the operation of the system, was $25,291,913. It is now four and one-half times as large as it was in 1897. During the same period the population of the territory served has increased from approximately 830,000 to 1,244,000, or only 50 per cent, while the number of revenue passengers has increased from approximately 172,000,000 to 363,000,000, or only 110 per cent.

In 1897 the permanent investment amounted to $2.901 for $1 of gross income, and $2.963 for $1 of passenger revenue. In 1916 it amounted to $6.178 for $1 of gross income, and $6.393 for $1 of passenger revenue. In 1897 the permanent investment was approximately 85 cents per revenue car-mile, while in 1916 it had increased to approximately $2 per revenue car-mile. In 1897 the return upon the investment required 5.680 cents per revenue car-mile out of a total revenue of 28.498 cents per car-mile. In 1916 the return upon the investment, including subway and other rentals, interest on the elevated indebtedness and dividends at the rate of 6 per cent on its stock, called for 10.028 cents per revenue car-mile out of a total revenue per car-mile of 30.985 cents. In 1897, 0.986 cent out of every nickel was required for a return on the investment. In 1916, 1.5 cents out of every nickel of revenue was required for the same purpose. The accompanying reproduction of one of the company's exhibits shows graphically how the investment has increased more rapidly than the business warranted.

3. *Increase in Service Rendered:*

While the operating expenses per car-mile, the brief notes, were substantially the same in 1916 as they were in 1897, being 20.744 cents in 1897 and 20.624 in 1916, and while the amount required to pay a return on the investment, including 6 per cent on the elevated

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stock, had increased from 5.680 cents per car-mile in 1897 to 10.028 cents in 1916, the revenue per car-mile increased only from 28.498 cents to 30.985 cents. During this period the average seating capacity of the cars had increased from thirty-two to forty-five, or an increase of more than 40 per cent in the average capacity of the cars. The latest surface cars now in use have sixty-two seats and some of the rapid transit cars seventy-two. It would naturally be supposed, the company remarks, that with an average increase of about 40 per cent in the size of the cars the revenue per car-mile would increase in proportion, assuming that no more cars were operated than was necessary to care for the traffic properly. That this has not been so is due to the practically universal free transfer system and the large increase in the population of the suburbs lying at extreme distances from the center of the city. The accompanying reproduction of an exhibit shows the growth of the transfer system.

The increase in the length of ride is indicated by the increase in facilities which are now required to accommodate the traffic at certain suburban points as compared with the facilities required at the same points in 1897, as shown by the following table:

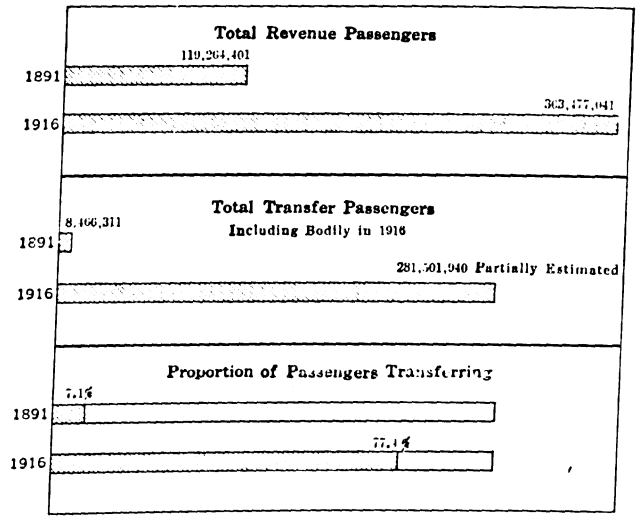
AVERAGE CAR SEATS FURNISHED PER DAY, TWENTY-FOUR HOURS

Section	Route Distance from Park St., Miles (All Surface)	Seats, 1897	Seats, 1916	Per Cent Increase Over 1897
Mattapan Square	6.706	.....	34,464	...
Neponset	6.807	10,052	18,836	87.4
Milton	7.621	16,072	35,176	118.9
Watertown Square	7.320	6,042	65,492	984
Newton (Nonantum Square)	7.063	10,268	41,956	309
Arlington Heights	9.533	7,636	37,680	393
Malden Square	5.585	20,756	67,012	223
Medford Square	5.724	6,518	57,356	780

This increase in the amount of long distance riding has prevented the increase in revenue per car-mile which would naturally have resulted from the increase in the size of the cars. The accompanying illustration shows graphically the increase in the number of seats furnished.

ADDITIONAL NET NOT OBTAINABLE THROUGH REDUCED EXPENSES OR INCREASED BUSINESS

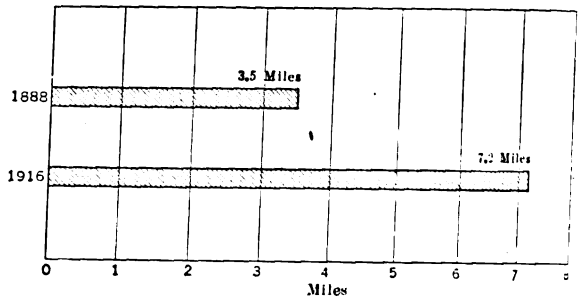
After thus stating the causes of the present financial situation, the brief avers that the additional net



BOSTON ELEVATED—GROWTH OF FREE TRANSFER SERVICE IN TWENTY-FIVE YEARS

revenue now required cannot be obtained through either a reduction in operating expenses or an increase in business. As before stated, the company believes that the operating expenses will be relatively higher during the current year than they were during the year ended June 30, 1916. Moreover, although the company has every reason to expect a substantial increase in business during the current year, it is absolutely impossible to forecast the exact amount of the increase. The increase in revenue passengers for the year ended June 30, 1916, was 17,160,457, or in gross earnings $894,779. This was the largest increase in any one year since the company began business.

On the assumption of an equal increase for the current year, there must be deducted the additional cost of doing the additional business. The cost of power and conducting transportation for the year ended June 30, 1916, was $7,161,355. This increases with the amount of mileage run and, on the assumption that it



BOSTON ELEVATED—SEAT-MILES PER REVENUE PASSENGER OR DISTANCE ONE SEAT IS RUN FOR EACH 5-CENT PASSENGER CARRIED

will require an increase of 5 per cent in the mileage to provide for the 5 per cent increase in the number of revenue passengers, the cost of power and conducting transportation for the current year will be increased by $358,000. Deducting this from the increase in gross amounting to $894,779 leaves $536,779 net to take care of additional expenses and charges amounting to at least $1,000,000.

This estimate allows only 40 per cent as the operating cost of doing the new business, and it is undoubtedly low. Among other things it takes no account of the increased rate of wages during the current year or any increase in maintenance charges due to increased mileage. In the company's opinion estimates for the ensuing years are still more uncertain, but it is evident beyond question that the increase in business cannot be relied upon to provide the additional net revenue which is needed.

HOW TO IMPROVE THE SITUATION

With assistance thus not possible through reduced expenses or increased business, the company in its brief suggests for the consideration of the commission the following methods of improving its financial situation:

1. An increase in the rate of fare.
2. The adoption of the so-called zone system of fares.
3. Charging for transfers.
4. Establishment of inclosed areas at transfer points where practicable so as to reduce the number of paper transfers.
5. Elimination of the 8-cent check between the company and the Bay State Street Railway.
6. Purchase of the Cambridge subway by the State and its rental to the company.
7. Temporarily charging off depreciation against premiums paid in on stock and bonds.
8. Return of the $500,000 deposited with the State so that it will be available for ordinary capital purposes.
9. Reimbursement for subway rentals.

The adoption of some of these suggestions, to the company's mind, would have but a relatively small effect on its net revenue, but they would all contribute in

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different degrees to the desired result, as shown below. Some of the suggestions contemplate that the entire cost of the transportation shall be borne by the car riders, while others contemplate that the communities in which the company operates shall make some contribution toward that cost. Heretofore the car riders who traveled upon the elevated system have not only paid the entire cost of transportation as such, so far as it has been paid, but have also through special taxes levied on the corporation contributed to the general expenses of the cities and towns in which the company operates and have likewise through the company made large contributions to the cost of maintaining the highways, which contributions have had no reference to any actual wear and tear caused by the operation of the company's cars.

The brief states, however, that an adequate system of street railway transportation is vital to the prosperity and growth of the community as a whole, apart from the car riders. It increases the value of real estate and the rents to be derived from it, it increases the business of the merchants, and it adds to the revenue of each city and town by increasing the value of the taxable property. The necessity of a contribution by the community toward the cost of improved transportation if existing fares are to be retained has been recognized in connection with new rapid transit construction in New York and Philadelphia, and the brief recites the main points of the arrangements in these cities.

1. *Increase in the Rate of Fare:*

The present fare on the elevated system is 5 cents, and by means of free transfers a passenger can in general ride from any part of the system to any other part for 5 cents. At the time this fare was established, in view of the fact that the length of ride was limited and that an additional fare was charged for transfers to different points and also for exceptionally long rides, the revenue was sufficient to pay the cost of transportation, including a return upon the capital investment. Conditions have changed, the company says, and, owing to the cost of the rapid transit lines, the extensions of the service and the increase in the cost of labor and materials a 5-cent fare with universal free transfers is not now sufficient.

The company is, however, by contract with the State limited to a 5-cent fare until June 10, 1922. This contract is contained in Section 10, Chapter 500, Acts of 1897. It makes no provision for increasing the fare if it should subsequently prove to be insufficient, but it safeguards the public in case the rate of fare should subsequently prove to be higher than necessary: (1) By requiring the company to pay to the State a sum equal to any amount paid out in dividends in excess of 6 per cent, and (2) by providing for a reduction in the rate of fare if the company should be able to earn more than 8 per cent upon its stock. Furthermore, the State retained the right, within certain limits, to control the character and extent of the service, upon which in large part depends the cost. The present insufficiency of the 5-cent fare, while due in part to the increase in the cost of labor and materials, is principally due to the fact that the company has felt compelled through the pressure of the Legislature and public opinion to extend its service more rapidly than any one anticipated in 1897, and more rapidly than the growth of the business warranted. Under these conditions, it is in the opinion of the company not unfair to expect the State to consent to a change in the contract, especially in view of the fact that the change is made necessary largely by the character of the service which the public has required, and that the company without some relief will be unable to meet further transportation requirements.

It is impossible to tell in advance what effect an increase of fare from 5 to 6 cents would have upon the income of the company. It would depend upon the extent to which the riding might be affected, and also upon whether or not tickets were sold at reduced rates. Experience has shown that an increase in the rate of fare not only temporarily, but permanently, reduces the amount of riding, so that the full benefit of the increased rate is not obtained. If this is coupled with the sale of tickets at a reduced rate, the increase in gross income is still less. The brief states that the instances of an increase of fares for urban transportation have been so few as to furnish no satisfactory basis for an estimate as to the effect on traffic.

As far as the collection of a 6-cent cash fare is concerned, the present system of prepayment and mechanical fare boxes could be easily adapted to it. If tickets should be issued, it would involve a very material change in the whole system of fare collection. The brief concludes this point with the statement that if the persons who use the cars are to pay the entire cost of transportation, an increase in the unit of fare is probably the only practicable method of providing the necessary increase in revenue, and in view of the fact that the territory served by the company has been built up on the basis of a uniform fare, is less objectionable than the so-called zone system.

2. *Zone System:*

In order to increase the income of the company by means of a zone system, it would be necessary that the zones be established at such points and such additional fares established for riding through the zones as to produce an average fare in excess of 5 cents. The principal argument in favor of the zone system is that the rate of fare so far as practicable is based upon the length of ride and is proportionate to the service rendered. It is generally considered that when passengers are carried more than 4¼ miles for a 5-cent fare it is done at a loss. This loss must be made up by the income received from passengers riding a shorter distance, who are therefore paying more than full compensation for the service they receive.

The elevated lines extend out from the city to points far beyond the limit to which passengers can be carried for 5 cents without loss, some of the distances ranging from 6.08 miles to 9.18 miles. Transfer provisions may increase the 5-cent fare distance. For example, the brief notes that a passenger may not only ride from Arlington to the center of Boston, a distance of 8.66 miles, for 5 cents, but if he desires he may transfer and continue his ride as far as Mattapan or the Charles River, covering in this way a distance of 18 miles or more for 5 cents. Even longer rides than this are possible under present transfer arrangements.

In the company's opinion, such long rides are a burden on the remainder of the system, but there are arguments against the adoption of a zone system of fares, as follows:

(a) The territory served has been developed, values have been fixed and homes established on the basis of a uniform fare, and it would be unjust at this late day to discriminate against portions of the territory by a difference in the rates of fare.

(b) The zone system, it is claimed, tends to concentrate the population within the interior zone, particularly in the case of people to whom the additional fare is of consequence, and to prevent their making their homes in the suburbs where the conditions are more healthful. On the other hand it is claimed that the zone system does not have that effect and the only difference is that in the case of a uniform fare the price of

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real estate in the suburban district advances much more rapidly than in the case of the zone system.

(c) In the case of the city of Boston, where the traffic is heavy at rush hours, the collection of additional fares at zone points would not only entail considerable additional expense but would be likely to delay and inconvenience the passengers somewhat.

If a zone system were to be established in Boston, however, the rapid transit lines would be a controlling factor. The interior zone would have to include the terminals of the rapid transit lines, for the reason that the expense and inconvenience of attempting to collect additional fares on the rapid transit trains would render it impracticable. The Forest Hills station on the elevated lines is about 4¾ miles from the center of the city, and this is the extreme limit to which a passenger can be carried for a 5-cent fare without loss. With this fixing the limit of the interior or 5-cent zone, a line could be drawn approximately the same distance from the center which, commencing at Fields Corner in Dorchester, would pass through Forest Hills, corner of Market and Washington Streets, Brighton, Mount Auburn, North Cambridge, Teele Square in Somerville, Medford Square in Medford and Malden Square in Malden. If a 5-cent fare was established for all rides either within or without this zone, and an additional fare of 2 cents for each passenger crossing the zone boundary whether going to or from the center of the city, it would undoubtedly mean a substantial increase in income.

In the company's opinion, however, the extent to which the net income would be increased is a matter purely of estimate, depending upon the number of passengers who would pay the increased fare and the additional cost of collection. If 10 per cent of the total revenue passengers paid the additional 2 cents, it would mean an increase in gross income on the basis of last year's business of $727,000. Against this must be offset the cost of collection. The company, through the installation of mechanical fare boxes, prepayment cars and inclosed areas, has endeavored so far as possible to economize in the collection of fares and to minimize losses. The present method of collecting fares could not be used for the collection of zone fares. Some different method would have to be adopted, and it would probably mean the employment of special fare collectors at times of heavy traffic. The additional expense of collecting these zone fares has been estimated at from $150,000 to $200,000 a year.

The brief concludes that whether a zone system of fares is adopted or not, the commission should lay down the fundamental principle that as long as a uniform fare exists, no further extensions of the system into territory not now served should be permitted unless it is within a distance to which passengers can be carried without loss.

3. *Payment for Transfers:*

As there were approximately 281,000,000 free transfer passengers for the year ended June 30, 1916, a charge of 1 cent for each transfer would on the face of it substantially add to the company's income. The system is, however, different from any other in the United States. It is a combination of surface and rapid transit lines, and so arranged that passengers from most of the suburbs will make their journey partly on the surface lines and partly on the rapid transit lines.

Transfers of this character constitute the largest part of the free transfers, and if each one were to be charged 1 cent for his transfer the unit of fare might just as well be increased to 6 cents unless the passenger were given the alternative of riding to his destination on the surface lines. The cost of maintaining a duplicate service would, however, offset any increase in income from those who chose to pay for transfers. A charge for transfers from one surface line to another might prove of advantage if the company could be guaranteed against having to provide additional through service, but the minute passengers were required to pay for their transfers the pressure upon the company to provide a through service for a single fare would be very great. The company believes that material advantage would be gained by reducing the number of transfer points and eliminating the use of paper transfers as far as possible.

4. *Inclosed Areas at Transfer Points:*

Free transfers are made either through the medium of inclosed areas or a paper transfer that is accepted in lieu of a cash fare. There are now 111 points on the system at which paper transfers are accepted, and during the year ended June 30, 1916, 109,843,228 free transfer checks were issued and 85,621,020 received by the company. The real solution of the transfer problem, discussed in detail in the brief, is to eliminate as far as possible the use of the paper transfers.

During the last three years the company has with the co-operation of the Public Service Commission put into effect several inclosed areas on its own property, and is also with the co-operation of the Boston Transit Commission establishing inclosed areas in connection with the new Dorchester Tunnel. Nevertheless, in order to enable the company to establish additional inclosed areas at some of the largest transfer points, additional legislation is necessary. In connection with surface lines and rapid transit lines not constructed by the Boston Transit Commission, the company should be authorized by the Legislature to take land by right of eminent domain as far as necessary for the establishment of inclosed areas, and should also be authorized to use public highways for that purpose as far as traffic is not unreasonably interfered with.

The Public Service Commission should also be authorized to grant necessary relocations of surface tracks wherever it is necessary for the purpose. While the local authorities have power to grant these relocations, yet they are confronted by strong local opposition on the part of storekeepers who benefit by the stop-over privileges which passengers avail themselves of at certain transfer points. The system, however, is essentially at the present time a metropolitan system, and the right to grant necessary locations for inclosed areas should rest with the Public Service Commission, which represents the territory as a whole.

5. *Eight-Cent Checks:*

During the fiscal year ended June 30, 1916, the company collected 1,827,762 of the 8-cent checks issued by the Bay State Street Railway, and the Bay State company collected 655,137 of the checks issued by the Boston Elevated Railway. The only explanation for the difference is that people living on the Bay State line in places where the Boston Elevated runs in adjacent territory purchase checks in the morning when riding on the Bay State cars and use the other portion when returning on the Boston Elevated cars in the afternoon. In parts of Chelsea this could readily be done, and, if it is done, each ride would cost but 4 cents in place of 5 cents.

This is the only instance where a passenger can ride over the entire elevated system for 4 cents, and the checks were never intended to permit such a practice. While the company believes it has the right to discontinue the issue and acceptance of these checks, its right so to do has been questioned, and suitable legislation

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authorizing it should be enacted. If the exchange checks were entirely discontinued and the same number of passengers continued to ride, the result would be that both the companies would benefit to the extent of 1 cent each on 2,472,899 passengers, amounting to $24,728, all of which would be net earnings.

6. *Purchase of Cambridge Subway by the State or a Metropolitan District:*

The purchase of the Cambridge subway by the State or a metropolitan district would provide the company with approximately $9,100,000 of new capital at a cost of 4½ per cent annually, which is much less than it will cost the company to obtain the money by the issue of its own stock and bonds. Whether the company can obtain any new capital, the brief states, and if so, at what cost, depends very largely upon the action of the special commission now sitting and the subsequent action of the Legislature.

7. *Charging Off Depreciation Against the Premiums Paid In On Capital Stock:*

If the Public Service Commission should feel that any provision must now be made for past depreciation, then, instead of restricting the issue of new capital or requiring this depreciation to be cared for in any one year, it should be authorized by the Legislature to allow the depreciation to be charged against the premiums paid in by the stockholders. This money, however, represents the investment of the stockholders just as much as that portion paid in up to the par of the stock, and it would be unfair to apply it permanently to depreciation. The company's suggestion, it is said, is intended merely as a temporary expedient to help the immediate situation and the fund, so far as it is used for that purpose, should be restored by charging a proportionate amount into operating expenses over a period of, say, ten years.

8. *Return of* $500,000 *Deposit With State:*

The repayment of this deposit to the company would give it that much additional capital which would be immediately available to pay the cost of additions and improvements. Necessary legislation should be passed authorizing the repayment of this sum.

9. *Reimbursement for Subway Rentals:*

With the exception of an increase in the rate of fare, none of the suggestions heretofore submitted will provide the company with a fair return upon its investment or with sufficient net revenue to obtain new capital in order to meet its immediate requirements. While they would all have a tendency in time to increase the income or reduce the expenses, the effect would not be immediate. The only adequate alternative for an increase in fare which the company is able to submit is the assumption by the communities benefited, of a portion of the present subway and tunnel rentals. The revenue car-miles run in the subways and tunnels for the year were 5,138,284, and the rentals of $844,184 alone imposed a charge of approximately 16.5 cents per car-mile without taking anything into account for a return upon the equipment. The return upon the entire permanent investment of the Boston Elevated for the year ended June 30, 1916, counting dividends at 6 per cent, called for 10.028 cents per car-mile.

The leases of the subways and tunnels from the city run until July 1, 1936, and thereafter are subject to termination by either party. The rate of rental cannot be changed without the consent of both the city and the company, and even with their consent probably cannot be changed without the consent of the holders of the bonds issued by the city to pay for the subways, which latter consent it would probably be impracticable to obtain. In the company's opinion, however, there is no legal reason why the State should not be authorized to retain the franchise and compensation taxes and apply them to the reimbursement of the company for subway and tunnel rentals as far as necessary to enable it to pay 6 per cent dividends on its stock. The balance would be distributed among the cities and towns on the same basis as at present. The franchise and compensation taxes, amounting together to $583,700 for 1915, are not retained by the State, but are paid over to the different cities and towns in which the company's tracks are located in proportion to the mileage operated in each of them.

On the basis of the company's operations in 1915, the above plan would have called for a reimbursement to the company of approximately $119,397, or a reduction in the amounts to be distributed among the cities and towns of about 20 per cent. The taxes for 1916 have not yet been ascertained, but with the franchise tax and corporation tax for 1916 the same as in 1915, this arrangement would call for a repayment of approximately $238,794, or a reduction in the amount to be distributed among the cities and towns of approximately 40 per cent.

This suggestion is offered as one of the alternatives for an immediate increase in fare. None of the other suggestions in themselves, the company believes, would produce enough additional net revenue, and unless some plan of this kind is adopted the company knows of no practicable method of obtaining the necessary additional net revenue except by an increase in fares. It has the great advantage of being flexible, as the amount for which the company is to be reimbursed each year depends upon the result of its actual operations, which cannot be forecast in advance. This suggestion also equalizes to some extent the burden of the rapid transit subways and tunnels by placing it proportionately upon all the cities and towns which are to be benefited instead of leaving it to be borne by the city of Boston alone. This plan would have the further advantage of making the public directly interested in the question of whether or not further burdens should be imposed upon the company.

General Conclusion

While general market conditions undoubtedly have had much to do with the increased cost of obtaining money for street railway purposes, the uncertainty as to street railway investments and in the case of the Boston Elevated Railway the uncertainty as to its future financial condition and its ability to maintain its 6 per cent dividend have increased the cost of obtaining new money. It is in the interest of the public that this should be obtained at the lowest possible rate, and in so far as this is affected by the uncertainty as to the maintenance of 6 per cent dividend this uncertainty should be removed.

Whatever else may be done, it is vital that the rate of fare should be increased whenever the company is unable to earn 6 per cent on its stock after making such allowance for depreciation and other reserves as the Public Service Commission may approve or require, and adequate provision should be made for this by legislation.

Whatever action is recommended by the special investigating commission, it should, in the company's opinion, include some arrangement for a period of years, say until the expiration of the present subway leases, by which the company may be assured of 6 per cent dividends as long as it is properly managed and properly performs its functions as a public agent.

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New England Street Railway Club Outing

A Visit to Connecticut Valley and Many Forms of Entertainment Were Features of This Most Enjoyable Event

TWO hundred and thirty-five members and friends of the New England Street Railway Club assembled at Springfield, Mass., Sept. 21, for the annual fall outing of the organization, which was one of the most enjoyable in the club's history. The program included features of transportation interest in addition to almost continuous entertainment, and registrations covered practically all sections of New England.

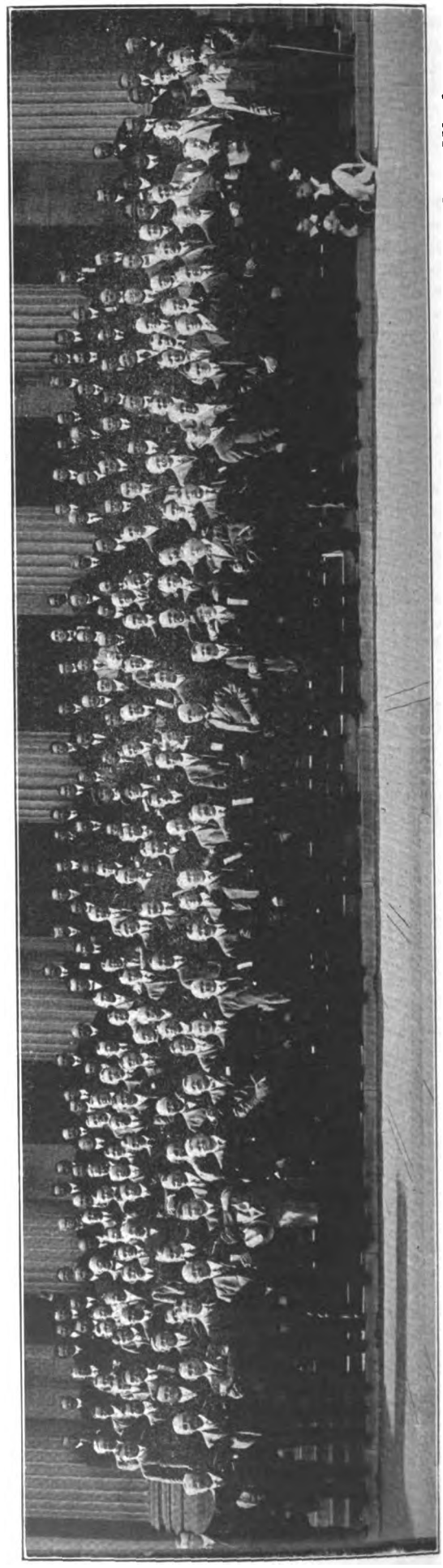
Upon arrival at Springfield the members were welcomed by President C. V. Wood of the Springfield Street Railway, who is also president of the club, and his associates in the local company. A buffet luncheon followed at the rooms of the Springfield Board of Trade, which was also attended by prominent business and professional men, who greeted the club most cordially. The outing program consisted of a cleverly designed transfer check on which the various events were scheduled, with time punch marks indicating the hour of departure of the special cars provided for the club at every point in the itinerary, and containing humorous admonitions in the form of conditions of use, the transfers being valid only to members casting off the cares of their daily work and entering properly into the spirit of the occasion. In one corner of the transfer there was a series of sketches somewhat similar to those at one time used on a real transfer to identify passengers, but those on the outing transfer consisted of humorous sketches appropriate to the occasion.

At the close of the luncheon the club assembled at the celebrated "municipal group" of buildings on Court Square, where a photograph was taken. Following this, six special cars were taken to the grounds of the Eastern States Industrial Exposition in West Springfield, where the members inspected an arena with a capacity of 7000 persons, a prepayment area and loop track facilities for handling the large traffic anticipated at the grounds next month. The new buildings were also visited, and cars were then taken to Riverside Park, where a clambake and green-corn feast of maximum dimensions was followed by an entertainment, the crowning feature of which was a superb display of fireworks, including a set piece showing a realistic likeness of President Wood; also a luminous trolley car, which crossed the lawn in the midst of great applause. The party then returned to Springfield, and the day closed with a cabaret show at one of the hotels.

On Friday morning an early start was made for the Hooker Street car shops of the Springfield company, now under construction. The extensive facilities in prospect here were scrutinized with interest. For the convenience of the visitors, the Springfield Street Railway Company distributed to the members of the club at this point a leaflet which gave the plans, elevations, section and other drawings of the North Main Street carhouse.

Upon arrival at Holyoke, President L. D. Pellissier of the Holyoke Street Railway welcomed the members to the city, and escorted them through the lately completed shops of his company.

The next objective of the club was the summit of Mount Tom, which was reached by electric car. Here the members enjoyed a good dinner and a fine view, the propitious weather adding greatly to the pleasure of the trip. The party returned to Springfield by special cars in the afternoon, and disbanded for home.



Members of the New England Street Railway Club on the Occasion of Their Outing to Springfield and Holyoke Last Week
View Taken in Front of Municipal Group in Springfield on Sept. 21

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The Individual Contract in Indianapolis

The Recent Use of Individual Contracts in New York Makes This Account of Their Adoption in Indianapolis Two Years Ago of Especial Interest

DURING the recent strike agitation in New York much discussion centered around the individual working agreements that had been signed or were being signed by employees of the Interborough Rapid Transit Company and the New York Railways. Numerous statements appeared in the daily press to the effect that similar service contracts had been used before for electric railway employees in Indianapolis, Ind., and that legal opinions rendered in regard to such contracts might serve as precedents in the New York case. Explanations of this so-called Indianapolis precedent, however, have been either vague or inconsistent, and the editors of this paper have deemed it wise now to review, from the complete record previously published in these columns, the main features of the Indianapolis case, in order that its exact effect upon the New York situation may be judged. The review should be of value in this respect, for as far as is known the contracts in Indianapolis, which are far more detailed than the New York agreements, form with the latter the only individual working agreements in the electric railway field.

How the Indianapolis Case Arose

The individual contracts between electric railway employees in and around Indianapolis and their companies came into existence as a result of the labor troubles stirred up in 1913 by the Amalgamated Association of Street and Electric Railway Employees of America. This association made a determined effort to organize electric railway employees in the Indianapolis section, but after a campaign of several months only a few employees had joined the union.

In August, 1913, short strikes on some of the interurban lines radiating from Indianapolis proved complete failures, but at the beginning of November a strike was called on the city lines of the Indianapolis Traction & Terminal Company. Violence followed, and the governor was compelled to call out the militia. On Nov. 7, 1913, to settle the strike, the governor and the Indiana Public Service Commission, in conference with the company, prepared an agreement which was ratified by the employees and ended the strike. This provided in general that any grievances as to wages, hours and other working conditions not settled between the employees and the company should be decided by the Public Service Commission and be binding for three years and that all adjustments and arbitration should proceed only in the name of a committee of employees, the intent being that the company would not treat with or recognize any union but would not discriminate between union and non-union men in its employ.

This settlement had no sooner been made than another attempt was made to call a strike of the men of the various interurban companies operating into Indianapolis. The men, however, refused to leave their cars and expressed to the companies their desire to be left alone by outside agitators. To define the situation more clearly it was suggested that agreements be drawn up which would in the future provide for arbitration by the Public Service Commission of matters not adjusted between the interurban lines and their employees, and such agreements were individually executed by employees of the Indianapolis & Cincinnati Traction Company and the Terre Haute, Indianapolis & Eastern Traction Company. Although, in a strict sense, these were the first individual contracts used in Indianapolis, they will be passed over here in order not to confuse the reader and attention will be turned to the more generally instructive case of the contracts later devised for employees of the Indianapolis Traction & Terminal Company.

The Indiana Public Service Commission, sitting as the board of arbitration as provided in the Indianapolis Traction & Terminal Company settlement of Nov. 7, began its hearings on Dec. 4. In its decision, rendered on Feb. 11, 1914, the commission ordered a wage increase and certain changes in working conditions, arranged for the future arbitration of disputes and held that the company was not required to recognize the union. It ruled that the company should not be obliged to employ only union men and that no men then or thereafter in its employ should be required to become a member of any labor organization, but that the company should not discharge a man solely for the reason that he was a union member. It was also provided that no discrimination by employees for or against union or non-union men would be permitted.

Impracticable Features of Award Led to Individual Contracts

The above-mentioned award of February, 1914, contained certain conditions which were found to be impracticable in the electric railway business. These conditions had mostly to do with the provisions that each motorman and conductor should be permitted and required to be off one Sunday in each month; that he should be permitted and required to have eight consecutive hours' rest between runs, and that extra men should receive a minimum wage of $45 per month. Under these regulations the company found it impossible to take care of the extra baseball, park and theatre traffic on Sundays and holidays.

The Amalgamated Association, having failed up to this time to force recognition of the union, undertook to take advantage of these defects in the award and compel the company to recognize the union as the price for a new agreement which would make the award workable. The railway refused to consent to any recognition of the union, and formulated an individual contract to be submitted to the employees.

This individual agreement, dated April 22, 1914, was in substantially the same form as the February arbitration award, but it contained clauses permitting car-service men who signed it to work Sundays if they so desired and provided eight hours' rest in each twenty-four hours but not necessarily eight consecutive hours between runs if the public service should at times prevent this. This individual contract was readily accepted by a majority of the employees. All the non-union men signed it, and many of the union men, about 90 per cent of all employees thus becoming parties to the modified agreement. The full text of the individual contract for employees of the Indianapolis Traction & Terminal Company appears on page 780.

Arbitration Board Upholds Contract

The Amalgamated Association, evidently wanting to have the sole right to enter into contracts on behalf of

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employees, immediately attacked the individual agreements, and endeavored to prove to three members of the Indiana Public Service Commission, acting as the board of arbitration under the February settlement, that such contracts conflicted with the February award in the matter of working conditions and were invalid. In the early autumn of 1914, however, this arbitration board held that the individual contract was valid in all provisions in which it did not conflict with the February award, and that if the company succeeded in getting the signatures of all employees the service contract would then be effective in all particulars. In other words, the only point where the individual agreement could not be construed as in accord with the February award concerned the aforementioned "impracticable" working conditions. In this regard the arbitration board held that the original eight-hour provision should remain unabridged, but that extra men could be hired for service on Sundays and holidays at the regular rate and not at the $45 monthly minimum wage. Thus the regular employees were disqualified from taking their regular Sunday runs on one Sunday each month and also whenever eight hours did not intervene between the end of the Sunday run and the beginning of the Monday run, but the arbitrators' decision left the men the opportunity to do the Sunday work as a result of all the employees executing the individual contracts.

Not satisfied with the arbitration finding, the Amal-

INDIANAPOLIS TRACTION & TERMINAL COMPANY WORKING AGREEMENT

INDIANAPOLIS, IND., APRIL 22, 1914

THIS AGREEMENT, by and between the Indianapolis Traction & Terminal Company and its car service men, witnesseth:

First: The rate of pay until Nov. 7, 1916, for men employed regularly as motormen and conductors shall be as follows:

In continuous service—One year or less, 21 cents per hour; one year and less than two years, 23 cents per hour; two years and less than three years, 24 cents per hour; three years and less than four years, 25 cents per hour; four years and less than five years, 26 cents per hour; five years or more, 27 cents per hour.

Forty-five dollars minimum monthly wage, provided that from any sum added to actual earnings to make such monthly minimum wage, the company shall deduct the value of any runs such employee missed by reason of his own fault.

The foregoing rates of wage shall not apply, however, to men employed especially to serve on special occasions as motormen and conductors when it is necessary to supplement the regular force.

Second: Each employee signing this contract agrees to in all things abide by the rules and orders of said company as the same are now or may from time to time be established. The business of said company shall at all times be conducted on the open shop principle. No scheduled run shall exceed twelve consecutive hours of continuous service, and schedules allowing at least eight hours' rest in each twenty-four hours shall be provided; but these rules shall be flexibly adapted to the actual needs of the public service; in all cases causing as little hardship as possible, to enable the company to accommodate park, theater, baseball and other special travel requirements, and at the same time not deprive the employee of the privilege of taking his regular run on any day.

Third: If at any time said car service men, or any of them, have any grievances of any kind or character as to wages or conditions of labor, such grievances shall be presented to and taken up with the company on the second or fourth Tuesday of each month, at the office of the superintendent. And such employee or employees may appear in person or be represented by any other employee or employees in the same class of service. Said superintendent will give a fair hearing, and from his decision an appeal may be taken on the third Tuesday of the month to the president of the company, who shall hear such appeal and correct any erroneous decision of the superintendent. And within ten days thereafter any such grievance not satisfactorily disposed of in the foregoing manner, shall be referred to the Public Service Commission of the State of Indiana for final decision. Said commission shall and is hereby agreed to be a permanent board of arbitration of all questions which may be referred to it under the provisions and in harmony with the terms of this contract. The authority and jurisdiction of said commission to revise, reverse or modify any decision rendered by it on any matter so referred shall be continuous. The evidence may be submitted by affidavit or orally upon oath. It is agreed that all such decisions of said commission shall be binding and conclusive unless so modified, revised or rescinded by said commission. And the parties hereby mutually agree to at all times conform to and obey any and all such decisions, and that this contract shall in all things be liberally construed so as to provide an effectual and constantly available remedy to adjudicate all controversies which may at any time arise.

Fourth: In any decision of the said Public Service Commission, said commission may decide when and under what conditions the said decision shall take effect, and to whom it shall apply, and fix any conditions it may deem proper, and either party may at any time file and have heard a motion for a modification or review of such decision. The decision of said commission on any point shall be in harmony with the express terms and provisions of this contract.

Fifth: Any discharged employee may appeal for reinstatement to the superintendent and from the superintendent to the president, and from the president to the Public Service Commission in the manner and at the times hereinbefore provided. Upon hearing of his appeal by the commission, if the commission finds that there is a reasonable and strong suspicion of his being guilty of conduct inconsistent with the proper discharge of his duties as an employee, he shall not be reinstated, but if the commission, on the other hand, shall find that he was discharged wholly without cause, he shall be reinstated upon such terms and under such conditions as the commission shall order.

Sixth: The parties hereto enter into this contract for the purpose of assuring a continuous and uninterrupted public service to the citizens of Indianapolis. It is the intention of the parties hereto, by entering into this contract, to avoid any possible suspension of the operation of the cars of said Indianapolis Traction & Terminal Company, or of any other cars operated over its tracks, due to any labor controversy, and to that end and in consideration of the mutuality of the obligations hereinafter as well as hereinbefore contained, it is further agreed as follows:

By each and every employee becoming a party hereto, that he will not participate in any strike of the employees of said company, or interruption of the service to the public, and will not at any time or for any reason engage in any such strike, or counsel or advise any other employee so to do, or enter into any agreement of any kind or character with any person or persons, the purpose of which shall be to induce or procure the employees of said Indianapolis Traction & Terminal Company, or any of them, by concerted action, to quit the service of said company, in a body or at a given time, or in any way to interfere with the operation of any car or cars or other property of said company, or to prevent its employing persons to run said cars, or otherwise to hamper or obstruct the said company in the discharge of its duties to the public as a common carrier of passengers, but that he will submit to arbitration in the manner above described any grievances or controversy which may arise, or that desiring to leave the service of the company on account of any such grievance or controversy without such arbitration thereof, or for any other cause, he will only do so peaceably and as an individual, singly, and without confederation or agreement, as aforesaid, and at such a time and in such a manner that the public service will not be impaired.

And in consideration thereof, said company on its part agrees that it will not lock out its employees in a body or close down its works, or cease operation of its cars, or refuse to employ and keep in its employ a force of suitable and competent men who are willing to abide by the terms of this agreement, or discharge men wholly without cause or otherwise violate the agreements herein contained.

Seventh: Any presentation of grievances, or any arbitration as herein provided, shall proceed only in the name of and under the direct charge of the complaining employee or employees or committee thereof, who before said Public Service Commission shall be entitled to appear by a duly admitted attorney of the Indianapolis bar.

Eighth: This agreement shall be signed by the duly authorized officials of the said Indianapolis Traction & Terminal Company, and by each of said motormen and conductors of said Indianapolis Traction & Terminal Company agreeing thereto. It shall become operative as a contract between the company and each and every employee who executes a copy which the company has previously executed, from the date of its execution by such employee, and may be executed by any employee at the time he enters the service of the company or any time thereafter. Joint execution by employer is not required or essential to its validity.

IN WITNESS WHEREOF said company has hereto set its name by its duly elected and authorized president, and said employees agreeing hereto have each subscribed their respective names, with the dates of their respective signatures thereto.

INDIANAPOLIS TRACTION & TERMINAL COMPANY,

By .....
President.

APPROVED:

.....

Employees:

Name:	*Date:*
.....	.....
.....	.....

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gamated Association demanded that all the individual contracts be surrendered and, upon the refusal of the company to comply with this demand, began to make preparations for a strike. The avowed purpose of this was to force the company and the signers of the individual contracts to submit to the cancellation of these agreements.

At this stage in the proceeding, however, an action was brought in the United States Circuit Court by the Guaranty Trust & Safe Deposit Company, Philadelphia, Pa., as trustee of the mortgage securing the bonds of the Indianapolis Traction & Terminal Company, to restrain the strike agitation. This was based upon two grounds:

1. That, inasmuch as the arbitration award of February, 1914, had provided against a strike, the action of the Amalgamated Association officials and all persons having no contract relations with the company, in attempting to induce, persuade, force or intimidate the men who were working under the award to break that award, was a wrongful act, which could be enjoined.

2. That the action of all such persons and also those who were employees of the company but had not signed the individual agreements, in attempting to induce, persuade, intimidate or force those who had signed the individual agreements to break them, was a wrongful act, which could be enjoined.

COURT ISSUES STRIKE INJUNCTION

The result of this action was a temporary restraining order on Sept. 23 and later, on Nov. 7, an injunction restraining the leaders of the Amalgamated Association and local labor union leaders from confederating to bring about a street railway strike in Indianapolis and prohibiting the car-service men from striking. The federal court applied the well-established doctrine that a person who is not a party to a contract has no right to solicit or persuade or otherwise procure a party to that contract to make a breach of it.

The individual service contract of the company was found by the court to be valid, binding and in full force on its signers, and the men who had not signed the contracts could not in any way interfere with those who had signed them enjoying the privileges provided thereunder. The names of about 200 union men who were working under the February award and more than 500 others who were working under individual contracts were included in the court order, and each was enjoined from striking or attempting to bring about a strike. The outside and local labor leaders were also enjoined from inducing any of the employees named to violate either the February award or an individual contract by striking to compel the company to operate upon the closed-shop principle.

A strike injunction has really, therefore, been in force since September, 1914. From then to the present time no labor organizer has presumed to advise, persuade or in any way solicit the car-service men on the Indianapolis lines to violate their agreements with the company by going out on strike. The injunction case was appealed by the Amalgamated Association to the Federal Circuit Court of Appeals, in Chicago, and it was argued on Nov. 30, 1915, and reargued on May 23, 1916, but no decision has yet been rendered.

SUPPLEMENTARY WAGE AND BONUS AGREEMENTS

The wage scale prescribed by the individual contract first offered on April 22, 1914, was to remain in force until Nov. 7, 1916, when the original three-year settlement agreement with the Governor and the Public Service Commission would run out. Prior to this time, on July 6, 1916, the company, as a result of a long discussion with representative employees, announced an increase in wages, as noted in the ELECTRIC RAILWAY JOURNAL of July 15. This increase was to be agreed to by the men as a supplementary clause of the individual working contract. The new wages were to become effective on Jan. 1, 1917, and to remain in force up to and including Dec. 31, 1921. Outside of the increase in wages provided for there was no change in the working conditions as stated in the individual contracts. All car-service men signing the individual working agreement and the new wage supplement, however, were to receive a bonus of 1 cent an hour for each hour worked up to and including Nov. 7, 1916, and a bonus of the difference between the old rate and the new rate from Nov. 8 to Dec. 31, 1916, inclusive. It was further provided that each employee, to be entitled to the bonus, must thereafter have truly opposed and used his influence to oppose any strike or attempt to strike, and, in the event of a strike, have faithfully reported for duty at his usual time and place each day and operated his car as his superior officer directed.

It was provided that for men signing the various agreements on or before July 8, 1916, the bonus would begin to accrue on July 1, and for those signing after July 1 and before Aug. 1 it would begin to accrue at the date of signing. In case of new employees entering the service before Jan. 1, 1917, the bonus would begin to accrue at the date of signing. Before July 8 most of the men had accepted the new terms.

The Right to Strike

Paul Shoup, president Pacific Electric Railway, Los Angeles, Cal., delivered an address before the Los Angeles Advertising Club on Sept. 4, on the subject of "Obligation." The address related largely to the Federal eight-hour railroad law, but Mr. Shoup also discussed the electric railway affairs and obligations of the worker. Among other things he said:

"No one disputes the right of a man to quit his job because of a personal dissatisfaction. The inference is, however, that he will not as a result become a burden on the public and that he has reasonable expectations of maintaining the independence he has exhibited in quitting work. No one blames a man for seeking better wages, but this seeking has proper foundation only in that he is able to give more to the world in productive labor, whether of hand or mind, than the value placed upon his labor heretofore. Men are sought for at higher wages because they are able to deliver the goods, but the situation is very different when men, through associated power, secure a larger return for their labor without any consideration as to what they may be giving for that labor.

"We must all understand why our individual returns for our work cannot be increased except at the expense of someone else unless we are able to give more to the world in the way of value than we have been giving. We must understand the meaning of the word 'obligation' and that it is not difficult, in failing to realize it, to wreck the whole industrial fabric of this country.

"How far we are from accepting the eight-hour day as having the practical sanction of society is shown by the election held upon an amendment to the constitution in California looking for the establishment of an eight-hour day; this was in November, 1914. The adverse majority was the greatest given against any measure ever submitted to the voters of this State; 560,000 voted against the measure and only 282,000 for it. In every county the first vote was adverse. In Oregon and Washington, where a similar measure was submitted, the results were the same."

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AMERICAN ASSOCIATION NEWS

Entertainment Committee Greatly Augmented

President Charles L. Henry of the American Association has appointed the following to the entertainment committee in addition to the men whose names were listed on page 1189 of the June 24 issue.

H. H. Adams, superintendent shops and equipment, Chicago (Ill.) Surface Line.

Carl Beck, Westinghouse Traction Brake Company, St. Louis, Mo. M. R. Boylan, General Auditor, Public Service Railway, Newark, N. J.; L. C. Bradley, district manager, Stone & Webster, Texas district, Houston, Tex.; G. Sabin Brush, superintendent railway department Cumberland County Power & Light Company, Portland, Me.; S. T. Bale, J. G. Brill Company, Philadelphia, Pa.; W. L. Boyer, president Bemis Car Truck Company, Springfield, Mass.

C. L. Cadle, electrical engineer New York State Railways, Rochester, N. Y.; Bruce Cameron, superintendent of transportation United Railways, St. Louis, Mo.; W. A. Carson, general manager Evansville (Ind.) Railways; T. W. Casey, National Pneumatic Company, New York City; G. H. Caskey, auditor Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.; E. F. Chaffee, O. M. Edwards Company, Syracuse, N. Y.; C. G. Chamberlin, W. H. Coe Manufacturing Company, Providence, R. I.; C. S. Ching, chief instructor Boston Elevated Railway, Roxbury, Mass.; S. K. Colby, Aluminum Company of America, New York City; R. C. Cram, assistant engineer Brooklyn (N. Y.) Rapid Transit System; H. D. Crampton, secretary Capital Traction Company, Washington, D. C.

D. B. Dean, J. G. Brill Company, Philadelphia, Pa.; J. H. Denton, Railway Utility Company, New York City; G. B. Dobbins, secretary Michigan Railway, Jackson, Mich.

A. H. Ehle, assistant sales manager Baldwin Locomotive Works, Philadelphia, Pa.

Thomas Farmer, Jr., Consolidated Car Heating Company, New York City; W. J. Flickinger, chairman efficiency committee, The Connecticut Company, New Haven, Conn.

N. M. Garland, Ohio Brass Company, New York City; J. E. Gibson, general superintendent Kansas City (Mo.) Railways; C. R. Gowen, general passenger agent New York State Railways, Syracuse, N. Y.; F. O. Grayson, president and general manager Grayson Railway Supply Company, St. Louis, Mo.; Alfred Green, Galena Signal Oil Company, New York City; S. W. Greenland, general manager Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.

A. A. Hale, Griffin Wheel Company, Boston, Mass.; W. J. Harvie, president Syracuse & Suburban Railroad, Syracuse, N. Y.; H. A. Hegeman, vice-president U. S. Metal & Manufacturing Company, New York City; F. W. Hild, general manager Denver (Col.) Tramway Company; J. M. High, Pantasote Company, New York City; L. W. Horne, vice-president and general manager Lord Manufacturing Company, New York City.

H. W. Irwin, Bay State Street Railway, Boston, Mass.

A. P. Jenks, General Electric Company, Chicago, Ill.

C. B. Keyes, General Electric Company, New York City; C. S. Kimball, engineer maintenance of way, Washington Railway & Electric Company, Washington, D. C.; G. L. Kippenberger, St. Louis (Mo.) Car Company; P. M. Kling, Laconia (N. H.) Car Company.

W. A Lake, Pantasote Company, New York City; C. W. Laskay, Hale & Kilburn Company, New York City; N. Le Grand, St. Louis (Mo.) Car Company.

T. F. McKenna, Electric Service Supplies Company, Scranton, Pa.; R. C. Mills, second vice-president Sioux Falls (S. D.) Traction System.

H. N. Ransom, Westinghouse Electric & Manufacturing Company, New York City; J. P. Ripley, railway engineer J. G. White & Company, Inc., New York City.

Martin Schreiber, engineer maintenance of way Public Service Railway, Newark, N. J.; E. E. Soules, manager publicity and advertising Illinois Traction System, Peoria, Ill.; R. M. Sparks, general passenger agent Bay State Street Railway, Boston, Mass.; R. W. Spofford, general manager Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.; E. C. Spring, Philadelphia & Western Railway, Upper Darby, Pa.; Jerry Stanton, General Electric Company, Philadelphia, Pa.

A. D. B. Van Zandt, publicity agent Detroit (Mich.) United Railway.

J. W. Welsh, electric engineer Pittsburgh (Pa.) Railways; Howard Whitney, engineer maintenance of way Springfield (Mass.) Street Railway.

The Chicago Special

The Chicago Convention train reservations indicate the largest Chicago special in several years. On Sept. 27, eighty-five reservations had been made with E. K. Bisby, passenger department, Pennsylvania lines, Chicago. The train will leave the Union Station, Chicago, at 11 a. m., Sunday, Oct. 8, and will make the regular Pennsylvania Limited stops that afternoon and evening, arriving at Pittsburgh at 11.40 p. m., and at Atlantic City at 9.30 a. m. Monday.

COMMUNICATIONS

Unit for Comparing Track Upkeep Costs

THE AMERICAN RAILWAYS COMPANY
PHILADELPHIA, PA., Sept. 23, 1916.

To the Editors:

In reference to a practical unit of track cost which has been so ably discussed in your columns recently, I venture the opinion that the importance of any cost keeping is the end for which the costs are kept.

A manufacturing concern may, by standardization, reduce costs, or it may increase prices to cover known costs found by accurate cost keeping. Failing in either of the above expedients, the factory may close its doors.

The street railways have control of these factors in a very limited degree. In the case of track work, the total cost of maintenance per track mile is the most logical unit, as stated by Mr. Roundey in your issue of Sept. 16, and also the most workable. It is idle in this instance to say that some maintenance is extraordinary and some ordinary, as the total of both are chargeable to current operation unless the property has been able to set aside large maintenance reserves, and the reserve, in case there be such, must have come from operating expenses. If it appears desirable to gather exact knowledge of the comparative value of different types of construction under various operating conditions the matter becomes complicated to the point of despair. I agree with Mr. Cram when he states in your issue of Aug. 26 that the most careful accounting which he has seen is of little help if there is no one present during

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the analysis who is familiar with all the construction details.

It is generally impossible for the accounting department to record so minutely the various details of any job, that without expert interpretation a cost of maintenance, per any conceivable unit, may be given in unqualified figures. For example, a piece of track may require maintenance on account of poor drainage, unsuitable ballast, tie renewals, joint failure, rail failure, bond failure or rapid destruction of paving, which may not have been foreseen by the engineer, or, if foreseen, proper materials may not have been obtainable. These partial failures may have been hastened by a change in volume or character of the traffic burden. If we assume that the variables have been determined with sufficient accuracy to evolve a workable unit then let us consider a municipal paving program which orders a street paved or repaved in the tenth or twelfth year of the life of the track, or which withholds permission to rebuild until, as happened in one case within the writer's knowledge, maintenance on a 2-mile stretch of double track was costing $600 per month.

Should not the engineer keep his records of costs and details of construction in such shape that for any section of track he can give, with but little trouble, the detail suggested by Mr. West? By use of a suitable job order system any unit cost can be worked up as occasion requires, without undertaking the unprofitable task of trying to measure open track with hourly service by the same yardstick used to measure the paved special work with fifteen-second headway.

C. G. KEEN, Engineer Way and Structures.

Encouragement in the Bay State Decision

BOSTON, MASS., Sept. 25, 1916.

To the Editors:

The abstract of the Bay State fare decision, published in your issue of Sept. 9, with the excellent editorial analysis of it in the same issue, gave a very clear statement of its salient features. The importance of the case has led me, however, during the past three weeks, to go over every page of the decision very carefully, with the result that I believe a great deal of encouragement can be drawn from it, even if the company did not receive permission to increase its rates in the one-fare zones from 5 cents to 6 cents. To indicate the reasons for this opinion the chief features of the case will be reviewed. The principal reasons cited by the commission for declining to authorize a general increase in rates may be summarized as follows:

1. That the company's valuation of its investment is too high by about 6 per cent.

2. That 7 per cent earnings are not necessarily a basis for a fair return in Massachusetts.

3. That annual depreciation charges should be, roughly, $700,000 instead of $1,000,000.

4. That fares on profitable lines should not be raised in order to carry along unprofitable ones.

5. That every possible means of increasing the business and raising the efficiency of the system should be exhausted before rates should be raised.

The commission frankly states, however: "In fixing this rate (6 per cent as a fair return) we must not be understood as ruling that a street railway company which finds it possible to declare dividends in excess of 7 per cent per annum may reasonably be required to reduce its charges. Each case must be judged upon its own merits."

This seems to be sound doctrine and will interest companies and commissions elsewhere but does not afford the Bay State Street Railway the relief requested. The commission evidently realizing this suggested a number of ways to assist the company as follows:

1. Regulation of jitneys, as the operators of this new form of public service ought to be subjected to proper regulation and to some of the obligations which the owners of the regularly established forms of transportation are by law compelled to observe."

2. The public must be prepared to expect in some instances reduction of service and should give its "sympathetic co-operation" by making sacrifices as the "larger good may seem to demand" in such matters as "a reasonable reduction in the present excessive number of stopping places," etc.

3. That "the entire system of street railway taxation may be in need of revising, and less onerous burdens should be imposed."

4. "It is unreasonable to expect the company to meet the cost of work on the street surface (paving, etc.) except in so far as it disturbs the surface itself."

5. "Through their local governments" the various communities served can "help to improve traffic conditions on the streets so that the operation of cars may not be unnecessarily impeded."

6. Also, they "can grant, without imposing undue restrictions, such new locations as may from time to time be necessary for the improvement of the service."

7. "In the judgment of the commission, the public can also be reasonably expected to make contribution in the form of some increase in fares."

The commission virtually concludes with the assurance that fares may be raised in the less populous districts and says: "If the company wishes to increase the prevailing fares upon these lines it is just and reasonable, in our judgment, for it to do so."

In another place the commission says that "the company ought to follow up the suggestions made by Mr. Arnold and other experts," and promises that it (the commission) "stands ready to assist and co-operate in every feasible and proper way." It is interesting to note that the Arnold recommendations, among other things, provided for the use of one-man cars and a speeding up of schedules.

The commission realizes that the company should have and is entitled to a greater net revenue. The tone of the decision as a whole is friendly to the street railway industry at large and shows a realization that it is about time to cry halt to electric railway baiting.

Railway service benefits two classes, the car rider and the property owner. It was established primarily for the benefit of the former, although the latter has been benefited to as great or even greater extent. The car rider supports the railway. The property owner may incidentally be a car rider too but often he rides in an automobile or may be a non-resident, all of which, of course, makes no difference. The question is why does the car rider who foots the transportation bills have to pay for paving and other excessive burdens levied on him indirectly through the medium of the railway and be deprived of transportation facilities which otherwise he could enjoy if it were not for these measures?

This thought seemed to be a strong factor with the Massachusetts commission in reaching its decision in this justly celebrated case for in denying a general fare raise at this time the note of warning is given in no uncertain terms that if the present 5-cent rate of fare is to be continued the railways must be relieved of "onerous burdens" and "excessive taxation."

OBSERVER.

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Some Recent Advances in

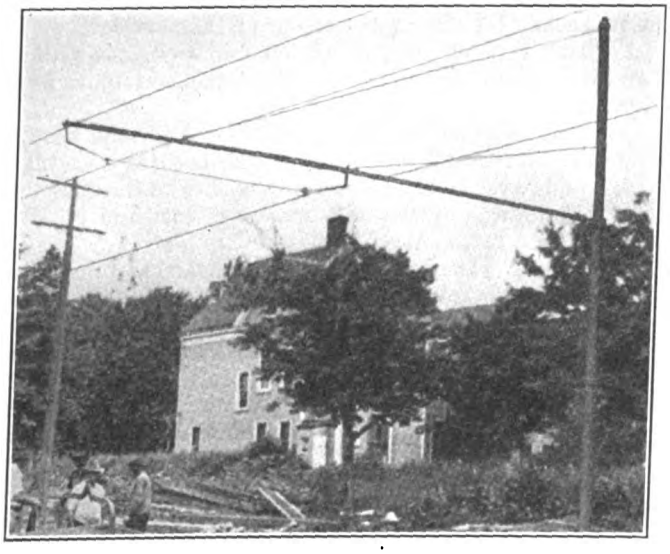
EQUIPMENT AND ITS MAINTENANCE

Portable Controller for Moving Trucks in the Shops—Reinforced Trolley Splice for Catenary Construction—Straightening Poles with Pivoted Jack—New Contactor Signals—Long Bracket Arms Used During Construction—Automatic Slack Adjuster for Single-Truck Brake Rigging

Unusually Long Bracket Arms

BY G. H. McKELWAY
Line Engineer Brooklyn Rapid Transit System

In order to avoid interference between a cableway constructed by a contractor for digging a sewer in an important street and the span construction in use for supporting the trolley wire, it was necessary to remove the spans from the poles on the side of the street where the contractor was working and to support the trolley wire from mastarms attached to the poles on the opposite side of the street. Such practice on double-track lines is not common unless the tracks are at one side



LONG BRACKET ARM USED DURING CONSTRUCTION WORK

of the street where they can be spanned with ease by a comparatively short bracket.

In the work in question the tracks were in the center of a comparatively wide street, the width being 80 ft. between house lines and 44 ft. between curb lines.

In order properly to support the trolley wire over the far track it was necessary to make the arms 31 ft. 6 in. long, or of a length greater than the supporting poles, which were of steel and 30 ft. long. Not only were the arms actually longer than the poles but their apparent length was increased by the fact that the poles were set 6 ft. in the ground, so that the arms appeared to be almost 75 per cent longer than the poles.

The arms were made of 3-in. pipe, each supported by two guy rods leading up to the pole. As the poles were not long enough to take these rods at their proper angle the poles were lengthened by the insertion of wooden extensions set into the tubing after the caps had been removed. The arms were bolted to these extensions.

Owing to the nature of the street, which was a heavily traveled one, it was impossible to back guy the poles to relieve them of some of the strain from the arms but this was found to be unnecessary, and even bracing was not needed.

Reinforcing Splices in Catenary Construction

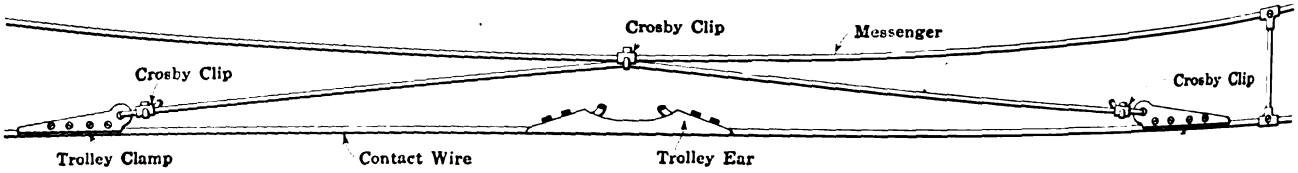
BY M. E. HARDING
Engineer of Overhead Washington, Baltimore & Annapolis Electric Railroad, Annapolis Junction, Md.

A point of weakness in overhead construction is at the splices in the contact wire. This company had considerable trouble at one time due to the breaking of splicing ears, and to overcome this trouble two expedients were adopted. A new type of splicing ear was designed, and the spliced wire was reinforced by means of guys between the messenger wire and the contact wire, as shown in the accompanying diagram.

The feature of the splicing ear, a patent upon which has been granted to the writer, is that the wire is passed through a hole on the end at an easy angle so that it is practically not bent at all at the point of entry. The wire is clamped by means of two cap bolts, and as an extra precaution the end may be bent up as shown. The hole in the end of the ear is so low at the point of entry of the wire that a practically continuous bearing surface is provided for the trolley wheel or shoe.

The guying arrangement consists simply of a clamp ear attached about 18 in. on each side of the splice with a light stranded wire running up to the messenger and clamped to it by means of a crosby clip.

While on the subject of line work, it may be of interest to know that in putting in the splicing ears as described above we use ladders, and by so doing save considerable in expense which would otherwise be necessary for line cars. The interference with traffic is also less. These ladders we carry on regular cars tied on to the truss rods with rope. On the new cars we have hooks specially put on for the purpose and the rope is unnecessary.



REINFORCEMENT OF SPLICE IN CONTACT WIRE USED BY WASHINGTON, BALTIMORE & ANNAPOLIS ELECTRIC RAILROAD

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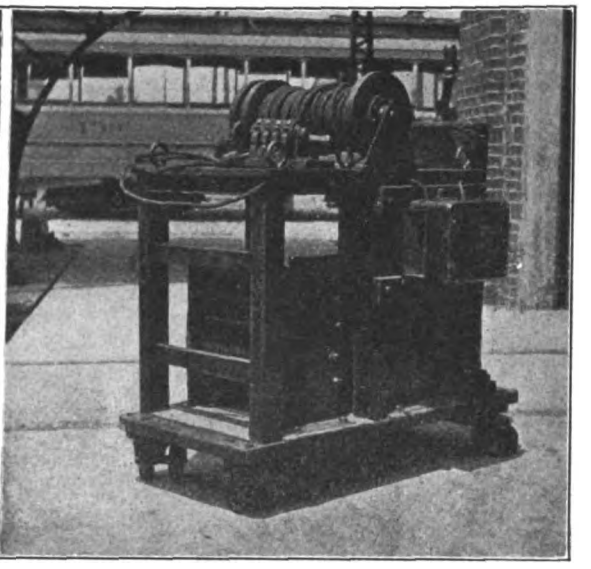
VIEW OF PORTABLE CONTROL SET IN SERVICE



VIEW OF PORTABLE CONTROLLER

Portable Controller Proves a Time-Saver

This Convenient Device Solves Problem of Moving Trucks in the Car Shops

BY H. C. EBELING
Engineer Cleveland (Ohio) Railway

Trucks completely equipped are moved for short distances in the general repair shops of the Cleveland (Ohio) Railway Company by the aid of a portable control set. Power is supplied through the use of this equipment to the motors in a truck, thus making it unnecessary for the workmen to get beneath a car when it is elevated for either removing or replacing trucks. It also saves much time in performing this operation. This device was made at the suggestion of the general shop foreman and it has been found to be a very useful piece of equipment in the truck and motor shops. It was made portable so that it could serve all parts of a large shop building, and duplicates were supplied to the motor and truck repair shops. A view of this equipment is shown in the accompanying illustrations.

The operation of this portable control set is quite simple and is readily understood by the repair shop men. A contact board is laid on top of the motor, and the motor leads are slipped under the bronze contact springs. Energy is supplied through a flexible cord connection to the trolley wire which passes over each of the tracks in both the motor and truck repair buildings. When the power is turned on to move the trucks, a cable connec-

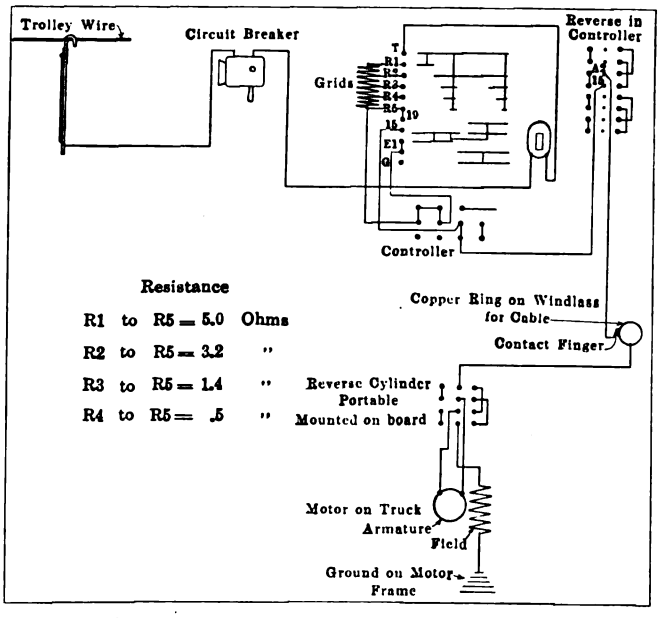
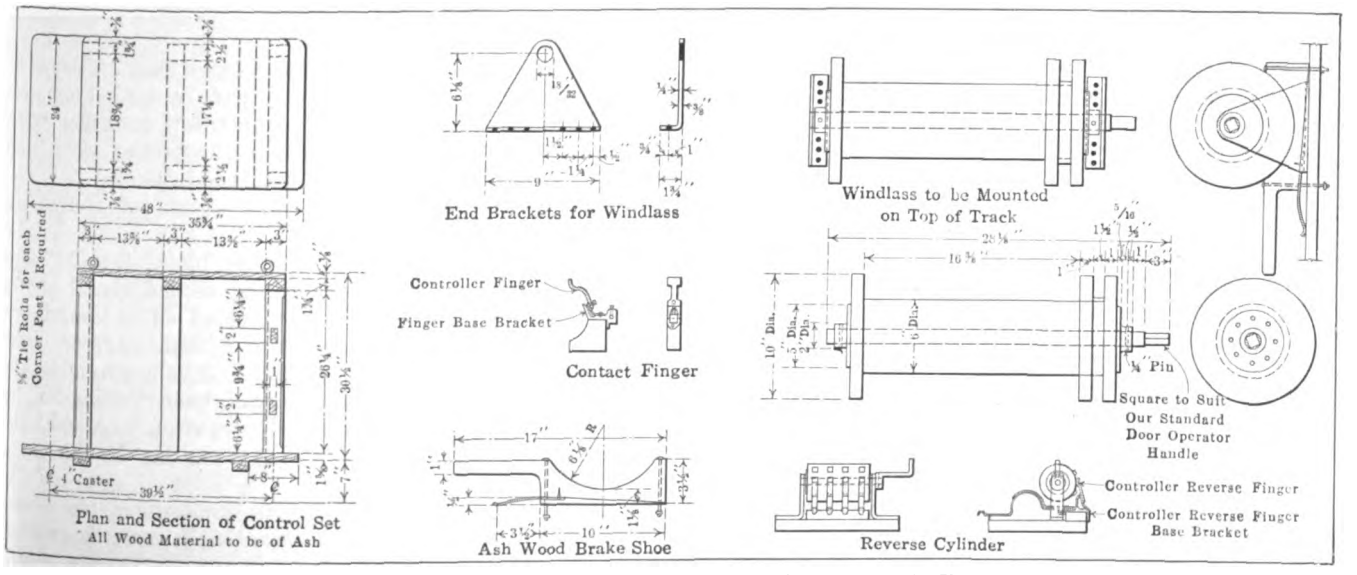


DIAGRAM OF PORTABLE CONTROL SET CONNECTIONS



DETAILS OF CONSTRUCTION OF CONTROLLER OF PORTABLE CONTROL SET

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tion between the controller and the truck is permitted to unwind from a drum as the truck moves along the track. A small reverse cylinder is also provided for use in case the motor connections are made improperly. A contact finger and ring on the drum supply a continuous path for the current from the trolley to the cable as it unwinds from the drum. The other features of this equipment are shown in the diagram on the preceding page.

A New Contactor Signal Using Standard High-Speed Aspects

Recently Developed Signal Designed to Comply with Tests Recommended by the Block Signal Committee of the Association

The campaign for "safety first" which has been carried on for the past few years has had great influence on every branch of the railway industry, and to a marked degree on the signaling art, which is one of the pioneers in this movement. One of the most important developments of the past seventeen years is the contactor-operated signal for electric roads.

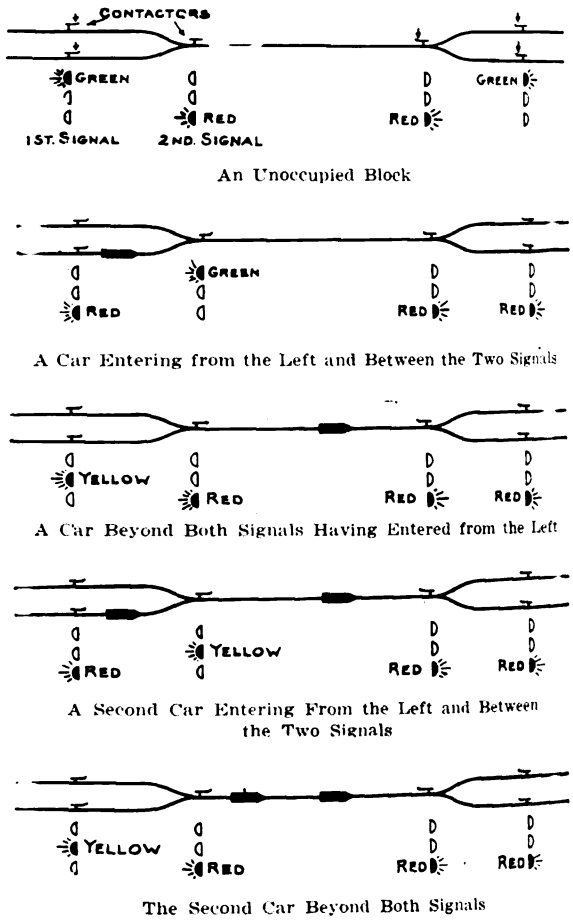
When electric railways began to use signals, they ran infrequent and low-speed cars and had small financial resources, and the old hand-thrown signal enabled cars to be operated with some degree of safety. As the service became more frequent, contactors were developed to operate these signals to save time and obtain greater safety. As the service was still more frequent it became necessary to develop signals so as to allow several cars to occupy the block at the same time while going in the same direction, and the registering mechanism was added. Later, with still higher speed, trouble began to develop with the contactors. It was also found as time went on and users of signals on electric railways obtained more experience with signals that false indications resulted from line wire troubles as in the earlier development of signals for use on steam roads.

The engineers of the public service commissions and the signal committee of the Engineering and Transportation Associations began investigating this question, and this year the signal committee is recommending a set of tests which it considers a contactor-operated signal should meet in order to be safe, regardless of any of the unusual conditions which arise on any of the wires leading from the contactors or mechanism cases or regardless of the unusual car movements which sometimes take place. With these recommendations in mind, the United States Electric Signal Company, West Newton, Mass., has developed its new Type N registering signal and claims that this signal overcomes all of the objections to previous types of contactor signals enumerated above and meets all the tests being recommended by the signal committee.

In the type N signal, a three-light signal aspect case is mounted on a trolley pole slightly in advance of the point where the double track unites in the single track. A little further on, possibly one or two poles, and opposite the single track, is mounted a second three-light aspect case. The mechanism case is mounted on either of these two poles.

Approximately opposite the first signal on each branch of the trolley wire is mounted a contactor. Approximately opposite the second signal is mounted a third contactor. This makes three contactors at each end of the block instead of two as previously. The two contactors opposite the first signal are connected together so that the operation of the signal is just the same whether a car enters the block from the right hand branch or the left hand.

From each contactor two wires run to the magnet controlled by it and, as the contactor is operated, two contacts are made in almost immediate sequence by a gravity-operated contact arm, whereby a very light charge is sent on one wire and a much heavier charge is sent on the other wire to the magnet. This magnet is so arranged that it will operate only if a very light charge is sent into it and then almost immediately thereafter a much heavier charge. This prevents the magnet from operating by a foreign feed, cross, break



ASPECT DIAGRAM, SHOWING THE SIGNAL INDICATIONS OF TYPE "N" SIGNAL WITH CARS MAKING THE DIFFERENT MOVEMENTS

or ground. It also avoids any danger that a false contact will be made in case the wire coming from the contactor chafes against the contactor or trolley wire or becomes broken and touches the trolley wire, and thus falsely registers cars out of the block.

The other end of the single track, of course, is equipped in the same way.

When there are no cars in the block, the first signal shows a green light and the second signal shows a red light. The two signals are of equal importance and the motorman is instructed that a green light means a clear track, or "Proceed." A yellow light means that there is a car in the block ahead moving in the same direction, or "Proceed with caution." A red light means "Danger, stop!" The meaning is the same on both signals.

A motorman approaching an unoccupied block sees a green light in the first signal and proceeds past it.

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After the front of his car is past the first signal, the trolley wheel strikes the contactor which makes up the circuits for operating the registering-in magnet, the registering-in magnet lifts its armature, which is then locked up, and this movement causes a red light to show in both signals at the opposite end of the block. After the registering-in magnet has lifted its armature and registered the car in, a circuit is made up giving a green light in the second signal and putting a red light in the first signal behind the car.

It should be noted that it is the operation of the registering-in magnet which gives the "proceed" light in the second signal. While the motorman does not have to pay any attention to the registering of his car, still he will not get a "proceed" signal unless his car is properly registered in. The red light in the first signal now prevents another car from passing the first signal until the armature of the registering-in magnet is dropped back into operating position again, and this occurs as the trolley wheel strikes the contactor mounted approximately opposite the second signal. When the trolley wheel strikes this second contactor, which is just after the front of the car has passed the second signal, a circuit is completed to a magnet which pulls the lock from beneath the armature of the registering-in magnet and allows its armature to drop back by gravity into operating position again. When this armature drops back, a red light shows in the second signal and a yellow light in the first signal.

The motorman of the second car approaching sees a yellow light in the first signal and knows that there is a car ahead of him in the block proceeding in the same direction and passes the signal and proceeds with caution. As the trolley wheel strikes the first contactor, the registering-in magnet is operated in just the same way in which the first car operated it, and a yellow light is then given in the second signal and a red light in the first signal behind the car. As this car's trolley wheel strikes the second contactor, the first signal returns to yellow and the second signal to red. Each succeeding car gets the same indication and operates in the same way as the second car.

The circuits are so arranged that as the trolley wheel passes the contactor on the double track the registering-in magnet is operated and its armature locked up, and as the trolley wheel thereafter strikes the contactor on the single track the registering-in magnet's armature is unlocked and dropped by gravity. If, however, a car is leaving the block, the trolley wheel first strikes the contactor on the single track. This causes a control magnet to lift its armature, which is locked up, and when the trolley wheel thereafter strikes the contactor on either branch of the double track the registering-out magnet is energized and the armature of the control magnet is unlocked and falls by gravity, thereby cutting out the registering-out magnet circuit and again cutting in the registering-in magnet circuit. The contactors are made directional in this way. Therefore, as each car leaves the block it registers itself out on the registering machine, and when the last car has left the block the signals return to the normal condition indicating an unoccupied block.

If fifteen cars should enter the block, the number which the registering machine will take care of, then all of the signals go to danger and so remain until one of the cars leaves the block.

The Type N signal is not only designed so that the signals are always safe regardless of any combination of crosses, feeds, grounds or breaks which may occur on either the wires running from the contactors or the two line wires running through the block, but it provides also for what might be called unusual movements. Thus, suppose a car accidentally ran under a contactor in advance of a danger signal and discovering its error backs out. In the Type N signal if the car is registered in, in these circumstances it will also register itself out in the backing-up movement. If on the other hand, it failed for any reason to register in as it passed under the contactor, it would also fail to register out as it made the backing up movement under the contactor.

Again, suppose the power went off along the line when a car was at a stop with its trolley wheel under the registering-out contactor, and the breaker at the power house went in and out several times. With the Type N signal there would be no danger that a car would be registered out each time that the breaker at the power house was thrown in. It would be registered out once only. The manufacturers claim also that all other unusual movements likely to occur have been safely taken care of in this new signal.

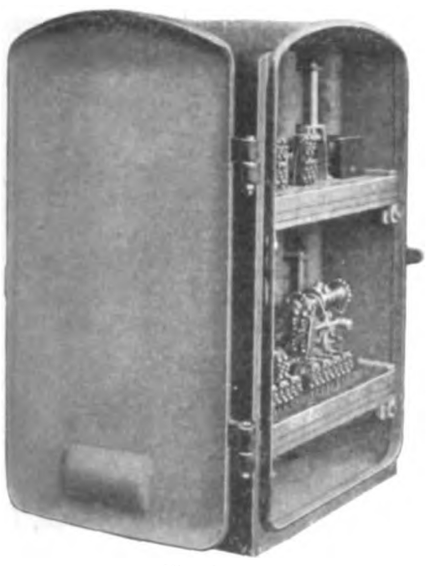

Fig. 1

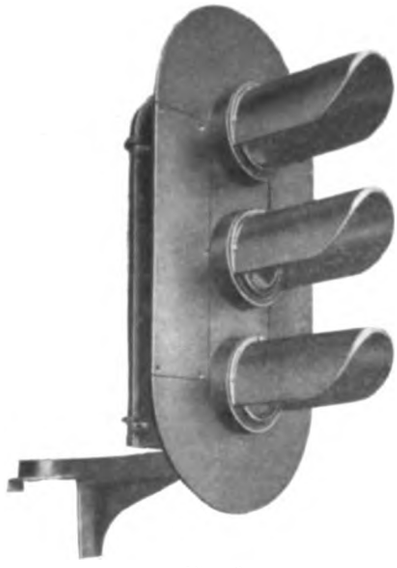

Fig. 2

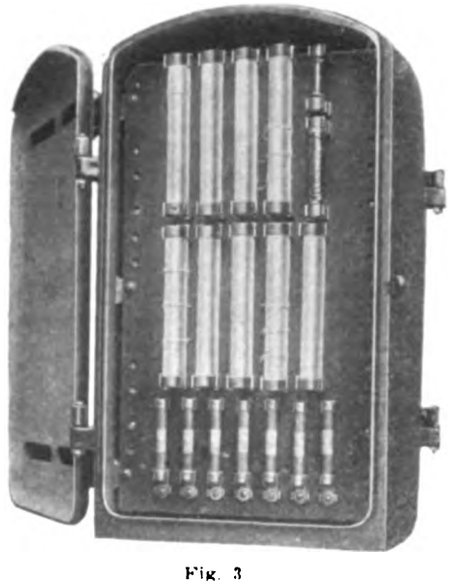

Fig. 3

FIG. 1—MECHANISM CASE OF TYPE "N" SIGNAL, SHOWING RELAY MOUNTED ON REMOVABLE SHELVES; FIG. 2—THREE-LIGHT ASPECT OF THE TYPE "N" SIGNAL; FIG. 3—RESISTORS AND FUSE PANELBOARD

GENERAL CONSTRUCTION

The aspect cases are three-light signals with spread-light lenses, ample background and substantial sun shields. Back of each lens are mounted two 23-watt lamps in parallel with a relay in series with the lamp normally in circuit, for cutting in the spare lamp if

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the one normally in circuit burns out. While this signaling system operates from the trolley voltage, still the lamps burn at normal candle-power, regardless of the voltage fluctuations, by means of a simple current regulator which has been found entirely satisfactory in two years of actual service. This current regulator makes it practical to use an all-light signal for day as well as night indication with the lamps fed from the trolley voltage, for the candle-power remains constant in the lamps.

A high-speed contactor of very simple design is used with no side contact strips or other parts in the path of the trolley wheel to cause shock and uncertainty of contact at high speed. The contactor is placed on an ordinary ear and guyed into position so that the weight of the span hangs from the contactor, and this weight rests upon an adjustable spring in the contactor which is adjusted to carry all but about 10 lb. to 12 lb. of the total weight of the span. As the trolley wheel with the pole tension on it comes under the contactor, some of the weight of the span is relieved, and the spring moves a plunger upward. Near the end of its upward stroke, the plunger unlatches a gravity-operated contact arm which falls and makes the two contacts in predetermined sequence. As these two contacts must be made almost instantly one after the other, the contact arm is operated by gravity to give the same speed each time, and as the trolley wheel operating the contactor simply unlatches this contact arm, the action of the arm is always the same regardless of the speed of the car. As the trolley wheel leaves the contactor, the plunger of the contactor moves downward, lifting the contact arm into operating position again and relatching it.

As the contact arm is only unlatched near the end of the upward stroke of the plunger of the contactor, it will not be operated by any swaying of the trolley wire such as might be caused by a trolley pole flying off and striking a nearby span wire. The contactor is so designed that expansion and contraction of the trolley wire does not affect its operation nor does creeping of the trolley wire. It has been successfully tried out in high-speed service for the past year and a half.

The mechanism case which is mounted on the trolley pole can be mounted either near the ground or higher as desired. It has two doors on opposite sides of the box. Just inside of one door is a panel board on which are mounted all the resistances and fuses. The resistances have ferrules on their ends and are held in fuse clips so that they can be removed instantly in the same way as the fuses without disconnecting any wires or resistance holders. There is also a cut-out switch which, when opened, deadens the entire panel board, so that a maintainer is in no danger of shock or of causing short-circuits when working on the board.

On the back of the panel board and facing the other door are mounted a series of contacts. Also facing the other door are two shelves made of substantial insulating material, and these shelves slide in and out readily on guides. On the back edge of these shelves are spring-operated contacts which match and touch those on the back of the panel board when the shelves are pushed all the way in. On these shelves and connected to the spring-operated contacts are mounted all the relays, also the registering machine. If anything goes wrong with a signal, a maintainer can instantly pull out one of these shelves without making any disconnections, slip in another shelf and put the signal immediately into service. He then has the relays in his hands where he can thoroughly inspect them without danger of getting a shock, or he can take the shelf to the shop and repair any parts at his leisure. All of the coils are form-wound and insulated with "Micanite" inside and outside. Double insulation is obtained by mounting the coil frames themselves on the shelf of insulating material. The best of insulation is used throughout. There is no fiber. "Micanite" is used for the coils and "Bakelite" for mounting the contacts. The current consumption is small, and wear on the contacts which break the arcs is reduced to a minimum by double breaks and by reason of the fact that the heaviest circuit broken is ¼ amp. The contacts on which the arcs are broken are easily replaceable by the removal of one small screw.

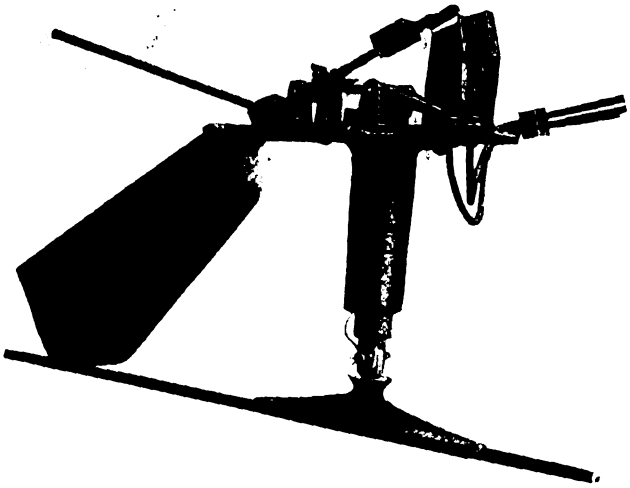

FIG. 4—HIGH-SPEED CONTACTOR FOR TYPE N SIGNAL, SHOWING COVER OPEN

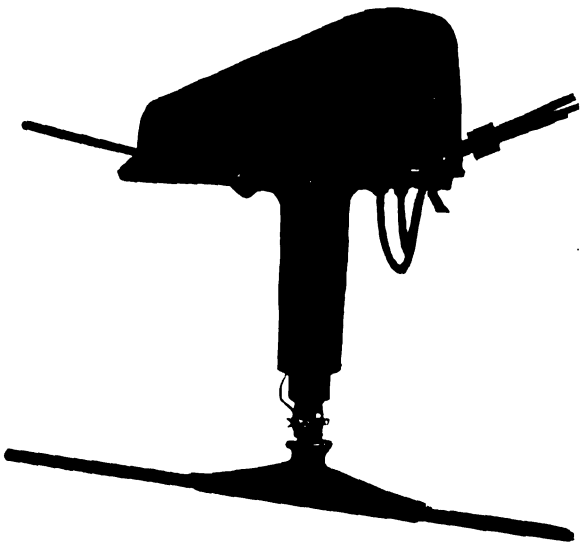

FIG. 5—HIGH-SPEED CONTACTOR FOR TYPE N SIGNAL, SHOWING COVER CLOSED

Summarized, the principal points of improvement which the manufacturers claim for this Type N signal over previous designs are as follows:

Fixed indications are used for a "proceed" indication instead of a momentary flash or movement of a part.

The responsibility on the motorman to watch the registering of his car is removed, yet he can not proceed unless his car is registered.

The same indication is used as the continuous track

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circuit indication and it is read in the same way, so that one standard form of indication can be used for all types of signals instead of one for the continuous track circuit, another for the registering and still another for the non-registering signal as now.

The simplest form of indication is used, one which is standard for high speed and has stood the test of time and one which in all likelihood will not have to be changed in the near future.

The simple all-light signal is made practical for daylight indication, when operated by trolley current, by means of the current regulator.

The signal is safe regardless of any crosses, breaks, grounds or foreign feeds which may occur on the wires running from the contactors or the line wires running through the block or current going off the line.

The signal is safe regardless of any unusual movements which a car may make under the contactors.

The signal has full flexibility of operation. A car can enter the block or leave it at any point, entering either from the right or left and do it safely.

The contactors are operable at high speed, for nothing is placed in the path of the trolley wheel, and they are exceedingly simple.

The mechanism is easily maintained, for any unit can be immediately replaced by another without making any disconnections and by simply slipping one out and replacing with another.

The signal can be operated safely when a car is entering the block against a red signal sufficiently far to go around the turnout.

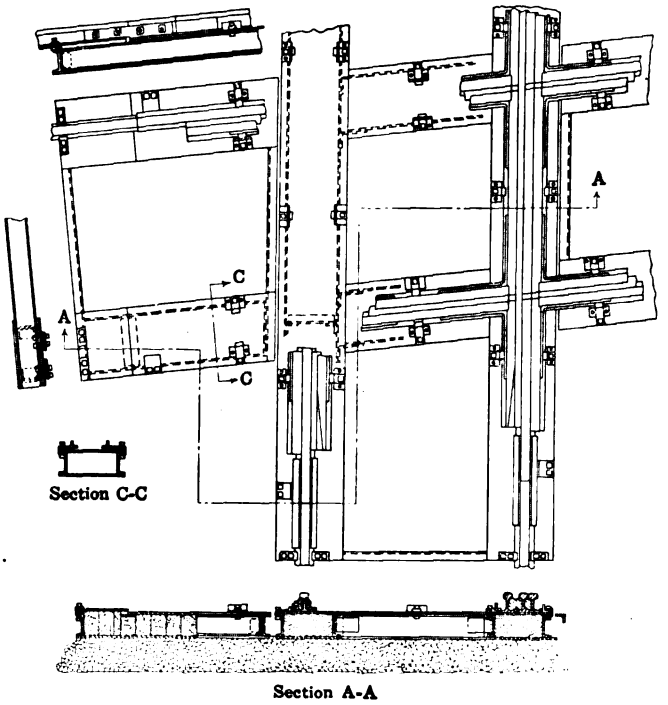
The signals all show "danger" when the full number of cars which the registering machine will protect has entered the block.

Simultaneous entry of cars at opposite ends of an unoccupied block gives "proceed" to one car and "danger" to the other.

Steel Railroad Crossing Structures Growing in Favor

The Crossing Described Is Wood-Block Filled and Was Placed at a Labor Cost of About $60

The structural-steel box-girder support as a substitute for the wooden ties to carry a railroad crossing has proved its superiority, and its use has been made standard on a number of interurban and steam railroads. At first these structures were filled with concrete, but recently creosoted wood block has been substituted by the International Steel Tie Company, Cleveland, Ohio, the manufacturers of this product, and the riding qualities of the structures have thereby been improved. The detailed construction of one of these steel crossing structures is shown in one of the accompanying illustrations. It will be noted that the structure is so designed that it furnishes a continuous support at all of the joints in the crossing. The creosoted wood-block filler in the inside of the girder is laid transversely with the rail, thereby furnishing additional support to the top plate of the girder and it transmits the wheel loads to the bottom plate, thence to the ballast. The box girders are made up of 5-16-in. plates

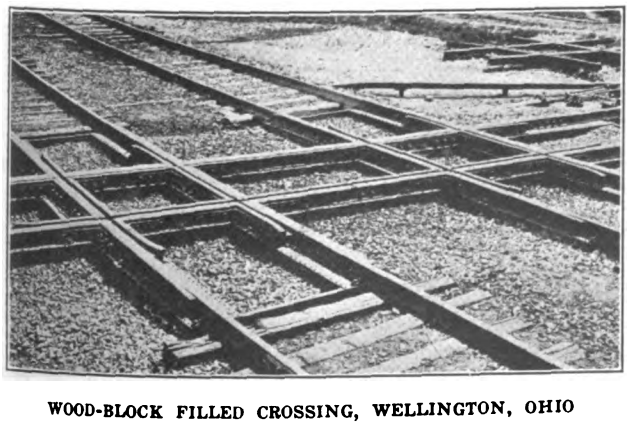


PLAN AND SECTION OF WOOD-BLOCK FILLED CROSSING

on the top and bottom with 6-in. channels forming the vertical members. This provides a structure which will carry the heaviest steam railroad track loads over a span of 6 ft. In a number of instances these structures have been installed under practically wornout crossings, and the additional support thereby provided not only prolonged the life of the crossing but greatly improved its riding qualities.

The structure shown under the two crossings in the accompanying halftone was installed at the intersection of the Big Four Railroad and the Wheeling & Lake Erie Railroad at Wellington, Ohio. This structure was installed under a traffic consisting of forty trains each way on the double track line and eight trains each way on the single track line. The conditions at this point are practically the same as those existing at an intersection of an interurban line with a steam railroad, and the cost of installing this structure, given in the above table, should be of interest.

Cost of unloading and trucking new substructure from car to point of installation	$18.00
Trucking out and removing old substructure	20.00
Trucking old substructure	5.00
Placing new substructure	12.50
Back filling and surfacing	5.00
Total cost of unloading and placing new substructure and removing old	$61.38



WOOD-BLOCK FILLED CROSSING, WELLINGTON, OHIO

Statistics of the Portland cement industry in 1915, compiled by the United States Geological Survey, show that there was a slight increase in shipments and a slight decrease in production and stocks as compared with 1914. The shipments of natural cement in 1915 were 750,863 barrels, valued at $358,627, a decrease in quantity of 422 barrels, and an increase in value of $7,257 compared with those of 1914. The shipments of puzzolan cement in 1915 were 42,678 barrels, valued at $39,801, a decrease in quantity of 25,633 barrels and in value of $23,557 compared with the shipments of 1914.

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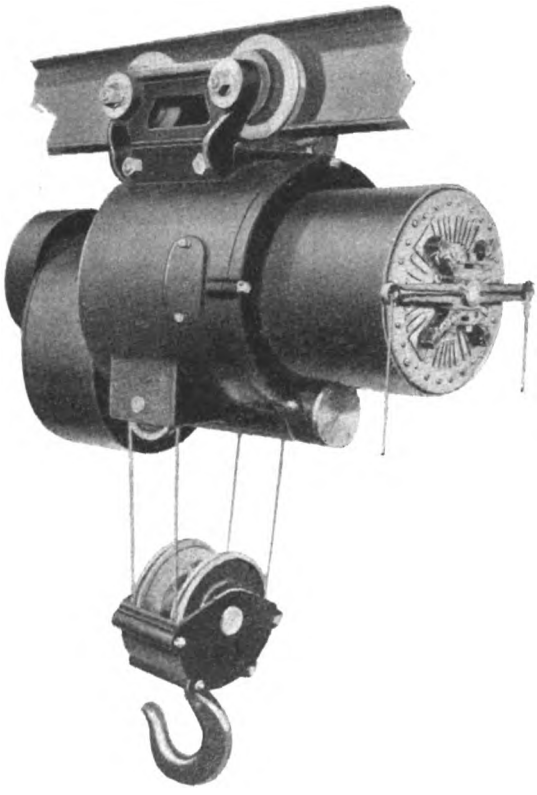
Roller Bearings Applied to Electric Hoist

The Economy Engineering Company of Willoughby, Ohio, has just placed on the market an inclosed electric hoist equipped with twelve Hyatt flexible roller bearings. Six of the roller bearings are used on the shafts to carry the gears, four in the trolleys and two in the load block as shown.

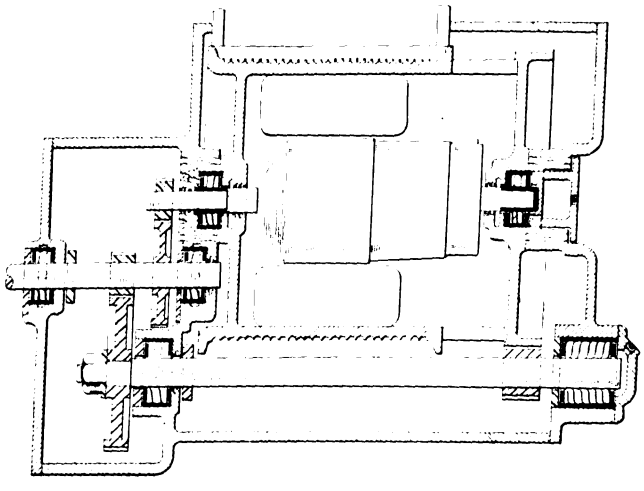
The frame is a cylindrical casting and supports the drum, brakes and motor. Openings in the frame allow these parts to be easily inspected after removal of the cover plate. The drum, which is made of cast iron, is centrally placed in the frame. It is grooved to take a



ELECTRIC HOIST SUITABLE FOR RAILWAY REPAIR SHOPS

rope for a given lift without overlapping. It also carries the drum gear and revolves about the armature of the motor, thus reducing the over-all size of the hoist and giving a high lift.

Any standard direct or alternating-current motor adapted for hoist service can be used with this device.

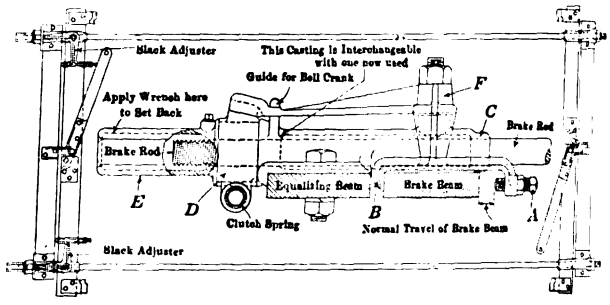


SECTION THROUGH HOIST SHOWING ROLLER BEARINGS

An automatic limit switch cuts off the hoisting motor when the block reaches the limit of its travel. The load is held in any position when the current is off by a solenoid-operated brake.

Slack Adjusters for Any Type of Truck

One of the essential features of a successful brake slack adjuster is that it must be so flexible mechanically that it can be applied to any type of truck. In order to meet this condition the Anderson Brake Adjuster Company, Omaha, Neb., has just issued Bulletin A, showing how this automatic brake slack adjuster may be applied to a Brill 21-E single-truck brake rigging, to Taylor single-truck brake rigging, or to Peckham or St. Louis single-truck brake rigging. In its original form this slack adjuster was primarily designed for installation in the brake rigging of double-truck equipment, but the increased popularity in the single-truck, light-weight cars has made it necessary to redesign the adjuster so that it could be applied to any type of single truck. These adjusters are illustrated and their operation described in the bulletin.



AUTOMATIC SLACK ADJUSTER APPLIED TO SINGLE-TRUCK BRAKE RIGGING

In the accompanying illustration this automatic slack adjuster is shown as it has been designed for Brill 21-E single-truck brake rigging. The manner of its operation is described as follows: The adjuster consists of but three moving parts, namely, the inner and outer clutch members *D* and *E* and the bell-crank *F*. Assuming that the brakes are too slack, the operation is as follows: Upon applying and releasing them as in actual service the brake beam will travel beyond the distance predetermined by the set screw *A*. This turns the bell-crank *F*, which rotates the outer clutch member *D*. This slips upon the inner clutch part *E*, because the braking strain is on the inner clutch at the same time. When the brakes are released the brake beam strikes the bell-crank at *B* and returns it to its normal position after all the braking strain is off the brake rigging. In the release direction the bell-crank *F* and clutch parts *D* and *E* all turn as a unit and thus compensate for wear. In other words, upon the application of the brakes (if they are too slack) but two parts. *F* and *D*, of the mechanism turn, and upon the release of all three, *D*, *E* and *F* turn. None of these parts moves upon the normal travel of the brake rigging as provided for by the set screw *A*. In a brake rigging that is greatly affected by load, proper allowance for that condition must be made by the set screw *A*. The clutch adjustment is permanent and need never be changed.

The social and welfare organization work of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., is to be augmented by the organization of a band, for which twenty men have volunteered. A leader will be employed.

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Pivoted Jack Pulls or Straightens Poles

Although the jack which pivots on its base recently put on the market by Templeton, Kenly & Company, Chicago, was designed primarily to pull poles without digging around them, this tool has been found to be as readily adaptable to straightening poles. In one of the

VIEW OF JACK IN POSITION FOR STRAIGHTENING POLE

accompanying illustrations a telephone pole, which by reason of its angle or rake from the vertical carried more than its share of the load, is shown with one of these jacks in position ready for the straightening operation. One man was all that was necessary to complete this job. The non-slipping I-beam base was placed a short distance from the pole to serve as the bearing for the jack. The jack which is pivoted on its base, was then set in position and the head placed against the side of the pole at an inclination of about 45 deg.

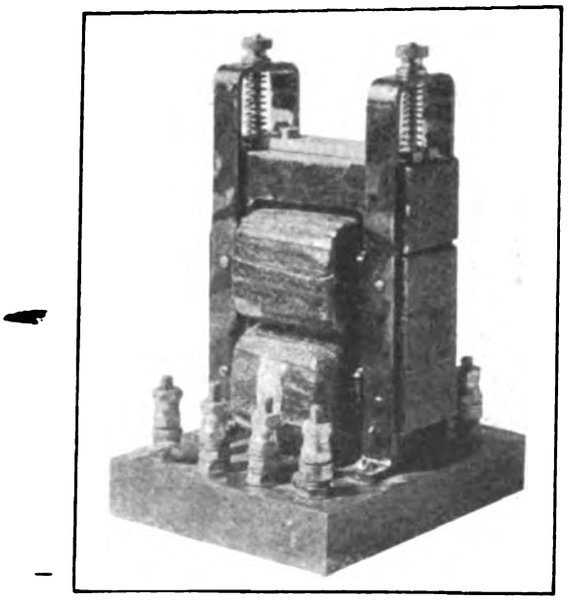
In another of the accompanying illustrations the pole is shown again restored to the vertical position, and it required sixteen strokes to the lever to accomplish this. When the pole was practically in the vertical position, the dependable truss formed by the rack bar holding against the non-slipping I-beam base permitted the operator to step away from the pole to check the correctness of its position. When the pole had assumed the vertical position it was only necessary to retamp the earth around the base. In actual service this jack has also been found to be a most useful tool for pulling poles. As a matter of fact an average record of eight minutes for pulling 40-ft. poles was made on a recent job.

VIEW OF STRAIGHTENED POLE

A Testing Transformer for Signals

In order that there may be an assurance of continuous protection on electric railways, it is necessary that the different units used in connection with the signaling be tested regularly. A test of the apparatus directly connected to the track rails is doubly important because this is required to work under the greatest variation of potential between dry and wet weather. On long track circuits where ballast conditions are such that leakage from rail to rail is excessive, it is oftentimes necessary to operate relays at 50 per cent above normal potential in dry weather to allow the signals to remain in the clear position when no train is on the track section which they protect. To provide for the testing of these alternating-current relays, and particularly those used in connection with the track circuits, a special testing transformer has been designed, which is shown in an accompanying illustration.

The transformer is provided with an adjustable magnetic shunt. By varying the leakage flux, it is possible



TRANSFORMER USED IN TESTING ALTERNATING CURRENT RELAYS

to approximate ideal phase relations of the currents in the two windings of a relay when these are supplied from the same source. Several of these transformers have been manufactured recently by the Union Switch & Signal Company, Swissvale, Pa., and are being used by a number of railroads at the present time. These transformers can be used by most line department employees even though not specially trained in testing signal apparatus, since the instructions for their use are clear and simple.

All axles are scrapped by the mechanical department of the Springfield Consolidated Railway Company, Springfield, Ill., after they have given about 500,000 miles of service. Experience has demonstrated that the 4-in., 4¼-in. and 4½-in. axles used in city service become crystallized, and failures are more frequent after they have been in service that length of time.

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NEWS OF ELECTRIC RAILWAYS

GRADUAL RETURN TO NORMAL CONDITIONS IN NEW YORK

Little Response to Sympathetic Strike Effort—Plan Suggested to Prevent Future Interruption of Public Service

The railways in New York whose employees are on strike have gone steadily on with the work of improving their service. As a result service on the lines during the non-rush hours in the daytime has been more than 75 per cent normal for the last week, while the number of lines and cars operated at night have been gradually increased so as to care for the need for transportation during the early evening hours on the north and south lines and on the cross-town lines. Except for the talk of a sympathetic walkout the strike is generally regarded by the newspapers as a waning issue, the space devoted to it being gradually decreased from day to day and made daily less prominent as an item of real news. As for the sympathetic strike, the date for such demonstration was put over from time to time and was finally announced for Wednesday. At this writing the figures which have been compiled for the sympathetic demonstration are so conflicting as to be of little or no worth. Each trade seems to be holding back for the other. As one union leader expressed it, the men he represented "did not propose to be made the goats of the situation."

While the companies have been going quietly about their work of rebuilding their transportation organizations, various bodies in no way directly concerned in the outcome of the issue have been at work petitioning here and there and advancing plans for possible intervention on the part of the public authorities. On Sept. 27 the Governor received a committee of Assemblymen who urged an extra session of the Legislature. He informed the committee that he saw no reason for calling a special session to devise means for ending the labor trouble. On the same day the State Industrial Commission voted three to two on a resolution to the effect that it would not be advisable to take steps toward a settlement of the strike at this time. On the previous day Chairman Straus of the Public Service Commission made another plea for arbitration. He said that the public had the right to demand arbitration, and that if it made its wishes known in strong enough language the operators would have to obey.

On Sept. 27 correspondence was made public between Theodore P. Shonts, president of the Interborough Rapid Transit Company, and L. G. Griffing, assistant grand chief of the Brotherhood of Locomotive Engineers, in which Mr. Shonts refused a request from Mr. Griffing asking a conference "for the purpose of discussing matters which we believe of mutual interest to the Interborough Company and to the organization which we represent."

The strike itself and the desperate efforts made by the leaders of the men to enlist the active co-operation of labor in other fields has naturally provoked a great deal of discussion as to means for preventing interruption of public service and for compelling contracts which are entered into to be lived up to scrupulously. Of the many suggestions made that of Henry R. Towne, former president of the Merchants' Association of New York, has perhaps attracted the greatest attention. As a result of the suggestion made by Mr. Towne, the Merchants' Association has decided to ask the Chamber of Commerce of the United States to take a referendum of its members. The resolution adopted by the board of directors of the Merchants' Association is concluded as follows:

"Resolved, That the tenure of service of employees of public service corporations, particularly of transportation corporations, should be regulated by law in such manner that each person who voluntarily elects to enter such employment shall, as a condition of such employment, be legally obligated by contract to continue therein for a specified term, during which term he may not lawfully quit that employment, nor the corporation lawfully discharge him from its service, except as provided by such contract; and that such contract should provide adequate penalties for violation of its terms by either party."

Mr. Towne advocates an enlistment or enrollment contract for a stated period after a probational period in the case of new employees, renewable by mutual agreement; penalties for violation of the contract by either party, such penalty to consist of a cash fine, the fine against the company to be collected from a fund created by the company and vested in a trustee, the fine against the employee to be collectible from a fund created by the company retaining a percentage of the wages of each employee until the fund equals two weeks' wages, the company to pay interest on the fund and repay the principle and interest when the employee leaves the service, the schedule of the fine to be fixed by law and stated in the contract; the company to recognize the right of the employee to membership in any local organization and not to discriminate against him on such account; the employee to respect the right of the public to uninterrupted service and not to combine with others to cause its interruption; the employee to have the right alone or in combination with others to request concessions in wages and the hours of work or conditions of service; the employee to have the right to appeal from acts or decisions of the company to a joint board of award constituted under the law by joint action of the company and its employees as a board of arbitration; both the company and the employee to have the right to appeal from the rulings of the joint board to an appropriate Federal or State commission.

PROGRESS REPORTED IN DALLAS NEGOTIATIONS

The Dallas traction and lighting controversy is yet unsolved, but it is reported that satisfactory progress is being made toward an agreement among all parties interested. Preparations are being made for the straw vote on the proposal to allow the electric railway and the electric lighting properties a valuation of $8,500,000, as asked by them under the proposed reorganization, instead of the valuation of $7,100,000 as fixed by E. W. Bemis.

In connection with the proposed reorganization, the Oak Cliff street car lines, operated by the Northern Texas Traction Company, a Stone & Webster Company, offer a big problem. Under the city's plan for consolidation of all street car lines in the city under one management, these lines would have to be purchased or leased by the new company that is to be formed, and negotiations have been under way for some time between C. W. Hobson and J. F. Strickland, who will head the reorganized company, on the one side, and representatives of Stone & Webster and the Northern Texas Traction Company on the other. It is understood that all offers for an outright purchase of these lines have been declined, but that the lease of these lines by the proposed new company is about to be agreed on.

In this connection Judge Charles F. O'Donnell, city attorney of Dallas, has been called to New York, where it is known that Mr. Hobson has been in conference with officials of the organization of Stone & Webster. It was also announced that the matter of leasing the Oak Cliff lines to Mr. Hobson had been under consideration in these conferences, and that City Attorney O'Donnell was wanted as a party to these conferences so that the conferees might know beforehand if the proposed terms of the lease would be satisfactory to the city of Dallas.

The contest involving certain charter changes and the model "service-at-cost" franchises that were adopted, on the face of the returns, in the election last April, has been set for Oct. 3 in the District Court, the three District judges in Dallas County sitting *en banc* to hear the case. This contest will have to be settled before anything definite is done in regard to the proposed reorganization of the properties or the lease of the Oak Cliff lines by Mr. Hobson.

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SAFETY FIRST FEDERATION CREATES NEW BUREAU OF STANDARDS

Charles L. Bernheimer, treasurer of the Safety First Federation of America and president of the Safety First Society of New York, has announced the establishment of a bureau of standards by the federation. The plan, which has been under consideration for some time, provides for a bureau which shall investigate the merits of various safety articles or devices to be submitted to it. This bureau, after thorough investigation, is to recommend to the directors for approval such devices as have measured up to the standards which will be adopted. If the directors approve the report of the bureau of standards and officially indorse the device or article, permission will be granted to the manufacturer, under certain restrictions, to use the official emblem of the Safety First Federation, and to stamp each article so endorsed with the federation's emblem and some such words as "Tested and approved, Safety First Federation of America, Inc."

Darwin P. Kingsley, president of the New York Life Insurance Company and president of the Safety First Federation, has agreed to act as chairman of the bureau of standards and has associated with him the following: Ernest P. Goodrich, formerly consulting engineer of the Borough of Manhattan, now assistant director of the bureau of municipal research in New York, and consulting engineer of the federation; E. E. Rittenhouse, ex-president of the Life Extension Institute, now commissioner, Public Service and Conservation, Equitable Life Assurance Society; Charles L. Bernheimer, president of the Safety First Society of New York, treasurer of the federation, director of the Chamber of Commerce of the State of New York and one of New York's well-known merchants; William Guerin, ex-chief of the fire prevention bureau of the city of New York, chairman of the federation's committee on fire prevention; George H. Robertson, automobile expert and chairman of the automobile technical committee of the federation; Joseph Tracy, consulting engineer; William Bondy, general counsel of the federation.

Plans have been perfected for a nation-wide campaign to educate pedestrians to use the crosswalks instead of crossing the streets diagonally, or in the middle of the block. For the purpose of raising funds to carry on this campaign, an appeal was authorized, to the owners of all motor vehicles to contribute sums of $1 or more, the campaign to be conducted through the constituent organizations of the federation and through the co-operation of the newspapers.

The second annual convention of the federation will be held in Baltimore on Dec. 7, 8 and 9, at which time the members of the federation will be the guests of the Safety First Society of Baltimore.

ONTARIO HYDRO-ELECTRIC RAILWAY UNION PROBLEMS DISCUSSED

At a meeting in Hamilton, Ont., on Sept. 1 of representatives of municipalities in the Province of Ontario between Niagara Falls and Toronto it was decided to ask the Ontario government to allow the municipalities to take over complete control of the hydro-electric undertakings, consisting of the main transmission lines from Niagara Falls to Hamilton constructed some years ago by the Ontario Hydro-Electric Power Commission on behalf of the municipalities, and the present projected system of hydroelectric railways. It was also decided to seek legislation at the next session of the Legislative Assembly amending the acts which were passed at the last session. In the opinion of the municipal representatives these acts tended to impede the progress of hydro development, particularly the proposed diversion of the Niagara and Chippewa Rivers.

Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission, which has jurisdiction over the proposed system of hydroelectric railways to be constructed in the Niagara and Western Ontario districts, in addressing the convention urged that the municipalities should take over the responsibility of the proposed Chippewa development.

He traced the development of the hydro system from the beginning. It was imperative that the Chippewa development scheme should be commenced forthwith. Premier Hearst had declared in the Legislative Assembly that if the municipalities passed the necessary by-laws, work could be proceeded with. It was therefore suggested that the 120 municipalities interested should submit by-laws to the ratepayers authorizing the municipalities to enter into contracts with the Ontario Hydro-Electric Commission authorizing the commission not only to supply power but also to develop it.

F. A. Gaby, chief engineer of the Hydro-Electric Power Commission, outlined the plan for the development of the proposed hydro-radial scheme for the Niagara peninsula and the district along the north shore of Lake Ontario to Toronto. He stated that the cost of the proposed line between Port Credit and Niagara Falls, which will be connected with the line proposed to be constructed west from Toronto to London, will be $11,263,363. This will cover all equipment and rolling stock and provide for contingencies. Provision was made in the estimates for terminals costing $600,000. Of this sum $200,000 was the estimated cost of the Hamilton terminal.

Sir Adam stated on Sept. 1 that an offer had been made to the Dominion Power & Transmission Company to take over its radial line to Burlington and Oakville, a distance of 22 miles. The radial line to Burlington was completed in 1898 and extended on to Oakville in 1904.

Within the next few weeks the municipalities in the Niagara-Hamilton-Toronto district will ask the Ontario government for orders in council permitting the people to vote on the proposed hydro-radial railway project. This line, it is expected, will be linked up with the proposed Toronto-London-Stratford hydro line.

ENGINEERS OFFERED PRIZES FOR PAPERS

Cash prizes of $50, $30 and $20 are offered by the engineers' subdivision of the Chicago Association of Commerce for the three best papers, not to exceed 3000 words, on any one of the following subjects:

(1) "Engineering and Civic Progress."

(2) "The Engineer of the Future."

(3) "The Business Relation of the Engineer to the Commercial World."

Relationship of the engineer and of engineering to the business and professional world; how best to realize the conceived ideal of engineering, concrete examples illustrative of the true significance of engineering, such as a brief prospectus of a proposed work or a short, crisp, readable news article on a piece of engineering construction—these are suggested lines for development. The contest is open to undergraduates and to graduates of any recognized school of engineering in the United States during the years 1915 and 1916.

The judges of the relative merits of the papers will be F. H. Newell, professor of civil engineering, University of Illinois; John W. Alvord, consulting engineer, Chicago, and John F. Hayford, director, College of Engineering, Northwestern University. All papers should be mailed to Engineers' Subdivision Contest, the Chicago Association of Commerce, 10 South La Salle Street, Chicago, and must be received not later than Nov. 1, 1916.

Joint Congress Committee on Railroads to Meet Nov. 20.—The Railway Business Association has issued a bulletin which declares that "the enormous increase in operating expenses compelled by the eight-hour law accentuates the necessity for general legislation designed to bring regulation into proper relation with the facts of the business as they exist." The legislation proposed is to be advocated before the joint committee of Congress which has set hearings to begin Nov. 20 and is to report in January, 1917.

Proposal for Reduction in Wages Formally Presented.—The Bay State Railway, Boston, Mass., has submitted to the members of Division 235 of the Amalgamated Association a request that a reduction in wages, similar to the scale of prices in effect in 1914 be the working schedule to replace the agreement which expires on Oct. 1. This would mean a reduction from 30 to 28 cents an hour for a maximum, a drop from 25 to 24 cents an hour for the minimum and a change in the sliding scale from five to seven years. A new agreement from the union calling for an advance in wages and better working conditions has been submitted to the company.

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Committee Recommended to Study Pittsburgh Transit.—In a communication to Mayor Joseph G. Armstrong and the City Council of Pittsburgh, Pa., the committee on city transit of the Chamber of Commerce has recommended the appointment of a commission to study the local transit problem. It is suggested that the commission be composed of fifteen members, including the director of the department of public works, to serve without remuneration, but that an appropriation of $100,000 to $125,000 be available for the general expenses of the investigation. The commission would render a report within a year to the Mayor and Council, giving recommendations "upon a comprehensive rapid transit system for the city, with plans showing routes, stations, number of tracks and general construction, whether subway, surface or elevated, with estimates of cost of construction, carrying capacity and gross and net income."

PROGRAM OF ASSOCIATION MEETING

National Safety Council

The annual meeting and congress of the National Safety Council will take place at the Hotel Statler in Detroit, Oct. 17 to 20. The development of the council's work has indicated the need for intensive study of the problems of various industries, so that the main feature of the meeting this year is sectional conferences. For instance, the electric light and gas industry members will be assembled in the public utilities section; the foundry members in the foundry section, and the cement members in the cement section. The electric railway sectional meeting will be held on Oct. 19. The chairman of the section meeting is George Oliver Smith, supervisor of safety of the Dohert Operating Company, New York, N. Y., and the vice-chairman is Edward C. Spring, assistant to the president of the Lehigh Valley Transit Company, Allentown, Pa. The addresses to be presented are as follows:

"How Graphic Charts and Bulletins Help in Safety Education," by Harold W. Clapp, general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio.

"Safety and Efficiency—How a New Member Tackles the Problem," by Julien H. Harvey, superintendent of efficiency of the Kansas City (Mo.) Railway.

"How the Safety Movement Is Helping the Electric Railway Industry Meet Its Problems," by H. H. Norris, associate editor of the ELECTRIC RAILWAY JOURNAL, New York.

"The Application of the National Electric Safety Code to Electric Railway Construction and Operation," by W. J. Canada, electrical engineer of the Bureau of Standards, Washington, D. C.

"Safety Devices on Street and Interurban Cars," by Charles H. Cross, secretary of the central safety committee of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

"Warnings at Interurban and Obstructed Crossings."

"Hazards of Power Houses and Carhouses and Their Remedies."

"Methods of Instructing New Motormen in Their Duties," by H. B. Adams, safety supervisor of the Aurora, Elgin & Chicago Railway, Aurora, Ill.

There will also be an address by F. R. Coates, president of the Toledo Railways & Light Company, Toledo, Ohio, on a subject to be announced.

Fifteen minutes will be allowed for the discussion of each of the papers presented. Representatives of electric railways will also be interested in the proceedings of the employees' benefit association sectional meeting.

A new feature of the congress this year will be a mammoth safety exhibit, where the latest types of safety devices will be shown.

It is planned during the congress, if possible, to select a universal danger sign. In preparation members have been asked to consider and test several signs of which samples in colors have been distributed. These show: red circle on black ground; red circle with concentric blue and yellow rings on black ground; red circle on white skull and cross-bones, superimposed on blue circle and yellow background, and red circle on white skull and cross-bones, superimposed on black circle surrounded by yellow rings, all black background.

Financial and Corporate

ANNUAL REPORTS

Interborough Rapid Transit Company

The comparative income statement of the Interborough Rapid Transit Company, New York, N. Y., for the years ended June 30, 1915 and 1916, follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Revenue from transportation	$34,182,100	95.24	$32,365,306	96.80
Other operating revenue	1,709,427	4.76	1,068,436	3.20
Gross operating revenue	$35,891,528	100.00	$33,433,742	100.00
Maintenance of way and structure—actual	$1,539,216	4.29	$1,545,949	4.62
Maintenance of equipment—actual	2,132,339	5.94	2,002,095	5.99
Total maintenance	$3,671,556	10.23	$3,548,045	10.61
Maintenance of way and structure—depreciation	$288,103	.80	$192,881	.57
Maintenance of equipment—depreciation	331,122	.92	368,334	1.11
Total depreciation	$619,225	1.72	$561,215	1.68
Total "maintenance" appropriation	$4,290,781	11.95	$4,109,260	12.29
Traffic expenses	542	....	145	....
Transportation expenses	8,330,357	23.22	7,615,957	22.79
Accident and damages	551,886	1.54	386,244	1.54
General expenses	834,597	2.32	829,707	2.09
Total operating expenses	$14,008,165	39.03	$12,941,314	38.71
Net operating revenue	21,883,362	60.97	20,492,428	61.29
Non-operating income	580,830	1.62	623,631	1.86
Gross income	$22,464,193	62.59	$21,116,059	63.15
Deductions from income:				
Taxes	$2,341,606	6.53	$2,133,980	6.38
Interest on bonds (rental)	4,085,440	11.38	4,001,146	11.97
Manhattan dividends (rental)	4,200,000	11.70	4,200,000	12.57
Manhattan cash rental	35,000	.10	35,000	.10
Interest on notes and 5 per cent bonds	3,043,630	8.48	2,632,572	7.87
Sinking fund 5 per cent bonds	.....	....	.....	....
Amortization	312	....	.....	....
Interest on unfunded debt	27,500	.10	37,500	.11
Other rental deductions	7,376	.02	7,376	.02
Total	$13,750,866	38.31	$13,047,575	39.02
Net corporate income	$8,713,326	24.28	$8,068,484	24.13

The gross operating revenue for the year increased $2,457,785 or 7.35 per cent, the result of a gain on the subway division of $1,513,457 or 8.48 per cent, and on the Manhattan Railway division of $944,327 or 6.06 per cent. The increase on the subway division was to the extent of $1,296,296 the result of an increase in passenger revenue, and to the extent of $217,161, an increase in sale of power and in other operating revenue. The increased subway traffic may be attributed to the revival of business evidenced in the autumn of 1915, which continued substantially unbroken to the close of the fiscal year. The increase on the Manhattan Railway division of $944,327 was the result of an increase in passenger revenue of $520,498, and in sale of power and in other operating revenue of $423,829. The increase in passenger revenue on the Manhattan division took place in the last six months of the fiscal year and reflected the improved facilities afforded by the third tracking of the elevated lines, which were opened for operation Jan. 17, 1916.

The report states that the increase in passenger travel on the Manhattan Railway division is very gratifying. Without any of the northern terminals, extensions or feeders being included in this operation, there was an increase between Jan. 17, 1916, and June 30, 1916, of 11,893,155 passengers, as compared to a decrease of 976,972 passengers for the first six months' period of the present fiscal year, and 461,904 for the first sixteen days in January. During this same period there was an increase of 15,840,859 passengers on the subway division as compared to an increase of only 6,216,718 for the previous six months.

The operating expenses in 1916 showed an increase of $1,066,851 or 8.24 per cent, the result of an increase on

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the subway division of $672,121 or 10.83 per cent, and an increase on the Manhattan Railway division of $394,730 or 5.86 per cent. The charges to operating expenses for maintenance and depreciation of both way and structures and equipment were $181,520 more than similar charges for the previous year.

The increase in traffic on both subway and elevated divisions, as well as the enlarged express service upon the elevated lines, led to an expansion of the train service, resulting in an increase in car mileage on the subway division of 3,772,304 car-miles and on the elevated division of 1,255,749. This increase in car mileage, the shortening of the hours of station men and increase in rates of pay of transportation employees, were responsible for the increase in the cost of transportation amounting to $714,400.

The net operating revenue increased $1,390,933 or 6.79 per cent, the result of a gain on the subway division of $841,336 or 7.23 per cent, and a gain on the Manhattan Railway division of $549,597 or 6.21 per cent. The total amount of taxes increased $207,626 or 9.73 per cent, the subway division showing an increase of $61,257 or 13.85 per cent, and the Manhattan Railway division an increase of $146,368 or 8.65 per cent.

The income from operation showed a gain of $1,183,307 or 6.44 per cent, the result of increase on the subway division of $780,078 or 6.96 per cent, and on the Manhattan Railway division of $403,228 or 5.63 per cent. The non-operating income decreased $42,800 or 6.86 per cent, principally due to the decrease in interest on bank balances and loans and reflects the temporary advances from general cash for the purposes of the construction of the Manhattan third tracks and power plant improvements.

The gross income increased $1,140,506 or 6.01 per cent, the result of a gain on the subway division of $763,024 or 6.53 per cent, and a gain on the Manhattan Railway division of $377,482 or 5.17 per cent. Income deductions, however, also increased $495,664 or 4.54 per cent. The surplus over dividends of 20 per cent on the capital stock was $1,892,014, a gain of $817,867 over the previous year.

The number of passengers carried was 683,752,114 compared with 647,378,266 last year, an increase of 36,373,848 or 5.62 per cent, the result of a gain on the subway division of 25,919,569 or 7.50 per cent, and a gain on the Manhattan Railway division of 10,454,279 or 3.46 per cent. The subway division was benefited by the improvement in general business conditions during the last ten months of the year, and it received the continuing advantages derived from the building up of the territory contiguous to the subway lines, while the Manhattan division, where the increase was confined to the last half of the year, reflects the result of an improved express service following the opening of the third tracks, as before stated.

Expenditures for additions and betterments during the year aggregated $28,063,562. They included payments made on account of construction and equipment of new subways and Manhattan Railway third tracks and extensions, as well as power plant improvements.

Claims, suits and judgments caused an increase of $155,523 in expenditures, while the expenses rose $15,726. The increase in the expenditures for accidents was principally due to the settlement of the remaining claims arising out of the short-circuit smoke accident at Fifty-third Street and Broadway, collisions on the elevated, and the accidents at center and side doors due to the increasing congestion. The space closing devices are said to be reducing the number of injuries due to the spaces at the curved platforms, but the accumulated space claims for the past have increased and it will be some time before the benefit of the new devices will show in reduced claims. At the close of the fiscal year there were 115 less suits in the courts of record, although seventy-one more such suits were commenced than during last year. The claimants were successful in a smaller percentage of cases tried than the previous year. The total disbursements for injuries and damages and expenses amounted to 1.91 per cent of the gross passenger receipts in the last year, an increase of 0.37 per cent over 1915.

The wages of employees were increased during the year in the sum of approximately $349,000. This sum, however, does not include the increases granted to conductors, motormen, guards, agents, porters, gatemen, special officers, starters, towermen, switchmen and train clerks, effective on Aug. 1, 1916, amounting to about $311,000 additional.

Pacific Electric Railway

According to the annual report of the Pacific Electric Railway, Los Angeles, Cal., covering the year ended June 30, 1916, the passenger earnings were $187,496 less than during the year preceding, notwithstanding the expositions. A résumé of the income statement gives the following figures:

Railway operating revenue	$8,856,796
Railway operating expenses	5,994,611
Net revenue from railway operations	$2,862,185
Taxes	515,556
Railway operating income	$2,346,628
Other income	37,301
Gross income	$2,383,929
Interest on bonds and floating debt, bond discounts, rents, etc.	3,205,664
Amount by which the company failed to earn fixed charges	$821,734

In commenting on these figures, President Shoup stated that the competition by practically unregulated automobile carriers is directly responsible for most of the deficit from the year's operation.

Chosen Light Railways and Tramways

According to the report of the railway bureau of the government-general of Chosen (Corea) for the year ended March 31, 1915, the open lines at the end of the year were 44.5 miles in length, and their construction expenses amounted to yen 2,799,474. These lines belong to the Chosen & Gas & Electric Company (5.8 miles, steam), the Zenhoku Light Railway (15.5 miles, steam), the Nikkan Gas & Electric Company (16.2 miles, electric), Kankyo Provincial Government (5.1 miles, hand), the Heijyo Street Tramway (1.2 miles, hand), and K. Mori (0.7 miles, hand). Thus there are 21.3 miles operated by steam, 16.2 miles by electricity and 7 miles by hand. The total length of lines not yet opened is 173.2 miles. The train mileage in the fiscal year reached 53,284 miles, and the car mileage 2,572,536 miles for passenger cars and 265,777 miles for wagons, making a total of 2,838,313 miles. Passengers carried numbered 11,286,473 by electric cars and 294,479 by other cars. The traffic receipts amounted to yen 375,454 and the expenditure to yen 283,657, leaving a balance of yen 91,797 as profit.

New South Wales Government Railways and Tramways

The results of operation of the government railways and tramways of New South Wales, Australia, for the year ended June 30, 1916, was a deficit of £137,457 as compared to a profit of £66,804 for the year preceding. This deficit was caused by the operating loss of £223,749 for the steam lines, for the tramways in the last year showed a profit of £86,292. The tramway earnings in 1916 amounted to £1,991,628, with working expenses of £1,602,650 and interest of £302,686. The earnings for the year showed an increase of £5,568 or 0.28 per cent, while the working expenses decreased £8,636 or 0.54 per cent.

The total capital expenditure for all tramway lines open to traffic on June 30, 1916, amounted to £8,166,423. The expenditures charged to capital account during the year were £196,130. In the last year 292,021,744 passengers were carried, an increase of 2,738,929. A total of 26,451,442 tram miles were run, a decrease of 391,532. Of the 48,757 employees (railways, 39,182; tramways, 9575) 5608 men had joined the expeditionary forces up to June 30, 1916. Of these 199 were killed or missing, and 300 others had been wounded. The added expenses of all lines attributable to the war were £461,524, while free transportation for war purposes was furnished to the extent of £170,000 on the basis of the usual rates.

A number of railway extensions are under construction, while others have been authorized. In consequence of the war, and owing to the difficulties of obtaining supplies, the improvements have not been advanced as rapidly as desired, especially the proposed steel bridge connecting Sydney with the North Shore, the installation of electricity on suburban lines and the construction of the Sydney underground railway.

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UNITED RAILROADS REORGANIZATION PLAN ANNOUNCED

The reorganization committee for United Railroads of San Francisco, Cal., has announced a plan which involves the extinguishment of $44,330,100 out of the present $91,928,100 of capital liabilities. The plan provides for the transfer of all the assets of the United Railroads of San Francisco and the San Francisco Electric Railway to the Market Street Railway, which will become the operating company. In consideration of this transfer bondholders of the United Railroads will receive 25 per cent of face value of present 4 per cent bonds in Market Street Railway 5 per cent bonds and 46 per cent of par value of their 4 per cent bonds in new 6 per cent cumulative first preferred stock of the Market Street Railway. The holders of unsecured notes and of stock of United Railroads will cause to be underwritten by the California Railway & Power Company at 90 per cent of their face value $2,500,000 of serial debentures to be presently issued and $3,000,000 of Market Street Railway 5 per cent bonds to be taken in 1918 or before. The proceeds of the debentures are to be used to redeem and discharge underlying bonds totalling $5,200,000, all of which are now maturing or will mature within two years. The holders of unsecured notes and stock of United Railroads will receive new second preferred and common stock of the Market Street Railway and surrender of certain obligations for their underwriting the above-mentioned securities and for causing the conveyance of the properties to be made by United Railroads of San Francisco to the Market Street Railway. The capitalization of the Market Street Railway will be $16,098,000 of 5 per cent bonds, $2,500,000 of 6 per cent debentures, $11,000,000 of first preferred stock, $5,500,000 of second preferred stock, and $12,500,000 of common stock, a total capitalization of $47,598,000.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—Consolidation of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro Electric Light & Power Company, Waynesboro Gas Company, Carlisle & Shippensburg Street Railway, Shippensburg Gas Company, Shippensburg Water Company and the electric light and power companies operating in Guilford, Quincy, Washington and Antrim townships, in Franklin County is reported again under consideration. Hambleton & Company, Baltimore, are the bankers who are said to be interested.

City Railway, Mount Vernon, Ill.—The City Railway has made application to have a receiver appointed for its property, consisting of the 3 miles of track and three cars. The company was incorporated in 1914 and after constructing the line, cars were operated until Feb. 16.

Consolidated Cities Light, Power & Traction Company, New York, N. Y.—J. S. Orler & Company, Inc., Boston, Mass., are offering for subscription first mortgage 5 per cent gold bonds of the Consolidated Cities Light, Power & Traction Company guaranteed principal and interest by the Cities Service Company. The bonds are dated July 1, 1912, and are due July 1, 1962.

Illinois Traction Company, Peoria, Ill.—The Illinois Traction Company has filed with the Public Utilities Commission of Illinois a petition asking the commission to authorize the St. Louis, Springfield & Peoria Railway to issue first and refunding bonds amounting to $392,000.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—In its annual report to the Public Service Commission of Indiana for the fiscal year ended June 30, 1916, the Indianapolis Traction & Terminal Company shows that its net earnings amounted to $301,452, an increase of $152,684 for the year. Passenger revenues totaled $3,072,332, an increase of $183,267. During the year the company carried 72,275,389 revenue passengers, 22,703,823 transfer passengers and 2,087,700 employees, policemen and other free passengers. The average fare per revenue passenger was 4.20586 cents, and the average fare for all passengers carried, including transfer and free passengers, was 3.23815 cents. The report shows that the book value of the property is now $11,434,589, and its total investment $12,346,748. During the year the company paid out for interest on funded debt $222,417; interest on unfunded debt, $21,080; taxes, $273,965; accidents and damages, $125,483, and salaries and wages, $1,195,247.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—It is said that minority stockholders of the Lake Erie, Bowling Green & Napoleon Railway will become a party to the plan to prevent the purchaser of the property of the company from scrapping the line. They will take part in the injunction suit recently filed to prevent this step. They allege that a profit on the investment could probably be realized under careful management. The decision of the Ohio Public Service Commission in refusing to prevent the abandonment of service on the line is referred to at length in this issue on page 697.

Paris (Tex.) Transit Company.—The Paris Transit Company has filed an amendment to its charter with Secretary of State McKay at Austin, certifying to an increase in its capital stock from $150,000 to $160,000.

Public Service Corporation of New Jersey, Newark, N. J.—The monthly financial statement of the Public Service Corporation of New Jersey for August shows a gross increase of $435,678 in total business over August, 1915, a percentage of increase of 14.4. The balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus was $392,417, and the increase in surplus available for dividends over the corresponding month of 1915 was $89,728. For the eight months ended Aug. 31, 1916, the gross increase in total business amounted to $3,206,776, an increase of 13.3 per cent. The balance available for amortization, dividends and surplus was $3,364,607, and the increase in surplus available for dividends amounted to $790,065.

Southern Cambria Railway, Johnstown, Pa.—The Southern Cambria Railway, on which a wreck occurred on Aug. 12 costing the lives of twenty-six people, has placed its property in the hands of a trustee, James P. Thomas, according to papers filed at the court house in Johnstown. This action was taken, it is reported, in anticipation of heavy claims for damages growing out of the accident.

Union Traction Company of Indiana, Anderson, Ind.—The report of the Union Traction Company of Indiana to the Public Service Commission of Indiana for the fiscal year ended June 30, 1916, shows a total investment of $23,277,985, an increase of $78,982 for the last year. The book value of road and equipment is $22,977,980, an increase of $55,159. The railway operating revenue for the year was $2,621,780, an increase of $167,879 over the previous year. The railway operating expense was $1,511,255, leaving a net revenue from railway operations of $1,110,524. Gross income totaled $1,008,819; interest on funded debt, $666,209, and deductions from gross income, $854,779, leaving a net income of $154,039. The total passenger revenue for the year was $2,190,932, an increase of $137,263. The number of revenue passengers carried was 15,737,969. The total freight revenue was $232,639, and the total express revenue, $84,397. Injuries and damages cost $104,502, and salaries and wages amounted to $835,472.

Waupaca Electric Light & Railway Company, Waupaca, Wis.—The plant and good-will of the Waupaca Electric Light & Railway Company, Waupaca, Wis., has been sold to E. A. Aspness, Montevideo, Minn., and Truman Hibbard, Minneapolis, Minn., by Irving P. Lord, president and principal owner. It is stated that the consideration was about $100,000. The property includes 5.4 miles of single track, ten cars, a going lighting and power business and three water powers. The transfer to the new owners will be made about Nov. 1, at which time Mr. Lord will retire from the management, where he has served for more than twenty-five years. At the time Mr. Lord took over the property it was practically bankrupt, and at the present time it ranks among the most prosperous plants of its size in Wisconsin. Mr. Aspness, one of the new owners, was formerly secretary and general manager of the Montevideo Light & Power Company, and Mr. Hibbard is secretary and general manager of the Electric Machinery Company, Minneapolis.

Wichita Falls (Tex.) Traction Company.—The Wichita Falls Traction Company has filed an amendment to its charter with the Secretary of State at Austin certifying to an increase in its capital from $700,000 to $775,000.

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DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1¾ per cent, preferred.

Central Illinois Public Service Company, Chicago, Ill., quarterly, 1½ per cent, preferred.

Chicago (Ill.) City Railway, quarterly, 2 per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Columbus, Newark & Zanesville Electric Railway, Columbus, Ohio, quarterly, 1½ per cent, preferred.

Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly, 1¾ per cent, first preferred; quarterly, 1¼ per cent, second preferred.

International Traction Company, Buffalo, N. Y., quarterly, 1 per cent, 4 per cent cumulative preferred; quarterly, 1¾ per cent, 7 per cent cumulative first preferred; 1 per cent preferred.

Iowa Railway & Light Company, Cedar Rapids, Iowa, quarterly, 1¾ per cent, preferred.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred; one-half of 1 per cent on account of the accumulated dividends.

Louisville (Ky.) Traction Company, 2½ per cent, preferred; quarterly, 1 per cent, common.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Porto Rico Railways, Ltd., Ponce, Porto Rico, quarterly, 1¾ per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 2 per cent.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 2 per cent, preferred.

Stark Electric Railroad, Alliance, Ohio, quarterly, 1 per cent.

United Gas & Electric Corporation, New York, N. Y., quarterly, 1¾ per cent, first preferred.

Virginia Railway & Power Company, Richmond, Va., 1½ per cent, common.

Washington Water Power Company, Spokane, Wash., quarterly, 1 per cent.

York (Pa.) Railway, quarterly, 1¼ per cent, preferred.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1¼ per cent, preferred; three-quarters of 1 per cent on account of accumulated preferred dividends.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	July,	'16	$17,421	*$8,516	$8,905	$3,501	$5,404
1 "	"	'15	16,016	*9,114	6,902	2,169	4,733
12 "	"	'16	205,216	*104,420	100,796	36,264	64,532
12 "	"	'15	182,229	*110,676	71,553	25,322	46,231

COLUMBUS (GA.) ELECTRIC COMPANY

1m.,	July,	'16	$70,246	*$28,591	$41,655	$28,651	$13,004
1 "	"	'15	57,364	*25,484	31,880	28,679	3,201
12 "	"	'16	795,636	*335,427	460,209	344,115	116,094
12 "	"	'15	700,035	*319,471	380,564	345,113	35,451

DALLAS (TEX.) ELECTRIC COMPANY

1m.,	July,	'16	$144,235	*$93,484	$50,751	$36,538	‡$16,213
1 "	"	'15	144,101	*94,002	50,099	33,397	16,702
12 "	"	'16	1,901,270	*1,176,633	724,637	427,172	‡312,664
12 "	"	'15	1,933,274	*1,126,295	806,979	400,819	406,160

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m.,	July,	'16	$72,309	*$38,992	$33,317	$8,763	$24,554
1 "	"	'15	65,067	*34,014	31,053	8,716	22,337
12 "	"	'16	797,879	*418,704	379,175	106,119	273,056
12 "	"	'15	676,520	*383,473	293,047	104,703	188,344

EL PASO (TEX.) ELECTRIC COMPANY

1m.,	July,	'16	$76,173	*$74,148	$2,025	$4,892	†$2,867
1 "	"	'15	77,426	*44,006	33,419	4,203	29,216
12 "	"	'16	1,045,317	*567,785	477,532	54,167	423,365
12 "	"	'15	991,199	*536,154	455,045	50,336	404,709

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

OHIO ABANDONMENT CASE DECIDED

Public Service Commission Holds That It Is Without Jurisdiction to Prevent Abandonment of Service Following Foreclosure Sale.

The Public Utilities Commission of Ohio has decided that it has no jurisdiction in connection with the application made to it to prevent abandonment of service on the Lake Erie, Bowling Green & Napoleon Railway, and has dismissed the complaint.

On Aug. 13, 1916, O. W. Fisher and others, residents of Wood County, Ohio, filed a complaint before the commission, stating among other things that the Lake Erie, Bowling Green & Napoleon Railway and those claiming the right to operate the line, through Theodore Luce as trustee, threatened to discontinue the operation of the railway and to tear up the track and dismantle the property and sell it as junk. They asked the commission to require those claiming the right to operate the railway to continue the operation and furnish passenger and freight service, and to restrain and enjoin the owners from tearing up the tracks and dismembering the property.

Mr. Luce in his answer stated among other things that the railway was never sufficiently patronized to make the operation of it profitable; that the road was sold by the order of the District Court of the United States for the Northern District of Ohio, Western Division, by a receiver appointed by the court; that he purchased the property; that he discontinued the operation of the said railway and intended to dismantle and sell it as scrap in pursuance of the orders of the court. He denied the jurisdiction of the commission to interfere with him in his purpose to dismantle the road and discontinue service.

In the reply filed by the complainants they denied that the decree of the court gave the purchaser any right to dismantle the property or to remove any part which might affect the general operation of the road, or interfere in any way with the continued running of cars, and also denied his right to suspend operation or to dismantle the road.

Because of the gravity of the situation, the commission took the matter up out of its regular order and granted a speedy hearing. In its finding the commission said in part:

"It is needless to say that, as this is an administrative body, clothed with no power to issue injunctions, the sole and only question to be determined in this proceeding is as to its authority to require the continued operation of the railway.

"On the threshold of the inquiry as to the jurisdiction of this commission in this matter, the question arises, Has a railway the right to abandon its service, surrender its franchise, and go out of business, without first securing from some constituted authority, permission so to do? If it has not the right voluntarily to abandon its service and withdraw from the business in which it was engaged, to what tribunal should it apply for such consent and what showing is it required to make before it is entitled to permission to cease to serve the public and carry on the functions for which it was organized?

"We do not find any power lodged in this commission to determine the question as to whether or not a railroad may entirely abandon its service. It seems to us to be a legal question which must be judicially determined by a court having competent jurisdiction to inquire into the justness and reasonableness of the application, and clothed with the equitable power to grant or withhold its consent as the facts and circumstances would warrant; and if granted, to prescribe the conditions upon which it may withdraw.

"In a recent case reported in Volume C, page 871, 1915, Public Utilities Reports, annotated, the New York commission in discussing the question as to whether or not a railroad which was doing unprofitable business might properly be abandoned said, 'While this is doubtless true as a general statement of the abstract right, it does not follow

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that a railroad corporation may discontinue its entire service at will and itself be the sole judge of the propriety and necessity of such a discontinuance. It would seem that consent of the State is a prerequisite to the absolute abandonment of the enterprise. We are not called upon to determine how such consent may be obtained; sufficient to say that there is nothing in the Public Service Commission's Law which clothes this commission with authority either to ascertain and decide whether the facts upon which such a right is predicated actually exists in a given case, or to determine the terms and conditions under which the abandonment of such an enterprise may be permitted.'

"If it is necessary, however, for the carrier first to obtain permission from a court of competent jurisdiction before it can withdraw from serving the public, has not that question already been determined in this case by the decree of the court in the foreclosure proceeding in which the purchaser received the right to sell said above described property, or any part thereof; provided, always, however, that any such assignment or sale shall be made for cash and that the proceeds thereof shall be paid forthwith to the special master, and by like expressions in the various decrees of the court which have been herein before quoted?

"Nowhere in a subsequent decree has the court surrendered its jurisdiction of all the questions affecting the disposition of this property; that court still holds the right, until the purchase price is paid, to retake and resell the property. The receiver and the special master are officers of that court, and the purchaser is but selling the property piecemeal and carrying the proceeds into that court which has the whole matter in hand, and is working out the rights of the public, the creditors and the stockholders. It seems to us that it would be presumption on our part to assume to make any order relative to this property while it is being sold for the payment of its debts and under the orders of a court of competent jurisdiction. If we were to assume to have authority, against whom would the order issue? Mr. Luce is in possession, but his title does not ripen until he pays the purchase price and receives the deed of conveyance. If the orders of the court carry with them the right to dismantle this property, and if the complainants feel that such order should not have been made, they have their remedy by appeal. If the orders already made do not amount to the granting of authority to dismantle the property, then any interested party may still apply to that court, and will doubtless grant a hearing upon the application to restrain the dismantling of the property, at least while under its jurisdiction.

"We are informed that since the filing of this complaint an application was made to the Court of Appeals sitting at Sandusky, Ohio, and that it took the view that the exclusive jurisdiction is still in the United States District Court.

"We realize that the withdrawal by a common carrier of its service is a serious loss to a community and if it were possible, would be glad to grant relief, if the facts warranted it; but as we view the matter the question is not within our jurisdiction, and the application will be denied.

"In order that the complainants may have an opportunity of presenting the question to the Supreme Court for review, if they so desire, we have noted their exceptions to the finding of the commission."

SAFETY INCREASED IN SAN FRANCISCO

After a tryout for one month of the plan for keeping jitneys off Market Street in San Francisco between the hours of 10.30 a. m. and 4 p. m., there is general approval of the plan, and its advantages are so apparent that there is little doubt of the rule being made permanent. The traffic chief of the police department stated to a representative of the ELECTRIC RAILWAY JOURNAL that only two auto accidents were reported on Market Street in the month since the jitneys were ruled off. From six to fifteen accidents had been reported regularly each month for the thoroughfare. Since the jitneys were prevented from operating on Market Street during the middle of the day, the number of buses in service has decreased at the rate of about fourteen a week. An average of twenty cars a week have abandoned the service and six or seven new cars a week have entered the service.

TEACHING SAFETY TO SCHOOL CHILDREN

Red for "danger" and green for "Irish" was the conception of the danger and safety emblems which Mrs. Katherine D. Larrabee, the lecturer of the bureau of Public safety of the Brooklyn (N. Y.) Rapid Transit Company, found to be most widely entertained among the children of the Brooklyn vacation schools and playgrounds whom she met in the annual summer school safety campaign under the auspices of the Brooklyn Institution for Safety and the Board of Education. Mrs. Larrabee was well pleased that the children universally recognized the danger sign, and she explained to them the more exact significance of the green symbol from the safety point of view.

During the safety work this summer approximately 100 lectures were given in fifty-five different playgrounds throughout Brooklyn. The school authorities, on account of the epidemic of infantile paralysis, were obliged to restrict very largely the extent of some of the playground activities, and the children were met by the lecturer as a rule in small groups rather than in large bodies of 1000 or more. Games and play stories were introduced with great success. An adaptation of the old "stage coach" game, in which various matters bearing on the question of safety were brought out, was especially introduced.

Safety races for prizes formed another part of the playground work, the winners of the trial heats being tagged by a piece of green paper and the losers by a piece of red paper. The winners of the final heats received prizes, such as a baseball to the older children and a rubber ball to the younger children.

The company's bureau of public safety, at the close of the summer playground work, received a letter from Henry J. Silverman, who acted as supervisor of the work in the vacation schools and playgrounds, to the effect that the principals and teachers in the schools had spoken to him about the interesting way in which the subject of safety had been taken up. He was sure that the work would bear good results. In connection with the summer work Ingersoll watches ("Junior" size to boys, "Midgets" to girls) were awarded to twenty-eight pupils for special merit in the safety work, and "safety always" banners were given to sixteen schools.

BAY STATE COMPANY NOT REQUIRED TO EXTEND DISCONNECTED LOCATION

The Public Service Commission of Massachusetts has issued a decision denying that portion of a petition of citizens of Lowell asking that the Bay State Street Railway be compelled to extend its lines from the intersection of Varnum Avenue and Totman Street to the so-called Boulevard entrance at Fowler Road. Chapter 244, Acts of 1916, section 23, gives the board power to order any street railway to build and operate any just and reasonable extension of its lines for which it may have or may be granted locations. The statute imposes upon the commission, however, the duty of examining the circumstances of every case and of considering the effect of any order to be made upon the financial ability of the company to make necessary changes of equal or greater importance. The petition also urged that the company be required to complete a previous location of its lines from the present terminus in Varnum Avenue northward to Totman Street.

The commission states that the present financial condition of the company does not warrant the enforced building of extensions where the prospect of securing sufficient revenue to justify their construction cannot be made to appear. Traffic counts by the parties to the proceedings and by the inspectors of the commission, and other evidence, hold out no promise of such increase in revenue as would indicate that the proposed extension from Varnum Avenue and Totman Street to Fowler Road could, in any reasonable, proximate period, justify its construction. The company's first location, however (from Mammoth Road to Lexington Avenue, in Varnum Avenue), has been partly built upon. This, in the commission's view, gives this part of the line a different status from that of the second location (from Varnum Avenue and Totman Street to Fowler Road), no part of which is regarded as of any value by the company and which the company has indicated its willingness to surrender. It

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is the board's view that the action of the company in building upon part of the first location obtained imposed upon the company the obligation of completing the work to the northerly limit of that location. The company is therefore required to complete its line to the intersection of Totman Street and Varnum Avenue, but is permitted to refuse to build the extension to the Boulevard entrance.

SEATTLE BUS QUESTION TO GO BEFORE VOTERS

At a special session of the City Council of Seattle, Wash., recently, a resolution was introduced and adoped which has for its purpose the submission to the voters at the general election on Nov. 7 of the entire subject of jitney bus regulation. The bill and resolution were both proposed by Councilman Allen Dale, and seconded by Councilman R. H. Thomson. The bill will come before a committee of the whole Council at an early date. It will provide for the issuance of certificates to motor bus operators by the superintendent of public utilities, who is to be empowered to grant, refuse or modify the route, terminals or schedule of each application for a certificate. It will also provide that changes in routes may not be made oftener than once in thirty days, and that all certificates shall expire on Dec. 31 of each year. The superintendent of public utilities will be authorized to promulgate necessary rules designating places throughout the city for taking on and discharging passengers. Appeals may be made from orders of the superintendent of public utilities to the Board of Public Works, and from the Board of Public Works to the City Council, which is to be the final arbiter. The City Council will be empowered to require the operators of motor passenger vehicles to furnish a bond in sufficient amount and with adequate security on the condition that the operator shall pay all damages which may be sustained by any person injured by reason of any careless, negligent or unlawful act on the part of the operator, his agents, or employees.

San Francisco May Operate Motor Buses.—As an auxiliary to the Municipal Railway system, the San Francisco Board of Supervisors recently approved the recommendation of City Engineer O'Shaughnessy, who proposed that motor buses be run across Golden Gate Park between Sunset and Richmond Districts, to connect with the municipal cars. No decision has been made as to just what routes will be followed, but the Board of Public Works has been directed to prepare and submit for approval of the Supervisors, specifications for furnishing the city with auto buses suitable for transportating passengers.

Accident in New York Subway.—In a rear end collision on the subway division of the Interborough Rapid Transit Company, New York, N. Y., on Sept. 25, a patrolman on strike duty was seriously injured and a dozen passengers were slightly hurt. The motorman of the follower, the moving train, jumped to safety. He has been in the employ of the company for ten years and Frank Hedley, vice-president and general manager of the company, declared that the extreme nervous tension to which motormen have been subjected because of the strike was directly responsible for the collision. Each of the ten-car trains involved was made up entirely of steel cars.

Commission Decision Rendered in Pittsburgh "Owl" Fare Case.—In an opinion handed down on Sept. 28 the Public Service Commission of Pennsylvania holds that the Pittsburgh Railways acted in violation of both the spirit and the letter of the public service company law of the State in the way in which it proceeded to give notice of the doubling of its "owl" car or night fares, and in an order supplementary to the opinion the commission directs the company to cease from collecting any rates or enforcing any rules or regulations except those contained in its original tariff filed on July 17, 1914, and further orders the company to make reparation to its patrons for excess fares upon presentation of certificates of excess payment issued under order of the commission since June 23.

Plea Made for Omaha Jitneys.—John N. Baldwin, attorney for the Jitney Drivers' Association, declares Omaha's twenty-five jitneys will be driven off the streets on Oct. 1, unless the ordinance relating to liability bonds is made less oppressive. The ordinance requires bonds rendering the insurance company "primarily liable" for damages in the event of accident. This and other clauses are practically prohibitive, according to Mr. Baldwin. The only company which has been bonding jitneys has given notice that no more bonds of the kind now in use will be provided. The jitneys' license will expire on Oct. 1. Mr. Baldwin says that as they cannot secure new bonds unless the ordinance is amended they will be driven off the streets.

Organizing for Kansas City Safety Work.—W. H. Cameron, secretary, and C. W. Price, field secretary, of the National Safety Council, spent Sept. 18 and 19, in Kansas City assisting the newly organized local council in planning its work. The extensive organization of the Kansas City Railways provided useful groundwork for the local council, and at each of the conferences many heads of departments of the railways were present. J. H. Harvey, superintendent of efficiency of the railway, and head of its safety movement, presided at all sessions. These conferences emphasized the value of educating the children. This phase of the work, perhaps the most important, will be prosecuted largely through the machinery already put into motion by the company for reaching the school children.

Buffalo Fare Reduction Case Adjourned.—Apparently not in sympathy with the suggestion made by the Corporation Counsel to start proceedings for a reduction from 5 to 4 cents in the fare charged by the International Railway, Buffalo, N. Y., over its city lines, the City Council adjourned the matter when it came up for a hearing. Porter Norton, counsel for the company, appeared before the city authorities and branded any attempt on the part of the city to force a rate investigation by the Public Service Commission as a reprisal to thwart the company's efforts to have its special franchise assessment reduced. Mayor L. P. Fuhrmann asked the Corporation Counsel why he desired to connect the proceedings to have the company's property appraised and the proposed rate investigation and he replied that the same evidence could be used in both matters. At the company's request the hearing was adjourned.

Division of Ferry and Bridge Fare to Stand.—Members of the Seattle Port Commission and taxpayers residing in the eastern and western districts of Seattle at a special meeting of the commission rejected the plan proposed by C. E. Remsberg, its secretary, for giving the Ferry Line Auto Bus Company 3 cents of every 5 cents paid aboard the bay ferry steamboat at West Seattle, whether or not the passengers use the bus line. Under the present arrangement with the Ferry Auto Bus Company, the taxpayers, according to reports, are losing $1,200 a month. This sum would be increased to about $1,800 a month were Commissioner Remsberg's plan placed in effect. The Port Commission's budget for 1917 shows a deficit of $24,000 for the operation of the West Seattle ferry, according to Charles Cowen, representing property owners in the Cowen Park District. On motion of Commissioner Robert Bridges the commission decided to continue the present plan of dividing the fares of only those passengers who use both the ferry and the autobus line. This line operates from the West Seattle Ferry, in West Seattle, throughout that district.

Prospective Improvement in Long Beach (Cal.) Traffic Conditions.—Officials of the Pacific Electric Railway, Los Angeles, Cal., have recently been in conference with the Long Beach Safety Commission, with the result that a program has been agreed upon by both parties which embraces much needed changes in the traffic conditions. James R. Williams, Safety Commissioner, plans to submit the agreement, which has been jointly compiled, before the city authorities, and it is anticipated that it will carry considerable weight because of the joint sanction of the Safety Commission and the Pacific Electric Railway. The principal features of the new program are as follows: Passage of a new ordinance prohibiting jitneys from operating on streets where car lines are in operation; removing the jitney terminal from the congested district, corner of First Street and Pine Avenue, to the corner of Ocean and Pacific Avenues; possible placing of the jitneys on a franchise basis, and a ten-minute service on all lines of both jitneys and street cars between the hours of 6 a. m. and 10 p. m., and half hourly from 10 p. m. to midnight.

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Personal Mention

H. B. Whiteman, who has been acting as assistant secretary and treasurer of the Nashville Railway & Light Company, Nashville, Tenn., has been appointed secretary and treasurer of the company to succeed H. C. Walters, resigned, who has entered the newspaper business.

A. E. Rhoades, inspector for the Transcontinental Freight Bureau in Sacramento, Cal., has been appointed general freight and passenger agent of the Central California Traction Company, Sacramento, Cal., to succeed W. P. Neville, whose resignation from the company is announced elsewhere in this column.

H. C. Walters, whose resignation as secretary and treasurer of the Nashville Railway & Light Company, Nashville, Tenn., was announced in the ELECTRIC RAILWAY JOURNAL for Sept. 23, entered the railway field in 1900 with the company. He started in at the very bottom and worked himself up to the place of secretary and treasurer, which position he filled for the past eight or nine years.

Charles B. Hole, Montclair, N. J., has succeeded Bird S. Coler, New York, N. Y., as president of the North Carolina Public Service Company, whose properties include street railways and electric light and gas plants, etc., at Greensboro, High Point, Salisbury, Spencer and Concord, N. C. Mr. Coler will continue with the company as a member of the board of directors. Mr. Hole will reside at Greensboro.

W. P. Neville has resigned as general freight and passenger agent of the Central California Traction Company, Sacramento, Cal., to become manager of the Lawrence Warehouse Company. Mr. Neville has been with the Central California Traction Company since it was organized seven years ago. He started as freight clerk and was promoted to chief clerk, then to agent and finally to general freight and passenger agent.

D. C. Green, formerly connected with the organization of H. M. Byllesby & Company as local manager at two Oregon and Washington properties, has been appointed general manager of the Fort Smith Light & Traction Company, Fort Smith, Ark., succeeding H. C. Hoagland, who has been managing that property in connection with his work as manager of the Muskogee Gas & Electric Company for some time past. Mr. Hoagland will continue as manager of the Muskogee Gas & Electric Company.

Alfred F. Townsend has been appointed manager of the Stone & Webster properties at Beaumont and Port Arthur, Tex., included in the system of the Eastern Texas Electric Company. Mr. Townsend has been associated with the Stone & Webster interests for the last fifteen years, during which time he has been connected with the Lowell (Mass.) Electric Light Corporation; Ponce (Porto Rico) Railway & Light Company; Sydney (Nova Scotia) & Glace Bay Railway and the Woonsocket (R. I.) Electric Machine & Power Company.

E. E. Hawkins has resigned as president of the Ogdensburg (N. Y.) Street Railway, the Ogdensburg Power & Light Company and the Ogdensburg Gas Company, and will remove to Patchogue, L. I., and devote his entire time to the Patchogue Electric Light Company, of which he is president. Mr. Hawkins has been engaged in public utility work for many years, and besides the connections just mentioned was formerly with the Patchogue & Port Jefferson Traction Company and the New Paltz & Walkill Valley Electric Railway, New Paltz, N. Y.

Harry D. Frueauff, retiring general manager of the City Light & Traction Company, Sedalia, Mo., was the guest of honor on Sept. 8 at a banquet tendered him at Hotel Terry, Sedalia, by the company employees and a few invited guests as a farewell previous to his departure for Montgomery, Ala., where he is to be general manager of the Montgomery Light & Water Power Company as noted previously in the ELECTRIC RAILWAY JOURNAL. In appreciation of the good fellowship that Mr. Frueauff has instilled among all officials and company employees during the three years' service at Sedalia the employees and other company representatives presented him with a valuable Elk charm.

Sam W. Greenland has been elected president of the Indiana Electric Light Association. Mr. Greenland was born at Clarion, Pa., in 1879. He was educated at the Pennsylvania Military College at Chester, Pa., and at the Pennsylvania State College, State College, Pa. At the latter institution he was graduated in electrical engineering. Since that time he had been employed in the construction department of the American Telephone & Telegraph Company in the Pittsburgh district in gas, electric and electric railway engineering with Robert W. Watson, consulting engineer, Harrisburg, Pa., and in central-station operating work. In the latter pursuit Mr. Greenland was first general manager of the Columbus Railway, Light & Power Company, Columbus, Miss. Later he took up the position he now holds, that of general manager of the Fort Wayne & Northern Indiana Traction Company. This company operates 220 miles of electric street and interurban railway in the vicinity of Fort Wayne, as well as electric light and power properties at Fort Wayne and at thirteen other interconnected Indiana towns.

Irving P. Lord, president and general manager of the Waupaca Electric Light & Railway Company, Waupaca, Wis., and principal owner of the company, has sold his interest in the property and will retire from the management to engage in law practice. Mr. Lord was born in Waupaca in October, 1857, and by teaching school and newspaper reporting he obtained funds to attend Lawrence University at Appleton, Wis. Subsequently he studied law and was admitted to the bar in 1881. In 1888 Alexander Dow of the Brush Electric Company, Cleveland, Ohio, and others, incorporated the Waupaca Electric Light Company and Mr. Lord became one of the stockholders. In 1892 Mr. Lord and W. D. Baker acquired the property and reincorporated it under the name of the Waupaca Electric Light & Railway Company, at which time Mr. Lord was made president. Mr. Lord was one of the charter members of the Northwestern Electric Association, which later was superseded by the Wisconsin Electrical Association, and served as president of the Northwestern association for a year. In January, 1912, he was elected president of the Wisconsin Electrical Association. The company at Waupaca operates 5.4 miles of line and ten cars. It furnishes energy for lighting and power in addition to that for railway operation.

W. B. Voth, who resigned recently as chief engineer and purchasing agent of the Empire United Railways, Inc., Syracuse, N. Y., has been appointed general manager of the Ogdensburg (N. Y.) Street Railway, the Ogdensburg Power & Light Company and the Ogdensburg Gas Company, and entered upon his duties with these companies on Sept. 25. Mr. Voth was connected with the Empire United Railways for two years. Before that he was general superintendent of the electric railway and lighting property at Sheboygan, Wis. Mr. Voth is a native of Milwaukee, and was graduated from the University of Wisconsin in 1897. After designing, constructing and operating several small hydroelectric plants in his native State, he was appointed resident engineer at Sheboygan in 1904 during the building of a steam power station and the reconstruction of the local commercial and street lighting system. After finishing the construction work Mr. Voth remained to operate the plant as general superintendent. At the same time he acted as consulting engineer for the Greensboro (N. C.) Company, controlled by the same interests, resigning, however, in 1914, to become chief engineer and purchasing agent of the Empire United Railways.

W. B. VOTH

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H. Bertram Potter has been appointed assistant to the president of the Boston (Mass.) Elevated Railway. This office in the company's scheme of organization is intended to supply President Brush with a personal representative who shall be authorized to represent and act for him in all matters. Mr. Potter is thirty-five years of age and has been in electric railway work eleven years. He was educated in the public schools at Cambridge, Mass. When he was sixteen years of age Mr. Potter entered the industrial field in a machine shop at South Boston. His business experience was broadened by a term of service as receiving teller in the then American National Bank, Boston, and by a period of traveling salesmanship for a clothing establishment. Through his banking acquaintance, Mr. Potter was selected in 1905 to go to Lewiston, Me., to take charge of the building of the Lewiston & Turner Street Railway, now a part of the Lewiston, Augusta & Waterville Street Railway system. In the construction and operation of this road, which included about 14 miles of track, Mr. Potter as general manager obtained valuable experience along many lines and developed the first purely electric freight business in New England, as distinguished from the usual ramified express service. Upon the purchase of the road by the Clark interests of Philadelphia he began work for the Lewiston, Augusta & Waterville property, only to be called immediately to the Boston Elevated Railway to develop the electric freight business of the latter. This branch of the company's service has been brought to a high stage of efficiency through agreements with other operating companies which handle the business, the Boston Elevated furnishing certain transportation and terminal facilities within its territory without the handicap of caring for usual detail. When the present chief executive of the company joined the Boston Elevated Railway about six years ago as assistant to the vice-president, Mr. Potter became Mr. Brush's assistant, and has held that post at each successive advance of his superior. His work has been closely identified with the bureau of transportation and during the last three years he has had charge of the company's interests before the Massachusetts Public Service Commission and other public and quasi-public boards and organizations. Mr. Potter's work at public hearings has won him the confidence of the commission and the public alike, and his willingness to meet opponents frankly and squarely with clear and friendly explanations of the company's position has accomplished much in the establishment and in the maintenance of the best public relations. He is a member of the American Electric Railway Transportation & Traffic Association, the New England Street Railway Club, Masons, Elks, Boston Chamber of Commerce and many local organizations.

H. B. POTTER

OBITUARY

James A. Leslie, brief mention of whose death was made in the ELECTRIC RAILWAY JOURNAL of Sept. 2, spent his life in the street railway business. He was born on Nov. 16, 1865, and entered the employ of the old Southern Railroad, St. Louis, as a street car driver. He remained on the front platform until the line was converted into electric, when he became a conductor on the Lindell Railway. There he remained a little over a year, when he returned to the Southern Electric as a road officer. After nine years as a road officer he resigned to retire to private business. In March, 1901, he returned to railway work, entering the service of the United Railways in the fifth division as an instructor of motormen. At this time the Olive line had just been changed from cable to electric power. Shortly afterward he was promoted to be division road officer on Broadway, and then came his promotion to superintendent of the division.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***McDonald & Burgettstown Street Railway, Pittsburgh, Pa.**—Incorporated to construct and operate a 15-mile electric railway in Washington County. Capital stock, $100,000. Incorporators: R. L. Henderson, Pittsburgh, and others.

FRANCHISES

Riverside, Cal.—The Pacific Electric Railway has received a franchise from the Council to relocate its tracks to the center line of Fourteenth Street between Main Street and a point east of Almond Street.

Lawrence, Kan.—The franchise granted by the city of Lawrence to the Kansas City, Kaw Valley & Western Railway has been refused by the company, owing to restrictions on the hauling of freight through Lawrence and the clause allowing the city to change the franchise whenever it wished. The interurban lines from Kansas City to Lawrence are now operating within the city limits under a temporary agreement.

***St. Louis, Mo.**—The J. C. C. Waldeck Electric Railway has asked the Board of Public Utilities for permission to construct an electric railway over Montrose Avenue from the Missouri Pacific Railway tracks to the plant of the Independent Packing Company at Hickory Street and Ewing Avenue.

Buffalo, N. Y.—The City Council has approved the application of the International Railway for a franchise to lay double tracks and operate cars ½ mile through Franklin Street from Chippewa to Allen Street. Under the charter the franchise must be approved by voters at a general election before it can be effective.

***Portage, Pa.**—Application has been made to the Borough Council for a franchise to construct an electric railway between Portage and Martindale. J. I. Johnson, Johnstown, Pa., is interested.

Parkersburg, W. Va.—The Kanawha Traction & Electric Company has asked the Council of Parkersburg for a thirty-year extension of its franchise.

TRACK AND ROADWAY

***Grass Valley, Cal.**—Plans are being made for the construction of a 1-mile electric line to connect the Empire and Pennsylvania mines, owned by W. B. Bourn, San Francisco.

Martinez & Concord Interurban Railway, Martinez, Cal.—Work will be begun on the construction of the Martinez & Concord Interurban Railway within the next few weeks. Grading will be begun on Escobar, Pine and Jones Streets and the Pacheco Road. Clifford McClellan, San Francisco, is interested. [Aug. 5, '16.]

Marysville, Cal.—It is reported that the Los Verjels Land & Water Company plans to construct an electric line from Bangor to connect with the Northern Electric Railway at Oroville.

Municipal Railway of San Francisco, San Francisco, Cal.—The public utilities committee of the Board of Supervisors will shortly take up the question of building an extension to the municipal street railway down Baker Street to the Palace of Fine Arts and the proposed new State Normal School in the California Building.

Georgia Railway & Power Company, Atlanta, Ga.—This company is double-tracking its Lakewood line from the Jonesboro Road in Lakewood Heights to the Southeastern Fair Grounds, about 1½ miles.

Quincy (Ill.) Railway Company.—This company will build a loop at Twenty-second and State Streets this fall.

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Columbus, Greensburg & Richmond Railway, Columbus, Ind.—A business survey of this company's proposed line to connect Columbus and Richmond, Ind., has been made by Otto Rensch and John A. Schaffer, Indianapolis, and C. C. Clinton, Chicago. They contemplate financing the road. Frank McColloe and Albert Holland, Columbus, are local promoters. [Sept. 9, '16.]

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has been directed by the Board of Public Works, following its own request, to maintain double tracks in South Meredian Street from Palmer Street to the tracks of the Indianapolis Union Railway Company. The company expects to do a large amount of repair and rehabilitation work before winter. Among the more important projects under way are the laying of new track and of paving between the tracks in Cornell Avenue from Twenty-seventh Street to Thirtieth Street, this work being now practically completed. Rails have arrived for completing the new tracks in Fairfield Avenue from Thirty-fourth Street to Woodland Avenue. The company expects to complete new tracks in East Michigan Street from Rural Street to Michigan Drive and is now engaged in laying new rails for the West track in West Street from Washington Street to New York Street.

Skowhegan & Athens Electric Railroad, Athens, Me.—President Morris McDonald and Directors George Macomber and Weston Lewis of the Maine Central Railroad, accompanied by Harvey D. Eaton, of Waterville, recently viewed the country over the route of the proposed Skowhegan & Athens Electric Railroad and afterwards told a delegation of citizens that they were highly in favor of the construction of the new road and were willing to make a good traffic contract with the promoters of the proposition. To date the proposition lacks about $8,000 to complete the pledges of $100,000, the sum necessary before it can be bonded and the construction work started. [June 26, '15.]

United Railways & Electric Company, Baltimore, Md.—This company proposes to construct an extension on Liberty Heights Avenue and the old Liberty road to Villa Nova.

Twin City Rapid Transit Company, Minneapolis, Minn.—Work has been begun by this company on the extension of its Franklin Avenue line from Twenty-seventh Avenue to Seabury Avenue south. This extension will bring the line to the western end of the Franklin Avenue bridge and ultimately the track may be extended across that structure to a connection with the Rondo line of St. Paul.

Kansas City (Mo.) Railways.—A contract has been awarded by the Kansas City Railways for the construction of four miles of extensions in Kansas City, to Littlefield, Fry & McGough, Chicago, at an estimated cost of about $220,000. The work is in five sections.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded to the Degnon Contracting Company, New York City, a contract at $810,265, for the construction of Section 1-B of Route No. 12, a part of the Fourth Avenue Rapid Transit Railroad. The section in question lies in part underneath the Atlantic Avenue station of the Long Island Railroad in Brooklyn. It is part of the Brighton Beach Connection between the Brighton Beach Railroad and the Fourth Avenue Subway. A contract was also awarded by the commission for the installation of tracks on the main portion of the Culver Rapid Transit Railroad in Brooklyn to Kaufman & Garcey, New York City, at $103,680. The new Culver line now under construction is an elevated railroad and will replace the present surface extension of the Fifth Avenue Elevated line extending to Coney Island, and known as the Culver Line. The new line will become an extension of the Fourth Avenue system. The contract awarded to Kaufman & Garcey covers track installation over practically nine-tenths of the line. The portion of the line from near Avenue X to the Coney Island Terminal will be constructed later. It is expected that the line will be completed and ready for operation some time next year.

Charlotte (N. C.) Electric Railway.—This company is building a 1½-mile extension in Dilworth.

Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.—It is reported that during the coming year this company will construct an extension to Hudson.

Hamilton, Ont.—The City Council of Hamilton, at a special meeting on Sept. 19 approved the proposal to construct a hydroelectric railway line from Port Credit to St. Catharines, via Hamilton.

Toronto (Ont.) Suburban Railway.—This company plans to construct an extension of its line from Bathurst Street east along Davenport Road and down Poplar Plains Road.

Southern Pacific Company, Portland, Ore.—Work will soon be completed by this company on the installation of a new safety device on its Oswego-Portland line. The system over this stretch of track will have seventeen signal lights and sixteen foundations, two for relay purposes. There will be a signal on each side of every curve between Oswego and Jefferson Street station. The company has spent considerable money in the reinforcement of its trestles by means of concrete pedestals and general overhauling of the roadbed. The total cost of improvements is estimated at $40,000.

Southern Pennsylvania Traction Company, Chester, Pa.—Joint installation of a new pole line in the business district of Chester will be made by the Southern Pennsylvania Traction Company and the Beacon Light Company. The poles will be iron of ornamental design.

Hershey, Pa.—Preliminary surveys have been completed of the proposed line between Manheim and Hershey. It is planned to connect with the Elizabethtown line of the Hershey Transit Company. It is reported that the Hershey Transit Company will supervise the construction of the line. [June 17, '16.]

Irwin-Herminie Traction Company, Irwin, Pa.—An application will be made before the Public Service Commission of Pennsylvania on Oct. 3 for an extension of the Irwin-Herminie Traction Company's line north to Export.

Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.—Grading has been practically completed between Womelsdorf and Newmanstown by the Lebanon Valley Construction Company for the proposed line of the Womelsdorf, Richland & Myerstown Street Railway. It is expected that the line will be placed in operation before winter. The road will be completed to Myerstown early next summer. Leroy R. Valentine, Womelsdorf, president. [Sept. 2, '16.]

Canadian Pacific Railway, Montreal, Que.—It is reported that this company contemplates the electrification of its line between Kingston and Renfrew. It is stated that a power plant will be installed on the Mississippi River back of Sharbot Lake to develop power for the project as well as to supply current to Kingston and vicinity.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—The East Chattanooga Chamber of Commerce has revived a movement instituted several years ago, seeking to have the construction of a street car line on Oak Street south and Ocoee Street. The Chattanooga Railway & Light Company will be petitioned to make the extension.

Nashville & Gallatin Interurban Railway, Nashville, Tenn.—Extension of this company's line from Edenwold to Springfield, Tenn., 19 miles, is expected to be undertaken shortly. Whether the line will be extended from Springfield to Adairville, Ky., 10 miles further, will depend on a survey of conditions now being made to show the probable traffic on such a line. Stockholders of the Nashville-Gallatin Interurban Railway have approved the extension to Springfield, for which Springfield will raise $150,000, to which $50,000 would be added in case of an extension to Adairville.

Dallas (Tex.) Electric Company.—A new street car line, about a mile long, extending from the vicinity of Fair Park to Parkview, a new addition to the city of Dallas, has just been placed in operation by this company.

Northern Texas Traction Company, Fort Worth, Tex.—With the nearing of completion of the new paving on Main Street from the Courthouse to the Union Station, Mayor Tyra has served notice on G. H. Clifford, general manager of the Northern Texas Traction Company's lines, that the company must complete its line on Commerce Street and redistribute its traffic over Commerce, Main, Houston and Throckmorton Streets, instead of operating all cars over Main and Houston Streets as at present.

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Petersburg & Appomattox Electric Railway, Petersburg, Va.—It is reported that work has been begun by the Vaughan Construction Company of Roanoke on this company's proposed extension between Hopewell and City Point, 2½ miles.

Grays Harbor Railway & Light Company, Aberdeen, Wash.—The City Commission has instructed the Grays Harbor Railway & Light Company that unless it paves between the rails of its right-of-way on Riverside Avenue within thirty days it must surrender its franchise to operate its electric cars in Hoquiam.

Tacoma Railway & Power Company, Tacoma, Wash.—Officials of Tacoma Railway & Power Company report cars of the company will be operating on Pacific Avenue, as far as Forty-eighth Street, about Nov. 1. Work on the extension of the Pacific Avenue line began recently.

SHOPS AND BUILDINGS

Ware & Brookfield Street Railway, Ware, Mass.—Work has been begun by the Ware & Brookfield Street Railway on the construction of a new brick carhouse. The structure will be 125 ft. deep by 75 ft. wide and will be near the site of the old carhouse.

Detroit (Mich.) United Railway.—Work is now under way by the Detroit United Railway on the construction of a new office building and carhouse at West Jefferson Avenue and Mecca Street to replace the carhouse located at Fort Street and Clark Avenue. The carhouse will be 209 ft. x 116 ft., of brick construction, and will contain a boiler room, compressor room, employees' wash and locker room and a stock room. The office building will be 64 ft. x 70 ft., of pressed brick construction. The lower floor will contain offices for the line superintendent, carhouse foreman and cashier, an assembly room for motormen and conductors and a restaurant for employees. The second floor will be used for a locker room and dormitory for night crews. The construction cost is estimated at about $65,000.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded to the Serber-Stander Company, New York City, the contract for the construction of station finish on three stations of the Broadway-Fourth Avenue Subway in Manhattan, namely, those at Canal Street, Twenty-third Street and Twenty-eighth Street on Broadway. The amount of the contract awarded was $149,325.

Tarrant County Traction Company, Fort Worth, Tex.—A contract has been awarded to H. D. McCoy, Cleburne, for remodeling the old Raymond Hotel property into a station for the Tarrant County Traction Company. The company expects to occupy the new station by Oct. 15.

Tacoma Railway & Power Company, Tacoma, Wash.—Work will be begun immediately by this company repairing its carhouse at South Thirteenth and A Streets. The cost is estimated at $6,000.

POWER HOUSES AND SUBSTATIONS

Iowa Railway & Light Company, Cedar Rapids, Iowa.—This company will erect a high-tension transmission line from Iowa City to Iowa Junction.

Des Moines (Iowa) City Railway.—A contract has been awarded by the Des Moines City Railway to A. H. Neumann & Company, Des Moines, for the construction of an addition to the company's power plant on the Des Moines River. The addition will cost about $55,000.

Ohio Service Company, Cambridge, Ohio.—Work is nearly completed on this company's power plant at Coshocton. A 5000-kw. turbo-generator and auxiliary equipment will be installed.

Montreal (Que.) Tramways.—It is reported that work has been begun by this company on the construction of an extension to its St. Denis power station. The cost is estimated at $20,000.

Pacific Northwest Traction Company, Seattle, Wash.—This company contemplates the immediate extension of its electric transmission lines to the district south of Conway. Plans have been prepared for the installation of a power-station at Conway. The cost of the line to Conway is estimated at $15,000.

Manufactures and Supplies

MOTOR AND CONTROL INQUIRIES INCREASING

Largest Buying in Eastern States—Orders Comparatively Small—Deliveries and Prices Warrant Prompt Consideration of 1917 Requirements

Inquiries for railway motors and control are reported as fairly active for this season of the year. During July and the first of August the inquiries were slow, but since that time the market has picked up noticeably and inquiries are out for quite a number of medium sized orders. Usually, just before convention time, inquiries are scarce and sales in motors and railway motor control are comparatively few. Now, however, there are inquiries for more than 150 quadruple equipments.

It is interesting to note that for a number of years there were spring and fall peaks in the buying of railway motors and control. In 1907, however, the Chicago Surface Lines, then just starting their three-year rehabilitation period, made some very large purchases of equipment in the middle of the summer. That year seemed to be the turning point, and since then orders for railway motor and control equipment have been more evenly spread over the year. This balancing of the placing of motor orders also may be due to the quite general abandonment of the old practice of shifting motors between winter to summer car bodies.

During the past two months there have been very few large railway motor or control orders, except that recently placed by the Boston Elevated Railway. This company purchased from the General Electric Company 100 four-motor equipments and forty two-motor equipments and pneumatic train control for all equipments. The Boston order is said to have amounted to about $500,000.

Referring to the general trade situation for railway motors and control, it is found that most of the activity lately has been, and now is, in the Eastern States. The Interborough at New York and some other large properties placed comparatively large orders earlier in the year.

There are practically no large inquiries on hand from roads in the Central States. In the spring the properties at Kansas City, Detroit, Milwaukee and Minneapolis placed orders for railway motors, which no doubt accounts for the scarcity at this time of large Western inquiries. But it should be noted that the size of the orders just referred to did not favorably compare in the aggregate with those placed by the same companies in former years. Neither was the total large when one remembers that comparatively few motors were ordered in 1915. The 1916 motor orders from the smaller roads in the Central States also are small, if compared with the orders of 1912 and 1913, notwithstanding the fact that many small roads ordered almost no motors during 1915.

The activity in the East during the summer as contrasted with the apparent inactivity in the Central States, may be ascribed to the lag in the return of normal business in the agricultural districts and the consequent lateness in the arrival of good street and interurban traffic in the Central States. Only a few roads in the Central States have yet been forced to increase their equipment to handle the growth of business.

Or, looking at the situation from the purchasing standpoint, it may be that inquiries have been withheld during the summer because of the belief that prices would be reduced before long. Prices now are high as compared with previous years, but in other divisions of the electrical industry, such as in the turbo-generator division, there have been recent price increases, while for motors and control the prices have remained constant since the first of August. Because of the dearth of raw material and because of the labor situation, the manufacturers state that they can offer no hope for any reduction in prices. This, of course, is a situation which now confronts only those roads which are in actual need of additional equipment for extension of service or for replacing obsolete equipment.

But the increase in business that many of the smaller and

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most of the larger roads are enjoying will shortly make the purchase of motors and control, as well as cars, a live topic for all roads. The result will be an increased volume of business and consequently the question of delivery will become most important.

Deliveries now on the popular types and sizes of railway motors are quoted at about six months. Eight months is quoted on specials. The delivery of motors and control is almost wholly contingent upon the deliveries to the manufacturer of the raw materials necessary for the construction of the equipment. Copper deliveries are now about five and one-half months, and the motor manufacturers are making heroic efforts to meet even the present comparatively small demands for railway equipment.

Many of those roads which are showing traffic increases are actively considering their future motor equipment needs. Forehandedness in ordering for next year's requirements may beget ample returns. It will certainly result in better delivery than otherwise would be obtainable. This will be true particularly for the smaller orders. Small lot motor orders must take their place in the line of travel through a manufacturer's plant. Exception, of course, can sometimes be made, but rush deliveries are now impossible, and the motor manufacturers, with practically no reserve stocks of parts and raw materials, have to make every order from the ground up, and so are forced to handle their orders on schedule and on the basis of the raw materials available. Thus those roads which will need new equipment during 1917 are crystallizing their requirements into inquiries, as evidenced by the recent activity earlier mentioned.

LARGEST COPPER ORDER PLACED

On Sept. 23, the copper producers closed at New York an order for 448,000,000 lb. of copper to be delivered during the first half of 1917. This large order is for export, and the price has not been made public, but the total order is said to amount to about $125,000,000. During the present week there have been no very large inquiries but prices are firm and indications are said to point to increased prices during October. Copper manufacturers are operating at top notch capacity yet none can make prompt deliveries. The demand for bare and insulated wire is in excess of the enlarged output of the wire manufacturers. This condition indicates the need for forehandedness in making specifications and considering purchases for any railway work to be done next year. The manufacturers are not in position to quote on orders for more than ninety days in advance and deliveries cannot be expected under four or five months. The reasons for restricting quotations to ninety days are: unstable prices for bulk copper, copper for manufacturing cannot be delivered before March, 1917, and the manufacturers cannot afford to tie up their facilities for long in advance.

The enormous size of the foreign order is realized when it is known that the total copper purchased for electrifying 440 miles of the Chicago, Milwaukee & St. Paul Railway was about 8,000,000 lb. as compared with this foreign order for 448,000,000 lb.

BIG TIE CONTRACT

The biggest contract for ties in the history of the Southern lumber industry is announced by the National Lumber Manufacturers Association, which states that a railroad tie contract amounting to several million ties a year for a long term of years, has been placed by a group of Eastern railroads with the Kirby Lumber Company of Houston, Tex. In order to facilitate the handling of this contract the Kirby Company has opened branch offices in New Orleans, Mobile and Hattiesburg. The ties will be produced in Louisiana, Texas, Mississippi and Alabama.

ROLLING STOCK

St. Petersburg & Gulf Railway, St. Petersburg, Fla., is reported to be in the market for four cars.

Ohio Electric Railway, Springfield, Ohio, has purchased ten trail freight cars, 38 ft. 6 in. over all from the Cincinnati Car Company.

City Railway, Dayton, Ohio, has purchased from the Cincinnati Car Company ten light-weight, double-truck, all-steel cars, 43 ft. 5¼ in. over all, to seat forty-eight passengers. These cars are exact duplicates of the all-steel cars placed in service several years ago with the exception that there is one additional window in the car body.

West Penn Traction Company, Pittsburgh, Pa., has ordered one 45-ft. baggage express car from the Cincinnati Car Company.

Fort Wayne & Decatur Traction Company, Fort Wayne, Ind., has purchased from the Cincinnati Car Company one 40-ft. baggage express car.

Citizens Railway, Clarksville, Tenn., is considering the purchase of two or three single or double-truck closed cars, with or without trucks, with a seating capacity of from twenty-five to forty.

San Francisco-Oakland Terminal Railways, Oakland, Cal., is planning to order twelve new cars for use on the Key Division. It is reported that they probably will be ordered from the American Car Company.

South Covington & Cincinnati Street Railway, Covington, Ky., noted in the ELECTRIC RAILWAY JOURNAL of July 29 as being in the market for twenty-five cars has ordered twenty-five all-steel, single-end, double-truck motor cars from the Cincinnati Car Company. These cars are to be low-floor, monitor deck, mounted on 24 in. wheels, will seat fifty-two passengers and will weigh about 29,000 lb. completely equipped.

TRADE NOTES

General Electric Company, Schenectady, N. Y., has received an order from the Public Service Railway, Newark, N. J., for fifty four-motor equipments, GE 200 type, with new PC control, and fifty air-brake equipments.

McKeen Motor Car Company, Omaha, Neb., has recently shipped to the Ferrocarriles del Norte de Cuba, a type "C" engine, 200 hp. motor car. The length over all is 72 ft. 9¾ in.; width over all, 10 ft. 2¾ in.; total seating capacity, eighty. The length of the first class passenger compartment is 14 ft. 4⅜ in. and seats twenty people. The third class passenger compartment is 32 ft. 5⅝ in. long and seats sixty people. The length of the baggage compartment is 8 ft. 6 in. and the mail compartment 2 ft. 6 in. The total weight is 74,000 lb. This is the 148th motor car turned out by this company, and upon arrival at its destination will go into service in place of the present steam passenger service between Jucaro and Moron. The car is electrically lighted by the Stone axle system.

John L. Fay, formerly superintendent of electrical distribution for the Union Electric Light & Power Company, St. Louis, Mo., has become associated with the Paducah Pole & Timber Company and the Southern Pine Manufacturing Company as sales manager. Mr. Fay was president of the company section, National Electric Light Association, and was actively engaged in company activities. He was chairman of the executive committee and a director of the Employees' Mutual Benefit Association, a director of the Utility Employees Savings & Loan Association, and chairman of the Central Safety Committee. Mr. Fay was also a member of the Engineers Club of St. Louis, the American Institute of Electrical Engineers, the St. Louis Jovian League of Electrical Interests, the committee on rules and regulations governing construction and maintenance of poles, wires, cables, etc., for the Missouri Association of Public Utilities; and a member of the committee on overhead lines and inductive interferences for 1916-1917 of the National Electric Light Association.

ADVERTISING LITERATURE

Sprague Electric Works of the General Electric Company, New York, N. Y., has issued Bulletin No. 48,707, which describes and illustrates direct-current motors and controllers for job presses, folders and bookbinding machinery.

Lord Manufacturing Company, New York, N. Y., has issued the "Lord Hand Book" describing hand brakes for all types of equipment. This book will be of considerable value to engineers and railway master mechanics, as it shows by diagram the various methods of installing brake rigging and computing brake pressures.

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Electric Railway Journal

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WHICH ONE OF THESE COMPANIES IS LIKELY TO BE BEST UNDERSTOOD

The Open Door *vs.* The Shut Mouth

People instinctively distrust what they do not understand.

The savage did not understand the sun and moon and so he made gods of them and exhausted his ingenuity in propitiating them.

Modern man is not so strong for propitiating; he is more likely to throw bricks at what he doesn't understand or what he comes to dislike by reason of misunderstanding.

To most people the working of an electric railway is a mystery.

They see a stream of nickels going into the concern which, usually, conducts its affairs behind closed doors.

There are stories afloat of dark deeds committed in times past behind those doors.

There is apparent reason for a lot of dissatisfaction with the service rendered by this concern.

People have been known to stand, holding on to straps, during the rush hours.

Indignation has been aroused by the fact that 6 cents worth of transportation has not been given for 5 cents, with a free transfer thrown in.

And when complaint is made the popular idea is that a marble-hearted official uses the complaint for lighting his 50-cent cigar.

And all this because the people on the outside can't see what is really going on inside.

Question: Whose fault is it?

Answer: The railways.

Question: What is the cure?

Answer: Turn the inside outside.

Let them see in; tell them what you are doing and why; what you are not doing and why not.

Make a reputation for efficiency and frankness instead of for crookedness and concealment.

If the inside of the railways is not turned outside by the railways, the turning will be done by others —they are already doing it in fact.

Beat them to it with a whole-hearted policy of publicity.

["When" "How" and "What With" are the subjects of future Talks on Publicity]

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THE "JOURNAL" AND THE CONVENTION

This issue of the ELECTRIC RAILWAY JOURNAL will first reach many of our readers at the Atlantic City convention, and to them this paper extends its best wishes for a most profitable gathering. In the next issue, that of Oct. 14, the report of the convention will be published. The JOURNAL this year, as last, will not publish a daily report of the convention proceedings. Instead the papers and discussions of each association will be grouped together in the report issue of Oct. 14, forming a complete story of each series of meetings. A small daily will be published during the convention simply to give prompt publicity to official announcements and other material of immediate but transient interest. The report issue will, we hope, not only accurately record the ideas expressed by the speakers at the meetings and the progress made by the industry as epitomized in the committee reports, but will convey to its readers everywhere the spirit and enthusiasm of the convention.

CONCLUSION OF THE NEW YORK STRIKE

The New York strike has now passed into history, and the results are the subject of congratulation to the railway companies, their employees and the public not only in New York City but also in every other city in the country. Employees of electric railway companies can now feel more safe in their jobs from outside interference, and the companies and the public are more assured of freedom in transportation. Too much credit cannot be given to the New York managers for the stand which they took and for the public relations work which had laid the basis for a proper general understanding of their position. In Brooklyn also, a most notable demonstration of loyalty was shown. This found expression in a mass meeting of employees held last Saturday night when mutual felicitations were exchanged between officers and men over the outcome on the B. R. T. The keynote struck was that both officers and men had confidence in each other, and that under the company's organization of departmental trustees, just as in the case of the Interborough and New York Railways internal brotherhoods, both sides can settle any possible points before they can give friction.

CODIFYING CLAIMS ETHICS

Again the Pittsburgh (Pa.) Railways has made an important advance in its efforts to free modern claim work from the prejudice and suspicion inherited from the old "strong-arm" days in the electric railway industry. In a "Code of Ethics and Policies" that has just been compiled, as noted elsewhere in this issue, this company has with most commendable frankness stated the ethical principles, general policies and mode of procedure to be followed by it in the handling of claims. The present advance made by the company lies not in the fact that the code constitutes any new development, for it is simply a permanent collation of the fundamental principles that have been used by the Associated Bureaus of the company under the guidance of Cecil G. Rice. It comes rather because the company has thus dared openly and officially to state, for the benefit of all parties concerned, its exact position in claim matters. The act is decidedly worthy of emulation. If the practices followed are just and fair, there is every reason for letting the public know what they are.

ELECTRIC RAILWAY POWER SUPPLY IN ST. LOUIS

Those electric railway executives whose interests require them to follow the power supply question closely can with profit focus their attention on the interesting situation outlined in the special report of the directors of the United Railways of St. Louis abstracted in our issue for Sept. 23, page 531. Briefly, these are the facts: (1) The railway is buying approximately 60 per cent of its required electrical energy from the company which locally distributes Keokuk power on the basis of a 60 per cent load factor and at a cost of slightly less than 0.6 cent per kilowatt-hour. This energy is purchased on a long-time contract. (2) An additional 30 per cent or more comes at present from the local light and power company, this being on a 45 per cent load factor basis and costing about 0.84 cent per kilowatt-hour. The contract for this power is temporary, expiring in 1919, having been drawn to provide for the uncertainties attending the inauguration of the Mississippi River Power Company project. It provides for an annual fixed charge of $15 per kilowatt and a secondary charge of 0.45 cent per kilowatt-hour. (3) The rest of the energy is supplied from the company's own steam plants, now antiquated, at a cost of at least 1 cent per kilowatt-hour. It is estimated further that by enlarging and renovating these steam plants, energy could be produced at 0.8 cent, or in a new plant that the cost would be 0.6 cent. The question is now whether the company should put up a modern steam plant to supplement the Keokuk hydraulic power or should provide for a gradually increasing supply from the local central power company.

The circumstances seem to indicate the advisability of the latter, for the same reasons that have dictated the combination of lighting and railway power plants elsewhere. These are, briefly, that the peaks of the railway load do not coincide with those of the lighting and power load, so that it would not be necessary to add as much generating equipment in the power company's stations to care for the railway load as would be needed in a separate plant. Again, there is economy due to the lower real estate, operating, maintenance and overhead cost per kilowatt, which naturally results from concentration of generating capacity.

The reader has already raised the mental question: "Why not take more Keokuk power since it is so cheap?" The answer is simple: Probably no more could be obtained at the price, an exceptionally low one secured because the hydraulic power company was desirous at the start of securing a foundation load of size and permanence. But even if it could be secured at the present price per horsepower-year it does not follow that the additional energy drawn would be cheap per kilowatt-hour, because it requires a high load factor to insure such a condition.

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PACIFIC COAST DEMANDS QUICKER SERVICE

The officials of practically every electric railway on the Pacific Coast are casting about diligently for some means of economically giving a quicker service that will put the street car more nearly on the plane of the automobile in point of rapid transit. Many companies are experimenting with "one-man" cars, some are operating auto bus and jitney lines as feeders, and every possible solution of the problem is receiving careful consideration. The seriousness of the situation growing out of the competition of the jitney and private automobile can best be judged by the statement that the earnings of the six largest companies in the five chief coast cities are falling below normal by from $500,000 to $1,000,000 each per annum, the greater part of the loss being attributed to this condition.

A manager of a company in the Northwest recently stated that the present problem is more difficult than the one faced when electric traction first appeared and it became necessary to change over from cable to electric drive. When that change was made, much experimenting was done, the public was patient with slow progress and the railways did the pioneering. In the present situation the evolution has been very rapid and has been fostered by competition. Jitney operation has not been on a feasible, business-like basis, it is true, but it has developed a popular demand for more speedy service and inclined the public to impatience with the old operating schedules.

This would seem to put the present state of affairs in a discouraging light, but there are hopeful signs in sight. With the realization of what the jitney is doing in the transportation field, the public is coming to recognize the obligations and responsibilities which it must assume, and regulation is slowly but surely following. News also comes from the Pacific Coast of the proposed formation of a jitney operating corporation, holding franchises and having an ultimate capitalization of $100,000. If this is an indication that the "here to-day, gone to-morrow" irresponsibles will soon be out of the way, competition will be short and decisive. When the time comes that the jitney is bearing its proper burden and is under adequate regulation, the best and most economical public transportation agency will ultimately win, and that is undoubtedly the electric railway.

It is manifest, however, that the electric railway must adapt itself to such changes in conditions as may have been brought about by automobile competition. A representative of this journal has just completed a trip along the Pacific Coast and has found practically unanimous agreement that the most promising direction to work is with some form of lighter weight equipment. In both Seattle and Portland recent experiments with light-weight "one-man" cars have been so satisfactory, even on busy lines, that this idea is being developed further at once. In southern California, experiments with gasoline-driven cars have been made at several points; one of the results of these is the Fadgl flexible car used on the local systems in Fresno and San José, as described in the issue of Aug. 19. It is the feeling on the Pacific Coast that Eastern interests have not fully recognized the difficulties which the Western roads are facing, and it is the hope of the Western roads that one of the results of the interchange of ideas at the Atlantic City convention will be some constructive, practical suggestions that will be a real help to them in the solution of the quicker service problem.

CONTRACTS WITH EMPLOYEES

The many references, mostly vague or incorrect, which daily newspapers in New York and elsewhere recently made concerning individual agreements used for electric railway employees in Indianapolis, led us last week to prepare a digest of the facts relative to such contracts. The history of the so-called Indianapolis precedent shows that in 1914, after an arbitration award under a three-year peace settlement, the Indianapolis Traction & Terminal Company circulated individual working agreements in order to remedy a few impracticable working conditions in the award. In the major matters of not recognizing the union, maintaining an open shop and providing against strikes through the use of arbitration, the individual contracts simply echoed provisions of the arbitration award, and the permanent arbitration board deemed them not inconsistent therewith. When later the leaders of the Amalgamated Association tried to force the cancellation of the contracts, they were restricted by the courts from interference on the ground of being strangers thereto.

It is academic to discuss what legal action might have resulted in New York had there been in force on the Interborough Rapid Transit Company a formal settlement plan and arbitration agreement as in Indianapolis. It seems worth while to note, however, that the courts will evidently uphold utilities and their employees in their right to make individual contracts, and will not permit disinterested third parties to bring about a breach of such contracts. Furthermore, individual agreements make it easier to proceed in civil action against employees in the case of an unlawful suspension of work.

Another suggestion is that of Henry R. Towne and approved by the Merchants' Association of New York, as stated last week, that a general contractual relationship be established by law for the employees of all utilities. Under this plan the tenure of service would be so regulated by federal and state enactment that everyone voluntarily accepting utility employment would be obligated by contract to continue therein for a specified time, with proper provisions for the punishment of violations as well as for an honorable release from the contract for valid cause. The plan would permit union membership, but would prohibit concerted action to suspend service and would settle disputed wage and working questions by arbitration. The utility companies can profitably make a study of this bill, especially as the Merchants' Association of New York thinks so well of it that it has asked the Chamber of Commerce of the United States to take a referendum of its members upon its provisions.

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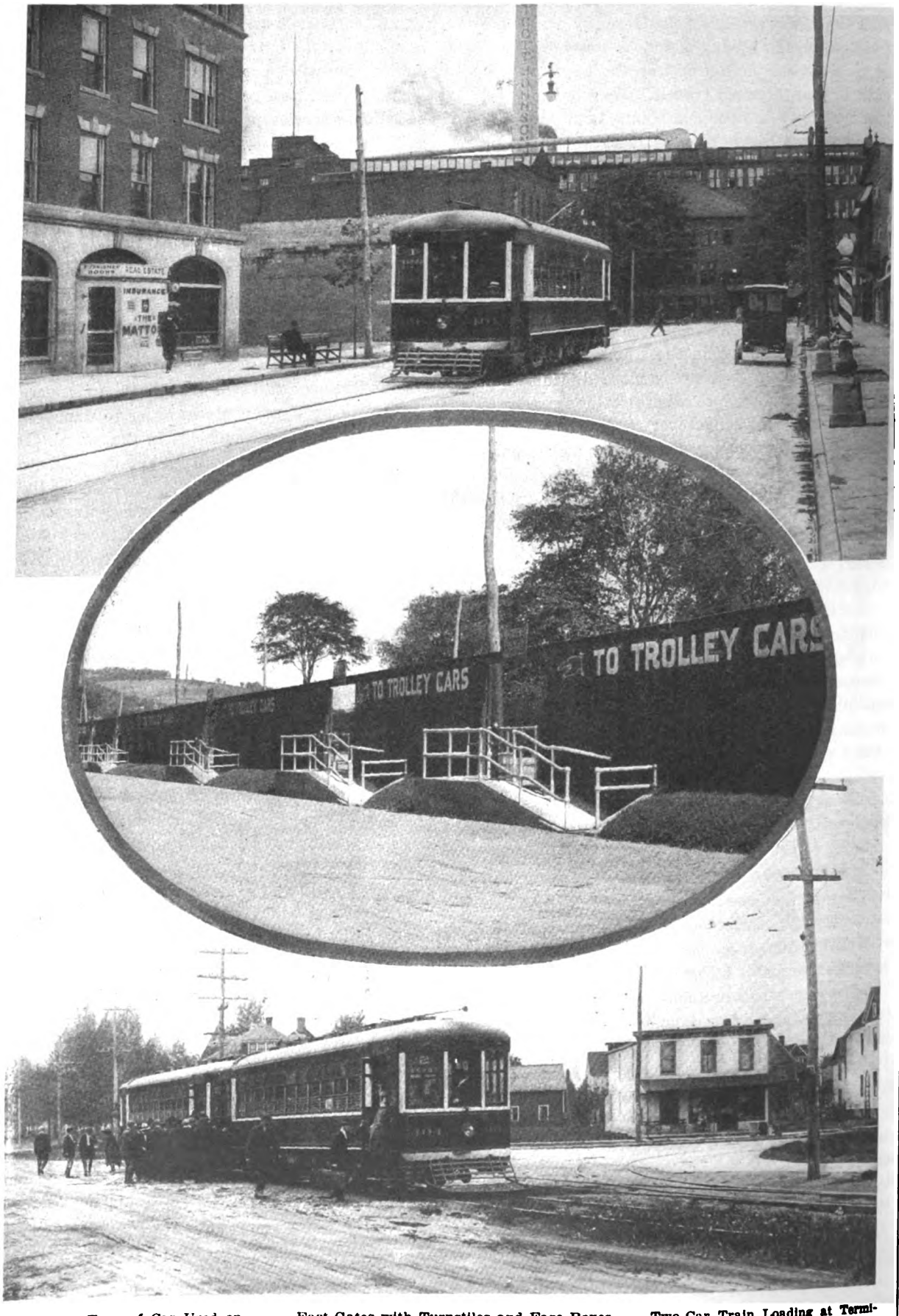

Suburban Type of Car Used on Endicott-Union Line

East Gates with Turnstiles and Fare Boxes for Handling Baseball Crowds

Two-Car Train Loading at Terminus of Suburban Line

Binghamton Traffic—Typical Views on the Lines of the Binghamton (N. Y.) Railway

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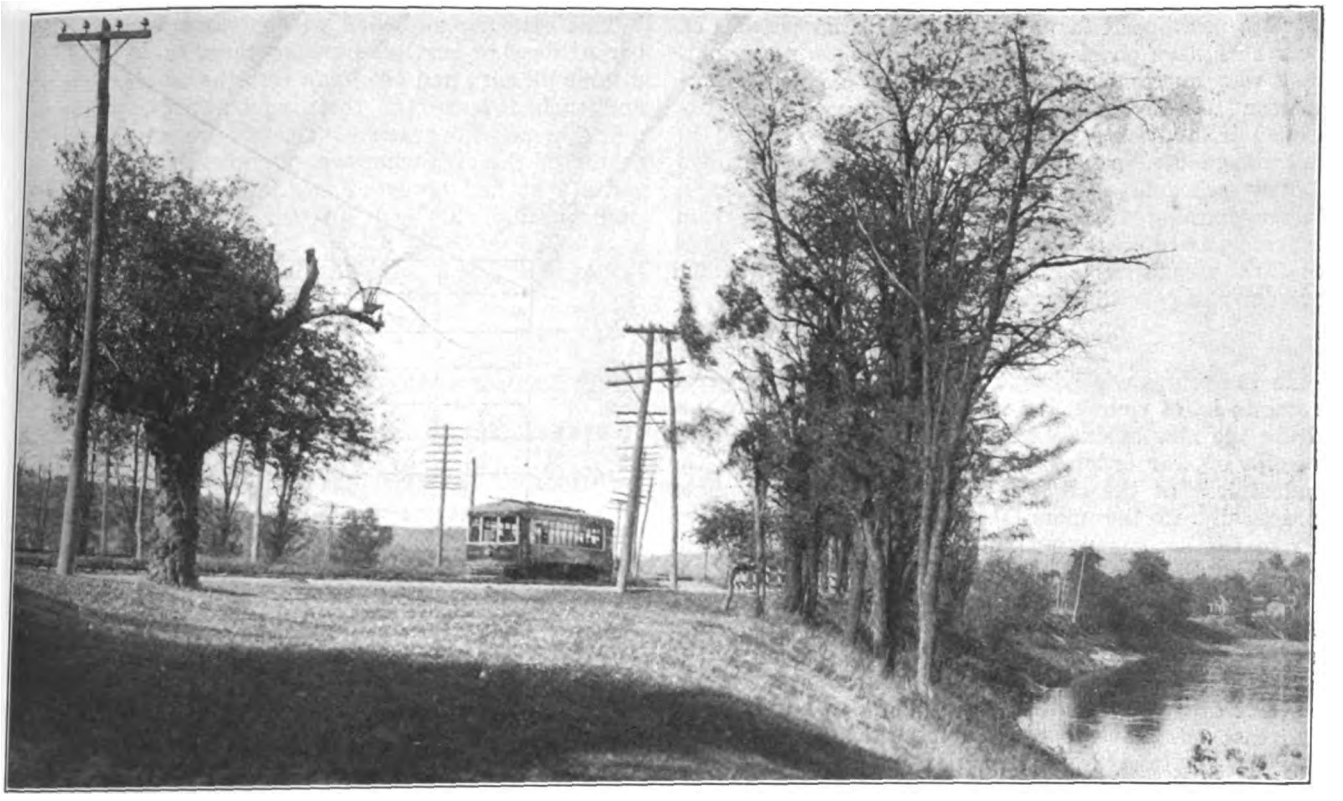

BINGHAMTON TRAFFIC—VIEW ON SUBURBAN LINE ALONG SUSQUEHANNA RIVER

Rehabilitating Railway Receipts

In the Face of the Situation in the Last Two Years the Binghamton (N. Y.) Railway Has Reached the Strongest Position in Its Recent History Through the Introduction of Energetic Methods of Stimulating Receipts and Improving Operating Conditions

As an example of the opportunities that are still latent in the electric railway industry, the recent record of the Binghamton (N. Y.) Railway has peculiarly timely interest. The situation that this property faced in the summer of 1914 was apparently typical of that confronting the industry as a whole, but since that date the introduction of new operating methods has placed the property on the strongest income-producing basis in its history, and the results constitute good evidence that the transportation field is still fallow. During the past two years the company's business has undergone a complete revival. Its net revenues each month are consistently showing increases of more than 15 per cent over the previous year's figures, and its gross revenues are growing steadily as the "riding habit" is developed among the city's population.

These improved conditions are represented in the accompanying graph, which shows, for the last seven years, the total annual figures for gross receipts. From this it will be seen that up to December, 1912, the gross receipts had maintained a regular annual increase, such as might be expected in any normally-growing city of moderate size. During the year 1913, however, there was a distinct falling off in the rate of increase, and this, coupled with a marked increase in car-miles, and also an increase in car-hours, produced a sharp decline in operating income.

During the year 1914, however, subsequent to its purchase by the Scranton & Binghamton Railroad Company, the property came to be operated under an entirely new policy. A change in management took place during August, 1914, and there was immediately inaugurated a vigorous campaign of development of the unexploited sources of railway income. The result of this was a marked increase both in gross and net receipts, even for the year ended Dec. 31, 1914, or after less than six months of operation under the new methods. During this period the car-mileage increased slightly, but the car-hours displayed hardly any increase, resulting in a change from 8.3 car-miles per car-hour in the year 1913 to a figure of 8.7 car-miles per car-hour during 1914. The increased schedule speed was maintained during the year 1915, giving a figure of 8.6 car-miles per car-hour. An increase of 25 per cent in operating income for the year 1915 over the previous year took place despite the fact that a practically complete overhauling of rolling stock, track and line was going on during the whole period, all of the old equipment that has been retained in service receiving extra heavy repairs to place it in a condition as good as new.

Briefly speaking, these results have been brought about by the introduction of a faster and more regular service, short headways on the shorter runs, and a consistent effort to meet, and if possible to anticipate, the patrons' needs. That the latter policy has produced results is perhaps best demonstrated by the following reproduction of a resolution which was passed at a popular mass meeting and published in the local newspapers, and which, in this day of suspicion and controversy between the public and local utilities, can be characterized only as extraordinary:

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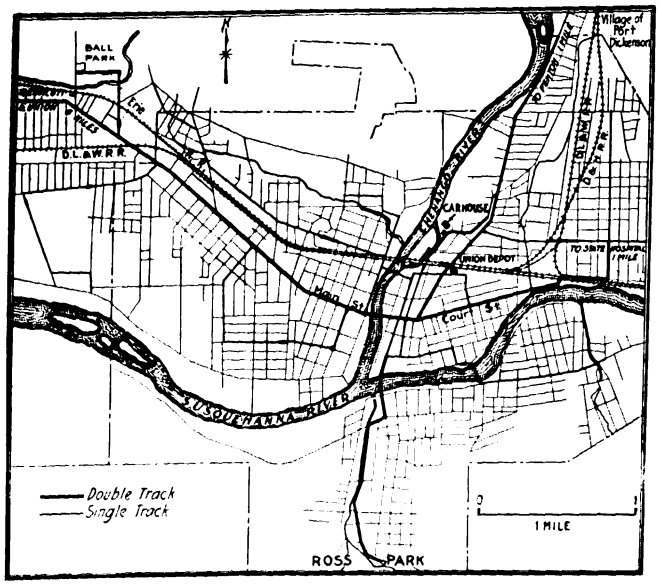
"At a meeting of taxpayers and street car patrons at Port Dickinson on Dec. 21, 1915, the following resolution was unanimously adopted: *Whereas,* the Binghamton Railway Company having improved and extended in a most satisfactory manner its roadbed in the village of Port Dickinson, and promptly provided a new schedule with modern pay-as-you-enter cars, faster running time, etc.; *Resolved,* that we herein express our appreciation of same, and desire to state that we wish to co-operate as best we may with the present and future plans of the railroad company.

[Signed] H. D. HARRIS, *Chairman.*
E. E. LANTIMAN, *Clerk.*"

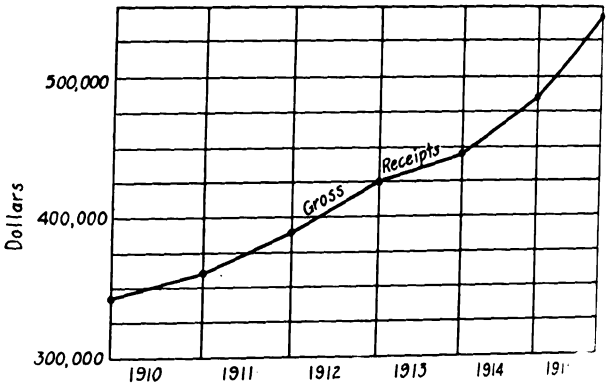
In the company's recent record the increase in gross receipts is, of course, the most interesting feature, because the new business has been in no way due to the receipt of war orders by the local manufacturers, the industries of the city of Binghamton being confined practically to the manufacture of shoes and cigars. From the accompanying map it will be seen that the center of the city lies in the peninsular formed by the junction of the Chenango and Susquehanna Rivers. About this section the city and its suburban towns straggle irregularly. The population of the city itself is about 55,000, but the electric railway system serves several other towns outside of these city limits, which increase the number of possible riders by about 25 per cent. However, a large part of the population of the city is collected in residential districts surrounding the business center at a radius of about 1½ miles.

It was this source of revenue that the company sought first to develop. Owing to the fact that, practically without exception, these districts were little more than a mile from the business section, almost all of the residents could walk from their homes to the city within a reasonable time, yet, from the standpoint of the railway management, the short-haul traffic that they could bring to the company was most desirable. The first step toward this end was a complete rescheduling of the runs on the entire system. In this, all schedules were considered a whole so that they could be made to dovetail in together, and thus make the headways between cars that were near and within the business section regular and at short intervals. Also, on all of the short lines radiating from the business district the headways were very much decreased, so that the frequent service would encourage the use of the cars.



BINGHAMTON TRAFFIC—MAP OF BINGHAMTON (N. Y.) RAILWAY LINES

This was accomplished without increasing the number of cars in service, because under the original conditions all cars had been run into the center of the city and turned there for their return trips. Under the new scheme of operation the cars were run through the center of the city wherever possible, thus avoiding the waits that had occurred at the central terminal originally used. This plan, in fact, permitted the removal of cars on several of the lines, even though the frequency of service was increased owing to the faster schedule speed and the elimination of delays in the center of the city. Again, on the trunk line that appears on the accompanying map running west from the city, there are operated cars which serve on four different runs to branch lines, and it was found that under the old conditions all four of these cars ran in a bunch at a fifteen-minute headway over the part of the trunk line that was near the city. In the rescheduling these runs were so planned that the cars moved over the trunk line at regular intervals of less than four minutes.



BINGHAMTON TRAFFIC—GRAPHIC RECORD OF GROSS RECEIPTS FOR PAST SEVEN YEARS

Time points were established on all of the lines, and these were rigidly adhered to, the arrangement of the points and the running times being worked out by having an expert motorman make runs over the line so as to determine from actual practice just what time could be made. This, alone, increased the schedule speed on all runs very materially. Subsequently, new rolling stock was purchased, as described in the ELECTRIC RAILWAY JOURNAL for Dec. 25, 1915, and this improved the schedules still further. An example of the extent of this change may be cited in the case of one line upon which the schedule speed with the old cars was increased 11 per cent, and when the new cars were placed in service the increase in speed rose to 17 per cent over that which had been in effect prior to the change.

Another circumstance which tended toward slow schedules under the old conditions was that the residents of the city had formed habits of deliberation in boarding and alighting from the cars. Frequently, as much as fifty seconds were consumed at a stop where passenger interchange normally should be completed in ten or fifteen seconds. This, of course, worked to the detriment of the running time, and to meet the situation signs requesting co-operation from the public were posted in the cars. These have produced excellent results not only in accelerating traffic but also in keeping the cars clean.

Again, on one of the lines—that extending northward from the city to the village of Port Dickinson—the schedule speed was increased by rebuilding the track and putting on new cars under a faster running time. The traffic over part of this line is fairly heavy, and in consequence a ten-minute headway was established

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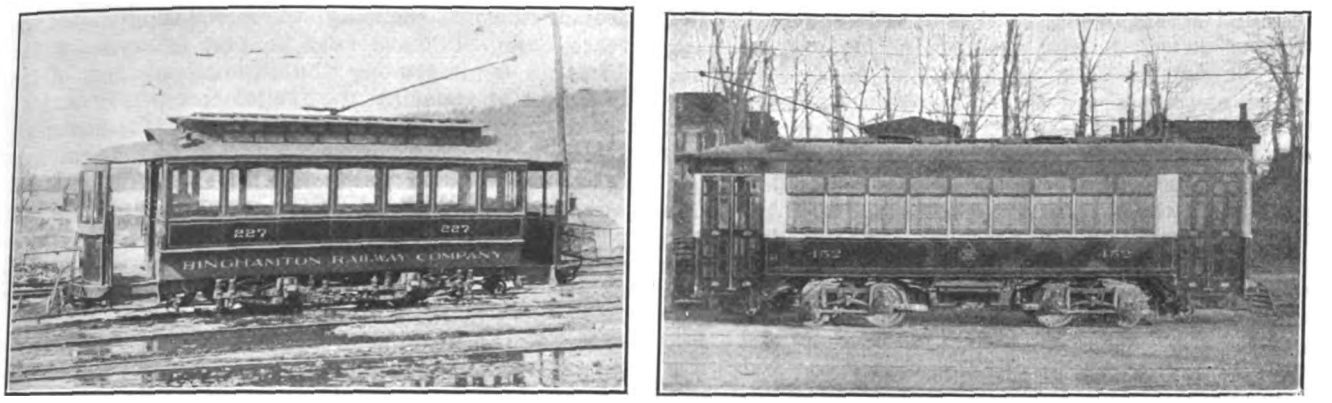

BINGHAMTON TRAFFIC—TYPE OF CAR ORIGINALLY USED AND NEW TYPE OF CITY CAR THAT DISPLACED IT

for about 2 miles north of the city. As the outlying sections of the line would not support such frequent service, the schedule was so arranged that the ten-minute headway on the inner section was made up with turn-back cars, a twenty-minute service being supplied for ¾ mile beyond the first turn-back point and a forty-minute service being given to an outlying section about 1 mile beyond this. This turn-back scheme, together with the new cars and tracks, as well as new paving that was laid, gave very great popular satisfaction, while the ten-minute service near to the city served as a definite incentive to the short riders.

For the long rides, frequency of service was not considered so necessary, and on the suburban line between Binghamton and the towns of Union and Endicott, which lie about 9 miles west of the city, the original headway of fifteen minutes was increased to twenty minutes. But with the new service the schedule time for the run was reduced from fifty minutes to forty-five minutes. This permitted the handling of the traffic with one car less than was previously operated, and with the new cars and the faster schedules that were introduced the change met with the patrons' approval.

An incidental feature of the campaign for increased gross receipts consisted in the introduction of improved fare collection methods. Prior to the change in management of the property, only about 12 per cent of the cars were of the prepayment type, and on none of these were fare boxes used. Fare boxes were, therefore, placed upon all cars, where this was possible, and were installed on all of the new cars purchased by the company. On some of the old cars with small platforms, where the use of fare boxes was impossible, Rooke registers were provided for the conductors, this plan being designed to protect them from misunderstandings under the close system of inspection that was also introduced.

By no means a small part of the recent success of the company has been due to its present popularity with the local residents. Probably the first step that was taken by the new management toward this end was the construction of a short line to serve a local baseball park, this being an extension over which there had been a long-standing dispute between the railway and the baseball fans, who constituted a large portion of the populace.

The extension, of course, is used very infrequently, and for no other purpose than for serving baseball crowds. In consequence, it really cannot pay, and this was the reason that had kept the railway from building it originally. It is provided with thoroughly modern

BINGHAMTON TRAFFIC—COURT STREET, BINGHAMTON'S MAIN THOROUGHFARE, WHERE CROSS-TOWN RUNS ORIGINALLY TERMINATED

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terminal arrangements so that crowds can be handled without delay. Ramps, gates, turnstiles and recording fare boxes have been installed, and all fares are collected as passengers leave the grounds before they board the cars. The park, it may be said, had been donated by a prominent manufacturer of the city, and since the location which he chose was about 1800 ft. away from the then existing railway line, there was a very considerable popular demand for railway facilities to serve it, regardless of the question of profit or loss to the railway. When the extension was finally built the local press reported the construction with elaborate notices, and this definitely inaugurated an era of good feeling on the part of the public.

Subsequently, a particular point was made of calling upon prominent business men and discussing with them possibilities for improving the service in general. Through these interviews a number of excellent suggestions were received, and they were promptly put in force, leading other citizens to interest themselves in street railway matters. Eventually the public at large became interested and began to boost the railway company. Naturally, under the circumstances, some suggestions as to improvements were received without being adopted because of their impracticable nature, but whenever this was the case a special point was made to explain in detail the reasons why the suggestions could not be put into practice.

The most striking result of the popularity thus acquired by the railway came up in connection with the jitney-bus craze when it reached the city of Binghamton. The first attempt to operate jitneys came shortly after the extension had been made to the local baseball grounds, and the first jitneys were operated between the city and this park. As soon as this competition began, the attention of several of the influential citizens was called to the fact that the ballpark jitney runs would be only an entering wedge for jitney operation generally, and that, in consequence, it would be desirable to advocate publicly the patronage of the railway to the exclusion of the jitney buses. As a result, the competition died within a few weeks, even without the passage of any regulatory ordinance.

2000th Issue of London "Electrician"

Commemorative Number Contains Authoritative Articles Summarizing Progress in Electric Traction, Prime Movers and Other Divisions of Its Field

IN commemoration of the issuing of the 2000th weekly number of the *Electrician*, London, that journal on Sept. 15 published a special number largely taken up with retrospective articles covering the several divisions of the field of electrical engineering.

The article on electric traction, written by Dr. H. F. Parshall, covers the history of electric traction, in America particularly. The writer states that while the physical knowledge on which electrical engineering is founded is largely English in origin it is remarkable that so much of the actual development and application have been on American soil. He believes that the technical application of knowledge is most likely to attain rapid development in those countries where industries find the greatest protection and there is the greatest security afforded for capital invested in such industries.

The development of electric power stations was treated by P. C. Hunter and that of the steam boiler by D. Wilson. Mr. Hunter points out that the pioneers in steam power development worked along lines of improving thermal efficiency, whereas during the last ten years engineers have been content to develop in the direction of improving the internal efficiency of the turbine and reducing its capital cost per kilowatt by the development of sets of increasing size and speed. The economical advantages obtained in this way have led to the cheaper production of electricity, increased sale and improved load factor, which in their turn have permitted the use of still larger turbines. He gives a graph showing the increase in load factor of electricity supply stations from less than 10 per cent in 1897 to 30 per cent in 1915.

Mr. Wilson traces the development of different types of boilers and shows the relation of increases in steam pressure to boiler design progress. Up to 1860 pressures did not show much increase and were lower than 40 lb. per square inch, but since that year the increasing pressure has been very rapid, assisting the development of the water-tube boiler. He states that during the past ten years there has been no fundamental change in water-tube boiler design. While types have varied the higher efficiency of the boiler to-day is due almost entirely to improvement in structural design and in the better assembly of the boiler house plant generally. These features he covers in considerable detail.

Code of Ethics and Policies

Associated Bureaus of Pittsburgh Railways Issue Book Frankly Stating Position on Claims for Injuries and Damages

THE Associated Bureaus of the Pittsburgh (Pa.) Railways and its allied companies have prepared for public distribution and for their own use a book entitled "Code of Ethics and Policies," which gives in detail the position of the companies on matters arising out of the consideration of claims for injuries and damages. Thus another step toward the perfecting of modern claim work has been taken by these bureaus, whose work along clerical, litigation, adjustment, inspection, medical, safety and welfare lines was described in detail in the ELECTRIC RAILWAY JOURNAL of July 24 and Sept. 11, 1915.

According to an executive pronouncement by Cecil G. Rice, assistant to the president, who is in charge of the bureaus, the circumstances surrounding each particular accident readily distinguish it from all others, but the underlying principles which guide and control the attitude and action of the Associated Bureaus in connection with such occurrences are comparatively few. Moreover, the codification of these principles is said to offer such convincing proof of sincerity and fair dealing on the part of the company as may reasonably be expected to encourage and develop a reciprocal attitude from others. To make the official character of the code absolutely clear, it is stated by Mr. Rice at the beginning that only such action on the part of members of the Associated Bureaus as is in complete harmony with the spirit and the letter of the "Code of Ethics and Policies" will receive official approval.

The general position of the company in the matter of claim work is ably summarized in the "Foreword," as follows:

"The Associated Bureaus hold in great regard their high calling to be mediator between those who have fallen into suffering and misfortune by reason of accident, on the one hand, and the companies, in connection with whose properties that may have occurred, on the other. It is earnestly hoped that all such persons will retain in their attitude toward the Associated Bureaus a spirit of amicability and confidence. Toward

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all such persons the Associated Bureaus will exercise a similar friendly regard in all of their dealings.

"All accidents and resultant injuries are as sincerely regretted by these companies as by those to whom they befall. It is then both harmful and erroneous to harbor a spirit of enmity or prejudice toward the companies, or the Associated Bureaus, solely because an accident has occurred. It is the desire and intention of the Associated Bureaus that such intercourse as may follow upon the occurrence of an accident shall result in increase of mutual respect and good understanding between all of the parties concerned.

"The Associated Bureaus hold as their high moral duty the prevention of accidents, both by anticipatory means and by searching inquiry into accidental occurrences. They seek to effect and maintain relations of fairness and good understanding between the companies and their patrons generally, and particularly with those persons who have sustained injury or material loss by accident in connection with the companies' properties, to the end that in these contingencies such action may be taken by the parties concerned as will be just, equitable and mutually satisfactory."

The first fundamentals stated by the code are the guiding principles and mode of procedure published in the issue of this journal of Sept. 11, 1915, page 437. To summarize these here however it may be said that the guiding principles concern the points of maximum accuracy, utmost expediency, absolute fairness, persistent courtesy, minimum consistent expenditures, and perfected co-operation and efficiency. Similarly, the mode of procedure involves the following acts: overcoming prejudice, inspiring confidence, analyzing and reducing to a business basis, creating a desire, causing a determination and satisfactorily closing the transaction. The code also includes ten "fundamental facts," as noted in the above-mentioned issue, which are suggested for the consideration of those who have been or may become involved in accidental occurrences. These facts have mostly to do with claims as a matter of business rather than law, and the reciprocal responsibilities of the public and the companies in handling such a business matter.

In regard to the medical profession, the code takes the point of view that the recognition by the company of the generous proficiency of doctors inspires a respect for their ethical tenets, and also the expectation of a reciprocal observance by them of other ethical procedure, *e.g.*, the general code for the Associated Bureaus. Moreover, the insistent belief that legal advice is unnecessary for the satisfactory disposition of business with the Associated Bureaus is not permitted to hinder full observance of the courteous consideration due to members of the bar. In a special chapter to members of the Associated Bureaus, they are told of the fiduciary relationship which they bear to the organization as a whole, and of their obligation to uphold its honor and dignity in speech and action.

In order to emphasize the main points brought out, the book at its end presents an "epigrammatic recapitulation," from which the following specimen sentences have been taken:

"The public, these companies and their employees form a community of interest, each having reciprocal rights and responsibilities.

"The voluntary adoption of a high standard of action is justification for expecting a corresponding attitude on the part of others.

"Only the one who seeks that to which he has no right can find excuse for objecting to the full details of an accidental occurrence being made known to the Associated Bureaus by those who know the facts.

"To advance the best interests of all concerned by recording details of an accidental occurrence one observes is a duty of citizenship involving no embarrassment or annoyance.

"The mere fact that a person sustains injury by no means warrants a request for compensatory damages.

"Justification for presenting a claim must be based upon the freedom from fault of the person injured and the causal negligence of the person from whom compensation is sought.

"A claim for damages is the same as a bill; it is an allegation of indebtedness susceptible of similar itemization and presentation.

"The unnecessary employment of another to represent one in so simple a matter as the presentation of a claim indicates business incompetency.

"If these companies owe they are not only willing but desirous of canceling the obligation.

"Only persons wanting too much, or something to which they have no right, now find excuse for litigation following accidental injury or damage.

"To discourage all unnecessary litigation is an economic duty of the public.

"Professional solicitors of claims for litigation are a public nuisance. To be solicited by them is a reflection on one's intelligence.

"A doctor whose advice is not for the best physical interest of his patient violates the ethics of his respected profession.

"An attorney who charges an exorbitant fee for collecting a simple bill for damages is dishonest and his client is foolish.

"Confidence begets confidence. The Associated Bureaus have confidence in the inherent reasonableness and honesty of the public."

Kansas City Safety Campaign Under Way

The safety campaign of the Kansas City (Mo.) Railways is under way in all its phases. Following the first distribution of literature to the schools, essay contests are being arranged, and films are at hand for exhibitions in the schools equipped with projection rooms, and in moving picture theaters. The safety work within the company has also started, expanding safety work that has been done for several years. A general committee manages the entire compaign. This committee consists of E. B. Atchley, publicity agent; Kearney Wornall of the claim department, and J. H. Harvey, superintendent of efficiency. Working directly under this committee is W. S. Woodland, formerly a supervisor. He has been appointed special safety agent. The safety work within the railways organization is under the charge of a central safety committee, with James E. Gibson, general manager, as chairman, Mr. Woodland secretary, and the heads of departments as members. Each department also has its committee, and in each of them are sub-committees.

In the description of the Dallas, Tex., new interurban terminal in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 23, 1916, a typographical error made it appear that all of the interurban lines using the terminal are managed by the Stone & Webster Management Association. It should have read that the Northern Texas Traction Company is so managed, since the Southern Traction Company and the Texas Traction Company are under the Strickland management. The Dallas Interurban Terminal Association is also managed by the Stone & Webster Management Association.

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Illinois Traction System Publicity
Newspaper Advertising Layouts and Posters Used in Advertising

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Illinois Traction System Uses Many Forms of Publicity

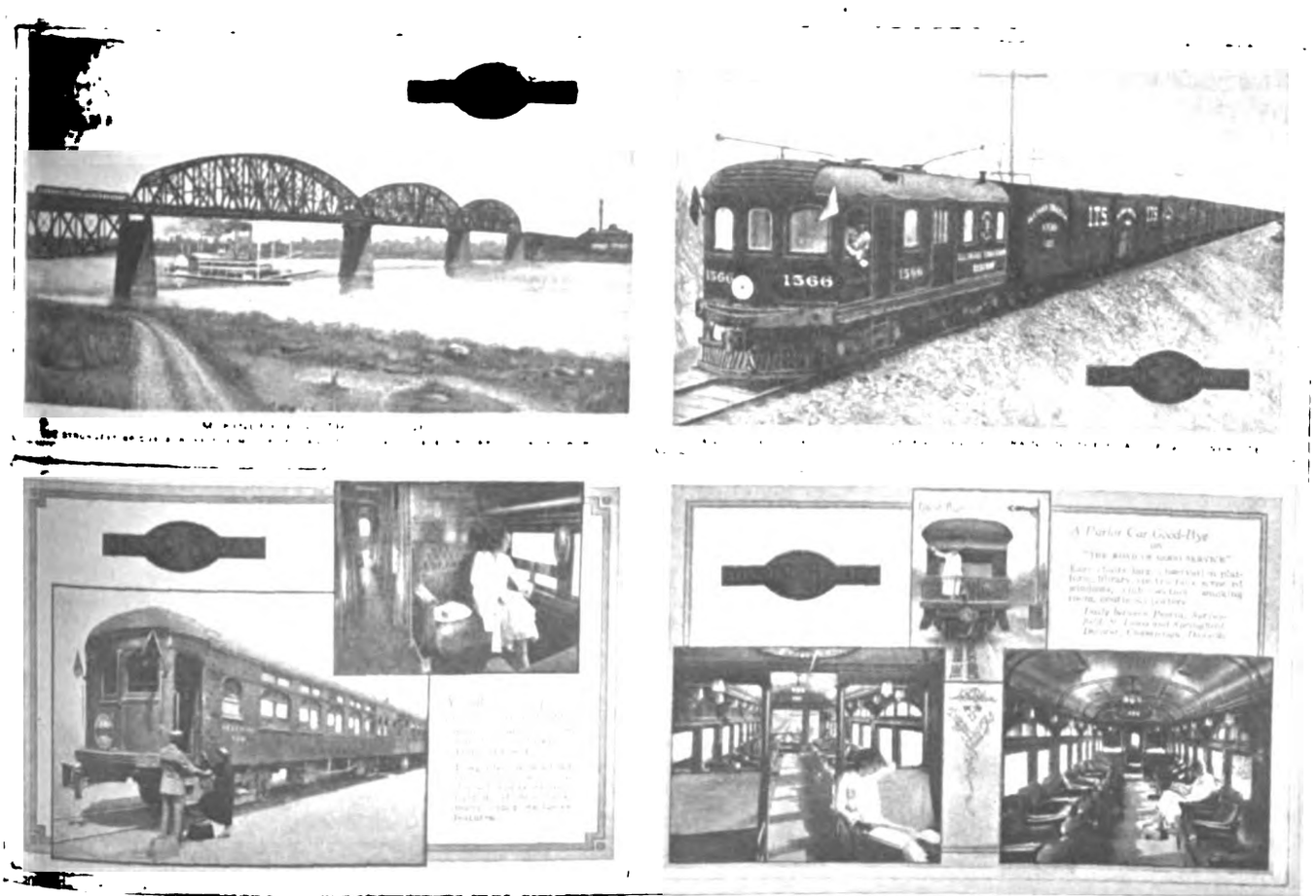
The Accompanying Illustrations Have Been Selected to Show the Several Phases of the Advertising Work Which Is Being Done by This Progressive Electric Railway System

THE department of publicity of the Illinois Traction System is kept busy constantly devising new and attractive ways of obtaining the public's attention. The various forms of publicity employed include newspaper advertising, posters, car cards, billboards, moving-picture slides, dodgers, postcards, playing cards, and paper napkins and fans for picnic parties. The department of publicity has made advertising contracts with approximately 200 weekly and daily newspapers in the towns and villages along its lines. Advertising copy is run when it is seasonable, and the amount varies with the different papers. In one of the accompanying illustrations are shown the various layout forms in which newspaper advertising appeared during the past year. Mats of these layouts were made for some newspapers and electrotypes were made for others, and the type matter was changed to suit the conditions existing in the different localities.

Newspaper advertising as well as publicity of all forms reaches its maximum just prior to the Illinois State Fair, which usually occurs in September. During the past two years the department of publicity has made it a special point to distribute the various forms of publicity in the territory served by the steam railroads which do not enter Springfield, Ill., the point where the State fair is held. A considerable quantity of this advertising matter is distributed at the various county fairs held along these steam railroads, and during the present year either a representative of the company was sent or advertising matter was distributed at forty-six of these county fairs. This advertising sets forth the convenience of connecting with the Illinois Traction System trains at the various terminals, and the frequency, the safety and the comfortableness of the service.

IMPRINT ON PAPER NAPKIN GIVEN TO PICNIC PARTIES

In order to see that as many passengers as possible return from the State fair by way of the Illinois Traction System, a building has been erected on the fair grounds. This also serves as the official State fair bureau of information. The State fair association has a representative at this booth, as well as the Illinois



ILLINOIS TRACTION SYSTEM PUBLICITY—POSTCARDS USED IN ADVERTISING I. T. S. SERVICE

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ILLINOIS TRACTION SYSTEM PUBLICITY—HANDBILL ADVERTISING SPECIAL SERVICE TO STATE FAIR

Traction System, and information not only regarding the Illinois Traction System trains, but about all of the steam railroads and the fair itself is furnished upon inquiry. In connection with its newspaper advertising for the Illinois State Fair this year, the Illinois Traction System is offering to all those who will present a coupon, which appears in the advertisement, a souvenir consisting of a complete railroad map of Illinois showing the Illinois Traction System's lines printed in heavy red ink. Several of the various forms of publicity which are being used are shown in the accompanying illustrations.

This year a new set of illustrated postal cards was prepared by the department of publicity. These portray the sleeping and parlor cars, the freight trains, the McKinley electric bridge, the company's waiting station and substations, and the block signals. All ticket agents

ILLINOIS TRACTION SYSTEM PUBLICITY—INFORMATION BUREAU AT STATE FAIR GROUNDS

are furnished with a supply of these postal cards, and the fact that they may be had upon inquiry is announced in advertisements and upon posters. These illustrated postal cards are also distributed at the county fairs, they are supplied to the steam railroad ticket agents, and they are placed in the Illinois Traction System's parlor and sleeping cars. The last edition of cards was printed in quantities of 10,000 of each kind. Several years ago there was a great demand for them, but since the picture postal-card fad has passed the present demand for them is not so great.

Playing cards of two qualities and especially designed are also purchased by the department of publicity and distributed by the passenger department. One pack of these cards, which is of a 25-cent quality, sells for 15 cents, and the other, which sells for 25 cents, is of a 50-cent quality. These cards are sold at cost by all the ticket agents, and frequently when there is a special car movement producing considerable revenue, playing cards are furnished free to the passengers. The fact

ILLINOIS TRACTION SYSTEM PUBLICITY—CAR CARD ADVERTISING SERVICE TO STATE FAIR

ILLINOIS TRACTION SYSTEM PUBLICITY—FACE OF EXTRA CARD AND BACK OF PLAYING CARD

that these playing cards are on sale at all passenger stations is advertised in the company's folder. There has been a large demand or them, because they are attractive and of excellent quality. Several extra cards are included in each deck, and on these is printed matter calling attention to the automatic block signals and the character and safety of the service. One of the extra cards contains a map of the road showing all the important stations. The back of the 15-cent playing card contains the Illinois Traction System's monogram on a conventional layout printed in red and gold. The back of the 25-cent playing card shows the rear end of one of the Illinois Traction System parlor cars printed in three colors.

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Observations of a Traveling Track Specialist

The Author States Some of the More Important Results of a Recent Inspection Trip to Several Doherty Properties

By A. SWARTZ
Vice-President Toledo & Western Railroad, Toledo, Ohio

IN the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 16, 1916, page 491, there appeared an article describing the work of the traveling specialists in the organization of Henry L. Doherty & Company. At the suggestion of the editors the writer has set down some results of his observations made during a recent trip as traveling track specialist for this company. No holding company, of course, operates a property with the expectation of allowing it to become a burden, but rather expects the property to maintain itself and earn some dividend for the holding company. This involves the standardization of methods and materials on the several properties operated by the holding company. Following the general policy of the Doherty interests to apply all possible methods for increasing the efficiency of their properties, the method described in the article referred to was developed. The general principle is not new, but as applied to electric street railway and interurban properties, it seems to possess some elements of novelty.

There is virtually no difference between the plan of using specialists to co-ordinate maintenance and operating methods of street railway properties and that which is carried on by any large steam railway system. A steam railroad is made up of a number of divisions maintained and operated by uniform methods except as these are modified to accommodate them to local conditions. Similarly the holding or operating company which controls electric railways in different parts of the country can standardize methods and materials with similar exceptions.

The holding company which absorbs a number of properties naturally falls heir to a variety of physical and operating conditions. With a systematic plan, however, it is in my opinion an easy matter to standardize with the aid of the experience of local managers. The opinions of these managers, without a comprehensive system, would result in great lack of uniformity.

In the Doherty organization the managers are frequently called in for consultation and are kept in close touch with the operating heads at New York, with excellent results for the local properties and the holding company itself. One can imagine that where a street railway is part of a local utility handling power, lighting, water and possibly gas, the manager cannot have time to go into the details of each department as thoroughly as he would like, and in some cases he does not have exceptional experts in charge of the departments. He is then pleased to have his property visited by men accustomed to specific classes of work, for to these he can refer the difficulties which they are especially qualified to rectify. The case is similar to that of the track foreman on a large steam railroad system who is delighted to have the roadmaster spend a few hours with him occasionally so that he can relieve himself of his troubles and get advice from one who really knows.

On a trip which I recently took for the Doherty interests I found many instances where reductions in expenses could be secured, although there were others where increased expenditure seemed advisable in order to reduce future maintenance and operating costs. Some notes of observations on this trip are given below.

TIE SPACING

At one point I found that 70-lb. T-rail had been used in concrete paving with steel I-beams placed 10 ft. center to center. The track was a solid structure of concrete from the top of the paving to the bottom of the foundation, which was 5 or 6 in. below the tie. The equipment used on this track was not very heavy, in fact, not over 1500 lb. per foot of track, so that the stress on rail and ties was not exceptional. The result of this extreme spacing of ties was seen in the unsatisfactory condition of the track at some points, although elsewhere it was holding up well, the tie rods, placed midway between ties, tending to maintain the gage.

On another property wooden ties with 7½-ft. spacing formed virtually the same construction as above. After having observed conditions in several locations with different tie spacing, I am practically ready to recommend that on the Doherty properties the tie spacing be increased to 3½ or 4 ft. between centers on small properties where light cars are used. This will result in a material saving on several properties.

I realize that this recommendation may elicit criticism, but many engineers will agree with me when they consider the small load per square foot and the low stress in the rail itself which are involved under the conditions mentioned.

It surely seems unreasonable that a street railway with a load seldom in excess of 2000 lb. per foot of track should use the same tie spacing as a steam road with a load of, say, 6000 lb. Why, therefore, cannot a street railway during reconstruction increase the tie spacing and save money? On one job in Toledo, one track was laid with ties on 3-ft. centers and the other was laid at the same time with ties on 2-ft. centers of standard construction having a concrete foundation. This track has been in use for four years and I see no evidence of unsatisfactory results with the greater spacing.

THE LIFE OF TIES

As indicating the variety of conditions which the track specialist meets, I would say that on one property I found yellow pine ties being destroyed by dry rot in six or seven years. On another property oak ties were being bought at a lower price than yellow pine would have cost, on still another property oak ties were cheaper than on the one just mentioned, while on another property oak ties were more expensive. It is obvious then that, in standardizing a system as a whole, the purchase of ties should be left to the local managers.

I believe that more attention should be given to the use of creosoted ties even on small properties, for even if these cost 30 or 40 per cent more than good white oak ties, they will last enough longer to offset the extra cost and will also save by reducing track maintenance. A creosoted tie costing $1 or $1.10 will last

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eighteen or twenty years in open track, providing care is taken to keep excess moisture away from it. A good oak tie, costing 60 or 70 cents will, under the same conditions, probably last eight or ten years. My observation leads me to believe that creosoted ties in pavement may last thirty years.

THE MATTER OF BALLAST

A great many properties have cheap ballast right at their own doors and can save money by using it. On one property which I visited, in the coal mining district, piles of shale which, as the accumulation of years, provided a natural source of ballast at little cost to the railway. This forms an excellent ballast, furnishing good drainage. I noted the tendency of small railways not to make the proper use of cinder ballast for track foundation, but to allow the track to be maintained on ordinary soil. Power house cinders, which are usually sold for less than their value or are not used at all, could have been used here to improve very greatly the riding qualities of the track. I strongly believe in the use of good cinders under ties and especially on open track in the outskirts of cities or on interurban systems. Continued use will eventually make a good sub-grade and the finest kind of foundation for stone ballast.

One company visited was crushing its own stone ballast and was furnishing local contractors with crushed stone for concrete work. A small plant for this purpose often brings in a good revenue.

PROPER DEPTH FOR PAVING BRICK

On some properties I found that 60-lb. A. S. C. E. rail was being used with brick pavement in which the bricks were 4 in. deep. The result was not satisfactory, for the paving will necessarily sink somewhat between ties, leaving those on the ties higher than the balance. The track had a crown of about an inch and vitrified clay nose blocks were used against the T-rail. The blocks, however, were too short and the flange or nose of the block was so shaped that vehicular traffic very readily kicked them up. At a number of points these difficulties had been remedied by the use of paving bricks 3 in. deep, which were very satisfactory.

TRACK DRAINAGE

On one property very poor drainage conditions were found, in fact, I believe the worst I ever saw. The roadway was of a very sticky clay composition, so that after every rain the sub-grade became a mere mud puddle. The difficulty had been partly remedied by using ballast made by breaking up vitrified retorts from a smelting plant. These were broken up in small pieces, not as small as they should have been for the best results, as some were as large as 5 or 6 in. across and 2 in. thick; however, when this ballast was applied to the roadbed and well tamped under the ties and filled up to the top of the tie it drained away the moisture in a surprising manner. While the broken retort material was of a spongy character and had a tendency to absorb water, it did allow the rainfall to get away from the track. An objection to the use of such large pieces was that when the ties are to be renewed it will be costly to replace them. I suggested, therefore, that the material be broken up smaller. This ballast was used principally on an interurban system, although some city track was similarly ballasted. The unsightliness of the ballast was, of course, against its use in the city.

The importance of good drainage is illustrated from the experience of the Lake Shore & Michigan Southern Railway, the track of which owes a great deal of its perfect riding qualities to the attention paid to drainage.

SINGLE-TRUCK CARS AND TRACK MAINTENANCE

On a number of properties I attributed the high maintenance charges per track to the use of single-truck cars. Unless such are especially built to overcome teetering, criticism from the public will be incurred even though to the casual observer the track is in fair condition as to surface. The result is that the track forces have to put a great deal of work on the track which would not be necessary with double-truck cars.

In selecting types of single-truck cars managers will have to consider this question carefully. I realize that it costs more to haul a double-truck car on account of the excess weight, but I am of the opinion that the increased wear and tear on the equipment and the increased (esthetic) track maintenance will go a long way toward offsetting the increased haulage charge. I realize that this statement may bring a storm about my ears and I hope that it does. I believe that it is a matter which, in our anxiety to reduce operating costs for transportation, has worked to the detriment of the maintenance department.

STANDARDIZING PURCHASES AND STORE ROOMS

One of the main purposes in the investigation recently made was an attempt to standardize the use of materials and to centralize the purchasing and storing of them at a fairly central location. This would eliminate the stock accounts of the several companies to quite an extent, save in the original purchase prices, and assure prompt delivery. It frequently occurs on small properties that when certain work is to be done the proper material is not available and it may be difficult to secure prompt delivery. Makeshifts are sometimes adopted instead of the proper materials, and the work must soon be done over again. Centralizing a store room should to a great extent prevent this.

In addition, it often happens that small companies must pay premiums on their supplies because they cannot buy in large enough quantities to get reasonable prices. This applies to rail, bars, spikes, bolts, special work, etc. There is no reason why special work cannot be standardized with, say, three or four typical types of construction for different layouts. An example of what can be done is seen in Detroit, Mich., where standardization has saved the railroad company a great deal of money. I expect to recommend to our company a system of standardization for all departments of our property and believe that a material saving must result.

A Co-operative Safety Advertising Campaign

By Working Together, Public Utilities, Manufacturers and a Leading Newspaper of Beaver Falls, Pa., Financed an Effective Publicity Undertaking

THERE was recently concluded in the city of Beaver Falls, Pa., which has a population of slightly more than 12,000 inhabitants, a safety publicity campaign which may prove suggestive to other communities. It was initiated by W. H. Boyce, superintendent Beaver Valley Traction Company, who proposed to the three local newspapers an advertising campaign to be jointly financed by the manufacturers and public service companies of the Beaver Valley.

The suggestion of Mr. Boyce appealed to the *Evening Tribune*, which put a solicitor into the field to explain the proposition to the companies and to collect the

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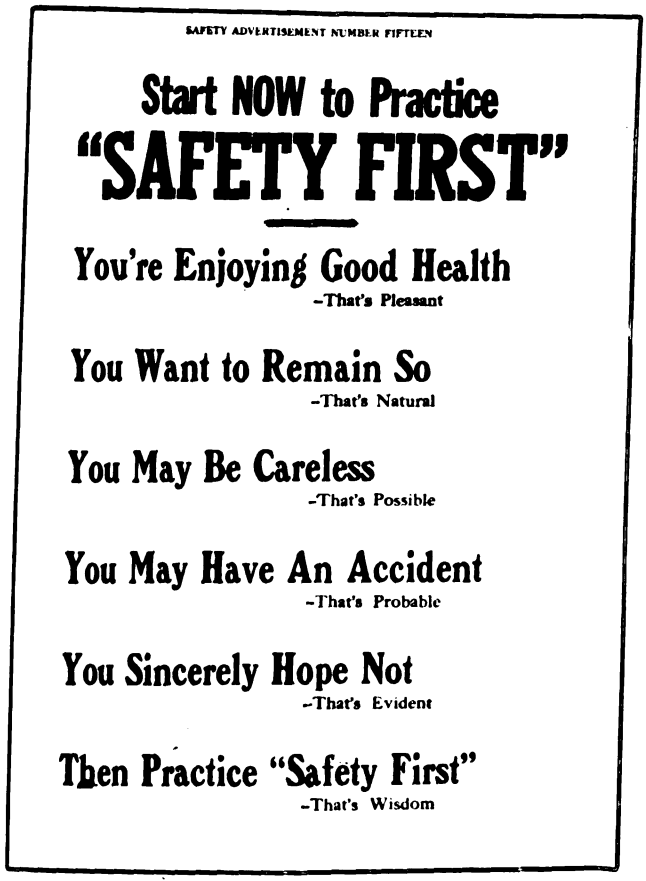
necessary funds. The *Tribune* has a daily circulation of about 5500 copies and it is widely distributed throughout Beaver County and in fact, throughout the western part of Pennsylvania. Sums varying between $25 and $100 were secured, the amount depending upon the number of employees of the subscriber. Sufficient money, about $900, was secured to provide for the publishing of twenty full-page advertisements and these appeared on Saturdays during the past spring and early summer. A sample of the advertisements are reproduced herewith. Some of them contain very much more text than the one illustrated, the type being too small for reproduction on a small scale.

The first advertisement announced the inauguration of the campaign, advocating common-sense care in the



SAMPLE SAFETY NEWSPAPER ADVERTISEMENT IN RECENT BEAVER VALLEY CAMPAIGN INAUGURATED BY LOCAL ELECTRIC RAILWAYS

prevention of accidents and urging the close observance of simple safety rules at all times. It was stated that the one object of the campaign was to be to prevent accidents and deaths due to accidental causes. The manifesto was signed by the Beaver Valley Traction Company; the Pittsburgh, Harmony, Butler & New Castle Railway; the Penn Bridge Company, and more than a dozen other manufacturers.

In addition to running the advertising copy in the *Evening Tribune*, it was reproduced on cardboard each week and 200 copies were distributed pro rata among the subscribers to the campaign. These cards were posted prominently throughout the shops, carhouses, etc., and served effectively to reinforce the newspaper publicity.

The Kansas City (Mo.) Railways Company is putting twenty snow sweepers through the shops. The vestibules of these sweepers are being inclosed and the heaters rearranged so that they will be of more service in keeping the motorman warm.

B. R. T. Employees Complete Organization

THE employees of the Brooklyn (N. Y.) Rapid Transit Company on Sept. 28 completed the organization of their independent union by altering the by-laws of the Employees' Benefit Association, which had been in existence for sixteen years, so as to provide for the election of a group of departmental trustees. These men, in accordance with the plan described in the ELECTRIC RAILWAY JOURNAL of Aug. 12 and Sept. 2, are to be spokesmen for the men of each department and present any grievances they may have to their superiors. The unanimity with which the alteration was accepted by the men was shown by the fact that before the meeting 9812 out of the total 10,200 employees in the association had voted by proxy in favor of the amendment. The 3000 men at the meeting voted as one man in favor of the amendment. In speaking to the men President Williams said in part:

"In taking this last formal step in a program of cooperation, we are merely strengthening the ties of mutual confidence which have long held us together. We are not merely adding safeguards to the protection of our mutual interests. We are not celebrating merely a local achievement. We are making a notable contribution to industrial and corporate history. We are demonstrating to Greater New York and to the world that many thousand men—joint workers in a great enterprise—can, when imbued with a common impulse and animated by an intelligent purpose, settle their own difficulties and look out for their own concerns without any dictation or interference from non-resident or resident busybodies.

"We are demonstrating to society that transportation need not be paralyzed at the whim of any small group of mischief-makers. We are proving conspicuously and conclusively that the forestalling, or adjustment of causes of discontent which always attach to working conditions, require no new laws, no official orders, no public investigations, no outside arbitrations. We are necessarily diminishing the opportunities for making a living to many agitators in politics, in labor circles and among social reformers, but there is still room left for all these in respectable and helpful employments, even if such new occupations be less remunerative and require harder labor. We are giving notice, especially to certain residents of Detroit, Troy and Boston, who have sought to disturb our peace, that in our working organization we have brains enough, and the disposition, to manage our own local affairs according to our own ideals and opportunities."

After referring to his thankfulness that the loyalty of the employees had been proved true in spite of the Amalgamated Association organizers in other parts of New York, President Williams continued:

"You perhaps do not know how much interest has been taken throughout the country in your attitude during the disturbing times of the past three months. There have been many inquiries from individuals and some from public service corporations as to how it happened that with practically all the street railway employees of Greater New York on strike, the men on the Brooklyn cars have remained loyal and have refused to allow the public to be inconvenienced by interruptions to service; and from some inquirers have come requests for copies of your association's new by-laws. While there were other contributing causes, the main reason, and the fundamental one, why our men have remained true is because we trusted them and they trusted us. This mutual confidence is the solid structure which years of close relations have built up. It makes no dif-

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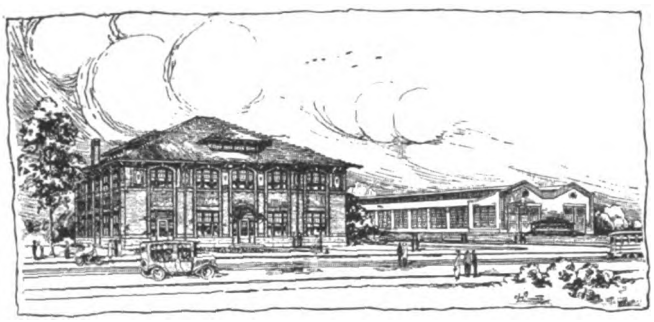
ference what wages are paid, what hours are required, what other conditions or privileges of employment prevail, if there is no reciprocal belief in sincerity of purpose there can be no sound foundation for industrial peace. If you are convinced that your company's management is sincere in its attitude toward you and will share its prosperity with you as it is able, you would not be real men if you did not stand by your company when it needed you. And, on the other hand, if your company believes in your loyalty toward it, it would indeed be a mismanaged company if it did not do the best it could for you. We have both met the test—and our mutual respect and confidence were never greater than they are to-night.

"The action which your association has taken has strengthened our old relations by supplying a better opportunity for exchanging ideas not only as to conditions surrounding employment but as to other interests of the company. I feel sure that we have entered upon a new era in our relations which will greatly promote our ambition for a model public service corporation. We cannot separate or get very far from each other if we all adhere to the principle which has animated us in the past—square dealing among ourselves and the success of the company. There always will be among men differences of opinion, but I have found that nothing scatters differences so quickly among intelligent and honest-minded men as frank discussion of facts. The disposition to be fair has been amply demonstrated in the past—the opportunity for full information on which to base conclusions is now furnished by the representation which each department will have in company councils."

$65,000 Buildings for Detroit United

THE office building and carhouse shown in the accompanying reproduction from the architect's drawing are under construction for the Detroit United Railway at West Jefferson Avenue and Mecca Street. These were mentioned briefly in the news columns of last week's issue of the ELECTRIC RAILWAY JOURNAL. The office building is to be of pressed brick and its dimensions are 64 ft. wide by 70 ft. deep. On the lower floor



NEW CARHOUSE AND OFFICE BUILDING FOR DETROIT UNITED RAILWAY

will be offices for the line superintendent, carhouse foreman and cashier, an assembly room for motormen and conductors, and a rest room for employees. The second floor will be used for a locker room and dormitory for the night crews.

The carhouse, which will take care of Fort, Grand Belt, Springwells and Wyandotte-Trenton cars, will replace the carhouse located at Fort Street and Clark Avenue. It will be of brick, 209 ft. deep by 116 ft. wide and will house twelve cars in the pithouse and eight cars in the washhouse. It will also contain a boiler room, compressor room, employees' wash and locker rooms and a stock room. The total expenditure on the two buildings will be more than $65,000.

Setting Power Service Standards

ALL electric railways that sell power will have to face, sooner or later, the problem of meeting the standards of power service set by a regulative body of some form or other. Circular No. 56, "Standards for Electric Service," recently published by the Bureau of Standards, contains much, therefore, that should be of interest to electric railway men. In this "circular," which is a paper-bound volume of 259 pages, the bureau presents a survey of the general field of State and municipal regulations relative to standards for electric service, and suggests rules and ordinances which may form the bases of future commission regulative codes and town or city ordinances.

The results of the survey are described under seven main headings, namely: The adequacy and safety of electric service; meters and instruments; standardizing laboratories of State public service commissions; rules and regulations for electric service as adopted by State commissions; suggested rules for the regulation of electric service by State commissions; the regulation of electric service by city ordinance; suggested ordinances for the regulation of electric service in towns and cities. Also, various summaries and tabulations are given in the several appendixes.

In an analysis of the various factors which affect the adequacy and efficiency of electric service it is pointed out that these matters are determined very largely by three general sets of conditions. These conditions are specified as: Central station operation; the transmission and distribution system; the energy translating and metering devices. The questions of voltage variations on lighting and power circuits, the interruptions of service, the frequency of alternation on alternating-current circuits, the accuracy of watt-hour and other meters, the efficiency of lamps, motors, and other energy translating devices are given as factors which affect the adequacy of service.

The rules and regulations for electric service as adopted by the various State commissions have been collated under some thirty-five different headings. Some of the factors named in the preceding paragraph form the headings which are of most interest to railway men. According to the tabulation of rules on the subject of voltage regulation, the permissible variations range from 3 per cent above or below to 10 per cent above or below the standard. Five per cent variation either way from normal seems to be the common permissible frequency variation. Permissible meter errors range from 1 per cent to 4 per cent. These percentages of error apply to both light and heavy load conditions.

In the model rules and regulations which the bureau has drawn up to assist in the future guidance of State commissions, the permissible voltage variations for several different classes of service are specified. For lighting service it is specified that the voltage shall be within 5 per cent plus or minus of the standard adopted, and the total variation of voltage from minimum to maximum shall not exceed 6 per cent of the average voltage in cities and other incorporated places having a population in excess of 2500, nor 8 per cent of the average voltage in all other places. For power purposes a voltage variation not exceeding 10 per cent plus or minus is specified. The permissible frequency variations are the same as given above. The maximum permissible meter errors are plus 2 or minus 4 per cent at light load and plus or minus 2 per cent at heavy load.

Copies of this circular may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 45 cents per copy.

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Damages and Accident Prevention at Boston

There Has Been a Marked Increase in the Burdens Imposed on the Company by Legislative Accident Enactment, Judicial Interpretations and Jury Verdicts

IN connection with the investigation of the finances of the Boston (Mass.) Elevated Railway, now being conducted by a special recess commission of the Massachusetts Legislature, an interesting analysis of the trend of damage payments for injuries has been prepared by Russel A. Sears, general attorney for the company. The causes of increased payments for injuries in the face of the company's well-known safety record and continuous efforts to avoid accidents of every kind are discussed in Mr. Sears' statement with great clearness and indicate the difficult problem ahead of the company's legal department. An abstract of Mr. Sears' analysis is printed below.

The solicitation of accident cases had hardly more than started in 1897, when the Boston Elevated Railway leased the West End Street Railway. At that time the law of negligence relating to carriers of passengers was more favorable to the carriers than to travelers on the highway and very frequently more favorable than to the passengers on its cars. Since then many changes have taken place, nearly all of which have operated to the disadvantage of the railway, and it has only been through great effort that the company has been able to hold its outlays for legal expense down to the ratios that it has. In order to show the conditions surrounding the legal department compared with former years, the calendar years 1913 to 1915 inclusive have been compared with 1910 and 1911, omitting 1912 on account of abnormal conditions associated with the strike of that year. Practically the same officials have been in charge of the department for these years and there has been no permanent important change of policy, in general.

The principal burdens which the company has been called upon to bear are:

1. Adverse legislation.
2. Liberal construction of the law by the Supreme Court toward claimants.
3. Liberality of juries.
4. Reluctance of justices of the trial courts to set aside what may be considered excessive verdicts and in taking away cases from the jury for want of evidence of negligence.
5. Increase in the number of claims and suits resulting from the foregoing.

ADVERSE LEGISLATION

The Legislature of 1910 declared that a sign or any other warning prohibiting a passenger from riding on the front platform or warning him that such riding was at his own risk should not constitute a defense. The designation of certain doors in rapid transit cars as "In" and "Out" was declared no defense for the company in 1911, and in 1907 the Legislature increased the amount recoverable in case of death caused by the railway to $10,000 and no longer permitted the maximum to be levied only in case of gross negligence on the part of the company. Up to 1914 there was no presumption in favor of a traveler on the highway that he was in the exercise of due care at the time he sustained the injury. In that year a statute was enacted which throws on the defendant the burden of proving that due care had been exercised.

During the past few years the Supreme Court has greatly liberalized the law toward persons injured by a railway. Before 1911 a traveler on the highway who was struck by the car of a street railway company had little or no chance of recovering damages, but now practically all such cases are questions for the jury and in this item alone the company pays approximately $50,000 more per year than before decisions of the court which have completely changed the course of such cases. Until recently, a person who fell in a street car while it was being started, even though the start were violent, had no case, but now if the plaintiff has a firm hold broken, the case goes to the jury, and even this theory is unnecessary if the plaintiff produces an expert prepared to testify that the car could not start unless through a defect in the equipment or negligent operation.

Collisions between cars and vehicles are now nearly all cases for the jury, whereas three or four years ago they were frequently taken away on account of lack of care on the part of the plaintiff. The Supreme Court has also decided that even two or three persons around a car might constitute a "crowd," in connection with cases of pushing passengers into spaces between platforms and cars.

As important as these decisions were in increasing the legal expenses of the company there has been little or no help through favorable decisions during these years.

LIBERALITY OF JURIES

The juries, particularly in Suffolk County (containing Boston proper) where the great majority of the company's cases are tried, have never been so liberal as in the past two or three years—and they never were stingy. The average of plaintiffs' verdicts from September, 1906, to June, 1911, inclusive, was $1,062.36, and from September, 1911 to June, 1916, inclusive, $1,438.58, an increase of 39.5 per cent. The average of all verdicts plaintiffs, defendant and non-suits, for the court trial years from September, 1906, to June, 1911, inclusive, was $352.45 compared with $575.28 in the later period, an increase of 63.3 per cent. The personnel of the juries is not improving; not only this, but the fact that a higher standard of prices in commodities and wages prevails in the industrial world, has been an element in the cause of the increase in the verdicts. Again, there is reason to believe that the theory of the Workingmen's Compensation act, in so far as it provides compensation whether there has been negligence or not on the part of the company, is to some extent wrongfully applied to passengers and to non-passengers in litigated cases where personal injuries have been sustained.

PRACTICE IN TRIAL COURTS

The justices of the Superior Court, before whom the cases are tried by the juries, have been more reluctant to take plaintiffs' cases away from the jury on account of insufficiency of evidence during the past three years than formerly, as is also the case in setting aside verdicts for the plaintiffs which may fairly be considered excessive. It is believed that the recent agitation concerning the recall and election of judges has played some part in this situation.

INCREASE OF CLAIMS AND SUITS

These legislative acts and court decisions have led to an increase in the number of claims and suits and to corresponding increases in payment for suits; and although in the period taken for comparison there has been a decrease of 9.5 per cent in the number of accident reports received by the company, there has been at the same time a large increase in the number of

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claims and suits and the payments required to adjust them as shown in the following tables:

PASSENGER ACCIDENTS

	Calendar Years 1913-14-15	Calendar Years 1910-11	Per Cent Increase	Per Cent Decrease
Total number reports received	9,697	10,701	...	9.5
Reports per million car miles	212	238	...	10.9
Reports per ten million passengers carried	355	422	...	15.8
Total number claims and suits settled	4,537	3,666	23.7	...
Number settled per million car miles	99	85	22.2	...
Number settled per ten million passengers carried	166	145	14.4	...
Total amount paid in settlement	$398,792	$305,996	30.3	...
Amount paid per million car miles	8,705	6,796	21.9	...
Amount paid per ten million passengers carried	14,618	12,183	20	...

NON-PASSENGER ACCIDENTS

	Calendar Year 1913-14-15 Average	Calendar Year 1910-11 Average	Per Cent Increase	Per Cent Decrease
Total number reports received	5,850	5,942	...	1.6
Total number claims and suits settled	1,906	1,238	53.9	...
Total amount paid	$242,962	$129,948	57	...

RAPID TRANSIT LINES

	1913-14-15 Average	1910-11 Average	Per Cent Increase
Total reports received	3,861	3,174	21.6*
Total claims settled	967	609	58.5
Total amount paid	$59,420	$53,535	11

*Cambridge subway opened March 23, 1912.

In noting the above data, it may be emphasized that the office expenses of the legal department have for the fiscal years 1909, 1910 and 1911, as compared with 1914, 1915 and 1916, shown a decrease of 14 per cent.

Before the passage of the Workingmen's Compensation act and its adoption by the company, the expense to which the company was put by reason of the suits brought, claims made and gratuities paid its employees was about $11,000 a year. Since the adoption of the act the cost to the company has been in 1912, $56,212.60; in 1913, $56,455.24; in 1914, $78,994.60; and 1915 will be about the same as 1914. These figures do not include the company's extra clerical assistance.

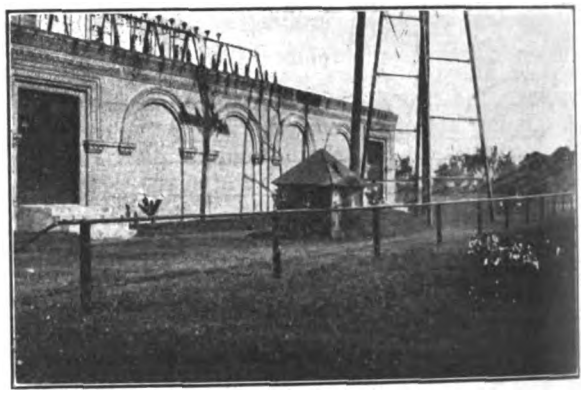
Notwithstanding the burdens placed upon it the Boston Elevated Railway was the first street railway in the country to win the Brady prize. In spite of the distinction conferred upon the company by the award of this medal—the award really meaning to designate that this road stood in the lead of all others in America in safety work, and in spite of the fact that new and improved methods in handling its accident claims, office economies and the adoption of nearly all that is modern and approved in the line of accident prevention, the Boston Elevated has paid nearly as large a percentage of its passenger revenue in recent years as did the West End Street Railway in the last two years of its existence as an operating company. The average for the West End in 1896 and 1897 was 4.05 per cent and for the Boston Elevated in 1915 and 1916 was 3.65 per cent.

With the foregoing conditions surrounding the company—and which are not likely to change to its advantage—with the tremendous increase in traffic in the coming years in a city physically ill-adapted to digest it, with the necessary high standard of safe operation and an ever-exacting traveling public, it appears that the Legal Department has some difficulties to face in the future.

J. H. Wheelwright, president of the Consolidation Coal Company, has offered prizes of $1000, $750 and $300 to boards of trade of cities and towns in territory served by the Monongahela Valley Traction Company, Fairmont, W. Va., for securing during the coming year new industrial establishments.

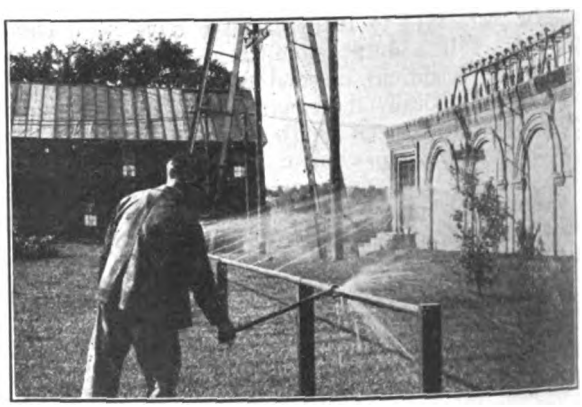
Home-Made Sprinkler for Power Station Lawn

At the Millbury (Mass.) plant of the Worcester Consolidated Street Railway, a convenient lawn sprinkler has been assembled by mounting a number of sections of 1¼-in. pipe on wooden posts about 3 ft. above the ground, connecting the pipe with a pump discharge in the adjacent plant and drilling needle orifices in small brass plugs inserted in the pipe every 30 in. Water is



HOME-MADE LAWN SPRINKLER MADE OF 1¼-IN. PIPE SECTIONS

supplied at a pressure of 80 lb. per square inch, and a 2-ft. pipe-handle at one end of the line, which is about 125 ft. long, enables the nozzles to be rotated through an arc of over 180 deg. As shown in the accompanying photographs of the pipe line, the resulting sprays can



VIEW SHOWING METHOD OF ROTATING SPRINKLER PIPE

be adjusted for maximum, minimum or intermediate range with the utmost ease. The pipe line is supported on 3-in. by 4-in. uprights, and at one end a coupling permits the addition of a standard portable sprinkler line.

New Car Signs for St. Louis

The United Railways of St. Louis, Mo., have installed enameled plates about 5 in. square, bearing numbers, on the front dashboards of their cars. These numbers are for the guidance of road officers and are used to designate the car's place on the time schedule, but do not correspond with those painted on the cars. The cars on each line are numbered consecutively. This new system is expected to make it easier to straighten out traffic tangles after blockades or accidents. Supervisors placed in different parts of the city can identify the cars by the numbers and can tell at a glance the time schedule and routing of any car. In trying out this system a check will be kept on each car.

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Why Toledo Railway Decided on Train Operation

Reasons for Selection of Two-Car Units and of Two Cars Rather Than a Motor Car and a Trailer Are Given

IN an article on the subject of train control appearing in the current issue of the *Electric Journal*, C. A. Brown, master mechanic Toledo Railways & Light Company, Toledo, Ohio, describes the control equipment used on the two-car trains and discusses the considerations leading to the adoption of this type of equipment. After experimenting with rolling stock borrowed from other properties it was decided that two-car units would be desirable particularly in handling crowds from the factories and from the downtown districts in rush hours. The economy in crew expense thus made possible was also a consideration.

In considering the relative merits of a motor car with trailer versus two-motor cars, the following points were brought out:

1. The motor car and trailer form of train unit first considered would give the necessary additional rush-hour seating capacity for the minimum first cost. The additional cost of a two-car multiple-unit train, as compared with the motor car and trailer unit, would be about $850, or $425 per car, for the particular type of equipment considered.

2. This two-car train unit, however, could be efficiently used only during morning and evening rush hours, and on holidays or other special occasions. The combined seating capacity of motor car and trailer would be about 110 people, which would ordinarily be much greater than the traffic requires. Therefore, during a large part of the day the trail car, representing about 37 per cent of the first cost of the train unit, would lie idle in the barn.

3. During the non-rush hour part of the day it would be necessary to keep in service, on certain lines in the city, rolling stock that was comparatively expensive to operate, while half of the new cars, being trailers, could not be used economically.

4. On Sundays and special occasions during the summer the traffic on some of the suburban lines, particularly the Toledo Beach line (13 miles long), becomes so heavy that it is necessary to supplement the regular suburban equipment with some of the regular city cars. As the line is single track it sometimes happens that as many as four or five cars follow one another from siding to siding and, aside from the element of risk, there is a considerable delay at sidings awaiting for the last car to come up. This situation would be considerably improved by even partial multiple operation of trains of three to five cars.

5. Trailer operation involves four-motor equipment of such capacity that the most economical type of motor, the field-control type, could not be used unless the more expensive remote control were purchased. This was because no K controller of a suitable type had as yet been developed. The economy of field control in the Toledo service had been demonstrated by a sample equipment placed in service in 1914. Careful tests showed a saving in power of approximately 17 per cent compared to the non-field-control equipment, with both equipments geared to give about the same free running speed. This large saving might not be obtained on the new cars, but it was estimated that the saving in power due to field control would be at least 7 per cent.

6. The combined weights of the motor car and the trailer would be less than that of the two-car multiple-unit train, but the weight of the single car with two motor's would be less than that of the car equipped with four motors for hauling the trailer. Therefore, if two-car train operation were realized 100 per cent of the time, the motor car and trailer would have the better weight economy, but any mileage made by the four-motor car operating along would require additional power as compared to operating the two-motor car.

A careful study of these different factors led to the conclusion that the relative economy of the motor car and trailer as compared with the two self-propelled units depended altogether upon the percentage of time two-car operations would obtain. It was estimated that out of a working day of sixteen hours there would be about six hours during which two-car trains might be operated economically. With this as a basis, a comparison was made of the power consumption of motor cars and trailers versus motor cars. It was assumed that the new motor cars would be operated all day, and that in one case the trailers would be withdrawn during non-rush hours, and in the other case the two-car multiple-unit train would be broken up into twice as many one-car trains and some of the older equipment could be sent to the barn. It was estimated that under these latter conditions the saving in power alone would just about offset the additional fixed charges for the double-motor train control equipments, and this, together with the savings in maintenance and the operating and other advantages mentioned, were considered important enough to justify the investment.

Railway Accident on Cleveland, Ohio, Bridge

THE accompanying illustration tells part of the story of an accident which occurred at 5.15 p. m., Oct. 3, 1916, on the lower West Third Street Bridge in Cleveland, Ohio. A runaway Scranton Road car jumped the track at the approach to the bridge, crashed into two posts and precipitated the span to the B. & O. Railroad tracks 23 ft. below. A second car entered the span as

BRIDGE SPAN IN CLEVELAND (OHIO) COLLAPSED BY RUNAWAY CAR

it was sinking, and went down with it. The bridge lies at the foot of a long, steep grade, and there is a short but sharp curve at the entrance to the span.

The span that gave way is of the through truss type, 105 ft. long and 32 ft. 6 in. wide, and constructed of wrought iron. It was erected in 1888, and is somewhat corroded; but it is said that the engineers of the railway and the city agree that probably even a new bridge could not have withstood the impact, although a plate girder bridge might have stood up. In the accident two persons were killed and a number were injured.

The Kansas City (Mo.) Railways are installing folding steps and rear doors which fold outwardly on the "900" type of cars, which are the last type to be so equipped. Automatic door signals, for the use of the motorman in signaling the conductor of approach to a stop are also being installed on all the cars.

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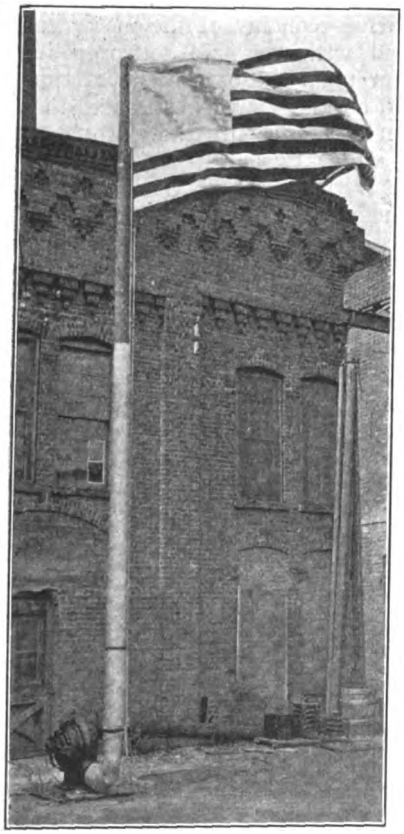
A Self-Waving Flag

THE pneumatic flag-pole and flag shown in the accompanying illustration was designed and constructed under the direction of the illuminating engineering laboratory of the General Electric Company for the Atlantic City convention exhibit. The cut shows the equipment as temporarily erected in a yard at the factory and without a large bronze ball in which the pole will terminate.



SELF-WAVING FLAG EQUIPMENT DESIGNED FOR ATLANTIC CITY CONVENTION

The pole is a metal tube 27 ft. high, and 5 in. in diameter at the top and 9 in. at the bottom. It is set over the exhaust port of a 2-hp. electric motor-driven blower, to be inclosed in a wood box having at one end a section built up as a supporting guide for the mast. The base will be surrounded with foliage to make it appear to set solidly in the ground. The principal section of this hollow flag-pole was originally part of the mast of the steamship Clermont, the skeleton of which was used at the Hudson-Fulton celebration in 1909.

For a distance of 9 ft. from the top of the pole it is perforated with two rows of ½-in. holes drilled 1½ in. apart. When the blower is in operation the blasts emitted through these holes hold the flag and impart to it the waving motion suggested in the illustration.

Standardization of Line Construction in California

THE Railroad Commission of California has issued fifty-eight orders to electric and telephone corporations looking to the safety of human life by the standardization of electric and telephone transmission system construction, and involving the spending of more than $750,000 to this end. The orders took the form of authority for extensions of time within which these public utilities may comply with Chapter 499 of the laws of 1911, as amended by Chapter 600 of the laws of 1915 referring to the placing, erection, use and maintenance of electric poles, wires, cables and appliances.

The Legislature passed this act for the purpose of removing the danger to employees engaged in the construction, reconstruction, maintenance and use of such property, and of the general public. The statute provided that it become effective six months from the date of its passage in so far as it relates to new work, and that five years should be allowed for the rebuilding of existing work to meet the provisions of the law. The Legislature in 1915 amended its previous act, and vested in the Railroad Commission the authority at its discretion to grant additional time to corporations, and instructed it to pass on all work done.

The commission's order names specifically the period within which each utility must do a third and also two-thirds and the entire work, which last must be completed before June 30, 1919. All the companies are to report to the commission from time to time as ordered upon the progress of the changes. The orders dierct the companies to proceed with the work as rapidly as possible, and vary in length of extensions granted according to the conditions under which the utility operates.

Colorado Association Discusses Investments and Regulation

THE fourteenth annual convention of the Colorado Electric Light, Power & Railway Association held at Glenwood Springs, from Sept. 21 to 23, was the largest in the association's history. In his presidential address John J. Cooper of Denver outlined some of the work of the past year. The papers of particular interest to electric railway managers were the following:

The first paper, "Utility Investments," by W. C. Sterne, president of the Municipal Properties Investment Company, Denver, called attention to the fact that the day is past when the public gives little study to its investments. Among the important things which the present-day investor wants to know are: The efficiency of management at the time of investment, dangers of differences with municipalities and of labor and wage difficulties, variations in prices of materials, the extent of rate and service regulations, an accurate forecast of depreciation elements, the effect of management changes, effect of periods of business depression on earnings, character and plane of political activity, financial plan upon which the utility is to be or has been established, and marketability of its securities.

The paper on "Customer Ownership," by William H. Hodge, manager of the publicity department of H. M. Byllesby & Company, Chicago, covered the matter of inducing consumers of a public utility to become financial partners in the enterprise and dealt with the experimental plan initiated to sell utility stock to utility customers in cities and towns served by the Northern States Power Company.

M. H. Aylsworth, chairman of the Colorado commission, speaking on "Utility Regulation," reviewed several recent decisions of the Supreme Court of Colorado which directly affect public utilities. One of these, wherein the court held that no state court can interfere with the public utility commission in its decisions under the act, he declared is of vital importance.

On Saturday F. W. Herbert, statistician of the Colorado commission, opened the proceedings with a paper on "Depreciation Accounts," which excited considerable discussion. The depreciation account of the utility should show in detail the "build-up" of the depreciation reserve so it may be prepared to give a correct analysis of the charges and credits to this reserve. The distinction between repairs and replacements, said Mr. Herbert, or items that should be charged to maintenance or reserves, must be determined for each individual case. He favored charging all repairs and minor replacements to the operating expense accounts and providing in the reserve for replacement of major units only.

A paper, "Tell the Public What You're Doing," by S. J. Ballinger, advertising manager of the Trinidad (Col.) Electric Transmission, Railway & Gas Company, could be epitomized in the sentence, "Tell them everything."

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COMMUNICATIONS

Interurban Future Never Brighter

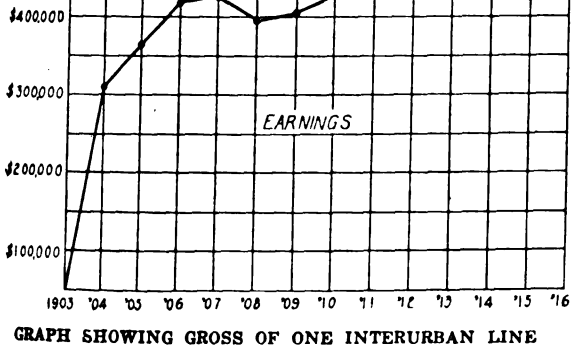
TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

INDIANAPOLIS, IND., Sept. 28, 1916.

To the Editors:

Referring to the recent article by F. W. Doolittle on the "Present and Future Development of Interurban Railways" in your issue of Sept. 2, I believe that one must not take too seriously his rather doleful analysis of "available" statistics. An attempt to read the horoscope of the interurban industry by means of the census reports, which do not comprehensively separate the urban and interurban lines without a first-hand knowledge of the systems themselves, is to do the lines a great injustice.

Any forecast for the average interurban necessarily depends upon the physical and income factors of the property. While the interurban is not subject to the same analysis as the steam road, it is primarily a railroad, and every effort of its management should be towards the intensified development of all the income factors to result in the maximum earning power of the property. This requires aggressive management, and if the road is not an economic blunder and has latent possibilities, its financial standing is assured. Otherwise, a reorganization has occasionally been found necessary to reduce the fixed charges so that its normal earnings



GRAPH SHOWING GROSS OF ONE INTERURBAN LINE

will easily take care of them. If the interurban cannot stand alone, it is certain to find its place as a unit in a larger utility company where the former errors of capitalization, engineering and operation can be corrected to the benefit of all concerned. The future of interurban lines was never brighter than at the present. The mistakes of interurban builders have been fewer in proportion than those of the steam roads.

Mr. Doolittle states: "Thirty years ago many of the shorter steam lines found themselves in the present situation of the electrical lines" *i.e.*, they were unable to get traffic agreements with the larger roads. The error of this analogy is appreciated from a knowledge of what was happening thirty years ago to the steam roads. In the period from 1892 to 1896, about 56,000 miles out of a total of 180,000 miles of main track passed into receivers' hands. This included among the "smaller" lines, the Southern Railway, the Wabash, the Erie, the Union Pacific, the Baltimore & Ohio, the Reading, the Atchison, the Northern Pacific, etc. They had been loaded with debt. With generally unstable conditions in the banks and the loans exceeding deposits by 25 per cent from 1890 to 1893, it would scarcely have been difficult for any intelligent observer to perceive that these roads could not escape a receivership.

Moreover, at Indianapolis, Columbia, Dayton and Louisville, interurban traffic agreements with the steam roads would now be useless without the expenditure of millions of dollars for freight terminals, yards, rebuilding lines, equipment. And would these expenditures be justified? There is considerable doubt.

The interurban lines out of Indianapolis were among the pioneer lines. The few mistakes these lines made in car design, overhead work, substation location, etc., have practically all been corrected. Any doubt as to the future will be quickly dispelled by going over the Chicago, Lake Shore & South Bend Traction Co., the Illinois Traction System, the Fort Dodge, Des Moines & Southern, or the Texas properties, which are among the newer lines. Still better, examine their financial statements.

The future of an interurban road is better understood if it is first considered from a financial standpoint. If one knows what is required as minimum earnings to protect the security holders, an examination of the earnings and a comparison of the earnings with those of other systems will better enable him to judge the possibilities of the road under discussion. For investment purposes, figures are reduced to earnings and costs per mile. Consider a theoretical case, as follows:

The cost of an interurban per mile should be (minimum)	$30,000
Fixed charges at 5 per cent	1,500
The line should earn $5,000 per mile a year	$5,000
Operating expenses and taxes per mile at 60 per cent	3,000
Balance	$2,000
Less fixed charges per mile	1,500
	$500
Less sinking funds on bonds per mile	250
Surplus per mile	$250

Compare this with one of the oldest lines out of Indianapolis, built in 1904. Main line, 62.31 miles; branch, 23.76; total, 86.07 miles. Main terminal, Indianapolis; sub-terminal, Lafayette:

In a typical year the gross income per mile was	$4,700
Operating expenses and taxes per mile (58 per cent)	2,770
Balance	$1,930
Fixed charges per mile	1,430
	$500
Dividends per mile	269
Surplus per mile	$241
Funded debt per mile (no sinking fund)	$28,697
Capital stock	5,228
Total	$33,925

Would you state that this road is in a "doubtful condition"? The accompanying curve showing the gross earnings of this same line indicates how little the automobiles have affected the earnings. This line runs through the richest farming land in the State, and with the excellent roads it is surprising how little the earnings of this road have been reduced. Approximately 88 per cent of its earnings are derived from passenger traffic.

The statement by Mr. Doolittle "that the interurban is not a device for promoting the growth of communities," is erroneous and misleading. There are any number of towns near Indianapolis that have been wholly built up by the interurbans. Ben Davis, six miles west of Indianapolis, had 100 people in 1906. At the present time the population is nearly 1000. The inhabitants travel entirely on the interurban to Indianapolis. The Vandalia does not stop a train and has no station. The majority of residents are people who work in Indianapolis but prefer the advantages of living in the country. The merchants of Indianapolis, Fort Wayne, Lafay-

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ette, Terre Haute and Richmond can testify in no uncertain terms as to the substantial and material effect of the interurbans upon the growth and prosperity of their community. The falling behind of Cincinnati in population compared to other cities of the same size has been ascribed directly to the lack of entrances and a proper interurban terminal for the various lines—a condition they are going to considerable expense to remedy. The movement of approximately 18,000 people a day in and out of Indianapolis, or the stoppage of this movement, as during the flood of 1913, would perhaps better illustrate the relation between the interurban and the communities they serve.

There are at present a number of interurban extensions and projects which only await the return of normal material prices and financial conditions to insure their completion.

The competition of automobile trucks with the traction freight service has not reached a serious phase. The dozen or so trucks operating out of Indianapolis in competition with our low freight rates generally go out of business after about twelve months of unprofitable operation. A. J. BOARDMAN, Superintendent.

More About the Building Association and the Loan Fund

EMPLOYEES' MUTUAL BENEFIT ASSOCIATION OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

MILWAUKEE, WIS., Sept. 30, 1916.

To the Editors:

In response to your suggestion that the readers of the ELECTRIC RAILWAY JOURNAL might be interested in learning more about the two funds which form a prominent feature of the welfare work of this company, and which were mentioned briefly in the abstract of my paper which you published in your issue for Sept. 9, 1916, I take pleasure in submitting the following:

Referring to page 443 of the issue mentioned, it will be noted that we have two entirely separate funds; namely, the fund of the Savings, Building & Loan Association, and the Loan Fund. These are quite distinct, the funds of the association being handled like those of any association of this type, while the Loan Fund is an entirely separate one furnished by the company.

The Savings, Building & Loan Association is a corporation organized under the laws of the State and subject to examination and regulation by the banking commissioners' office of the State. Any employee may purchase stock in the association and pay for it in installments of 50 cents per month per share. Another class of stock can be paid for at the rate of 75 cents per month per share, and there is still a third class which may be paid for at the rate of $1 per month per share. The great majority of employees purchase the stock which is paid for at the rate of 50 cents per month per share. This stock matures in about eleven years. It will be seen that an employee taking $1,000 worth of this stock will pay into the funds $5 per month for a period of eleven years or a total of $660. At the end of the eleven years, when his stock matures, he receives a check for the sum of $1,000, the difference, $340, being the interest which has accumulated on his savings. It will readily be seen that this makes saving very attractive to the average thrifty employee.

The Loan Fund was established nearly five years ago. As stated above, the funds are furnished entirely by the company and are intended to meet emergencies arising from sickness or death, or other trouble which may temporarily embarrass an employee. The amount that may be loaned from the company fund is limited, of course, and application for a loan must be made through the superintendent under whom a man is directly employed. No interest charge is made but the employee is required to pay back into the fund a definite part of his loan per month.

This fund provides a remedy against unexpected financial emergencies which may confront a man and which might force him to seek relief at the hand of a loan shark. BERT HALL, Welfare Secretary.

Name for One-Man Car

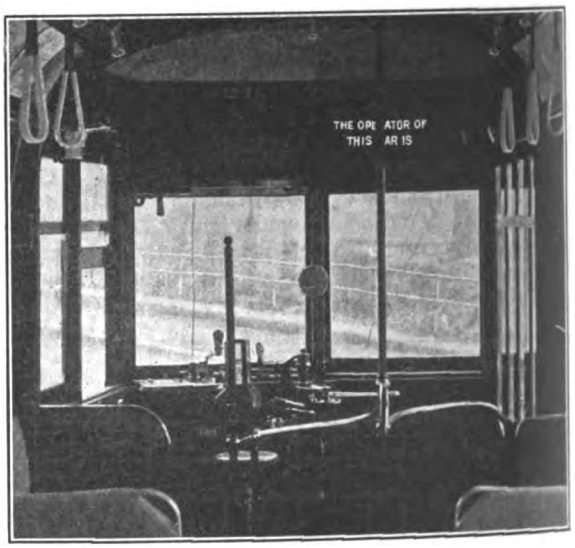
CHARLOTTESVILLE & ALBEMARLE RAILWAY COMPANY

CHARLOTTESVILLE, VA., Sept. 26, 1916.

To the Editors:

I have noticed the discussion in your columns as to a suitable name for the one-man cars and suggest "Single Operated" as being the most appropriate.

We have recently placed the name of the operator in the front of the car, stating that "The operator of this



FRONT OF CAR IN CHARLOTTESVILLE

car is ——," and we find this very satisfactory indeed. The accompanying illustration shows the front of one of our cars with this lettering. We have a small paddle with the operator's name on one side and that of his mate on the other. Then, when the second motorman boards the car he turns the paddle over and exposes his name. The paddle is suspended by two brass hooks.

JOHN L. LIVERS,
Vice-President and General Manager.

Data for Determining Cause of Rail Corrugation

EMPLOYEES' MUTUAL BENEFIT ASSOCIATION OF THE

DALLAS, TEX., Sept. 15, 1916.

To the Editors:

In a communication on page 407 of your issue for Feb. 26 I urged the compilation of a report blank covering, in the form of questions, all suspected causes of rail corrugation. Since writing this letter, I have been collecting opinions and facts from various sources on the subject, and as a result have prepared the accompanying list of questions, to which additions might well be made by others who have found other facts or theories with regard to rail corrugation which had not become known to the present writer. After this series has been made as nearly perfect as possible it could

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be issued to advantage by the A. E. R. E. A. committee on corrugation in printed form to every street or interurban railway in the United States. When these are returned filled, the committee would have some definite basis on which to draw conclusions. The present method of discussing theories on this subject without complete data is simply a waste of time, as is the idea of taking the experience on corrugation of a few isolated properties, no matter how large those properties may be.

In this connection I might say that on a recent trip I visited a large number of members of the association, and in every case of street railway or interurban members I have found more or less trouble from rail corrugation. I have explained to each my idea in regard to this question list, and in every case the company has requested a copy of the questions inclosed, has promised to use them, and, where necessary, to add other questions which might cover any peculiar conditions on the track in question.

I see no other way of getting the necessary information on which to base positive data on this subject. Hitherto the method seems to have been for single individuals to form theories on this subject by pure mathematics, chemistry or mechanics, or else from their own isolated experience, and no such theory has been advanced by any one person which has not been immediately contradicted by another person either from theory or from isolated experience.

H. S. COOPER, Secretary.

"CORRUGATION DATA" SHEET

NOTE: Use separate sheet for each type, kind and weight of rail.

Rail

Dimensioned section of rail affected.
Length of rail.
Metallic constituency (analysis).

Sub-Base

Character, *i. e.*, concrete slab, concrete beam, stone, gravel, dirt?

Roadbed

"Ballasted" (under and between ties), stone, gravel, dirt.
Depth of ballast under ties.
"Rigid," depth of concrete under wooden tie, or, if steel tie is used, depth of concrete under rail.
Does base of rail rest on the concrete for full length or only at ties?

Ties

Wood or steel. If former, give dimensions; if latter, give make and type.
Spacing of ties (track center) on both tangent and curves.

Fastenings to Ties

If wood ties, kind of spike and number to tie. If metal ties, method and number of fastenings.
If tie-rods are used, give spacing of same. If tie braces are used state whether every tie, alternate ties, etc.

Joints

Give make, type and number of bolts, rivets, etc., per joint.
If welded joint, state method of welding.

Gage.

Give exact original gage of corrugated track.
Give present gage of corrugated track.

Curves

Are all curves guarded? If *not*, give maximum radius of curve *not* guarded.
Give gage of curves, both guarded and unguarded.
Give elevation of curves according to radii—or otherwise.

Traffic

Is traffic one way or both on same track?
If both, give proportion tons-per-wheel in each direction.

Cars

Maximum speed and average speed of cars over track affected.
Single or double truck. If both, give proportion of each.
Wheelbase of single trucks. Truck wheelbase of double trucks.

Wheels

Diameter of driven wheels.
Diameter of traveling or pony wheels.
Cast iron or steel. If latter, give make and type.
Give dimensioned section of tread and flange of all new wheels used on corrugated track.
Give exact gage of new or repressed or reground wheels.

Braking

Hand, air or magnetic? Are coasting recorders or watt-meters used?

Paving

Give *kind* and *condition* of paving between and outside of rails.

General Questions

Do you grease or oil any curves, all curves, or only those that are guarded or of a certain minimum radius?

What lubricant do you use on curves and how do you apply it?

NOTE: In answering the following "comparative" questions please bear in mind that the comparison is desired only as between similar rail, sub-base and roadbed.

Have you noticed any difference in corrugation between curves that were lubricated or not lubricated? Which were less corrugated?

Have you noticed any difference in corrugation on the tangent rail running out of the curves lubricated and not lubricated?

Have you occasion for frequent or copious use of sand on the whole or portions of the corrugated track?

Have you noticed any difference in corrugation where sand is not used and where it is used?

Are any portions of your tracks regularly artificially watered?

Have you noticed any difference in corrugation between the portions artificially watered and those subject only to rainfall?

Have you any street intersections in paved streets where unpaved streets come in and where dirt is brought in from these streets onto your track?

Have you noticed any difference as to corrugation at such points as compared to intersections of paved streets?

Is the corrugation worse on tangent or on curved track?

Is the corrugation worse on the inside or outside rail of guarded curves? What is the situation with respect to unguarded curves?

Is the corrugation worse on rail where cars are operated entirely in one direction?

Is the corrugation worse on levels or grades, and, if cars are operated only in one direction, is it worse on ascending or descending grades?

Some Leading Questions

Taking into consideration the conditions contained in above questions, the portion of your rail that is worst corrugated is operated under which of these conditions? Answer this by writing the numbers preceding the questions giving the conditions.

Have you any theory, based on your experience or full knowledge of all track and traffic conditions in one or more localities, as to the actual cause, or causes, of rail corrugation?

Have you any practical suggestion as to its elimination, diminution or prevention?

NOTE: As the above requested theory and suggestion are desired from actual practical experience and knowledge, it is necessary that the questions preceding the last three be answered.

The Car-Development Issue

UNIVERSITY OF ILLINOIS

URBANA, ILL., Oct. 4, 1916.

To the Editors:

Allow me to congratulate you on the Convention Issue of the JOURNAL for Sept. 30, 1916, which has recently been received. Although I have not had time to go through the various articles in detail, it appears to be a masterpiece on the subject of cars and car equipment.

The subject is timely, coming as it does when economies must be introduced wherever possible. I am convinced that car design warrants more study, not perhaps from the builder's standpoint, but from that of the user. Being treated from this side, the entire issue is valuable to the operating company and to the student of electric railway problems.

I am especially glad that you are trying to explode the "local conditions fallacy." The more one travels in different communities, the more evident does it become that the problem of rapid transit is one common to all, and that the solution may be a general one regardless of locality. The resulting changes to meet local conditions have been in most cases trifling in their general effect, while they invariably increase the cost of equipment to what might well be termed a prohibitive figure.

Ten years ago one might have pointed to a number of types of cars that could be well called "standard." Now there is no uniformity in type, even for the same service in the same city. May it not well be that we are passing through a transition period in the design of equipment, and that in a few more years a set of new and improved standard types will be evolved from the present chaotic conditions? A. M. BUCK,

Assistant Professor of Electric Railway Engineering.

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Some Recent Advances in

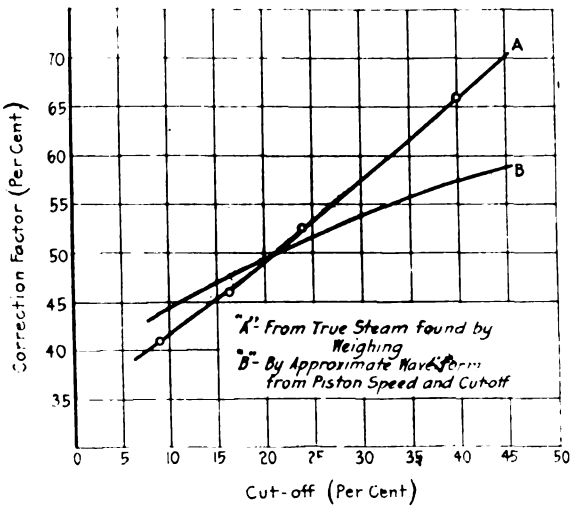
EQUIPMENT AND ITS MAINTENANCE

D. C. Regenerative Locomotive on Canadian Railway—Measuring Reciprocating Engine Steam Flow—Sleet Cutter for Over-running Third Rail—New Shockless Railroad Crossing—Reverse Phase Relay of New Design—Operating Features of Condenser Arrester

The Steam Flow Meter Applied to Reciprocating Steam Engines

BY VICTOR B. PHILLIPS
Engineering Assistant, Cleveland (Ohio) Railway

It is frequently necessary to measure with some accuracy the steam consumption of a reciprocating engine. In plants of any size the maintenance of the pistons and cylinders, in order to hold down the loss from leakage steam, is a large item of expense. A check on this loss is important. Except where surface condensers are used, there has been no direct way of measuring the engine steam consumption, other than the use of some factor applied to the indicated steam. Because of the wide variation of leakage steam, the indicator card is practically of no value in this connection. The writer recently had occasion to measure the steam consumption



CURVES SHOWING RELATION OF STEAM FLOW METER CORRECTION FACTOR TO POINT OF CUT-OFF

of some large reciprocating engines, and to this end investigated the subject in its various phases, including the use of the steam flow meter.

At first thought the use of the steam flow meter for this purpose seems quite impracticable. The meters generally used are designed for steady, uniform flow only. Of these the pitot tube type of meter is the most common. Now the steam headers leading to large engines invariably vibrate in spite of the most rigid fastenings and we have therefore some idea of the extremely turbulent and violent conditions of flow, which exist in these headers. Obviously then, these conditions preclude all possibility of analysis, and whatever constants are involved must be empirical. The pitot tube, perhaps more than any other means of measuring fluid flow, requires proper conditions. Therefore its use in connection with pulsating flow must at best be lacking in close accuracy, while the use of empirical constants may be had only under the strictest adherence to the limiting conditions of these constants.

The steam flow in an engine header may be conceived as a regularly intermittent wave flow. An analogy would be the wave of an oscillatory electric current where the instantaneous value of current corresponds to the rate of flow of steam. Furthermore, a steam flow meter measuring this pulsating flow may be likened to an ammeter for measuring oscillatory or alternating current. In electrical power measurements we are interested primarily in the effective value of an alternating current—in other words, the square root of the average of the squared instantaneous current values and an a.c. ammeter is made to read in terms of effective amperes. In order to accomplish this the needle of an a.c. ammeter is damped so as to stand steady at a point corresponding to the average of the deflections for the instantaneous current values. Suppose now, that the mercury columns of a steam flow meter be so damped as to prevent their oscillation with intermittent flow. The result is an instrument closely analogous to the a.c. ammeter, and it is evident that a meter so damped will show a deflection corresponding to the average of the squares of the instantaneous velocities and that the scale will show a value corresponding to the square root of this deflection. In the case of steady flow for which the meter is originally calibrated, this square root of the average square is the same as the average of the instantaneous values; just as in direct current we make no distinction between average and effective current because they are the same.

On the other hand, in alternating current whatever the wave form, effective current is always larger than average current and the ratio of these two values depends entirely upon the wave form. The case is similar for steam flow, and we may conclude that whatever the form of the pulsation wave existing in the steam header the reading of the meter from the steady flow scale will be larger than the average velocity. As it is the average velocity in which we are interested and not the "effective" velocity, the meter reading will always be too high, and the ratio that it bears to the proper value will depend entirely upon the wave form of the intermittent flow. If it were possible to determine the nature and form of the pulsation wave existing in the steam header, we could readily arrive at the correction factor to be applied to the meter reading. However, the complexity of the wave form and the difficulties incident to such a determination preclude the possibility of all but empirical constants. The writer did try to approximate the wave form from the instantaneous piston speeds, for various cut-offs, but the constants determined from these approximated wave forms varied considerably from the actual constants. The results are shown graphically and indicate some relation between theoretical and actual values but insufficient correspondence to be of practical value.* The results are of value, however, in that they show some correspondence to theory—even the crude theory represented by the curve.

In any event, we may conclude that the general

*The actual constants referred to here were determined by reading the meter and simultaneously weighing the condensate using a surface condenser.

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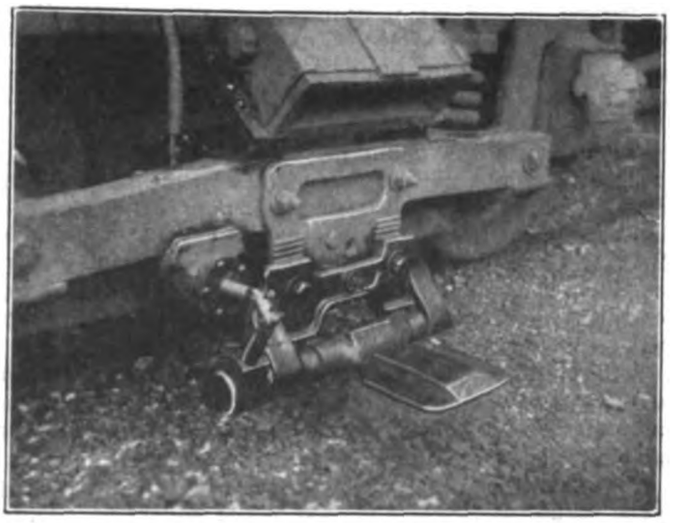
theory outlined above is entirely valid and that the use of empirical constants, having due regard for the type of engine and piping arrangement, is practical. Data obtained by the writer, although necessarily limited, verify this conclusion.

The first step in applying the steam flow meter to pulsating flow is the effective damping out of all pulsating motion in the mercury columns of the meter. This may be accomplished by simply introducing into the columns orifices of sufficient restriction. In the present instance short lengths of glass capillary tubing were fitted into place by bushings of rubber tubing. The result was, in this case, the total elimination of all movement of the columns due to the intermittency of flow; but at the same time an instantaneous response to the smallest changes of load upon the engine. The principle of this method of damping is, of course, readily understood and needs no further treatment. It is certainly very simple and entirely effective. Perhaps for some types of fluid flow meters this device may be impracticable; but in any event its equivalent should be readily devised.

As already indicated the correction constants to be applied to the meter readings on intermittent flow depend upon wave form and therefore upon cut-off and load. The values of these constants or correction factors must be determined empirically. They must, moreover, be limited in their application to a close adherence to the conditions under which they are formulated. However, it should be pointed out that in the case of large engines especially, the number of distinctly different types of engines and of different pipe sizes and relations is exceedingly limited. It is only in application to large units that any system of measuring steam consumption is justifiable. Hence, a comparatively small amount of empirical data should make feasible the direct measurement of steam delivered to any kind of steam engine—certainly a measurement eminently worth while.

Before concluding, the procedure followed by the writer in determining the necessary correction factors for the particular case in hand will be outlined. The meter was connected into the high-pressure pipe leading to a 1200-kw. Robert Wetherill engine, operating on a surface condenser. The engine was then held at a number of different loads and the condensate weighed for definite periods of time. At the same time the steam flow meter was read and the cut-off determined by indicator cards. In this way the relation between correction factor and cut-off was established. The meter was then applied to a 1600-kw. C. G. Cooper engine operating non-condensing. The relation between load and cut-off was determined for this engine. It was then assumed that for the same percentages of cut-off the correction factor was the same for both engines, and in this way the factor for each load was readily available. Later, the steam consumption of an entire non-condensing plant determined in general, by this method, was closely checked by exceedingly exhaustive and careful heat balances in which the prime-mover consumption was found by the method of difference. The discrepancies were less than 2 per cent, thus affording a close check upon the method of direct measurement by meter.

In conclusion, the writer wishes not to propose unreservedly the application of the steam flow meter to pulsating flow, but rather merely to suggest this way of measuring engine steam consumption to the end of further discussion and investigation. The desirability of such a measurement in many cases is evident, and the results here presented, though exceedingly limited, do perhaps merit further consideration.



SLEET-CUTTING SHOE IN POSITION, SHOWING LOCKING PIN, AIR HOSE AND CYLINDER

Combination Sleet Cutter and Current Collector

A Home-Made Pneumatic Device for Cutting Sleet on Covered Over-running Third-Rail

BY J. B. BLAIKLOCK
Master Mechanic Atlantic City & Shore Railroad

The accompanying description and photographs are of a pneumatic sleet cutter designed by the writer for cutting sleet on a covered over-running third-rail system.

On account of the small clearance between the third-rail and cover it was necessary to design a cutting shoe which could be left down. The pressure is applied from the motorman's cab without disturbing the shoe, which had also to be used as a current collector. The ordinary slipper type shoe similar to that used by the Atlantic City & Shore Railroad on its Ocean City division, is hinged on a 1-in. spindle which is rigidly held in the shoe bracket by cotter pins. This is changed in the sleet cutting shoe, and the bracket holes are bushed with brass and the spindle lengthened out to take the crank, which is operated by the air cylinder. The spindle is made to work easily in the brass bushings and is held in position by steel collars bolted to it. The end of the spindle is keyed for a $\frac{3}{8}$-in. key and a 2-in. steel drum is fastened to it. The crank works on this drum and

SLEET-CUTTING SHOE IN A RAISED POSITION, SHOWING TOOTHED STEEL BLADES WELDED ONTO THE SHOE

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is thrown in and out of gear by a small steel pin, fitted with a tee handle. The ordinary shoe springs are left on and when the sleet cutting device is not needed the small pin is lifted up and the shoe is then free to work in the usual way.

The hole in the drum in which the pin engages is bored out, which allows the shoe about 1½-in. lift when the air is not on and the mechanism is in mesh. The cylinder is made from a gray iron casting, bored out to 2 in. in diameter, and is bolted to the underside of the third-rail beam. There is a ⅝-in. flange left on the top of the cylinder which fits up snug to the beam and takes the thrust off of the holding bolts.

The piston is made of steel and is fitted with a 2-in. cup leather. The piston rod is attached to the crank by a small steel link, which makes a flexible connection and also allows a slight adjustment of the shoe.

The cutting shoe is of the ordinary type with hard steel blades electrically welded to the underside. These blades are ground with toothed edges to help the breaking up of the sleet.

The car is fitted with two steel cutters, one on either side, and the air is supplied through 2⅜-in. pipes, which are bolted to the truck. These pipes are connected to the pipes on the underside of the car with rubber hose which allow for the free movement of the truck. A piece of rubber hose connects the end of the pipe on the truck with the air cylinder and insulates it from the ground. The valves in this piping system are located in the cab. There is a one-way and a two-way valve, which allows either shoe to be operated.

With a tank pressure of 100 lb. per square inch, we get approximately 600 lb. per square inch on the shoe, which is sufficient for ordinary sleet storms. The weight of the extra mechanism on each shoe is 24 lb. and the total weight, including pipes, etc., is approximately 55 lb. The whole apparatus, except the air piping on the car body, is removed after the winter season.

D.C. Regenerative Locomotive on the Lake Erie & Northern*

By Separately Exciting Fields of Motors Power Is Returned to Line on Descending Grades at Speeds Above 7 M.P.H.

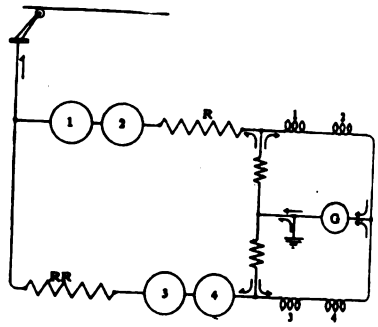
BY C. C. WHITTAKER

After extensive tests there was placed in service on the Lake Erie & Northern Railway in April of this year a 1500-volt, direct-current regenerative locomotive. This locomotive is of the standard Baldwin-Westinghouse swivel-truck type, weighing 60 tons, having 36-in. wheels and equipped with four standard, 125-hp. field-control motors, geared 24:53. It is designed for passenger or fast freight service and is capable of exerting a continuous tractive effort of 6520 lb. at 26.5 m.p.h., and 8520 lb. at 22 m.p.h.

The control for acceleration consists of the usual bridging control, except that the motors are bridged both in going from series to parallel, and from parallel to series when shutting off. Beside being necessary to the regenerative control, this feature is advantageous for acceleration alone, as much of the burning on the transition switches is eliminated.

Both acceleration and regeneration are controlled by a single master controller. This is provided with the usual mechanical interlocks between the main and reverser levers and with other special mechanical interlocks which render false manipulation by the operator impossible. There are sixteen notches for acceleration and eleven for regeneration. The operation of the control during acceleration is entirely manual, while during regeneration it is either manual or automatic, as desired.

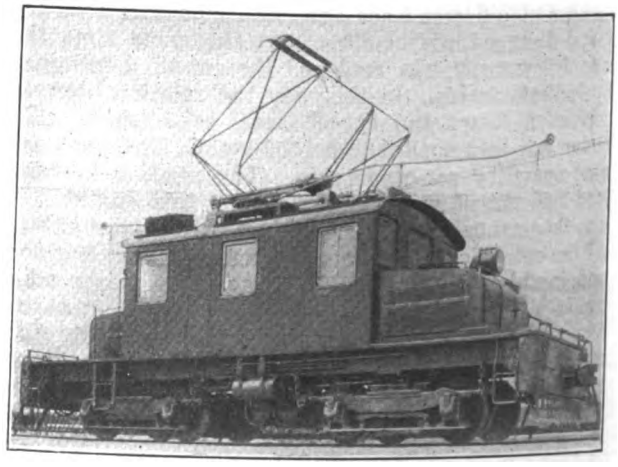
Regeneration is accomplished by using the main motors as generators connected in series-parallel at the higher speeds, and all in series on the lower speeds. The fields are separately excited during regeneration by current from a motor-driven series generator, whose voltage ranges from 70 to 85.



SIMPLIFIED DIAGRAM OF CONNECTIONS OF REGENERATIVE LOCOMOTIVE WITH CONTROLLER ON FIRST NOTCH FOR REGENERATION

The field control feature is used only on acceleration, all regenerative running being done with the full field connection in order to decrease the current required for excitation. A simplified diagram of the connections obtained on the first notch when regenerating is shown herewith. From the location of the ground connection it will be seen that the regenerated current flowing from the substation through the ground connection passes through the same resistor as the exciting current from the generator, and in the same direction. The effect of this condition is to weaken the main motor fields automatically whenever the regenerated current increases. This means of securing motor stability has proved exceptionally effective, the motors never having flashed over either while on test or since installation.

On account of this inherent stability during regeneration, it is not essential that the line voltage be the same as the regenerated voltage when the locomotive motors are first connected to the line. Tests show that motors may be connected to the line without injury when regenerating at double line voltage. A selective relay is arranged to control the line switch connecting the motors to the line and is adjusted to cause this line switch to close whenever the controller is in a regenerative



1500-VOLT, D. C. REGENERATIVE LOCOMOTIVE ON LAKE ERIE & NORTHERN RAILWAY

*For an article describing the general features of the 1500-volt electrification between Galt and Brantford, Ont., see ELECTRIC RAILWAY JOURNAL, issue of May 27, 1916, page 986.

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position and when the voltage generated by the motors is approximately 1500. If the speed of the locomotive is sufficiently high when the controller is turned to the braking position, the selective relay will act on the first notch; if not, the field drum will automatically rotate notch by notch, short-circuiting the resistance in series with the motor fields, thereby strengthening them until the voltage generated is sufficient to cause the selective relay to act. This will bring in the line switch and complete the main circuit to the line. The resistances, *R* and *RR* in the diagram, are in series with the motors when the first switch closes, and the rotation of the field drum is stopped from the time the line switch closes until this series resistance has been cut out.

The field drum and change-over switch are mounted in the cab. The main drum is rotated by means of a standard *PK* operating head. The upper part of the main drum is provided with interlock fingers so connected that it is possible to move the drum from the master controller, notch by notch, in either direction. A second drum manipulates the main and control change-over connections, and is operated by the usual reversing mechanism of the *PK* head. It also is controlled from the master controller.

Connected in series with the main motor armatures is a low-current relay, the function of which is to disconnect the motors from the line when regenerating with the motor fields at maximum excitation as soon as the regenerated current has fallen to approximately 30 amp. per motor. This feature prevents needless overheating of the main fields while the regenerated current is inappreciable.

A fan, supplying air to the main motors and serving as a load to keep down the speed of the motor-generator set when there is no load on the generator, is mounted on an extension of the shaft at the generator end. The motor-generator set weighs 1500 lb., or 50 per cent more than the blower motor which would be required if this set were not used. The motor is provided with a series field connected in series with the field of the generator.

This locomotive is not designed to regenerate at speeds below 7 m.p.h., since to do this would require too much current through the main fields. Moreover, in reducing the speed to 7 m.p.h., approximately 93 per cent of the kinetic energy which was stored in the train when running at 26.5 m.p.h. has been utilized.

The smoothest stop is made when the controller lever is turned to the last notch, resulting in automatic regeneration. Then, as the ammeter indicates that the regenerated current is falling off after the last notch on the field drum has been reached, an air-brake application should be made which will begin to retard the train just before the retardation from the regenerative brake ceases. When the regenerated current drops to 30 amp., the low-current relay will operate, disconnecting the motors from the line, and the remainder of the stop is made by the air brakes.

Among the principal advantages which regenerative control in general offers are:

1. Decrease in net power consumption.
2. Decrease in wear on brakeshoes, wheels and brake rigging.
3. Decrease in brakeshoe dust nuisance with reference to subways.
4. Decrease in heat liberated from brakeshoes with reference to subways.
5. Additional means of braking, thereby affording greater safety.

From the results thus far obtained, when applied where conditions warrant, this system of regenerative braking promises to yield very satisfactory results.

The Condenser Lightning Arrester for Electric Railway Protection

BY Q. A. BRACKETT

Previous to the development of adequate lightning arresters it was not an unusual procedure for a conductor to protect his car from lightning during a storm by stopping the car and pulling down the trolley. Nowadays such an interruption to service would never be tolerated, and at night passengers would never be willing to be left in darkness unnecessarily. It was but natural therefore that other and better methods of protection should be developed as the need grew with the progress of the industry.

Next to disconnecting the apparatus from the line, the most effective protection from incoming lightning surges would be to dead ground the line directly ahead of the apparatus. In the past it has not been considered possible to make use of this method of protection while there was power on the line, as the short-circuit for the lightning was also a short-circuit for the dynamic current.

The development of the condenser arrester, however, has made it possible now to use this very effective method of protection without any of its former disadvantages. This is due to the fact that the lightning current is of very high frequency while the power current is direct. It is only necessary, therefore, to ground the line through some device which will let high frequency current pass freely, yet will oppose the flow of direct current. The condenser possesses these characteristics; to direct current it is an insulator, while to current of lightning frequencies it is an almost perfect conductor.

If, then, a condenser of adequate dielectric strength and capacity is connected directly between line and ground ahead of the apparatus to be protected, it will provide a short circuit for incoming lightning, but will not allow the escape of any power current whatever. Unlike other arresters, it needs no series spark gap to protect it from leakage of power current and subsequent overheating. Likewise, it has no power current to break following lightning discharge and, therefore, needs no series resistance to assist it at the expense of reducing its freedom of discharge. This also means less burning and wear and tear on the arrester, fewer surges on the line, and eliminates all need for current interrupting devices such as circuit breakers, magnetic blowouts, etc. Maintenance expense is reduced practically to zero, since the arrester is not affected by heat or cold and has no parts that deteriorate or need readjustment. This low maintenance expense is especially important in the case of railway arresters either for car or line protection on account of the large number of units involved.

The condenser itself is impregnated with a special wax of much higher dielectric strength and melting point than the paraffine hitherto commonly used in the manufacture of condensers. This condenser, properly insulated, is inclosed in a weatherproof iron box. Between the condenser and the line lead an adjustable series spark gap is provided, while the condenser itself is shunted by a high resistance. When the spark gap is used the resistance serves to keep the condenser discharged down to zero voltage, so that it can provide somewhat greater protection than it could if always charged to line voltage, as would be the case if the spark gap was not used. The latter can be set extremely close to the line voltage since there is no power current to interrupt.

Where the apparatus to be protected is old or known to have weak insulation, so that it could not stand the

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voltage rise necessary to break down even a short series spark gap, the gap should be closed entirely. This will do no harm whatever to the arrester and will enable it to protect weak insulation more readily. This in various cases has made possible the regular operation of cars whose motors without this type of protection would have had to be rewound on account of weakened insulation.

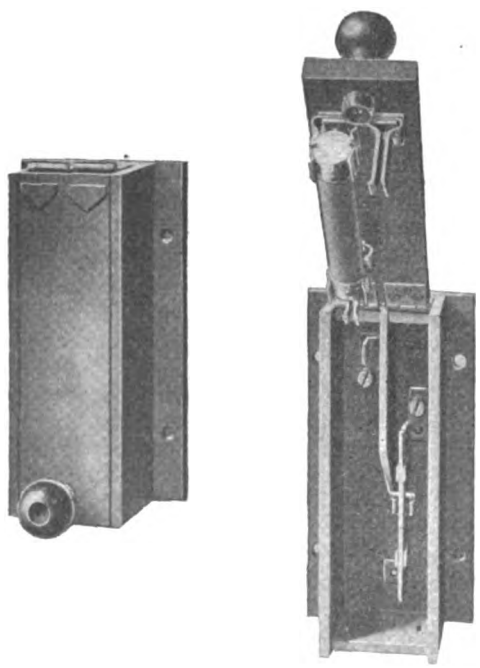
While the condenser arrester is comparatively a newcomer in the electric railway field it is by no means an untried experiment. The first 1500-volt direct-current line in this country was equipped with condenser arresters on all its rolling stock as early as 1911, and the results have been so satisfactory that most of the line is now protected by condensers as well. Many other installations have since been made throughout the country. The present season, however, has brought marked improvements in condenser design that have resulted in both better condensers and smaller sized complete arresters.

Arresters of the present design will pass 500 amp. without allowing the voltage to rise above 800 volts, or 1000 amp. with a voltage not over 1600 at a frequency of 10,000 cycles per second. Almost all lightning surges are of still higher frequencies. At 1,000,000 cycles the above current values would become 5000 and 10,000 amp. respectively. No other form of arrester, with the possible exception of the electrolytic type, comes anywhere near providing such freedom of discharge, and the electrolytic type has a maintenance expense many times greater, which makes it less suitable for car and line protection where many units are involved.

An Inclosed-Fused Switch

The Anderson-Ellcon inclosed-fused switch, shown herewith, has just been placed on the market by the Ellcon Company, New York.

This switch consists of a fuse, clips and a knife blade installed in an insulated box, which is made of a combination of impregnated asbestos lumber, fiber and alberene stone. It is so constructed that when opened the fuse terminals are disconnected from the live metal parts and are exposed in such a way as to render them most accessible for the examination or replacement of fuses.



QUICK-BREAK FUSED SWITCH, SHOWING DETAILS OF CONSTRUCTION

These switches are designed for high voltage direct-current circuits and are made in both single and double-pole units, the single pole being used principally on grounded circuits.

Automatic Tap-Changers for Voltage Regulation

For the purpose of insuring good voltage regulation for the Philadelphia-Paoli electrification of the Pennsylvania Railroad, pending the completion of the Chestnut Hill electrification which will help to balance the load on the three-phase generators, an automatic transformer tap changing device is in use. The principle is shown in the accompanying diagram.

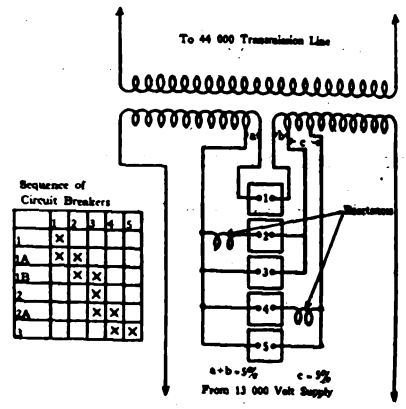


DIAGRAM OF "TAP-CHANGER" APPLIED TO A STEP-UP TRANSFORMER

Steps 1, 2 and 3 are operating positions; other steps are transition positions.

The ratio of transformation and, therefore, the secondary voltage are changed by varying the relative numbers of transformer turns, electro-pneumatically operated oil switches being used for this purpose. The control is automatic, being operated by a compensator, and interlocks are provided to prevent improper operation of the switches.

A Recent Projector

Since its recent purchase of the headlight, searchlight and lamp business from the Esterline Company, Indianapolis, Ind., the Electric Service Supplies Company has perfected a golden glow projector, which has all the inherent qualities of the golden glow headlight.

It is molded from a greenish-yellow glass, ground to a true parabola by special machinery and polished and silvered as would be the finest French plate glass mirrors. The violet, ultra-violet and other high frequency rays are absorbed by the glass reflector thus projecting a powerful beam of golden-yellow light. These projectors have already been found particularly well adapted to flood-lighting sections of track on electric and steam roads where construction work is carried on at night.

They are manufactured in two sizes, the smaller size being equipped with a 9-in. diameter reflector while the larger size employs a 12-in. reflector. Concentrated filament lamps of any wattage up to 150 in G-25 bulbs having a light center distance of 2¼ in. may be used with the 9-in. reflector, while the 12-in. reflector takes concentrated filament lamps up to 250 watts in G-30 bulbs, having a light center distance of 2¾ in. They are equipped with a focusing device accessible from the outside of the shell so that the beam of light, by a simple adjustment of the focal center, may be concentrated in a straight beam or dispersed to cover a large area.

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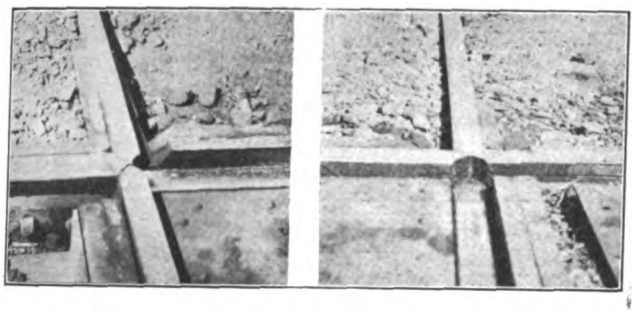
Shockless Crossing Now Equipped for Automatic Operation

Control Circuits Are Similar to Those of an Automatic Block Signal System

About two years ago at Slauson Junction, Los Angeles, Cal., a Cobb shockless crossing was installed at the intersection of the tracks of the Pacific Electric and the Santa Fé Railway. This installation was reported in the ELECTRIC RAILWAY JOURNAL for May 22, 1915, page 994, after it had been in successful operation for about six months. One of the accompanying illustrations shows the present appearance of this crossing after having withstood the severe traffic to which it has been subjected for about two years.

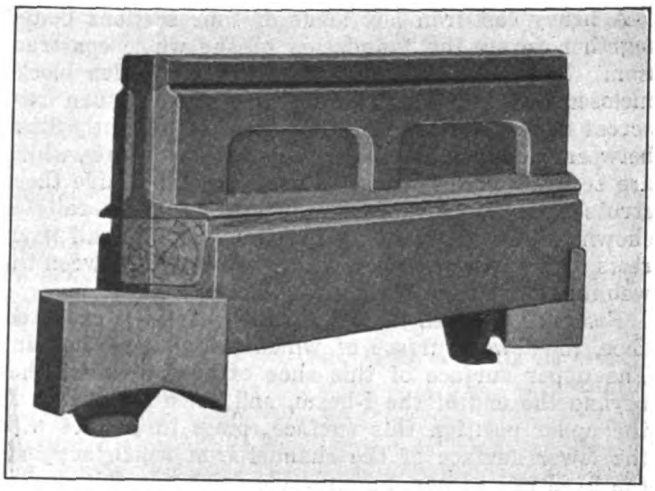
The daily electric traffic at this point consists of 360 high-speed electric cars made up into 240 trains, aggregating 15,000 tons, while the steam traffic of about 5000



TWO VIEWS OF THE SHOCKLESS CROSSING AT SLAUSON JUNCTION, LOS ANGELES, CAL., AFTER BEING IN OPERATION FOR TWO YEARS

tons daily comprises heavily-loaded freight cars and a few passenger trains. There have been no accidents or delays at the intersection, the rails have not required replacement, and they show less wear than that on a manganese crossing installed on a near-by branch line where the traffic is only one-quarter as great. It is said that the trains pass over the shockless crossing with no more noise or jar than is experienced on continuous rails.

In this crossing the necessity for jump gaps is eliminated by depressing, by a suitable mechanism, the rails which are not in use. The through rails remain at grade, and are so abutted that a continuous bearing surface is presented to the car wheels. The raising and lowering of the rails at the crossing at Slauson Junction is controlled from an interlocking tower, which also controls the switches, signals and derailers at this point.

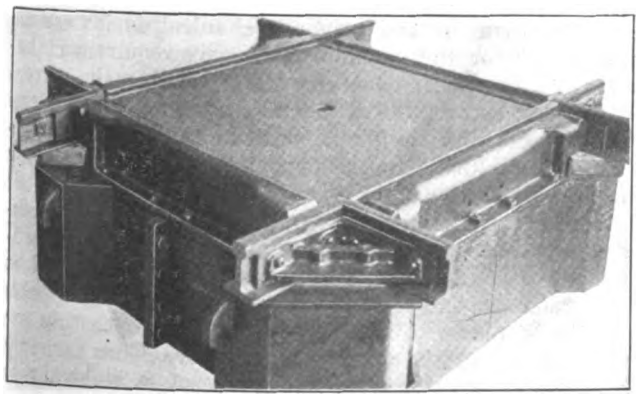


THE MOVABLE ELEMENT OF THE SHOCKLESS CROSSING, SHOWING THE MOUNTING OF THE RAIL

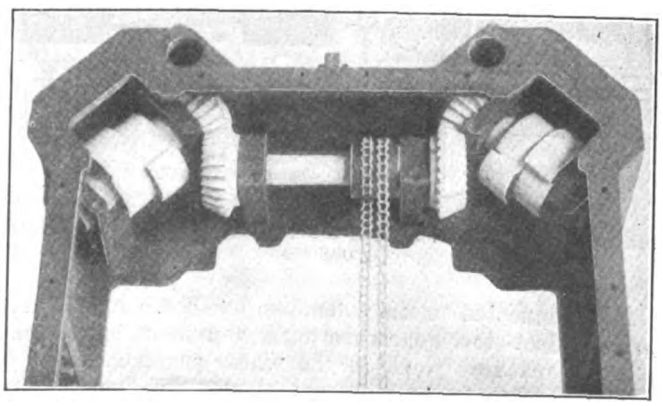
The excellent results obtained by this crossing led to the installation of a shockless crossing at the intersection of Fourth and Main Streets, Los Angeles. At this location, where the shockless crossing has been installed about six months, several special problems had to be solved. Both the Pacific Electric and the Los Angeles Railway operate cars on Main Street, and as the Los Angeles Railway is a narrow-gage line there are six rails on this street instead of four. The crossing is electrically operated and electrically and automatically controlled, the control circuits being similar to those of an automatic block signal system except that they operate the crossing rails instead of signals.

As the traffic on Main Street is much greater than that on Fourth Street, the control is so arranged that the crossing rails are normally set for the Main Street traffic to pass. The Main Street cars, however, have no control over the action of the crossings, the control of which lies entirely with the Fourth Street cars, which on approaching the crossing cause it to be automatically set so that they can pass. As soon as the Fourth Street car has passed out of the block, the mechanism automatically goes back, so that it is set for the Main Street traffic.

Since the crossing at Main and Fourth Streets was installed further developments have been made which include an improved method for moving the rails. The accompanying illustrations show the latest type of crossing in which the rails are raised and lowered by cams, and the diagram shows how two solenoids are used to accomplish the necessary movement of the camshafts.



THE EXTERNAL APPEARANCE OF THE SHOCKLESS CROSSING, SHOWING THE FOUR FIXED RAIL CORNERS RIGIDLY BRACED BY THE CONNECTING STRUTS



HALF OF THE INSIDE OF THE SHOCKLESS CROSSING, SHOWING THE CENTER DRIVING SHAFT AND THE CAMS WHICH RAISE AND LOWER THE RAILS

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A heavy cast-iron box made of four sections bolted together forms the foundation of the whole construction. The fixed rail corners rest upon wooden blocks inclosed in 12-in. iron channels, which in turn rest across the corners of the box foundation. Tightly fitted between the fixed rail corners are cast-iron struts, which are securely bolted to the foundation, and inside these struts are the movable rails. One of these rails is shown in an accompanying illustration. The rail itself rests on a hardwood block which is inclosed between the web and two flanges of a steel I-beam.

Fastened to each end of the I-beam is a cast-steel shoe, the lower surface of which bears upon the cam. The upper surface of this shoe extends a few inches beyond the end of the I-beam, and when the rail is in the upper position this surface comes in contact with the lower surface of the channel iron which supports the fixed rail corner, the movable rail being thus locked between the cam and the fixed rail corner. This also provides additional support for the fixed rail corner and prevents any jamming or rattling. A cast-steel hook is bolted to the side of each shoe. These hooks fit in grooves in the sides of the cams and serve to pull the rail downward should there be any tendency for it to stick due to the accumulation of dirt or grit. On the sides of the rail are cast-iron filler pieces, the object of which is to prevent stones and foreign material from working into the crossing.

The rails move up and down through channels with just sufficient play to allow them to move freely, and with enough force to crush any small stones or ice that may get in between the rails and the adjoining iron work. There is no possibility of individuals or vehicles becoming caught in any of the moving parts, because there is no lateral motion nor is there any projecting moving part above the cover.

Half of the internal mechanism of the crossing is shown herewith. The camshafts are supported on journal boxes, which rest on short columns cast integral with the cast iron box foundation. These shafts are geared to the center shaft, which is supported by heavy pedestal bearings bolted to the foundation. The center shaft is driven by heavy

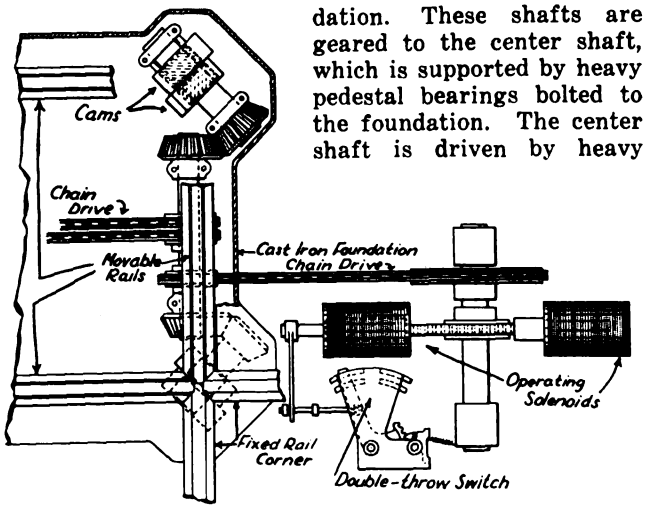
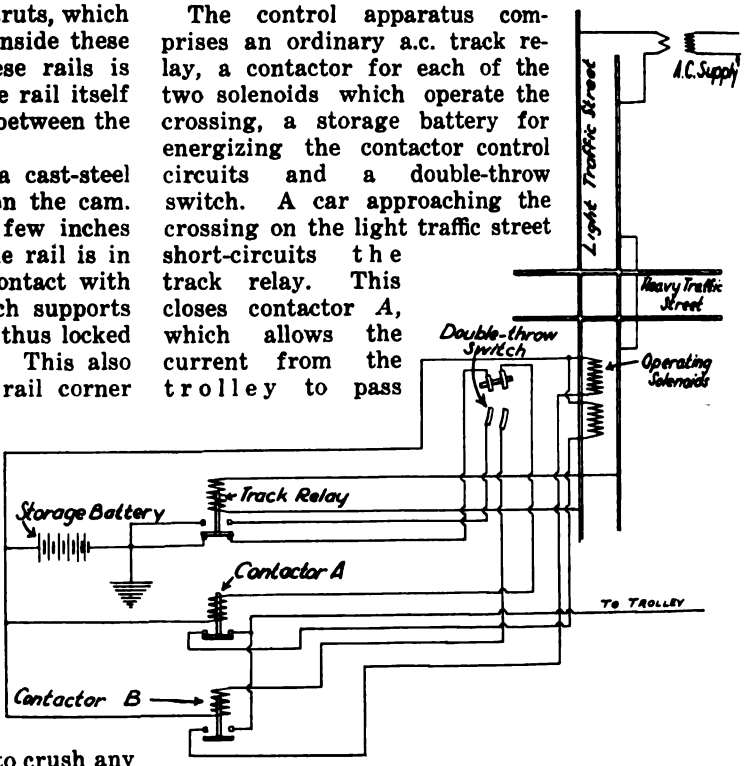


DIAGRAM OF THE OPERATING MECHANISM OF THE SHOCKLESS CROSSING

chains connected to the solenoids, as shown in the diagram. Cast-steel gears are used, and there is no complicated machine work in the whole construction.

The accompanying diagram shows the control circuits, by means of which the automatic operation of the crossing is carried out. On the diagram the street having the greater traffic is indicated as the heavy traffic street, while the intersecting street is called the light traffic street. The crossing is normally set for cars running on the heavy traffic street, and the cars approaching the crossing on the light traffic street cause it to be set automatically so that they can pass.

The control apparatus comprises an ordinary a.c. track relay, a contactor for each of the two solenoids which operate the crossing, a storage battery for energizing the contactor control circuits and a double-throw switch. A car approaching the crossing on the light traffic street short-circuits the track relay. This closes contactor *A*, which allows the current from the trolley to pass



WIRING DIAGRAM OF THE CONTROL CIRCUITS FOR THE AUTOMATIC OPERATION OF THE SHOCKLESS CROSSING

through the solenoid and operate the crossing, setting the rails so that the approaching car can pass. The movement of this solenoid also shifts the double-throw switch so that when the car leaves the block the track relay closes contactor *B*, allowing the current from the trolley to pass through the other solenoid, which resets the rails for the cars on the heavy traffic street. This completes the cycle.

In the crossings that have been installed the operation requires from three seconds to four seconds. The power required to raise and lower the rails under normal operation, of course, is small, but to take care of any emergencies such as the front wheels of a car coming on the crossing before the rails have been completely raised, the operating mechanism is made strong and powerful enough to raise the rails when a car is on them.

While the crossing just described is operated by solenoids it is obvious that an electric motor, a compressed air mechanism or any other mechanical device can be substituted for the solenoids, the only requirement being that the main driving shaft shall make three-quarters of a revolution in one direction to bring one pair of rails into the grade position, and then a three-quarters revolution in the opposite direction to reverse the operation.

The driving apparatus is preferably placed in a compartment outside the box containing the crossing mechanism, so that it can be more readily inspected, and so that traffic on only one track will be blocked if repairs have to be made. Provision is made for operating the crossing by hand in cases of emergency. Thus far, only crossings in which the tracks intersect at right angles have been equipped, but preliminary designs have been made, to adapt the shockless crossing to tracks intersecting at different angles and on curves.

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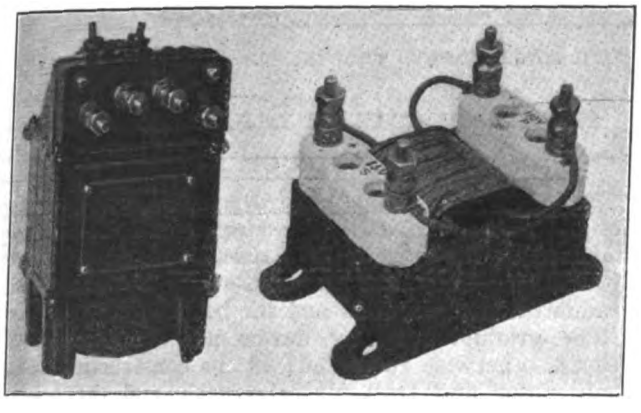
Semi-Inclosed Transformers

A complete line of semi-inclosed track transformers used for feeding track circuits in connection with railway signaling and varying in capacities from 5 to 250 volt-ampere 25 cycles and from 5 to 500 volt-ampere, 60 cycles has been placed on the market by the Union Switch & Signal Company. These transformers, as shown, are of the shell type and are arranged for mounting on either a shelf or wall. Those of the lesser



SHELL-TYPE TRANSFORMER FOR RAILWAY SIGNALING

capacities are equipped with standard Railway Signal Association porcelain terminal blocks which bear 14-24 binding posts. Those of the greater capacities are equipped with single terminal boards of treated maple, slate or porcelain, also bearing the standard 14-24 Signal Association binding posts. These transformers are arranged with the requisite number of primary and secondary taps to take care of track circuits of varying lengths and leakage resistances, as well as for signal lighting.

Railways Use Calculating Machines to Increase Office Efficiency

The amount of both routine and complicated calculations made in railway engineering and accounting offices is constantly increasing owing to the careful records which are kept of the operations of the workmen, the performance of apparatus and the expenditures of the company. In order that the economies effected by accurate records may not be wiped out by the increased cost of clerical work, it is advisable to do as much calculating as possible by mechanical means.

The Monroe computing machine is being used by a score of the leading railways of the country, and is adapted to this service. It has a standard adding-machine keyboard for setting up the numbers involved in the computation, a crank for performing the operations, and a carriage holding the dials which show the results and the proof of the operations as they are completed. The operations of the machine are accomplished by a forward turn of the crank for addition and multiplication and a backward turn for subtraction and division. No special training is required to operate the machine.

The Tri-City Railway, Davenport, Iowa, has installed watt-hour meters in eight of their cars for the purpose of checking up the operations of the motormen. In the office of the transportation department the mechanical calculating machine is used in adding up the total miles run by each motorman and the corresponding total kilowatt-hours of energy used. From these quantities the kilowatt-hours per car-mile are computed.

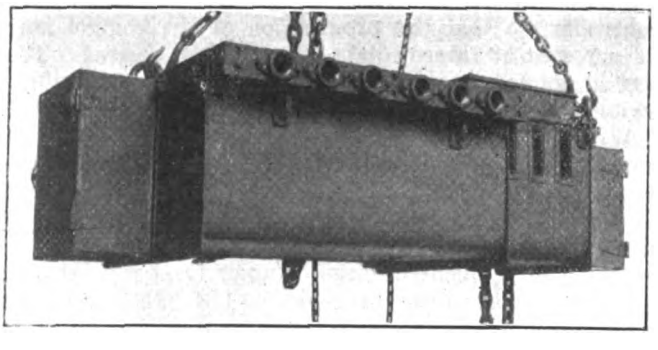
The accompanying table shows how these computations are tabulated. Assuming that the motormen are subject to the same operating conditions, the quantities in the last column indicate the relative efficiencies of the men.

Motormen	Total Miles	Total Kilowatt Hours	Kilowatt Hours Per Car-Mile
1—B. Geertz	928	2,105	2.268
2—Hoffman	531	1,280	2.410
3—Guenther	1,036	2,520	2.432
4—Schroeder	228	585	2.565

A New Low-Floor Car Control

The increased use of low-floor cars as a means of reducing the unloading and loading time element has necessitated the development of several kinds of apparatus, among the more important of which is the control. A controller box which, together with a master controller, control switch, grid resistor, main fuse and the necessary interconnecting cables, constitute a complete equipment for this type of car, and which is known as the HLD control, has recently been placed on the market by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

The controller box, shown in the accompanying illustrations, is divided into compartments, one containing three switches or circuit breakers, one containing the reverser and commutating switch and two small end compartments housing the motor cutout switches, relays and control terminals. While the maximum depth



CONTROLLER BOX INCLOSED AND READY FOR MOUNTING

is over 17 in., this occurs only above the switch compartment, the top of which is only 14 in. square and extends between the sills, so that the effective depth beneath the car sills is only 14½ in.

The principal changes in main motor circuit connections, as well as the application and shutting off of power and the overload tripping features, are accomplished by three independent electric-pneumatic switches. These switches are of the HL type, which are provided with magnetic blowout. The minor changes in motor circuit connections, as required to accelerate the car, are accomplished by means of a drum type PK switch. The direction of motion of the car is controlled by a pneumatically operated reverser.

The operation of the car or train is governed by a master controller which controls the operation of the magnet valves and thus directs the movement of the switches, drum, and reverser, and regulates the operation of the motors. One master controller is located in each cab. Compressed air for operating the switches, drum, and reverser is obtained from the air-brake system through a reducing valve. The power for operating the magnet valve is taken from the line voltage through a suitable resistor. The circuits from the master controller are carried to a multi-conductor train

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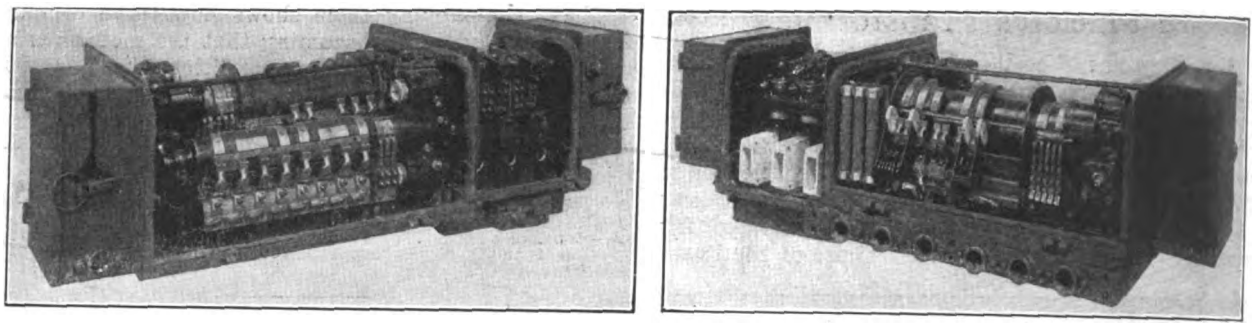


FRONT AND REAR VIEWS OF CONTROLLER BOX WITH COVER REMOVED SHOWING DETAILS

line from which branch circuits are run to each piece of apparatus. This train line extends the entire length of the car and terminates in receptacles at each end. The train line of any car may be connected to that of any other car at either end by means of a jumper placed in the adjoining receptacles, thus making the train line continuous throughout all cars. Operation of the master controller on any car will then operate the respective pieces of apparatus on all cars simultaneously.

The control circuits for the unit switches, operating drum and reverser are so interlocked that the sequence of operation is predetermined and the action of one part can take place only when the other parts are in their correct relation. By means of a series limit switch, the acceleration of the car may be made automatic, thus preventing excessive overloading of the motors. However, each notch in series is registered on the master controller, so that the progression of the control may be arrested at intermediate speeds when desired. The second notch is secured at will, independent of the limit switch.

Where the service requires, a compound limit switch may be supplied whereby a momentary increase above normal current may be secured by closing a push button. The master controller handle may be provided with an emergency cutout attachment, which operates contacts in the control circuit supply, and may also be arranged to apply to the brakes. The handle must be held down continuously while operating in order to maintain power on the motors.

All arcing is confined to the pneumatically operated unit switches which are designed to effectively care for this duty, leaving less attention necessary to be paid to the drum contacts as compared to that required for a standard platform controller.

This control, while primarily designed for light-weight, low-floor cars, is capable of handling two or four motors having an aggregate capacity of not over 200 hp. at 600 volts. Among the more important advantages of this low-floor car control are the following: compactness, reliability, ease of installation, light weight, low maintenance, safety, and simplicity.

Scrap Axles Used for Forgings

The Kansas City Railway up to the time of the prevailing scarcity of forged steel, made it a practice to purchase old steam railroad axles for use in the manufacture of forgings. These axles were bought at an average price of $20 per ton, whereas billets at that time cost from $27 to $28 per ton, f.o.b., Pittsburgh, Pa. These old axles contained a high carbon steel, which, if purchased by formula, would have cost the company approximately $35 a ton. The carbon content of these axles is 0.30, which makes them a very satisfactory material for the manufacture of high-grade forgings.

Improvements in Standard Truck Construction

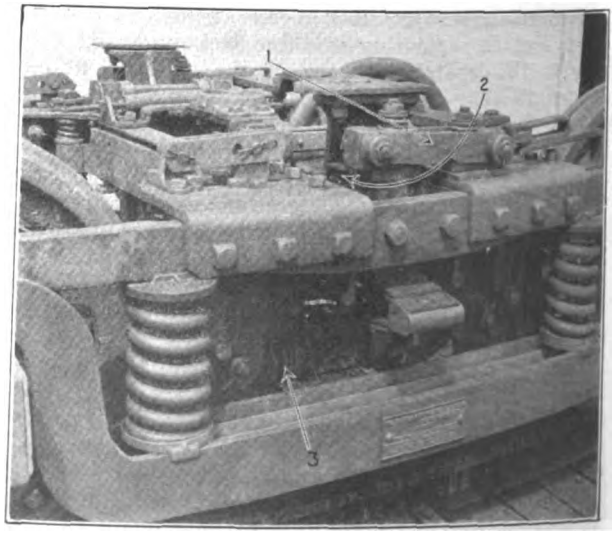
Three very important improvements in Brill truck design recently have been perfected and installed as standard on the various Brill trucks to which they are applicable. They are the side-swing dampener, the graduated spring system and the bolster guide.

The graduated spring device now is incorporated (unless otherwise requested) in the construction of all Brill motor and trail pivotal trucks, and the bolster guide is a standard part of all motor pivotal trucks. Preference is given to the block and link type of guide shown in the accompanying illustration, but in some cases there is not sufficient space to install this type, and in those cases a ball and link type is employed.

In detailing the construction and action of these new devices (which form a very important part of the Brill exhibit at the American Electric Railway Association convention at Atlantic City), a specific type of truck, the 27-M.C.B., is taken.

When the car is running free, without any effect from the brakes or acceleration of the motors, both the elliptic and the equalizing springs are free to act to cushion the car. However, in a truck of this type, not equipped with the bolster guide, when the brakes are applied the springs cease to act to a greater or less extent. This is due to the fact that when the shoes are forced against the wheels they cause the axles to spread apart and consequently press the journal boxes against the sides of the pedestal. This pressure in most cases is great enough practically to stop the action of the equalizing springs.

In order to overcome any undesirable vibration, which might extend up into the car and set up injurious



27-M.C.B TRUCK SHOWING (1) BOLSTER GUIDE; (2) SPIRAL SPRINGS FOR SPRING SYSTEM, AND (3) SIDE-SWING DAMPENER

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jars and shivers through the frame of the car with the result of decreasing the length of its life, the bolster guide was designed. This device entirely replaces bolster and transom chafing plates. Its purpose is to link the bolster to the transom in such a manner that the spring action will give the bolster a vertical movement, and also that the bolster may move transversely of the truck for easement on curves. The links, however, hold the bolster in such a position that it cannot approach or move away from the truck transoms, and, therefore, since the bolster and transom or truck frame never are in frictional contact, the former practically floats on the springs and well may be termed a floating bolster.

Due to the bolster guide link being pivoted on both the bolster and the transom, the vibration in the truck frame is lost in the link, which moves up and down quickly at the end attached to the transom and merely revolves slightly on its bolster pivot, giving the car the full benefit of the action of its springs under braking and acceleration, when the spring action really is needed more than at any other time to produce smooth riding.

In trucks of the M. C. B. type which do not include as a part of their construction the graduated spring system, the elliptic springs have to be made sufficiently strong to carry the car's maximum load, in some cases more than 150 passengers. It is easy to see that a spring heavy enough to carry a load of this size would not produce the best results when only a few passengers are occupying the car. The capacity load is the exception rather than the rule, a lightly loaded car being more common, and therefore it seemed but natural to endeavor to devise some means of providing easy spring action and smooth riding under the more frequently occurring light load. This system consists of a spiral spring mounted between the top of the elliptic spring and the truck bolster. The capacity of this spiral spring is less than that of the elliptic; in fact, it is of such strength that after the seated load is in the car the bottom part of the pocket on the truck bolster contacts with the spring seat, and from that point on any additional load is borne by the elliptic spring only. Thus the spiral spring remains out of action until the passenger load again is less than the seated load, at which point it again becomes active. Thus easy-riding qualities of the truck under light passenger loads are assured.

The above descriptions show how the vertical motion of the car is taken care of by the graduated spring system and the bolster guide. However, even with the vertical motion of the car corrected so absolutely by the combination of these two devices, there remained another disadvantageous feature to be cared for. This was the side swing set up in the car in taking curves or in passing over bad irregularities in the track, which swing in many cases had a propensity for becoming very intense. This swing, before the perfection of the side-swing dampener, was possible because the upper end of the links, by means of which the elliptic springs connect the truck bolster and the transoms, are hung so that the whole link will swing sidewise under the necessary force. To check this lashing back and forth, a fairly heavy spiral spring is placed in compression at the end of the bolt supporting the casting upon which the bottom of the elliptic spring rests. The compression of this spiral spring forces the hanger link against the casting upon which the elliptic rests and sets up a friction, the amount of which can be regulated by more or less tension to suit the condition of the roadbed so as properly to handle the side swing. Thus, with this dampener installed on the truck the side swing is taken care of simply, but efficiently.

A Recent Design of Reverse-Phase Relay

The General Electric Company, Schenectady, N. Y., has just placed on the market a new reverse-phase relay which is shown in the accompanying illustration.

This relay was designed for the protection of apparatus against accidental phase reversal caused by the interchanging of wires when repairing cables or installing additional switching apparatus. It is specially applicable for two conditions: first, where the motor operates normally in one direction only, and, second, where the motor, under normal conditions, operates in either a forward or a reverse direction by changing the phase rotation with a controller. In the first case the relay is installed as near the motor as possible, so that when current is thrown on the motor under unintentional reversed-phase conditions, the relay operates, opens the motor switch and automatically cuts out the motor from the circuit. In the second case the relay is connected outside of the controlling apparatus of the motor, and affords protection for reversals of phase between the controlling apparatus and the source of power supply.

REVERSE-PHASE RELAY WITH COVER REMOVED SHOWING OPERATING MECHANISM

This relay operates on the same principle as a squirrel cage induction motor. The operating coils correspond to the stator, and a hollow aluminum cylinder, connected to the contacts, corresponds to the rotor. The cylinder or plunger does not rotate, but moves in a straight line, either up or down, depending upon the phase rotation. When one of the phases of the line is reversed, the plunger moves and operates the circuit-opening or circuit-closing contacts. Both sets of contacts are equipped with toggles so arranged that there is no tendency for the contacts to open or close until the toggle has buckled, the contacts then being quickly thrown to the desired position. The type of contacts required for any installation will depend on the method of tripping out the motor switch. When contactors alone are used, circuit-opening contacts are recommended. The circuit-opening contacts are reset by hand. Circuit-closing relays are used in connection with a shunt trip on air or oil circuit breakers.

These relays are designed for two-phase or three-phase service with either current or potential windings, depending upon the amount of current and the voltage of the current. Current windings, which will cause the relays to operate on phase reversal at 70 per cent of normal current, are supplied for the following conditions: for circuits up to and including 100 amp. and 550 volts, connected in series with the line; for circuits

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above 100 amp. up to and including 550 volts, connected in the secondaries of current transformers, and for circuits of 600 volts and above at all currents, connected in the secondaries of current transformers. Potential windings are supplied for circuits up to and including 550 volts, connected directly across the line and for circuits above 550 volts connected to the secondaries of potential transformers. These coils are furnished with external resistances of the proper value for the different voltages.

Control Equipment of New Toledo Cars

Safety, Economy and Adaptability Were Considerations in the Selection of this Equipment

Elsewhere in this issue appears an abstract of an article by C. A. Brown giving the reasons for the selection of train control for the Toledo Railways & Light Company, Toledo, Ohio. The new cars are equipped with Westinghouse light-weight HLF control and are arranged for single-end operation. They can be operated as single cars, or several cars can be operated in train. The cars are equipped with bus lines so that all trolley poles need not be raised.

Interconnected with the control system is a door interlock automatically preventing starting until all doors

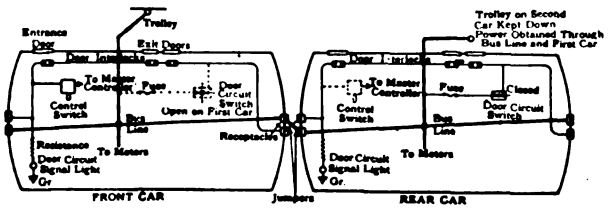


DIAGRAM OF CONNECTIONS OF DOOR INTERLOCK CIRCUIT

are closed. There is also a rear light signal indicating whether the car is standing still, starting or moving.

The connections of the door interlock circuit are shown schematically in one of the accompanying diagrams. The door circuit switch is closed only on the rear car, so that the current for the contact passes through all the door interlocks of the train in series to the master controller on the first car and thence to the control circuits. This arrangement allows the controller to be placed on the first notch as soon as the car stops, so that the car will start immediately when all the doors are closed. A signal light is also provided near the controller which, by lighting up, tells the motorman when all the doors are closed.

A slip ring is provided on the master controller which causes several of the important circuit-making

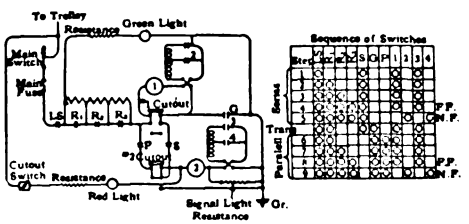


DIAGRAM OF MAIN CIRCUIT AND REAR-END SIGNAL LIGHT

At standstill the red lamp burns brightly and the green lamp is out. On the first notch the green lamp lights up and stays lit as long as power is on. As the main resistance is cut out the red light becomes dimmer; at the full series position it gets half voltage; at full parallel it is shunted out by the main circuit.

switches to open simultaneously whenever the controller handle is moved one notch toward the off position. This distributes among several switches any burning that may occur when the controller is notched off, thus insuring a maximum life of switch contacts and arc box sides.

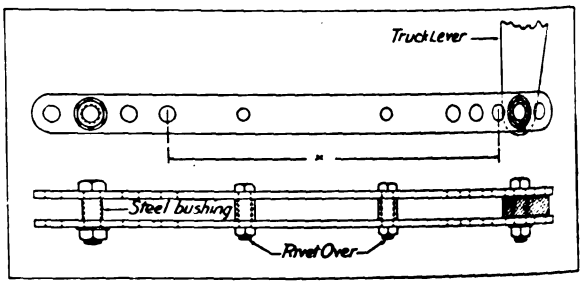
The connections of the rear signal light system with the main circuits are shown in the second diagram. When the car is standing still the circuit is completed through a red light by the resistance which shunts the No. 2 motor fields. This resistance is high in comparison with the resistance of the motor field and, therefore, does not interfere with the normal operation of the motors. During series running a green light burns also on account of closing the LS switch. During parallel running the potential across the red light, is reduced to zero, which extinguishes the red light, but the green light, being directly across the line, still burns.

The brake equipment is of the Westinghouse straight air type with an automatic emergency feature. It is possible for the conductor to set the brakes in emergency, if conditions require, through a conductor's valve. The motor-driven air compressor is of the "bungalow" type.

Brake Lever Strut for Slack Adjusters

The Smith-Ward Brake Company, New York City, have recently developed several types of automatic shim slack adjusters to meet the requirements of the different types of trucks in service, such as Brill 27-G, Standard 0-50 and Taylor S-B.

It was desired to make a form of strut that could be used under practically all conditions, one that was light but strong, and while easily adjustable, was as free from wear, tear and rattle as could be made. The brake lever strut, shown in the accompanying drawing, has been brought out to meet these conditions. It has only two bushings, these being inside the brake lever



BRAKE LEVER STRUT FOR USE ON STANDARD TRUCKS

bushings and in the strut. The wear is transferred from the pin to the bushing, hence the bolt replacing the pin is free from wear. If desired, it can be adjusted in ½-in. steps to allow for shoe and wheel wear and can be used instead of a turnbuckle if one cannot afford slack adjusters. It can be made lighter than the present struts, being riveted together and made on the principle of a built-up girder and not simply held together by the two spreaders. According to the claims of the maker, this brake lever strut is cheaper to buy in the first place and then cheaper to maintain than others.

The Ottumwa Railway & Light Company, Ottumwa, Iowa, is testing out a Collins non-splashing type electric track switch at the intersection of the Jefferson and Court Streets car lines in Ottumwa. The switch is connected so that the Court Street car motorman turns the switch his way by shutting off power and coasts through, while the Jefferson Street car motorman goes through with power on. If the tests are successful it is anticipated that others of the same type will be installed on the company's lines.

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LONDON LETTER

Proposal Made to Curtail Glasgow Night Service—Plan to Remove Embargo on Electric Vehicles—Electric Train Service on the North London Railway

(From Our Regular Correspondent)

A proposal has been made by the Glasgow Corporation Tramways committee to curtail the car service at night by an hour. The reason given is the scarcity of labor and the consequent strain on the department, which will be accentuated if the attested men still in the service are called to the army. At present nearly 600 of the traffic staff are working seven days a week. It has also been agreed to recommend that, for the duration of the war, the working hours be fixed as follows: Drivers and conductors, fifty-four hours a week; controllermen and truckmen, fifty-four hours; sawyers and wood cutters, fifty-four hours; permanent-way laborers, fifty-six hours; mains and cables (laborers), fifty-six hours; red-leaders, fifty-six hours, and car works (laborers and handymen), fifty-four hours. It has also been agreed to recommend that these employees be paid time and a half for the extra hours worked between the present weekly total of fifty-one hours and the proposed working week. Another recommendation which has been adopted is that during the war male employees in the classes referred to receive a bonus of 2s. a week and female employees a bonus of 1s. a week.

Correspondence has taken place between the Board of Trade and the electric vehicle committee of the Incorporated Municipal Electrical Association with regard to import restrictions. The secretary of the committee wrote to the Board of Trade on July 7 pointing out the increasing adoption of the electric storage battery vehicle for commercial purposes, and asking that the import restrictions upon commercial vehicles be waived in respect to storage battery vehicles owing to the impossibility of obtaining such vehicles of British make. The effect upon the electric supply industry was pointed out, as was the simplicity of control of such vehicles, which enables men of military age to be released for service with the forces, as women or elderly men can become proficient in driving after but a few hours' tuition. It was pointed out also that there is at the present time only one British firm making the heavy type of commercial electric vehicle now in such demand, and it is understood that they are quite unable to cope with the orders coming to them, as they have but recently taken up this line of manufacture and are heavily involved in the production of munitions of war. It was therefore asked that there should be free importation at the present time of American-built commercial electric vehicle chassis. The Board of Trade replied on July 11 to the effect that if the committee would send a statutory declaration to the effect that the chassis it was desired to import are to be used solely for commercial purposes, the matter of their importation should have consideration.

On Oct. 1 electric train service was to commence on the North London Railway and its connections, which constitute through routes from Broad Street to Richmond and to Kew Bridge, via Hampstead Heath and Willesden. This is the first instalment of a more comprehensive scheme undertaken by the London & North-Western Railway, which includes the electrification of the lines from Euston and Chalk Farm to Watford. A small section between Queen's Park and Willesden has been in operation over a year, serving as an extension of the Bakerloo Tube, and the North-Western trains between Willesden and Earl's Court have been working electrically for more than a year. When the project is completed passengers from Watford and intermediate stations will have frequent and speedy services, with the choice of Broad Street, Euston, or the stations of the Bakerloo Tube as London destinations, so that the city and West End will be equally accessible. Between the heart of the city and Richmond a forty-minute journey without change and entirely in the open will compare favorably with the routes by the Waterloo and the City & South-Western lines, involving a change, and by the District, which is underground for a great part of the way.

The experts recently asked by the Corporation of Edinburgh to make a report on the future working of the tramway system in that city have stated that they propose to submit a full report in the near future. In the meantime, they have prepared a report on the methods of traction that might be adopted, keeping in view probable future extensions. The experts who were selected by the Edinburgh Corporation are: J. B. Hamilton, general manager of the Leeds Corporation Tramways; J. A. Brodie, city engineer of Liverpool, and A. H. Campbell, city engineer of Edinburgh. The chief point on which the experts were asked to report was whether it was practicable to arrange for a system of traction other than the cable so that it might become operative immediately on the expiration of the lease to the tramways on June 30, 1919. This question is answered in the affirmative, and the interim report adds that the corporation might proceed with its arrangements independently of the tramways company. Another important question asked was whether it would be advisable to adopt a new system of traction for some of the routes, retaining the cable for other routes, to which the interim report makes reply that it is desirable to have only one system. Another question asked was whether the electric system could be operated in such a way that there would be no overhead wires in the central parts of the city. The objection to overhead wires has all along been the chief reason that other systems have not been adopted. The experts reply that such an arrangement would be possible, but that it could not be put into operation immediately on the expiration of the lease, as the excavation for a conduit system would require considerable preparation and would involve interference with the running of the cable cars. It is suggested in the report that the overhead system might be introduced temporarily.

A report of the Portsmouth Corporation Tramways for the year ended March 31, 1916, has been issued by the general manager. Owing to so large a number of motormen and conductors joining His Majesty's forces, and the impossibility of obtaining suitable men to act as motormen, the car service in September, 1914, had to be reduced. Women conductors were introduced on the cars in June, 1915, but this did not overcome the difficulty of obtaining a sufficient number of motormen to improve the services, as others were still being lost, and all the male conductors, who were eligible to act as motormen, had not been trained for this position. It was not until March, 1916, that it was possible to make any improvement. At that time service during the afternoons and evenings was restored in full. The traffic revenue for the year shows a substantial increase over that of the previous year, despite the fact that considerably less mileage was run. The committee decided on July 20, 1915, to increase the bonus paid to motormen and conductors whose conduct had been satisfactory from 10s. a man each half-year to 30s. a quarter, the women conductors to receive a bonus of 10s. each half-year for general good conduct and freedom from reports.

In order to economize the coal consumption in and around London, it has been suggested by the Board of Trade that the many electrical companies should link up. A committee has been formed on which sit representatives from most of the undertakings. The body has held a number of informal meetings, and it is expected that a scheme will be formulated shortly. In the East End some of the municipal supplies are already linked up. It is said that a thousand tons of coal are being saved annually through the linking up of the Stepney and Poplar supplies. In addition to the fuel saved, there is the saving in machinery. In the case of electric railways linking up is already provided for, at least sufficiently to overcome part of the difficulty which would arise from a breakdown, though one station might not be able to supply the full demands of another added to its own load. But there are also a number of power stations operated by railways for lighting and crane and lift power, and therefore among the concerns mentioned as parties to the conference above noted are the Great Eastern, the London & South-Western and other railways, though the proposal concerns railways only incidentally.

At a recent meeting of the Leeds City Council the question of a war bonus for women conductors on the tramways was discussed. The annual cost of the increased war bonuses amounted to £8,000 or £9,000, and in spite of opposition the increased war bonus as proposed by the general purposes committee was adopted.

A. C. S.

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NEWS OF ELECTRIC RAILWAYS

ATTEMPT TO STAMPEDE ATLANTA EMPLOYEES

Effort Made to Intimidate Atlanta Men and Coerce Them Into Going on Strike Fails

The Georgia Railway & Power Company, Atlanta, Ga., resumed operation of its railway lines on the morning of Oct. 3 on regular schedules in and around Atlanta, after having suspended service and ordered all cars to the carhouses at 6.30 p. m. on Oct. 2, following an attempt to stampede a strike among its men. The cars are being operated by regular employees. The company maintains that there is no strike in the true sense of that term, that rioting and other violence and the threats and other forms of moral intimidation directed against the men and the cars are the work of a lawless element which in the main has no relation even to organized labor. This element is composed almost entirely of outsiders, but includes some former employees discharged by the company during a preceding period of time and a majority of a hundred or more former electric linemen who went on strike two months ago. The linemen were unsuccessful in their attempt to coerce the company, but developed their case into the present agitation. Leading the agitators is a paid organizer of the International Brotherhood of Electrical Workers, who is quoted as saying he has been delegated by the Amalgamated Association to further its interests in Atlanta. The issue lies clearly on the one hand between those who aided and abetted by the lawless and unattached element of the city would force the carmen against their will to join the street railway union, and on the other hand the company, its men and the law-abiding public. The company's men have resisted so well all efforts to coerce them that the sole factor which governs the company's ability to render adequate service is that of sufficient protection against rioters.

At 6 p. m. on Sept. 30 without previous warning, the agitators succeeded in interrupting service temporarily by prevailing upon about thirty men to abandon their cars in the downtown section. The interruption lasted only five minutes in the longest instance. The company was prepared with reserve men from the regular forces to resume traffic at once. Rioting followed and resulted in a number of men being pulled forcibly from their cars. In the interest of the safety of its men and passengers the company finally suspended service for the remainder of the night. Service was resumed on regular schedule Sunday morning, but the rioting in the downtown sections was resumed and again was not stopped by the police. On this account at about 10 a. m. service was suspended for the remainder of the day.

At a meeting of the city police commission Sunday afternoon, citizens protested against the attitude of the police, with the result that the commission directed the police to enforce certain ordinances which had been violated and coupled the direction with the warning that non-observance of these instructions by individual officers and members would constitute inefficiency and insubordination.

Service was resumed on Monday morning on regular schedule on all lines. Violence and other forms of intimidation on the outlying sections of three lines resulted in the curtailment of service on those lines about noon. At dark the sporadic rioting of the day in the outskirts of the city and its environs became general and increased rapidly in intensity. At 6.30 p. m. the company suspended service for the remainder of the night on all lines.

The lawlessness and disorder which characterized the attempt to stampede the men was condemned at a meeting of citizens called by the Atlanta Chamber of Commerce on Monday morning. Among the leaders at this meeting was Asa G. Candler, Mayor-Elect of Atlanta. The meeting resulted in the creation of an executive committee, the individual tender by every member of his service as deputy to the Sheriff of Fulton County, and an agreement to meet each day until the situation is remedied.

SERVICE IN NEW YORK APPROACHING NORMAL

The week just passed has served to indicate more clearly the collapse of the New York strike. The companies have continued about their orderly work and are daily approaching more nearly to the schedules in effect before the men went out. In this work they have been helped materially by the repeal on Oct. 2 of the Mount Vernon experience ordinance. This ordinance and the similar ones in effect in Yonkers and New Rochelle since 1913 hampered the companies greatly. The amendment repealing the fifteen-day experience ordinance in Mount Vernon was passed by a vote of eight to one. The Third Avenue Railway promptly resumed service in Mount Vernon following the repeal of the measure.

In Yonkers and New Rochelle the experience ordinances still stand. As a result no cars are being run there. In order to show its ability to give service in Yonkers, however, the Yonkers Railroad on Oct. 2 manned some of its cars with starters who had more than the fifteen days' experience specified in the ordinance and started operation. The disorder that followed caused the company to withdraw the cars in the interest of the safety of its patrons. There were also repeated attacks on cars in Mount Vernon. The repeal of the ordinances in these cities is being agitated. In New York City the cars are still under police protection and the wire screens which were put over the entrances to the cars at the beginning of the strike are still up.

The attempt at a sympathetic strike failed dismally. The time for calling this strike was put off and put off. When it did come on Sept. 29 some 12,000 men in other trades are said to have responded to the call. Most of these men had grievances of their own and probably would have gone out to enforce their individual demands. One of the exceptions, however, was among the workers in the breweries. These men returned to their jobs after being out twenty-four hours.

ANOTHER INCREASE IN WAGES IN BALTIMORE

Following the monthly meeting of the directors of the United Railways & Electric Company, Baltimore, Md., on Sept. 27, William A. House, president of the company, announced that the board, in recognition of the continued loyal and efficient services rendered by its motormen and conductors, authorized an increase in the rates of pay of these employees, effective on Oct. 1. Employees in several of the other departments will receive similar consideration. This is the fourth increase in the wages of employees of the railways since 1912. The schedule of increased pay is as follows:

Class No. 1 will comprise men who have been in the service less than one year, and will be paid 24 cents an hour.

Class No. 2 will comprise men who have been continuously in the service more than one year and less than two, and will be paid 25 cents an hour.

Class No. 3 will comprise men who have been continuously in the service more than two years and less than three, and will be paid 26 cents an hour.

Class No. 4 will comprise men who have been continuously in the service more than three years and less than five, and will be paid 27 cents an hour.

Class No. 5 will comprise men who have been continuously in the service more than five years, and will be paid 28 cents an hour.

The directors at the monthly meeting in June authorized the inauguration of a death benefit or insurance plan, to the privileges of which employees are eligible without any outlay whatever on their part, the entire expense being borne by the company. In 1914 the company also established a pension system, under the provisions of which employees retiring after a stated period are pensioned for the remainder of their lives. The company also stands the expense of this pension plan.

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SHORT STRIKE IN ALBANY

Question of Discipline Involved—Men Finally Accept Terms of Settlement Previously Rejected

A strike of the employees of the United Traction Company, Albany, N. Y., was declared effective at 5 a. m. on Oct. 2, by the local Amalgamated Association as a means of forcing the company to meet demands of the men with respect to how the company should deal in a particular matter of discipline. On Oct. 4 the strike was declared off after an agreement had been reached to arbitrate the question in dispute.

When it became apparent that the good offices of the representatives of the company could not dissuade the men from going out the company issued a statement reviewing the history of the controversy. As previously stated the question at issue was one of discipline. The company's statement to the public follows in part:

"The only point we refused to concede was the right to discharge an employee who had willfully violated the rules and had gone by a safety stoppage point at between 25 and 30 m.p.h., narrowly missing an automobile in which were three citizens of Albany. For the safety of the public there must be rules of this nature; for the safety of the public the men who violate these rules must be disciplined. We have no desire to discharge competent and careful men; they are assets of the company; it costs money to train them and develop them; but where a man is found who is proved by reputable witnesses to be doing things that endanger the lives of citizens we claim the right to dismiss him in the interest of the public, and ask the public to stand back of us in what seems to us a most reasonable stand.

"Let the public remember this is no strike for wages. We pay high wages, wages that compare favorably with those of any other traction company in the United States and Canada. There is no complaint about working conditions. The point at issue is, shall we be forced to keep men who operate cars with reckless disregard of the rights of the public? We offered to arbitrate the matter in dispute by referring the question to the Public Service Commission. This was refused. Mr. Droogan (president of the local union) suggested instead the arbitrators who adjusted the difference of a year ago, and we gladly accepted this suggestion, but even this concession was not sufficient to avoid the strike."

The difference between the men and the officials was over section 6 of the agreement between them. The men complained they were punished for offences in a manner outside of the meaning of section 6. The company agreed to arbitrate on the specific cause, but refused to arbitrate on section 6. The men wanted a board of arbitration to pass on the meaning of the entire section, which they say is clouded.

The meeting on Oct. 4 at which the agreement to arbitrate was reached was called by the State Mediation Board. At the suggestion of Mayor Burns of Troy the officials of the company agreed to enter into the discussion of the strike with the representatives of the men. At this conference the men agreed to arbitrate, first, whether or not section No. 6 of the working agreement between the parties had been violated in handling the case of Motorman Michael J. Hurley; second, whether or not the case of Motorman Michael J. Hurley was adjudicated fairly by the officials of the company. This is the same offer that was made to the men at a conference on Sept. 29 in the office of the company. It was at that time refused and an ultimatum served on the company that a strike would follow in forty-eight hours. The signed agreement which formed the basis of settlement of the strike reads, in part, as follows:

"At the conference an agreement was reached that the following questions would be submitted to a board of arbitration, namely:

"'Whether or not section 6 of the working agreement between the parties has been violated in handling the case of Motorman Michael J. Hurley;

"'Second, whether or not the case of Motorman Michael J. Hurley was adjudicated fairly by the officials of the United Traction Company; and

"'The following named gentlemen were selected to comprise the board of arbitration: Cornelius F. Burns, Mayor, city of Troy; Lynn J. Arnold, William E. Woollard; and that the strike be declared off and operations be resumed as soon as possible."

BOSTON ELEVATED APPEALS TO EMPLOYEES

In connection with the presentation of its appeal for additional net revenue to a special legislative commission, the Boston (Mass.) Elevated Railway has sent a copy of its printed statement to every employee of the company, to all stockholders, heads of municipal governments in its territory and to city and town solicitors, to public service commission and college libraries, officials of local improvement associations, state officials, prominent engineers, railroad presidents, and union officials. Accompanying the statement sent to employees in each case was a letter signed by Matthew C. Brush, president of the company, expressing thanks for loyal support, emphasizing the benefits of team-play, and calling attention to the difficult financial situation now confronting the company, the investigation under way by a special commission and outlining the importance of the company's statement. The letter to the employees, dated Sept. 28, follows:

"I want to thank all the employees of the company with whom I have had any dealings for the past three years for their cordial, loyal support and co-operation, and hope that I may in the future know all the employees better than in the past.

"The success or failure of any enterprise must not only necessarily reflect credit or discredit on each and every employee, but must revert in the same proportion to the advantage or disadvantage of all. It is absolutely impossible for any man by himself to make a success of his work, and therefore the success of all of us lies in each and every employee recognizing the importance of team work and working with the common interest of all at heart.

"The public is very apt indeed to judge the company by the attitude of the employees with whom it comes in daily contact, and the courteous consideration of the car riders by all employees will go a long ways toward placing the company in a proper and favorable position in securing the consideration and co-operation of our patrons which is so essential to the success of all of us.

"It is my desire to assist each and every employee of the company to make a success of his position. The difficulties which lie immediately before us are of sufficient seriousness and magnitude to warrant the keen and conservative consideration of each and every employee and officer of the company as well as all citizens of Greater Boston.

"As you know, the company is presenting at this time to the commission, consisting of the Lieutenant-Governor of the State and others, all the facts in connection with the condition of our property, and is forwarding to each stockholder of the company a copy of the statement which has been presented to the commission; and, assuming that each and every employee must be equally interested in the success of the company, we are inclosing herewith a copy of this same statement. I sincerely trust that every employee will read the statement carefully and to the extent that he sees fit permit others to read it.

"We all have three interests to conserve and protect: the investors', who have supplied the funds to make the physical property possible; the employees', whose wages must be provided and who render the service; and the car riders', who furnish the income; and I sincerely hope, and have every reason to believe, that all officers and employees will conscientiously bend every effort toward making our community justifiably proud of our transportation system, and as near a model street railway as is within our power."

INJUNCTION AGAINST STRIKE IN MISSOURI

A temporary injunction to restrain the motormen and conductors of the Springfield (Mo.) Traction Company from striking was granted in Kansas City on Sept. 28, by Judge Arba S. Van Valkenburgh of the United States district court. The strike was scheduled for midnight on Sept. 29, at which time more than 50 per cent of the conductors and motormen were to walk out, according to the report. The threatened strike was the result of the discharge of Stanley Jones, secretary of the local carmen's union and a conductor on one of the company's lines. Jones was discharged for alleged violation of the company's rules. Following the discharge of Jones, arbitration of the matter was requested and refused, on the grounds that it was not a matter for

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arbitration. Following this, the strike was called. The injunction restrains the carmen, J. H. Bisplinghoff, president of the union, and Stanley Jones, the secretary, from calling a strike, threatening a strike or inciting a strike, or striking. The grounds for the restraining order were that the strike was a violation of the agreement between the company and the union and that such a strike would seriously handicap the company and would jeopardize its franchise.

The title of the petition was the Guaranty Trust Company, New York, a corporation, and J. G. Bodell, against Division No. 691 of Springfield, Mo., of the Amalgamated Association of Street & Electric Railway Employees of America and J. H. Bisplinghoff, president, and Stanley H. Jones, secretary. The petition cites that the franchise of the Springfield Traction Company calls for the operation of cars on certain schedule time and that any failure to so operate will jeopardize the franchise and such failure to operate would afford grounds for proceedings to forfeit the rights and franchise of the company. The petition then brings in the facts which have brought about the present situation, as presented by the company:

"That Stanley H. Jones is secretary of the division No. 691 and that for weeks, in violation of the rules and the regulations of the company, persistently and continuously refused to wear the uniform of a conductor; sat among the passengers while on duty; refused to call the names of the streets; on several occasions left his car, while on duty, and rode on another car, which after making a trip, could meet the car he belonged on."

It is also alleged in the petition that Jones has admitted many of the violations. The petition sets forth that on Sept. 14, the company discharged Jones; that on Sept. 15, he requested an arbitration of the matter; that on the next day he was informed by the company that it was not a matter of arbitration; that Jones and Bisplinghoff called on the division for a strike; that the division has voted a strike and is about to declare a strike, and that unless the restraining order is granted, the division will strike. It is further set forth that the object of the strike is to nullify the contract between the company and the division.

A. F. Van Deinse, general manager of the company, is quoted as follows:

"The position of the company in this matter has always been that it has a legal and binding contract with the union, the provisions of which the company has always observed and intends to observe in the future and that the company believes that its employees should do likewise. This contract gives to the company the option of suspending or discharging any employee for the violation of any rule or regulation, and the company had discharged an employee for the violation of a number of rules on several occasions, and therefore the company held that the employee was rightfully discharged, inasmuch as he personally admitted the violation of these rules, and the company further maintains that after the employee's violation of the rules, the question of discharge was not one which could be arbitrated, and therefore the company appealed to the federal court for a writ of restraint, preventing the union from breaking its contract with the company."

BUFFALO FARE CASE AGAIN ADJOURNED

At the request of Thomas Penney, vice-president and general counsel of the International Railway, Buffalo, N. Y., the City Council on Sept. 29 again adjourned the hearing on the application of the corporation counsel for permission to start an action before the Public Service Commission in an effort to force the company to lower its fare on the Buffalo city lines from 5 cents to 4 cents. Mr. Penney branded the proceeding as merely a reprisal because of the company's efforts to have its special franchise assessment reduced. He denied that any excessive return on the investment was being earned by the company and refuted statements of witnesses who charged that the company had never paid sufficient taxes. Mr. Penney declared the company paid the city directly or indirectly every year more than $1,500 for every car operated and that this year the company will pay $250,000 in additional wages to employees. He added that for fourteen years the stockholders received no dividends. He said that a rate investigation would be very costly to the city, and urged the City Council not to approve the recommendation of the corporation counsel.

Statistics were filed with the Council by the corporation counsel which tended to show that the net earnings of the International Railway, for the fiscal year ended June 30, 1915, were $1,947,839, and a statement was made that if six tickets were sold for 25 cents the reduced income would be $1,067,939, which, based on a valuation of $17,000,000 for the company's property inside the city, would result in a return of 6.85 per cent. Other figures were filed with the Council by the city attorney with the assertion that with a 4-cent fare the railway could earn at least 7 per cent on a fair value for the properties inside the city.

In replying to the argument advanced by a witness to the effect that cheap fares prevail in Detroit and Cleveland, Mr. Penney said that 40 per cent of Buffalo city passengers were transfer passengers, thus materially reducing the average fare per passenger.

Lecture Course on Public Utility Investment.—The Wall Street Branch of New York University, co-operating with the American Institute of New York City, has just announced a course in public utility investment arranged as to place and hour to be convenient for active business men in the downtown district. The course will consist of thirty lectures, one each week, on Friday, beginning Oct. 6, at 25 Broad Street, New York, at 5.15 p. m. It will be conducted by Thomas Conway, Jr., Ph.D., professor of finance, Wharton School of Finance and Commerce, University of Pennsylvania, and will be an advance course, especially designed to be of service to men engaged in the financial field. Included in the course will be seven lectures on electric railways, the points to be considered being those of especial interest to the investment banker.

Picnic of Grand Rapids Employees.—The employees of the Grand Rapids (Mich.) Railway were the guests recently of President Benjamin S. Hanchett of the company on his home grounds, Lakewood, the force being divided so that all could attend. The men brought their families who were entertained and refreshed at the expense of the company. The number entertained on the two days was approximately 5000. The entertainment and barbecue were in charge of L. J. DeLamarter, secretary and treasurer of the company. Several yearling steers were provided for the roast. The players from Ramona were transferred from that stage to one erected at Lakeside. In the evening the dancers made use of Mr. Hanchett's ballroom. There were balloon flights, fireworks and such other accessories as go to help furnish a good time. The last day of the picnic chanced to be the thirty-second anniversary of Mr. Hanchett's connection with the railway.

Work on Buffalo-Niagara Line Progressing.—The International Railway, Buffalo, N. Y., expects to have the new fast double-track line between Buffalo and Niagara Falls completed and in operation by July 1, 1917. Between 600 and 700 laborers will be added to the construction gangs within the next few weeks and J. W. Mack, superintendent of tracks of the company, plans to have all fills made and right-of-way graded before snow begins to fall. Tracks have already been laid for part of the distance between Buffalo and Tonawanda and between North Tonawanda and La Salle. The longest fills for the elevation of the tracks through Tonawanda and North Tonawanda have been completed and the company is now awaiting the arrival of steel for the bridges which will be erected at several points along the line. Owing to the difficulty experienced in obtaining steel for the bridges along the new line, the company has made application to the North Tonawanda Board of Public Works for permission to construct a temporary wooden bridge over Wheatfield Road.

PROGRAM OF ASSOCIATION MEETING

Electric Power Club

The Electric Power Club will hold its next meeting at the Homestead Hotel, Hot Springs, Va., Nov. 15-18. This club has as its members the officials of the companies which manufacture motors of all types. C. H. Roth, 1410 West Adams Street, Chicago, is secretary-treasurer.

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Financial and Corporate

ANNUAL REPORTS

Third Avenue Railway

The comparative income statement of the Third Avenue Railway, New York, N. Y., and its controlled lines, for the years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Operating revenue:				
Transportation	$10,837,076	97.3	$10,565,027	97.0
Advertising	80,000	0.7	95,250	0.9
Rent of equipment	18,386	0.2	16,470	0.1
Rent of tracks and terminals	73,210	0.6	73,441	0.7
Rent of buildings and other property	85,802	0.8	84,710	0.8
Sale of power	41,894	0.4	50,959	0.5
Total operating revenue	$11,136,370	100.0	$10,885,859	100.0
Operating expenses:				
Maintenance of way and structures	$1,090,700	9.8	$925,973	8.5
Maintenance of equipment	599,549	5.4	678,573	6.2
Depreciation accruals	*294,271	2.6	562,958	5.2
Power supply	731,597	6.6	779,458	7.2
Operation of cars	2,923,776	26.2	2,914,525	26.8
Injuries to persons and property	659,197	6.0	602,798	5.5
General and miscellaneous expenses	509,100	4.5	511,890	4.7
Total operating expenses	$6,808,194	61.1	$6,976,179	64.1
Net operating revenue	$4,328,176	38.9	$3,909,680	35.9
Taxes	848,122	7.6	731,034	6.7
Operating income	$3,480,054	31.3	$3,178,645	29.2
Interest revenue	157,870	1.4	81,127	0.8
Gross income	$3,637,924	32.7	$3,259,773	30.0
Deductions from gross income	†$2,646,851	23.8	$2,565,730	23.6
Net income	$991,072	8.9	$694,042	6.4

*No additions have been made to the depreciation reserve since Dec. 31, 1915.

†Interest on certificates of indebtedness of the Dry Dock, East Broadway & Battery Railroad has not been included in the account since Feb. 2, 1908.

The income account for the system during the current year shows, after the payment of all interest, taxes and depreciation, a balance of $991,072, an increase of $297,029 over the preceding year. The gross earnings of the company were the largest in its history and the net earnings also exceeded those of previous years and were abnormally large. The revenue from transportation increased $272,048 or 2.6 per cent, and the operating expenses showed a net decrease so that the net operating revenue increased $418,496 or 10.7 per cent.

The report states that the showing made is accounted for in part by the fact that since Jan. 1 no payments were made out of the net earnings into the depreciation fund, and also by reason of the fact that the condition of the labor market made it impossible to do a good deal of work which the company was anxious to do, and some of which it was under orders from various authorities to finish by fixed dates and yet was unable to find labor to do. It is stated that the company endeavored to find responsible contractors to take part of the work off its hands, but the answer from them has been that they could not take the contract at this time under any circumstances.

In respect to the adjustment bonds, $248,000 have been purchased by the company under the following circumstances. At the time of the purchase of the Belt Line Railway Corporation an application was made to the Public Service Commission for permission to capitalize, among other things, a certain claim which that company had against the receivers of the old Metropolitan Street Railway. The claim was rejected by the commission as worthless. In the course of time, however, the claim realized in cash $185,000 and that sum, of course, brought the cost of the Belt Line road down by the same amount. In order to save the large amount of interest it was devoted to the purchase of the adjustment bonds. Some other money, the report states, has been and will be devoted to the same purpose, and it may reasonably be expected that within a comparatively short time the income from these bonds, together with such supplementary sums as the company can use for that purpose, will result in materially diminishing the principal of this mortgage.

In consequence of the 4 per cent bond issue of last October and the discontinuance of cash payments into the depreciation fund after Jan. 1, dividends were begun at the rate of 4 per cent on Jan. 1 and have been continued down to the present time. On Jan. 1 wages were increased by $90,000 a year and since then the company has felt it desirable to make a further increase of about $150,000. Nevertheless, President Whitridge thinks that the present rate of dividends can be maintained.

During the year the company's printing plant has been in active operation, and the results show that the actual saving is $32,000 a year, considerably in excess over the amount originally estimated.

HITCH IN NORTHERN ELECTRIC PLAN

Minority Opposition Leads Reorganization Committee to Allow Foreclosure of Three Underlying Issues—Hearing Before Commission

The recent hearing on the application of the reorganization committee of the Northern Electric Railway, Chico, Cal., before the Californa Railroad Commission occupied several days and involved the presentation of a large volume of evidence. Representatives of the overlying bondholders attacked the proposed reorganization plan and threatened resort to legal measures unless more favorable terms were offered. Later, because of the opposition of the small but insistent minority of the holders of notes and overlying bonds, the reorganization committee reluctantly decided to allow foreclosure proceedings to be taken by holders of three issues of the underlying bonds. First mortgage liens which are to be foreclosed forthwith comprise the entire bond issue of the Northern Electric Company, amounting to $3,770,000; first mortgage issue of the Marysville & Colusa Branch Railway, amounting to $750,000, and the first mortgage bond issue of the Sacramento & Woodland Railway, aggregating $750,000.

When the commission opened the case it was apparent that there was a wide divergence of views as to the values involved. The reorganization plan called for the issuance of new securities totaling $14,800,000, while the total reproduction cost reported by Richard Sachse, chief engineer for the commission, was $10,392,316. The securities which were proposed to be issued by the new holding company were to comprise the following: (1) First mortgage 5 per cent bonds, $500,000; (2) second mortgage 5 per cent bonds, interest payable for the first five years only if it is earned, but bearing an absolute interest rate of 5 per cent thereafter, $5,300,000; (3) third mortgage income bonds, $7,000,000; stock, $2,000,000. The plan further provided that the bonds thus issued should be pledged as security for notes on the same basis as the bonds in lieu of which they were to be issued.

Under the direction of the reorganization committee, A. S. Kibbe, consulting engineer, presented to the commission a report showing how the Northern Electric Railway could increase its operating income nearly 50 per cent during the next four years by an aggressive campaign for new business. By reducing the ratio of operating expense from 76 to 70 per cent, the net income could be raised in the first year to $164,000, during the second year to $184,000, during the third year to $221,000 and during the fourth year to $272,000. This would involve, however, the expenditure of approximately $500,000.

At the conclusion of the hearing Commissioner Edgerton stated that the commission would first pass upon the valuation of the properties and the earning power of the railway. Then it would be up to the security holders to get together by agreement, or resort to foreclosure proceedings. In the event of a foreclosure, he said it would appear that the underlying bondholders would undoubtedly get the best part of the properties, leaving the remnants for the overlying bondholders. This announcement of the commission's attitude was made prior to the decision of the reorganization committee to allow foreclosure. Earlier comment on the reorganization plan appeared in the ELECTRIC RAILWAY JOURNAL of July 10 and Oct. 23.

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UNITED RAILROADS CAPITALIZATION CUT IN HALF

Further Details of Reorganization Plan That Is Urged for Quick Adoption in San Francisco

The reorganization committee of the United Railroads of San Francisco, which as briefly noted in last week's issue has announced a plan involving the extinguishment of $44,330,100 out of $91,928,100 of capital liabilities, has asked for quick action on its proposals. The holders of the 4 per cent bonds of the company have been notified that bonds must be deposited immediately if the committee is to be placed in a position where it can undertake to prevent hostile foreclosure and receivership proceedings through the action of the holders of the underlying Market Street Cable Railway bonds and Ferries & Cliff House Railway bonds which mature this year. Pursuant to the provisions of the bondholders' deposit agreement the committee has extended the time for the deposit of bonds to Oct. 31, 1916.

Under the proposed plan, according to the full details now available, all of the physical properties, franchises, bonds and stock owned by the United Railroads, and all of the physical properties, franchises and bonds owned by the subsidiary San Francisco Electric Railways, are to be transferred to the Market Street Railway, which will thereupon become the operating company. All of the issued stock of this latter company is now owned by the United Railroads. The liabilities of the United Railroads which are thus to be readjusted and the bonds and stock of the Market Street Railway under the plan are as follows:

Present		Future	
Market Street Ry. bonds	$7,098,000	Market St. Ry. bonds	$7,098,000
United Railroads bonds	23,854,000	Market St. Ry. bonds	6,000,000
		First preferred stock	11,000,000
Market St. Cable Ry.	1,800,000	Market St. Ry. bonds	3,000,000
The Omnibus Cable Co.	2,000,000	6 per cent debentures	2,500,000
Ferries & Cliff House Ry.	400,000		
Sutter St. Ry.	1,000,000		
7 per cent notes	1,925,000		
6 per cent notes	740,000		
5 per cent notes	1,000,000	2d preferred stock	5,500,000
1st preferred stock	5,962,500	Common stock	12,500,000
2d preferred stock	28,200,000		
Common stock	17,948,600		
			$47,598,000
		Liabilities extinguished	44,330,100
	$91,928,100		$91,928,100

From the above it will be noticed that all the underlying bonds of the Market Street Cable Railway, the Ferries & Cliff House Railway, the Omnibus Cable Company and the Sutter Street Railway, aggregating $5,200,000, all of which bonds are now maturing or will mature during the next two years, are to be retired. The reorganization plan provides that the Eastern and other capitalists who hold the unsecured notes and stock of the United Railroads will furnish a fund for the payment of these bond issues, as and when they mature. The process by which this will be accomplished is the underwriting by the controlling California Railway & Power Company at 90 per cent of face value of a new issue of $2,500,000 of serial debentures and also the underwriting at 90 of $3,000,000 of Market Street Railway 5s to be taken in 1918 or before. The holders of the unsecured notes and stock of the United Railroads will receive new second preferred and new common stock of the Market Street Railway and the surrender of certain obligations as a consideration for the underwriting contract described above.

The committee believes that the foregoing plan is advantageous to the holders of the Market Street Railway 5 per cent bonds as it takes care of $4,200,000 of bonds underlying that issue and adds to the security of those bonds the properties of the San Francisco & San Mateo Electric Railway, Sutter Street Railway, Sutro Railroad, San Francisco Electric Railways and other property. The $9,000,000 of Market Street Railway 5 per cent bonds to be issued includes all bonds exchanged for underlying bonds cancelled and to be cancelled.

The plan, the committee states, is as fair to the holders of the United Railroads 4 per cent bonds as the existing circumstances and conditions will permit. Besides taking care of the $4,200,000 of underlying bonds mentioned, and the $1,000,000 of Sutter Street bonds which underlie the United Railroads, it gives to these bondholders 25 per cent of the par value of the United Railroads bonds in Market Street Railway 5 per cent bonds and 46 per cent in the 6 per cent cumulative first preferred stock, thereby giving them new securities equal to 71 per cent of the face value of their present bonds, which are to-day selling on the market at 33 per cent of their face value. The new securities will entitle the bondholders to the same income they now receive, and will have to be paid in full before the stockholders below them receive anything in the way of principal.

In the opinion of the committee these bondholders can well afford to let the equities behind 71 per cent of the face value of their present bonds go to the present noteholders and stockholders in consideration of the latter financing the underlying bonds as proposed in the plan and surrendering all of their notes and also their claims to an interest in the property or to any equitable consideration which they might assert in the event of foreclosure proceedings on account of the fact that in 1906, at the time of the disaster, they paid in $5,000,000 in cash for the rehabilitation of the property, and because in December, 1912, they loaned the company $1,550 000 for the particular purpose of paying $1,200,000 of Market Street Cable Railway 6 per cent bonds and $350,000 of Park & Cliff House Railway bonds which matured Jan. 1, 1913, and on account of which there are $1,550,000 of Market Street Railway 5 per cent bonds now unissued in the possession of the trustee and which it is proposed under the plan to transfer to the United Railroads bondholders.

Unless such a reorganization is brought about, the committee avers, a general foreclosure of all of the mortgages and a receivership seem inevitable. If a suit should be brought on the underlying bonds which mature this year, and a receiver should be appointed by the court, it would probably result in all of the other bond mortgages being foreclosed in the same suit, the property being sold as a whole and the proceeds distributed upon equitable principles among the various classes of bondholders and creditors, in accordance with the value of their various and respective security and interests. Owing to the number of bond mortgages now existing and the different portions of the properties upon which they are liens, it would be difficult to determine the respective values of the several classes of bonds and to what extent these various bonds might be used in payment of the properties at foreclosure sale, and a long and expensive litigation would or might ensue.

In view of these conditions, the committee concludes, it would seem that, even if foreclosure proceedings should be brought, it would become advisable, sooner or later, for all of the various bondholders, creditors and stockholders to come together and agree upon some plan of reorganization for the protection of their various interests and for the purpose of taking the controversy out of the courts and receivership, and it would therefore appear to be obvious that every effort should be exerted at the present time to come to an immediate agreement upon a plan of reorganization and save the properties from the results of such receivership and prolonged and expensive litigation.

Boston (Mass.) Elevated Railway.—The West End Street Railway has petitioned the Massachusetts Public Service Commission for the right to issue 12,000 shares of common stock, the proceeds of which will be used to reimburse the Boston Elevated Railway for improvements, etc. Of the 12,000 shares 4300 have been authorized by the stockholders and the remaining 7700 shares will be authorized at the annual meeting on Nov. 28.

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California Railway & Power Company, San Francisco, Cal.—In issuing checks for a dividend of 1 per cent on the prior preference stock of the California Railway & Power Company, notice has been given of the reorganization committee acting in the case of the controlled United Railroads of San Francisco, the plan of which committee is described in another column. While the United Railroads hitherto has paid the interest regularly upon its notes held by the California company, it is said to be unlikely that it will be able to make remittance on this obligation during the period of its reorganization. In spite of this fact the directors of the California Railway & Power Company decided to pay the current dividend as they had the money on hand.

Cities Service Company, New York, N. Y.—The directors of the Cities Service Company have authorized the issuance of $8,000,000 of preferred stock and $118,800 of common stock, for the purchase of the capital stock of the Crew Levick Company, Ponca Refining Company, Cushing Refining Company and the Producers Refining Company. These properties will be subject to a bonded indebtedness of approximately $5,500,000. The policy of City Service Company has been to pay no cash dividends on the common stock in excess of 6 per cent, but to reinvest all earnings in excess of this amount. To insure that this policy will be carried out it is proposed to amend the articles of incorporation.

Empire United Railways, Inc., Syracuse, N. Y.—The Bankers' Trust Company, New York, N. Y., has received $15,000 from the estate of Clarence W. Seaman as a guarantor of $681,900 of one year secured notes of the Empire United Railways, Inc., due on Feb. 16, 1916. The total of the obligations of the Seaman estate on this account is $81,119 with accrued interest. It is announced that the Seaman estate will pay this amount, but that the executors have been handicapped in settling the estate. The Empire United Railways securities involved in the matter are successors to short-time notes of about $1,000,000 in face value issued originally by the Rochester, Syracuse & Eastern Railroad. The issue became due on Feb. 16, 1915. Under a plan then agreed to holders of $1,000 notes received about $275 in cash, two $100 bonds of the Empire United Railway and new short term notes issued by the consolidated company and guaranteed by signers of the original issues. Following the default on the new notes on Feb. 1, 1916, as to principal and interest the Bankers' Trust Company requested the guarantors of the notes to make good their obligation. All but four of the guarantors promptly made their payments and in March the Bankers' Trust Company distributed to holders $633 on each note of the original par value of $1,000.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The Oakland, Antioch & Eastern Railway has just completed its third year of operation as an interurban electric system. While a detailed comparison has not been made, it is stated that this is the only electric system in the State showing an increase in freight and passenger revenue for the fiscal year ended July 1, 1916. This condition is largely due, it is pointed out, to the fact that the road has had very slight jitney competition. The following comparative table for years ended Aug. 31 indicates the ratio of increase in business: Passenger revenue—1914, $374,267; 1915, $457,523; 1916, $497,707; freight revenue—1914, $59,005; 1915, $61,447; 1916, $96,528; passengers carried—1914, $572,773; 1915, $650,047; 1916, $750,869.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—The St. Joseph Railway, Light, Heat & Power Company has executed a first and refunding mortgage for $15,000,000 to the Bankers' Trust Company, New York, N. Y., and the Mississippi Valley Trust Company, St. Louis, Mo., as trustees, given to secure 5 per cent thirty-year gold bonds, the proceeds of which are to be used to retire $5,000,000 of its first mortgage bonds and $326,000 of first mortgage bonds of the St. Joseph & Savannah Interurban Railway now outstanding and for other corporate purposes.

Sapulpa & Interurban Railway, Sapulpa, Okla.—The final transfer of the property of the Sapulpa & Interurban Railway from the hands of the receiver to Charles Williams, St. Louis, who recently purchased it at receiver's sale, has been made with the approval of the court and the filing of the record. No changes are contemplated in the management. Mr. Williams is understood to be acting for the Midland Valley Railroad, an operating steam railroad.

DIVIDENDS DECLARED

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Boston (Mass.) Suburban Electric Companies, quarterly, 50 cents, preferred.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Citizens' Traction Company, Oil City, Pa., quarterly, 1½ per cent, preferred.

Detroit (Mich.) United Railway, quarterly, 1¾ per cent.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.

Philadelphia & Western Railway, Upper Darby, Pa., quarterly, 1¼ per cent, preferred.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred and preferred.

Tri-City Railway & Light Company, Davenport, Iowa, quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

United Railways & Electric Company, Baltimore, Md., quarterly, 50 cents, common.

Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent, preferred; monthly one-half of 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Aug.	'16	$53,860	*$30,000	$23,860	.....	.....
1 "	"	'15	51,882	*27,561	24,321	.....	.....

AURORA, ELGIN & CHICAGO RAILROAD, AURORA, ILL.

1m.,	Aug.,	'16	$198,214	*$125,332	$72,882	$35,933	$36,949
1 "	"	'15	189,975	*120,667	69,308	36,517	32,791
2 "	"	'16	407,244	*254,767	152,477	72,051	80,426
2 "	"	'15	377,463	*241,392	136,071	73,047	63,024

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m.,	Aug.,	'16	$910,429	*$689,838	$220,591	$98,634	‡$144,667
1 "	"	'15	796,220	*506,578	289,642	98,145	‡214,122
2 "	"	'16	1,842,935	*1,277,293	565,642	197,268	‡414,928
2 "	"	'15	1,602,703	*981,569	621,134	196,410	‡470,531

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m.,	Ju'y,	'16	$172,935	*$100,904	$72 031	$36,280	$35,751
1 "	"	'15	174,092	*107,635	66,457	35,917	30,540
12 "	"	'16	1,902 376	*1,200,898	701,478	436,822	264,656
12 "	"	'15	2,132,940	*1,236,432	896,508	433.219	463,289

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m.,	Aug.,	'16	$445,555	*$206,622	$238,933	$215,051	23,882
1 "	"	'15	427,195	*191,113	236,082	212,032	24,050
2 "	"	'16	894 650	*410,393	484,257	429,349	54,908
2 "	"	'15	855,109	*381,044	474,065	423,239	50,826

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m.,	Aug.,	'16	$46,027	*$45,074	$953	$8,019	††$5,965
1 "	"	'15	40,621	*41,327	†706	$5,842	††5,036
2 "	"	'16	96,072	*89,579	6,493	$14,034	††5,374
2 "	"	'15	83,232	*84,614	†1,382	$14,187	††11,713

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m.,	Aug.,	16	$587,474	*$369,299	$218,175	$120,714	‡$99,067
1 "	"	'15	511,492	*349,743	161,749	120,284	‡42,852
2 "	"	'16	1,156,749	*740 800	415,949	241,403	‡177,667
2 "	"	'15	983,640	*669,158	314,482	240,568	‡76,600

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m.,	Aug.,	'16	$849,966	$525,187	$324,779	$144,734	$180,045
1 "	"	'15	798,901	496,687	302,214	145,697	156,517
8 "	"	'16	6,740,241	4,187,967	2,552,274	1,143,167	1,409,107
8 "	"	'15	6,196,934	4,028,822	2,168,112	1,131,830	1,036,282

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m.,	Aug.,	'16	$21,076	*$21,872	†$796	$1,863	††$2,630
1 "	"	'15	24,718	*22,182	2,536	1,598	‡970
2 "	"	'16	44,201	*44,271	†70	3,678	††3,694
2 "	"	'15	50,734	*44,900	5,834	3,188	‡2,708

*Includes taxes †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad under guarantee; also interest on notes held by the New York, New Haven & Hartford Railroad not credited to income of that company.

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Traffic and Transportation

JOPLIN ABANDONS TRANSFER MOVE

Companies' Explanation of Their Inability to Meet Proposed Demand Accepted by the City

A move to have a universal transfer system established on the railways in Joplin, Mo., was abandoned on Sept. 20, by J. F. Lee, commissioner of public property and public utilities, and Mayor McIndoe after a conference with W. A. Satterlee of the Joplin & Pittsburgh Railway and D. C. Morris, representing the Southwest Missouri Railroad. E. F. Cameron, city attorney, also attended the conference. Mayor McIndoe and Mr. Lee said they would not take the matter before the Public Service Commission of Missouri because they had faith in the arguments presented by the railroads against the plan.

The Southwest Missouri Railroad's case was explained in a letter received by the Mayor from A. H. Rogers, president of the company, as follows:

"You have requested that the Joplin & Pittsburgh and the Southwest Missouri Railroad companies inaugurate a system of inter-company transfers in Joplin, so that a passenger can board a car on either line and by transfer ticket be carried from any point within the city on either line to any point within the city on the other line.

"The two street railways are entirely separate and distinct organizations and each is giving universal transfers within the city to its own passengers, and I cannot see any good or valid reason—or justice—in the request that their transfer privileges be enlarged so as to include inter-company business. The result would be that the fare received by either company from each passenger transferred from one line to the other would be only 2½ cents. This means a 50 per cent reduction in said fares and would entail a loss on each passenger so transferred. The street railways of the country are all suffering from largely increased costs of operation without any corresponding increase of income, and the situation in Joplin is the same as elsewhere. The amount received here per passenger is the same as it was twenty years ago, and the cost of transporting each passenger has increased significantly.

"At present the Southwest Missouri Railroad is under contract to do a large amount of street paving in Joplin and other cities along its lines, which will entail an expenditure of more than $100,000. This money must all be paid out of earnings. No bonds can be issued for this purpose, as no increase of business or revenue will result from these street improvements. In fact, a loss of business to jitney competition may be anticipated.

"The loss of revenue that would result from inter-company transfers is something that neither company is in a position to bear, and is something the like of which would hardly be requested from any other line of business in your city.

"Therefore, I desire to advise you that I cannot, consistently with my duties as I see them, voluntarily comply with your request, and I trust you may regard your two street railways as good fellow citizens and carefully consider the hardships under which they are already laboring, and not add anything to their existing burdens. In the day of $100 jack their volume of business temporarily was largely increased, but now it is getting down to its ordinary basis and the companies are compelled to practice every possible economy consistent with the necessary costs of operation, which seems still to be mounting higher and higher. They are not asking any increase in their rates of fares, which is now the prevailing custom with railroads and other public utilities, but do ask that the present low rates be not revised downward.

"Street railway fare in Joplin is one of the few things that has remained stationary in these days of almost universal advanced prices and costs of living."

Mr. Satterlee told the conferees that it costs his company more than 4 cents for each passenger hauled in the city.

ROCHESTER COMPANY COMPLYING WITH DECISION

Report of Commission Inspector Shows That New York State Railways are Meeting Requirements of Jitney Decision

The Public Service Commission for the Second District of New York has approved a report of Charles R. Barnes, electric railway inspector, which shows that the Rochester lines of the New York State Railways have complied or are complying with all but two of the minor recommendations for improvements imposed on the company by the commission, following denial of permission to operate independent jitney buses in competition with the electric railway in Rochester.

The two minor recommendations which the report shows the company is disinclined to follow are the connection of the Lake Avenue and Dewey Avenue lines through Ridge Road and new trackage in Mount Hope Avenue. The commission holds these recommendations in abeyance pending the study of the transportation situation in Rochester now being made by an engineer in the employ of the Rochester Chamber of Commerce.

The other recommendations of the commission will provide a seat for every passenger in Rochester throughout the day, through additions of equipment, re-routing cars, installation of additional facilities and the elimination of cases of delay. These involve large amounts of new construction and rearrangement, and it is estimated that the total cost of the improvements now under way will be more than $1,000,000.

An interesting feature of the development is the entrance of the railway into the jitney field itself. As the north side cross-town line recommended by Mr. Barnes cannot be built until the city builds a new bridge over the Genesee River, the company proposes to cover this route by motor buses running on a fifteen-minute headway during the day with increased rush-hour service, and affording transfer facilities at a slight cost between the seven north and south trolley lines which the bus route will cross. The fare on the buses will be 5 cents, without transfer privilege, but transfers will be issued from one north and south railway line to another, good on the second line after crossing town via the bus. The buses will run a total distance of 2½ miles.

The fifty new cars which the company will operate were ordered last April for delivery early this fall, but the condition of the steel market at present indicates that the cars will not be delivered before next month. These cars are of the latest design, light weight, four motor, single and prepayment type, with front and rear entrances and center exists and will seat fifty-two passengers each.

The decision of the commission in the Rochester jitney case, far-reaching in its importance, was reviewed at length in the ELECTRIC RAILWAY JOURNAL of May 20, page 957.

HEARING ON BERKSHIRE THROUGH CONNECTION

The Public Service Commission of Massachusetts held a hearing at Boston on Oct. 3 upon the petition of residents of Westfield, Huntington and other towns of the Berkshire district that the Berkshire Street Railway be required to place its Lee-Huntington line in operation. Clinton Q. Richmond, general manager of the company, stated that the company was greatly disappointed at not being able to obtain a location several years ago from North Blandford to Westfield in place of the existing route from North Blandford to Huntington. Consequently the company was obliged to build its line over an unsatisfactory 5-mile route, whereas the preferred route was much easier. Until the company felt assured that it could operate safely over these long grades it could not undertake to render service over the Blandford-Huntington section, especially in view of the severe climatic conditions. The Lee-Huntington line represented an investment of about $3,000,000. The company had undertaken to operate sections of the line running eastward from Lee. Mr. Richmond said that the construction difficulties were perhaps not fully appreciated by the petitioners. The company did not believe that it would be feasible to haul loaded freight cars over the Blandford-Huntington section of the line. Even for

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a passenger service and light express traffic it would be necessary to install a substation to feed the middle portion of the mountainous route. About 13 miles of line are under operation at present, while 10 miles are not in service. If the commission ordered service to be established between Lee and Huntington, the company would be obliged to inaugurate it as soon as safe operating conditions could be assured. About $19,000 would have to be expended before the line could be opened for operation from terminal to terminal.

Mr. Richmond said that the financial condition of the company had an important bearing upon the opening of any further lines. The investment of the New Haven company in the Berkshire system is $11,298,820, and the public owns underlying bonds amounting to $1,500,000. The gross earnings of the system for the year ended June 30, 1915, were $952,868; operating expenses were $802,759; net earnings, $150,109; taxes, $61,679; balance, $88,430; interest on bonds in the hands of the public, $69,000; balance for bonds owned by the New Haven, $19,430. During the last fiscal year the New Haven company not only received no adequate return for the bonds and notes held by it, but, in addition, had to advance $216,272 to make needed additions and betterments to the property to keep it in reasonable condition. For the ten months ended April 30, 1916, the results were only slightly better, the property not earning enough to pay the interest on the bonds owned by the public and by the New Haven, amounting to $2,346,000. The commission took the case under advisement.

TOWNS AND CITIES HELD TO BE SINGLE-FARE PASSENGER UNITS

That towns and cities in Indiana through which interurban lines are operated are passenger units and that no more than 5 cents fare can be charged within the limit of the unit is held by the Public Service Commission of Indiana, which has decided a case at Elkhart, through a letter written by Charles A. Edwards, a member of the commission, to the Rev. F. J. Jansen of Elkhart.

Mr. Edwards stated that the Elkhart situation was the only case of its kind that he knew of in Indiana. He said that in all towns and cities of the State a fare of 5 cents is charged for all travel within the limits of the town or city. Whether the passenger boards the car some distance from the central station of an interurban company in any city or town, or whether he boards it at the station, makes no difference in his fare from that city to another city and makes no difference in the 5-cent fare charged between points in the same city. If the passenger leaves the car beyond the central station of an interurban company, but still within the city or town limits to which he has paid his fare, Mr. Edwards said, no additional charge can be made.

The Rev. Mr. Jansen had complained to the commission that the interurban car on which he was accustomed to travel to the rectory of the church stopped at the Elkhart interurban station, and that the conductor insisted on collecting an additional fare from him if he rode the few blocks to the rectory, beyond the central station. The Chicago, South Bend & Northern Indiana Traction Company, which operates the interurban line in question, showed that it had filed its tariffs with the commission on the basis of the "penny zone," and had based its rates on 1 mile zones within the city limits of Elkhart at the rate of 2 cents per mile.

In his letter to the company requesting that they rearrange their tariff Mr. Edwards stated that the city through which the interurban operated should be taken as a unit, and no additional charge should be made for carrying the passenger beyond the central station, as long as his stop was within the corporation limits. Mr. Edwards said that he had submitted the question to the commission and was upheld in his decision. Under this ruling, a passenger taking a car at Goshen, for example, and riding to the central station at Elkhart, would, if he so desired, be able to continue his ride to a further point in the city of Elkhart on a through interurban car without payment of any additional fare.

Railway to Operate Gasoline Launches.—The Evansville, Suburban & Newburg Traction Company, running out of Evansville, Ind., will put two gasoline launches into service on the Ohio River, to ply between Newburg, Ind., and Owensboro, Ky. This will give the people of the Owensboro direct connection with Evansville. A through rate will be quoted.

Twenty-five Year Jitney Grant Discussed.—At a recent informal meeting of the City Council of Portland, Ore., the proposition of issuing a franchise for a period of twenty-five years to a jitney company was discussed, and was referred to Commissioners Daly and Dieck. F. T. Griffith, president of the Portland Railway, Light & Power Company, was present at the meeting and protested against the granting of the franchise unless regulations were inserted similar to those imposed on his company.

Buffalo Line Handles Peaches.—The International Railway, Buffalo, N. Y., is operating four express fruit trains each way daily between Buffalo and Olcott Beach. The line bisects the famous Niagara County fruit country where hundreds of thousands of bushels of peaches are marketed annually. Large electric locomotives are used to haul the trains over the interurban lines and in most cases the International box cars are used. Fruit for shipment long distances is packed in railway refrigerator cars and turned over to the trunk line railroads at Lockport and Buffalo.

Dallas Jitneys Decrease in Number.—There were 331 jitneys in operation on the streets of Dallas, Tex., on Sept. 26, according to the report of City Automobile Inspector Birthright to Police Commissioner Winfrey. This is a decline of twenty-four jitneys for one week, as the report for the preceding week showed 355 jitneys in operation. There has been a marked decrease in the number of jitneys recently, the number dropping from more than 500 to 331 in a few weeks. Many licenses are expiring now and comparatively few of these are seeking a renewal of their grants to operate.

Plea Entered to Abandon Line.—Ansel M. Easton, who owns and operates the Burlingame (Cal.) Electric Railway, has filed with the Railroad Commission of California an application for authority to abandon the railway, claiming it has never paid expenses, and during the last year has lost $3793.58. Mr. Easton obtained a franchise for the railway in 1911, and built a single-track line running from Broadway to Hillside Drive and Vancouver Avenue. The cars were operated by storage battery and the fare has been 5 cents. Mr. Easton says that he will pave the right-of-way upon removal of the tracks, and he wants the commission to declare his rights to operate the line forfeited.

Failure to Live Up to Traffic Rules Alleged.—The Public Service Commission of Maryland has adopted an order requiring the United Railways & Electric Company, Baltimore, Maryland, to meet the service requirements promulgated by the commission recently. The commission states that on May 29, it adopted rules for the regulation of traffic, and for "the comfort, convenience and safety of the public," especially with reference to the carrying capacity of cars; and that from checks made by the commission's transportation expert and from numerous complaints from citizens, it appears that the rules "are not being observed as they should be, and as the public and the commission are entitled to expect and demand."

Board of Trade Protests Jitney Competition.—The Hollywood Board of Trade has registered with the City Council and the Public Utilities Board of Los Angeles, Cal., a resolution protesting against the jitney bus competition existing under present regulations. The Hollywood organization asks that jitney permits be limited to streets in Hollywood that are not now served by the Pacific Electric Railway and to streets that will open up new service territory. The resolution calls attention to the part the Pacific Electric Railway has taken in building up the community, and also to the large investment the railway has made, particularly in street paving and in payment of taxes. The Council has referred the resolution to the Public Utilities Board.

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Personal Mention

J. F. Henning has resigned as superintendent of materials and supplies of the Chicago (Ill.) Surface Lines to become assistant general manager of the Vesta Accumulator Company, Chicago.

C. B. Hammond, chief clerk of the Elmira, Corning & Waverly Railway and the Corning & Painted Post Street Railway, Elmira, N. Y., has been appointed general agent of both companies. Mr. Hammond has been with the companies since October, 1909.

S. B. Irelan, manager of the City Light & Traction Company, Sedalia, Mo., was presented with a handsome gold watch by the employees of the Bartlesville, (Okla.) Interurban Railway when he returned to Bartlesville recently for a visit. Mr. Irelan was formerly manager of the property at Bartlesville.

W. L. Wuster, chief clerk in the payroll and distribution department of the Chicago (Ill.) Surface Lines, has been appointed superintendent of materials and supplies of the company to succeed J. F. Henning, resigned. Mr. Wuster was born in Chicago in 1888 and after completing his education in the public schools took a course in electrical engineering at Armour Institute of Technology, Chicago. In 1907 he accepted a position with the Chicago City Railway as street timekeeper in the track department. In 1909 he was made time distribution clerk in the track department, and in 1912 he was appointed chief clerk of the payroll and distribution division of the Chicago City Railway.

John A. Clay, who has been elected president of the Colorado Electric Light, Power & Railway Association, is the general manager of the Western Colorado Power Company, with headquarters at Montrose, Col. Mr. Clay was graduated sixteen years ago from the engineering department of the University of California. His first position in the central station field was with the Independent Light & Power Company, San Francisco. Later he entered the employ of the Pacific Mail Steamship Company in its San Francisco-to-China service. Shortly thereafter, however, he took up construction work ashore for the General Electric Company in the Northwest. Entering central station work again he was employed by the Tacoma Railway & Power Company and the Washington Water Power Company. Then for a period he was connected with the Hecla Mining Company in the Coeur d'Alene district. Since 1906 Mr. Clay has been with the Western Colorado Power Company of Montrose, remaining through various reorganizations.

A. L. Langdon has retired as traffic manager and general freight agent of the Long Island Railroad under the pension rules of the company, after nearly fifty-three years of continuous service with the Cumberland Valley, Pennsylvania and Long Island Railroads. With the retirement of Mr. Langdon the position of traffic manager will be discontinued, but the duties of that office will be performed by the general freight agent and the general passenger agent, who will report directly to the president. Mr. Langdon was born seventy years ago at Sugar Grove, Pa. He was educated at the Randolph Academy, from which he was graduated in June, 1863. He entered the service of the Pennsylvania Railroad in November, 1863, as a clerk at Corry, Pa. On June 15, 1903, he was transferred to the Long Island Railroad as general freight agent, and on Feb. 1, 1905, he was promoted to traffic manager of the Long Island Railroad. Donald Wilson, formerly special agent in Mr. Langdon's office, will be advanced to the position of general freight agent of the Long Island Railroad.

M. J. Feron, in addition to his duties as general superintendent of transportation of the Chicago (Ill.) Elevated Railways, has been appointed superintendent of transportation of the Chicago, North Shore & Milwaukee Electric Railway. J. W. Simons, the present superintendent of that road, will report to Mr. Feron. Mr. Feron has been connected with the elevated railway systems of Chicago for about twenty-two years. Previous to that he was for several years with the Chicago & Northwestern Railway as yard master. Mr. Feron entered the employ of the Metropolitan West Side Elevated Railway of Chicago as switchman, and since has served as dispatcher, train master and superintendent of that road. With the consolidation of the operating staffs of all the elevated railways in Chicago in the fall of 1911 Mr. Feron was appointed general superintendent of transportation. His duties are now extended to cover the 186 miles of high-speed, double-track suburban and interurban road connecting Chicago and Milwaukee.

R. J. Fallon, engineer of maintenance of way of the Chicago (Ill.) Elevated Railways, has been appointed chief engineer of the Chicago, North Shore & Milwaukee Electric Railway. He now has jurisdiction over the way and structures departments of all of the Chicago elevated lines, and will have charge of all of the engineering work on the double track interurban line which connects Chicago and Milwaukee. J. S. Hyatt, engineer of maintenance of way of the Chicago, North Shore & Milwaukee Electric Railway, will remain in charge of the way department, reporting to Mr. Fallon. Mr. Fallon graduated from De LaSalle Institute, Chicago, in 1890, and began work with the Chicago, Burlington & Quincy Railroad, in whose service he spent eight and one-half years, during which time he served as rodman, assistant maintenance engineer, locating and construction engineer, division engineer, Chicago division; assistant engineer and superintendent of track elevation at Chicago. In 1907 Mr. Fallon was appointed engineer of maintenance of way of the Metropolitan West Side Elevated Railway in Chicago, and in March, 1910, he was made assistant general manager of that road. With the consolidation of the operating staffs of all of the elevated railways in Chicago in the fall of 1911, Mr. Fallon was appointed engineer of maintenance of way of the Chicago Elevated Railways.

Thomas Penney, former president and for several years past general counsel of the International Railway, Buffalo, N. Y., has been elected a vice-president in addition to E. J. Dickson. This is a newly created position. Mr. Penney resigned as president of the International Railway and the International Traction Company in January, 1913, but continued as a director of the companies. He is a member of the firm of Norton, Penney, Spring & Moore, attorneys. Mr. Penney was born in London, England, and came to this country when a boy. He prepared for college at Williston Seminary, East Hampton, Mass., and after completing the academic course at Yale he took a law course of two years, graduating with the degree of Bachelor of Arts and Bachelor of Law and was admitted to the bar of Connecticut. In 1889 he began the practice of law in Buffalo and in 1895 became first assistant to the district attorney, which position he occupied for four years. A vacancy then occurred in the office of district attorney and Mr. Penney was appointed to fill that office. The following year he was elected to that office for a term of three years. He declined a renomination, and resigned, having become a member of the firm of Norton, Penney & Sears. Mr. Penney served as president of the local railway in Buffalo from 1908 to 1913.

OBITUARY

Leigh Stanley Bache died on Sept. 26. He was first vice-president and general manager of the Bound Brook Oilless Bearing Company, Bound Brook, N. J.

George E. Hill, a leader of the Fairfield County Bar, formerly president of the State Bar Association, and many times honored by selection to various offices, died at Bridgeport, Conn., on Sept. 30, in his fifty-second year. He had served for two years as a trustee of the Connecticut Company, which took over the electric railway holdings of the New York, New Haven & Hartford Railroad.

James Lumsden, treasurer of the Lumsden & Van Stone Company, steam piping engineers and contractors, Boston, Mass., died suddenly near Bingham, Me., on Sept. 25. Mr. Lumsden had been in poor health for two years. Besides his connection with the Lumsden & Van Stone Company, Mr. Lumsden was a director of the Federal Trust Company and was also prominent in Masonic affairs. He was fifty-two years of age.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Carolina Southern Railway, Orangeburg, S. C.**—Incorporated to construct a standard gage railroad from Orangeburg to Estill, S. C., about 60 miles. Electric or steam power can be used. Capital stock, $30,000; maximum $1,000,000. Incorporators: J. Leroy Dukes, Orangeburg; E. N. Mittle, Bowman, and W. C. Martin, Branchville.

FRANCHISES

Henderson, Ky.—The City Council of Henderson passed the new street car franchise on its first reading. Several changes were made in the ordinance as to fares, routes and time to make required repairs, in the event that the Henderson Traction Company becomes the purchaser. The new franchise is to continue for twenty years.

Moncton, N. B.—It is reported that this company has asked the City Council for a franchise to construct an extension of its line from the present terminus on John Street to the corner of Wilbur and Union Streets.

Portland, Ore.—A franchise granting the right to operate street cars over the interstate bridge across the Columbia River between Vancouver, Wash., and Portland, Ore., has been granted to the Portland Railway, Light & Power Company by the Pacific Highway Bridge Commission. By the conditions of the franchise, the Company is to maintain a thirty-minute schedule from 6 a. m. until 11.30 p. m. and payment to Multnomah County, Ore., and Clarke County, Wash., will be one-half of the profits of the company over operating expenses. The company will be obliged to install wires, poles and conduits for the operation of cars, and to maintain the tracks on the bridge, without expense to the counties.

TRACK AND ROADWAY

Mobile, Volanta & Pensacola Railway, Mobile, Ala.—This company, which was formerly the Mobile & Baldwin County Railroad, proposes to construct a 40-mile extension east to Pensacola, Fla. It is stated that the company will issue $100,000 bonds to secure funds for carrying out the work.

Pacific Electric Railway, Los Angeles, Cal.—This company will reconstruct its tracks on Santa Monica Boulevard, Sawtelle. New ties and the latest type of heavy T-rails will be laid and the pavement will be of asphalt with concrete base. Cobblestones will be laid against the rails.

Central Florida Interurban Railway, St. Cloud, Fla.—Right-of-way has been secured for most of the route of this company's proposed line from St. Cloud to the East Coast and to points in central Florida, and it was expected that surveys would be begun on Oct. 1. William Hall, St. Cloud, secretary. [Sept. 23, '16.]

Boise (Idaho) Railroad.—Work will soon be begun by this company on the reconstruction of its track on Warm Springs Avenue. A new concrete base will be laid under the track and 60-lb. rails will be used.

Pocatello Traction & Interurban Railway, Pocatello, Idaho.—According to reports, the Pocatello Traction & Interurban Company is considering the extension of its lines to the upper Snake River Valley, and on to Rexburg. The Rexburg Commercial Club is agitating the proposition. Clark Gibson, Pocatello, secretary of the company, has been delegated to find out the sentiment in the communities through which the proposed line will pass.

Lee County Central Electric Railway, Amboy, Ill.—This company's line south of Ashton, extending to Amboy, has ceased to be operated as an electric road and the wire has been sold. The road is now being operated by steam. It is stated that the line will be extended from Amboy to Reynolds Church.

Illinois Traction System, Peoria, Ill.—This company has announced that it will make a number of improvements in its track and roadway in and near Catlin.

Union Traction Company of Indiana, Anderson, Ind.—The Public Service Commission of Indiana has granted the Union Traction Company an extension of time until Nov. 1, 1917, to complete the installation of a block signal system.

Rockford & Interurban Traction Company, Rockford, Ind.—This company is relocating its tracks in the center of the street along the east end of Taylor's Park.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.—This company is constructing an extension of its line from Gypsum to Brushy, about 7½ miles. Contracts for the grading have been let to Donald Jeffery, Delmar, Iowa, and Duggan & Naylor, Omaha, Neb. Three bridges, two concrete box culverts and one 50-ft. deck girder span on concrete abutments, will be built by A. H. Neumann & Company, Des Moines. R. L. Cooper, chief engineer, has active supervision of the work.

Winnipeg (Man.) Electric Railway.—The Manitoba Public Utilities Commission has refused to grant a hearing on the application of the City Council to compel the Winnipeg Electric Railway to construct a temporary line on Sargent Avenue from Arlington Street to Wall Street.

Winnipeg, Selkirk & Lake Winnipeg Railway, Winnipeg, Man.—This company is double-tracking its line from the city limits of Winnipeg to Kildonan Park, about 1½ miles.

Cumberland & Westernport Electric Railway, Cumberland, Md.—It is reported that this company will reconstruct its line between Moscow and Barton, having obtained right-of-way which will shorten the distance between the two points.

Bay State Street Railway, Boston, Mass.—The Public Service Commission has approved the petition of the Bay State Street Railway for permission to relocate its tracks from Wyman Street to North Federal Street, Lynn.

Norfolk & Bristol Street Railway, Foxboro, Mass.—This company reports that it has ordered special work for a double-track connection with the Bay State Street Railway at Norwood, Mass., to be installed during this month.

Worcester (Mass.) Consolidated Street Railway.—The Public Service Commission has granted the petition of the Worcester Consolidated Street Railway to relocate its tracks on Water Street between West and Main Streets.

Kansas City (Mo.) Railways.—This company will construct an extension of its Broadway line to Twenty-fourth Street and to the Union Station as soon as permission is received by the Kansas City Terminal Company to use the Broadway viaduct.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—It is reported that work will be begun next spring by the Omaha, Lincoln & Beatrice Railway on the construction of an extension from Omaha to Lincoln.

New York Municipal Railway, Brooklyn, N. Y.—Bids will be received by the New York Municipal Railway until Oct. 16, for the installation of tunnel and station lighting equipment, etc., for the Broadway subway in Manhattan. Plans and further information may be obtained upon application to W. S. Menden, chief engineer, 85 Clinton Street, Brooklyn.

Interborough Rapid Transit Company, New York, N. Y.—Bids have been received by the Public Service Commission for the First District of New York for the construction of a railroad yard for the storage of subway cars in connection with the White Plains Road extension of the Interborough Rapid Transit Company. The yard is officially designated as the 239th Street yard, and will cover an area of several city blocks. Another yard is now being built at 180th Street and Bronx Park on the White Plains Road line. The 239th Street yard will make provision for 580 subway cars on 37 tracks, and an adjoining yard to be built on the same plot by the company will have a capacity for about 350 elevated cars. In order to prevent grade crossings at the entrance to the yard, the contract provides for the reconstruction of a portion of the White Plains Road structure south of the 241st Street terminal station. The Thomas J. Buckley Construction Company, New York City, was the low bidder for the construction of the yard at $372,392.

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Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio. — A contract has been awarded by the Cleveland, Southwestern & Columbus Railway to L. F. Gotte, Berea, at $40,000 for grading a new branch line around Berea.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.—The Ohio Valley Traction Company, a subsidiary of the Portsmouth Street Railroad & Light Company, is constructing an extension to Ironton and will enter the city over the Sixth Street route.

Tulsa & Oklahoma City Rapid Transit Company, Tulsa, Okla.—S. A. Horton, attorney, 415 to 418 Baltimore Building, Oklahoma City, Okla., who is interested in the promotion of the Tulsa & Oklahoma City Rapid Transit Company, announces that construction work will be begun Oct. 20. It is said that right-of-way from Tulsa to Oklahoma City has been secured and all matters relative to bonuses arranged. The line will be about 170 miles long. [Apr. 17, '15.]

Guelph (Ont.) Radial Railway.—This company will reconstruct about 3000 ft. of track on Ogilvie Street, Guelph, next spring.

Portland & Oregon City Street Railway, Portland, Ore.—Work on the Portland & Oregon City Street Railway from Powell and East Twenty-second Streets to East Third and East Clay Streets in Portland is progressing very rapidly, and it is thought the Portland end of the railway will be completed the latter part of this month. Heavy steel rails are being laid.

Philadelphia, Pa.—Sealed proposals will be received by William S. Twining, director Department of City Transit, 754 Bourse Building, Philadelphia, until Nov. 2 for the construction of a section of the Broad Street subway, comprising a portion of the station under City Hall and the Market Street subway and work appurtenant thereto, known as Contract 102. This section will be about 300 ft. long and 106 ft. wide, embracing four tracks with two station platforms, and will include the underpinning of the west side of City Hall and also the Market Street subway.

Pittsburgh (Pa.) Railways.—The petition of the Monongahela Street Railway and the Pittsburgh Railways to the Public Service Commission for permission to tear up the double tracks on Eighth Street between Talbot and Braddock Avenues has been granted by the commission with modification. In the petition it is requested that no municipality be permitted to grant a corporation right to lay tracks on the street. The commission holds that the rights of future traffic cannot be jeopardized and that any time after ten years the company may be ordered to restore the tracks.

Three Rivers (Que.) Traction Company.—This company is completing the construction of an extension of its line from Three Rivers to Cap de la Madeleine, and it is expected that operation will be begun this month.

Saskatoon (Sask.) Municipal Railway.—About 1200 ft. of double track has been laid by the Saskatoon Municipal Railway on the new Twenty-fifth Street bridge and it is expected that the bridge will be opened for traffic by the end of October.

Galveston (Tex.) Electric Company.—This company is laying new rails on Winnie Street from Thirty-third to Forty-first Streets, also on Forty-first Street from Winnie Street to Broadway.

Paris (Tex.) Transit Company.—The City Council and the Paris Transit Company have reached an agreement whereby ornamental iron poles will be used for supports for the company's trolley wires on the public square, and the city will attach brackets and use the same poles for street lighting purposes.

Blue Ridge Light & Power Company, Staunton, Va.—This company has decided to make improvements and extensions in its street railway system and to add new cars and carhouse facilities and has employed W. E. Moore & Company, engineers, Pittsburgh, Pa., to supervise the construction. It is expected that these improvements will be completed by the early spring of 1917.

Monongahela Valley Traction Company, Fairmont, W. Va.—A report from the Monongahela Valley Traction Company states that it expects to place contracts within the next three weeks for the construction of a ½-mile extension and paving in Stealy Heights addition to Clarksburg and a ½-mile extension to Lumberport.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—The Public Utilities Commission of Ohio has granted the Kanawha Traction & Electric Company permission to issue $1,700,000 of 5 per cent bonds, $40,000 of which is to be used in improvements in the property in Parkersburg and $33,000 for the construction of a reinforced concrete viaduct at Boaz.

Norfolk & Western Railway, Roanoke, Va. — Extensive improvements, involving an expenditure of between two and three million dollars, will be made by the Norfolk & Western Railway within the next few months. Among the improvements planned is the extension of the electrification of its system on three divisions.

West Virginia Traction & Electric Company, Wheeling, W. Va.—Work will soon be begun by the West Virginia Traction & Electric Company laying new rails at various points along its line. New track will be laid at Fulton and Woodsdale Streets and at the curve at Echo Point.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will construct a depot at the corner of North Lemon and West Maple Streets, Orange.

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received by George H. Pegram, chief engineer, 165 Broadway, for the completion of the passenger station electric lighting and electric heating systems for Routes 36 and 37, Borough of Queens, and the Jerome Avenue and White Plains Road lines in the Borough of the Bronx, Routes 16 and 18.

New York Municipal Railway, Brooklyn, N. Y.—Bids will be received by the Public Service Commission for the First District of New York until Oct. 19 for the construction of concrete track floors and platforms over the mezzanines of eleven stations on the Culver line.

Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.—It is reported that this company will construct a carhouse and repair shops at the junction of the Alliance and Warren divisions in Ravenna.

Oshawa (Ont.) Railway.—A report from the Oshawa Railway states that during the next few weeks contracts will be placed for the construction of a heating chamber and for the installation of a complete steam-heating system in the carhouse and workshops at Oshawa.

Toronto (Ont.) Civic Railway.—A nine-car addition is being built to the carhouse of the Toronto Civic Railway at St. Clair Avenue, Chalkley & Sons, Toronto, being the contractors.

Monongahela Valley Traction Company, Fairmont, W. Va.—This company reports that it expects to place contracts within the next three weeks for the construction of a small storage barn at Gypsy, W. Va.

Norfolk & Western Railway, Roanoke, Va.—Among the improvements being planned by the Norfolk & Western Railway is the construction of a new freight station and additions to its shops in Roanoke.

POWER HOUSES AND SUBSTATIONS

Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col.—Extensions are being made to the plant of the Trinidad Electric Transmission, Railway & Gas Company, including the installation of a 5000-kw. turbine. Haller & Krumbhaar, 68 William Street, New York, consulting engineers.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa.—This company will construct a substation at Brushy, Iowa.

Morris County Traction Company, Morristown, N. J.—A report from the Morris County Traction Company states that a new substation is being built at Dover, N. J. The company has just received a 500-kw. rotary converter outfit from the General Electric Company.

International Railway, Buffalo, N. Y.—Plans are being made by the International Railway to construct a substation at Twenty-fourth Street and Allen Avenue, Niagara Falls.

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Manufactures and Supplies

TENDENCY STRONG FOR MOTOR-SIZE STANDARDIZATION

Myles B. Lambert Urges Adoption of a Few Standard Motors—Operating Officials Aid Motor Development—Circuit Breakers vs. Fuses on Cars

Standardization of railway motors is nearer than ever before, and railway men and motor designers are showing a stronger and stronger tendency toward this goal. These statements and those that are reported in the following interview were recently made by Myles B. Lambert, of the Westinghouse Electric & Manufacturing Company, to a representative of this paper.

Mr. Lambert said that the need for motor standardization is recognized on the score of service efficiency and economy.

Until recently, however, the electric roads as a class have not seemed to have a full understanding of just what the standardization of their motors would mean. There are now, including foreign and locomotive motors, approximately seventy-five types and sizes which the manufacturers are called upon to build. This is a greater variety than is necessary. All service requirements could be met by six types, within the range of 25 to 100 hp. Notwithstanding the multiplicity of designs and sizes available, the manufacturers are regularly confronted with demands for detail changes in motors that have excellent road records and for the inclusion in the design of what might be characterized as fads. The interpole railway motor has been on the market about ten years, and it is significant that during this time there have been only one or two motor designs that may be said to have remained standard for a reasonable length of time.

In earlier days the Westinghouse 101-B and the General Electric 80 motors were accepted very largely as standard motors. After their acceptance the engineering departments of the manufacturers, not being required to continue the redesign of these motors, could afford to devote a proportionately greater amount of engineering study and refinement to the two types mentioned. This benefited the purchaser as well as the manufacturer. One of the developments of this particular work was the spring cushioning of field coils. Purchasers of railway motors call for so many capacities, presumably to meet various local conditions, that the manufacturer cannot devote the same amount of engineering study toward the final refinement of any one type of motor as would be given to development work if there were fewer sizes of motors to be manufactured. For these reasons, as well as for reasons of economy in manufacture and sale, it is urged that the roads adopt a smaller number of types of motors within a given range of horsepower.

Undoubtedly a great deal of the credit for the development of the railway motor to its present high state is due to the co-operation rendered by railway officials. For service data and for authoritative opinions on the value of changes in design, the manufacturers put great reliance on the observations of the operating engineers. For that reason, as well as for the good of the industry, the manufacturers are desirous that the roads maintain the personnel of their mechanical staffs at the highest possible point. Operating men of high mechanical ability probably do as much to develop the technical side of railroading as the men in all other departments of a road. Only by the co-operation between the manufacturers and the mechanical officials has it been possible for the electric railway motor to reach its present highly developed state, and to be able to render the remarkable service that is reported for the newer types of equipment.

Reverting to standard motors, it is quite clear that if there were fewer types to be manufactured more time could be devoted by both the manufacturer's development department and by the operating officials to the improvement of details of each standard motor based on service tests. It is true that with such a great multiplicity of motor designs, all of which stand up very well for a number of years, no great amount of time is availbale for thoroughly studying each principle and for improving any one type, because at the end of the normal life of a motor a new type is called for.

The motor of to-day for any given rating is called upon to do its work under more severe operating conditions than ever before. Cars accelerate faster because there is less voltage drop in the distribution system. Consider, for instance, the power distribution networks of to-day as compared with those of ten or fifteen years ago. Now, the trolley wire in the large cities is supplemented by an enormous amount of copper, fed from rotaries of great capacity. The track rails are welded or heavily bonded and even supplemented with continuous return copper. Thus the drop in the voltage due to the load, even though the load may be caused by a blockade, is relatively small, and the motor of a given capacity operating on a city system thus equipped performs a proportionately higher duty than the same motor in earlier days or than it does even to-day on smaller roads with their lighter distribution circuits. Higher mechanical strains and electrical stresses also must be met.

These conditions and the general appreciation of a motor built to require little maintenance expense have brought into quite general favor the solid-frame, box-type motor. In heavy city service the split-frame motor will not make the same record for low maintenance cost as the box-type motor. The split frame, where subjected to the stresses of heavy service, is less rigid and in consequence demands earlier attention for maintenance of such parts as loose housings and bearings, worn-out brush-holders, loose bolts, etc.

Standard multiple-unit control equipment is fairly well established. New types were recently developed to accommodate all types of cars, including the low-floor design. The multiple-unit type is rapidly becoming popular for city service, even where single cars are used. Among the large companies using this type are the Boston Elevated (surface lines), New York Railways, Third Avenue Railway, Brooklyn Rapid Transit, Public Service Railway, Toledo Railway, Mahoning & Shenango Valley Railway, Scranton Railways, United Railways of Baltimore, Pittsburgh Railways, United Railroads of San Francisco, and many other smaller properties.

There is, however, a great opportunity for economy in standardizing methods of installation and car wiring. The average car builder and railway operating engineers are in doubt as to how much to charge or estimate for installation of equipment. A car builder, in order to be safe in his estimate, must add a contingent allowance, because hardly any orders of control are installed in accordance with the plans followed on any previous job.

There is an opportunity here for the equipment committee of the American Electric Railway Engineering Association to establish standard methods of installation showing desired clearances, sizes and arrangement of conduit and car wiring, which are now lacking, and which the control manufacturers and car builders would all understand and work toward.

Speaking of circuit-breakers, Mr. Lambert said that the car circuit-breaker has become merely a canopy switch on those large city systems which have enormously heavy feeder and return circuits. When there is a short in the motor an enormous amperage is drawn from the heavily fed line, and it is almost without the possibility of commercial manufacture to build circuit-breakers that will safely and repeatedly handle such disturbances, particularly so since the circuit-breaker is mounted in the vestibule. Several years ago Mr. Olds, then superintendent of equipment for the Milwaukee Electric Railway & Light Company, fused each motor and urged the more general adoption of his practice. Mr. Lambert thinks that this safety method will later become general practice, namely, the use of a fuse on every motor in addition to a circuit-breaker or a high-capacity limit switch.

Because of the abnormal conditions existing in the raw materials field, engineers have found it necessary to substitute certain equipment parts so that available materials

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could be used in place of those on which the supply is extremely restricted. For example, the asbestos market is glutted, and it is practically out of the question to secure the necessary quantity of asbestos heretofore used in railway equipment construction. Therefore, the manufacturers have employed treated cloth wherever possible. During the summer it was almost impossible to obtain tin, and the Westinghouse development department perfected a very high-grade lead base alloy. This bearing metal has demonstrated itself, it is said, to be the equal of the tin base alloy, and it may be adopted generally later, a plan which would reduce maintenance cost.

The Westinghouse Electric & Mfg. Company's plant at East Pittsburgh is busier than ever before. There are now more than 29,000 people on its payroll, which amounts to nearly $2,000,000 a month. A very small part of this organization is employed in munitions manufacture. That work has practically all been removed from the East Pittsburgh plant of the Electric Company to other buildings especially devoted to munitions manufacture. Prices on railway equipment and supplies now seem to be at a maximum, and there has been no basic increase since the 1st of August. Deliveries on railway motors are quoted at from six to eight months, based on copper delivery.

ROLLING STOCK

Levis County Railway, Levis, Quebec, is constructing two 32-ft. single-truck cars in its own shops.

Louisville (Ky.) Railway is contemplating the purchase of three trail, baggage and freight cars, 40 ft. over-all.

Blue Ridge Light & Power Company, Staunton, Va., is contemplating the purchase of six light-weight one-man cars.

Montgomery Light & Traction Company, Montgomery, Ala., has purchased five 21 E trucks from The J. G. Brill Company.

Grand Rapids (Mich.) Railway will purchase about Feb. 1, 1917, fifteen single-truck, double-entrance, pay-as-you-enter motor cars about 45 ft. over-all.

United Railways & Electric Company, Baltimore, Md., has issued invitations for tenders covering the furnishing of seventy-five double-truck, semi-convertible, four-motor, pay-within cars, together with all appurtenances. Bids are to be submitted not later than noon, Oct. 16.

Corning & Painted Post Street Railway, Corning, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 12 as having ordered four cars from the Southern Car Company, has received this equipment. These cars are arranged for double end operation either as one or two-man cars and are mounted on Philadelphia Holding Company's radial axle trucks with 11 ft. 6 in. wheelbase and are equipped with G E 258-B motors.

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received from the Connecticut Company a large order for overhead material, consisting of trolley frogs, trolley ears, crossovers and section insulators.

Western Electric Company, New York, N. Y., announces the removal of its offices and show rooms in Buffalo from 98 Terrace to 709-711 Main Street, where two large show windows afford splendid display facilities. J. W. Tabb is the manager.

Charles Lounsbury has been elected president and general manager of the American Railway Supply Company to take the place of the late Walter Chur, who died on Aug. 29. Mr. Lounsbury has been with this company for thirty years and was formerly assistant to Mr. Chur.

Robert C. Clifford, who for the past four years has been district sales manager of the U. S. Cast Iron Pipe & Foundry Company, in charge of their St. Louis and Kansas City offices, is now associated with the Walter A. Zelnicker Supply Company, St. Louis, Mo., in charge of its rail department.

McKeen Motor Car Company, Omaha, Neb., is shipping a 55-ft. 200-hp. composite McKeen motor-car to the Lakeside & Marblehead Railroad. The car makes the trip under its own power in charge of a demonstrator from the works. It is to operate on the 8-mile line between Danbury and Marblehead in Ohio.

G. L. Simonds & Company, Chicago, Ill., announce a change in name. In the future the company will be known as the Vulcan Fuel Economy Company. The personnel and policies of the organization remain the same. The only change, in addition to that of the name, is an increase in capital, the better to handle the company's growing business.

Holden & White, Chicago, Ill., have been appointed general sales distributors by the Safety Appliance Company of Chicago, manufacturers of locomotive and electric railway car sanders and sanding devices. This will mean the introduction to the electric railway field of the Reliance air sander, which provides for positive delivery of sand to the rails.

Edgewater Steel Company, Pittsburgh, Pa., which was recently incorporated, has completed the details of organization and has purchased the plant of the Kennedy-Stroh Corporation at Oakmont, Pa. In addition to carrying on the lines of manufacture in steel and brass formerly handled at this plant, new construction is now under way to give this company a well-equipped plant for the manufacture of locomotive and car-wheel tires, rolled-steel wheels, gear rims, roll shells and turbine rings.

Lindsley Brothers Company has removed its general sales offices from Minneapolis to 832-34 Edison Building, 72 West Adams Street, Chicago, Ill. District sales offices will be continued both in Minneapolis and St. Louis. Headquarters will continue at Spokane, Wash., as in the past. To further improve its service to pole users the general sales offices in Chicago have been divided so that an expert will be in charge of each line of the business. G. L. Lindsley will be available at all times for consulting service, R. L. Bayne, for many years in charge of the service department, will devote his entire time to seeing that all requirements are properly taken care of, and H. S. Sines will devote his time to assisting customers in selecting the proper materials.

The Ackley Companies, represented by G. S. Ackley & Company, 50 Church Street, New York, N. Y., report a very satisfactory increase in export orders for material handled exclusively through the New York company and through various agencies. Among orders recently received for Ackley adjustable and No-staff brakes are a number from South Africa, Japan, Australia, New Zealand, Cuba, Russia, England, Chile, Brazil and Argentina. Many orders for Tool Steel gears and pinions have been received for use in mine tram cars and other industrial plants for Norway, Sweden, Holland, Russia, France, Italy, Greece, South Africa, Australia, New Zealand and Cuba. Orders for Wasson air-retrieving trolley bases have been received from Peru and Australia. They also report a very satisfactory domestic business on the Automatic trolley guard and on renewable fuses.

ADVERTISING LITERATURE

American Steel & Wire Company, Chicago, Ill., has issued a manual of its process of water purification with sulphate of iron.

Universal Safety Tread Company, Boston, Mass., has issued an illustrated circular on Universal safety tread for school work.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued the bulletin No. 207, giving a partial list of the material it has on hand.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued an illustrated circular, printed in two colors, describing the Drew protective and reclaiming pole sleeve.

Dearborn Chemical Company, Chicago, Ill., has just issued a booklet entitled "Incrustation, Corrosion, Foaming and Other Effects of Water Used in Steam Making and Methods of Prevention." The booklet is divided into three chapters, chapter 1 describing corrosion and its causes; chapter 2, incrustation; and chapter 3, foaming. A detailed description of the service rendered by this company is also given.

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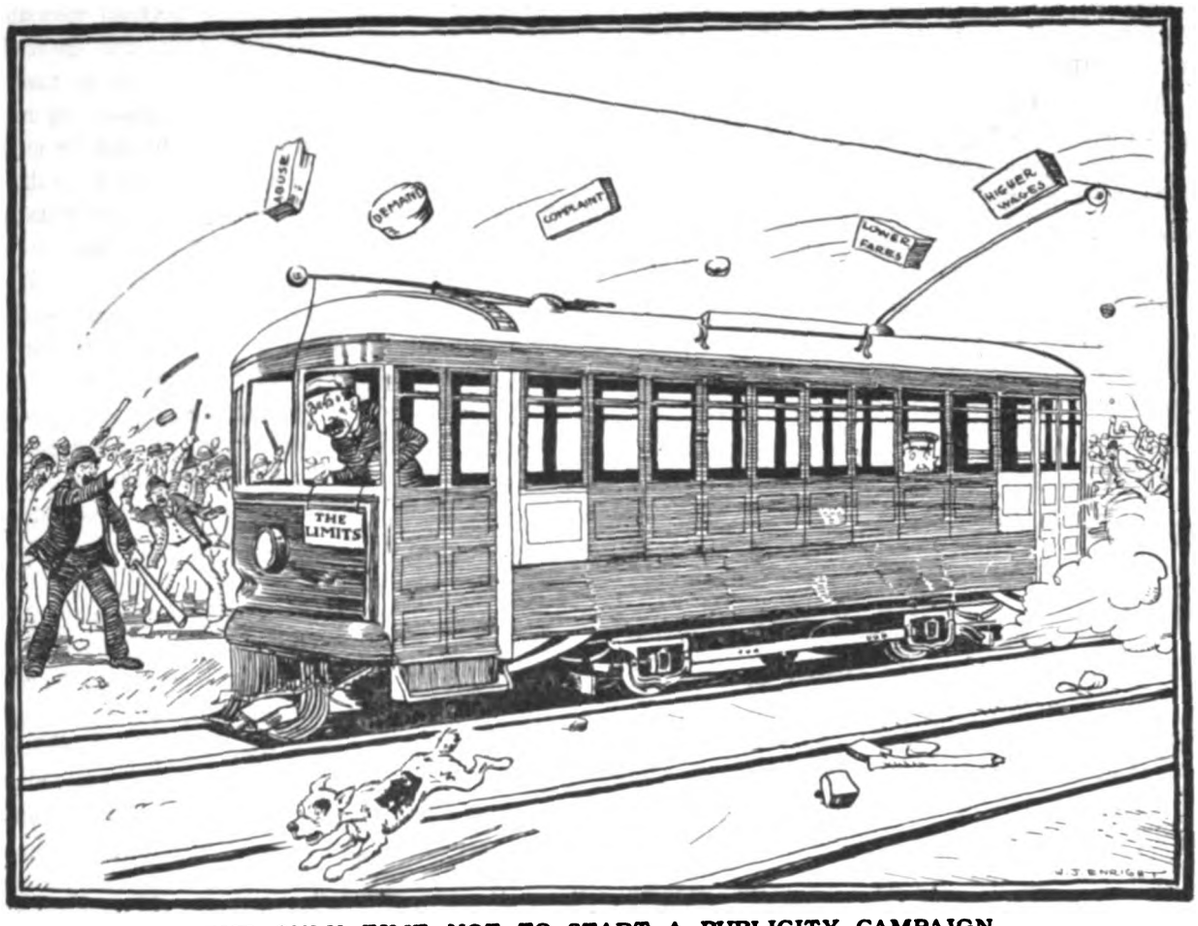

THE ONLY TIME NOT TO START A PUBLICITY CAMPAIGN

What Is the Best Time for a Publicity Campaign?

Almost everybody agrees that publicity is the best policy.

Two questions remain: When? How?

The best time for publicity is NOW and all the time hereafter.

The only time not to start a publicity campaign is when the air is full of bricks thrown by citizens, officials, politicians and strikers.

Corporation publicity is not an umbrella for a sudden thunder shower.

It is a permanent shelter from misunderstanding, unreasonable attack, unfair dealing; and permanent shelters are not built in a day.

Think over the publicity campaigns you know about. Nine out of ten have been started in a crisis.

For years armor plate manufacturers allowed to exist unchallenged the belief that armor—some of it blow-holed—was being foisted upon the government by a little coterie of greedy manufacturers at enormously profitable prices.

These manufacturers waited until the Senate had passed a bill to establish a government armor plant and not until then did they start to show that their armor had been good, had been sold on a small margin of profit, at a lower price than any other government pays, and would be sold in the future for less than it would cost the government to make it.

Do not make the Bethlehem (Pa.) mistake; follow rather the example of Rehoboam of Bethlehem in Judea, who "fortified the strongholds and put Captains in them, and store of victual, and of oil and wine."

For if you are a public service corporation there is a prospective crisis of some kind staring you in the face.

It may be labeled "Franchise Renewal," "Labor Trouble" or "Service-at-less-than-Cost," but it is there in the road ahead.

Publicity is preparedness against these specters.

Publicity is a short name for a big, broad policy of day by day, in season and out of season, keeping the public well informed as to facts, the knowledge of which will create belief and confidence in your honesty, good intention and good-as-can-be performance.

Confidence cannot be created in a day; it can only be created by consistent and persistent education.

The time for publicity, then, is like the need for it, and that is all the time.

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CONVENTION OF THE AMERICAN ASSOCIATION

The thirty-fifth convention of the American Electric Railway Association ended yesterday and compares well with any of those which have preceded it. Atlantic City always brings out a large attendance, and the convention this year was no exception to that rule. The final figures of attendance had not been compiled at the time this page went to press, but the tentative figures indicated a considerably larger number of persons present than at the 1914 convention, the last previous one in Atlantic City. The exhibits, although less numerous than hitherto, were good in quality and especially interesting. Perhaps the absence of a special exhibit last year added to the interest with which the exhibits were viewed.

The speakers on the program of the American Association consisted of Colonel Baker and Captain Wilson, who spoke on preparedness at the meeting on Tuesday; Ivy L. Lee, who presented an address on publicity on Wednesday, and the historical talks on Thursday. We have not included in this list the excellent paper by Mr. Kealy on valuation, that being really a part of the report of the committee on valuation. Of these addresses, the one most closely related to the internal affairs of the companies was that by Mr. Lee, and we hope that his straightforward treatment of the subject of publicity will be of help in shaping the future policy of both the individual companies and the association on this important subject. There is no mystery about modern methods of publicity, as we have pointed out many times in these columns, and as we are showing in the series of cartoons now being published in this paper. But if effective results are to be secured those who are endeavoring to secure publicity must be in thorough sympathy with both the idea of publicity and the manner of living which makes such a policy effective. We wish that the association, which is the logical body through which the local companies should co-operate in their individual campaigns, would do more to help the local companies in this regard.

A notable feature of the American Association committee reports was the report presented by Mr. Mortimer in behalf of the sub-committee on social relations of the committee on public relations. Owing to length of this report it is impossible to print it in this issue, but it will be published next week. It shows what can be done for the industry by assiduous work, and it can well serve as a model next year for all the other subcommittees of the committee on public relations as well as for the main committee. Public relations are generally recognized as being the most important subject before the association. Proper attention to this matter is the foundation of the fare question and the franchise question because unless the authorities and the public understand the problems of the railways improvement in their condition is almost hopeless. In our opinion the time has come for serious realization of this situation. The public relations committee must do much more than it has in the past if it expects support from the industry. It should cease to mark time and should lead in this important matter.

PROGRAMS OF THE AFFILIATED ASSOCIATIONS

As the Atlantic City convention closed but yesterday, it is difficult to view it in true perspective at such close range. However, it is possible to indicate a few high points in the proceedings of the affiliated associations which are significant of current tendencies in the work of these associations.

The engineers seemed most concerned with the promulgation of standard specifications for materials and manufactured products. A great deal of money and a much greater deal of time, as measured in terms of money, have been expended in producing an imposing array of standards. At the present time the standards seem to be getting ahead of the industry, and the pressing problem before the Engineering Association is to secure a wider adoption of them. The association may well pause in the development of new standards, as it proposes to do, and study the adaptation of the present standard to operating conditions, as well as try to educate the industry in the economical adaptation of the standards to its requirements. It is easier to understand the present condition when one considers the enthusiasm, assiduity and thoroughness with which the compilation of the *Engineering Manual* has proceeded.

The Transportation & Traffic Association has been undergoing a heart-searching process during the meeting just closed which is very creditable to it, especially in view of its present and past achievements. This association has problems which are, perhaps, the most difficult of all to solve. In contemplating the magnitude of its field the Association has undertaken ambitious researches. In these much has been accomplished. However, as the Association frankly says, the problems have been so large that it has been difficult to obtain definite solutions or to affix the "Q. E. D." at the end. As one T. & T. official said to the writer, at the convention, "Our problems are very intangible, and therefore difficult of solution. We can well envy the engineers, who seem to be able to proceed from premises to conclusions. Mathematics doesn't help the transportation men much."

The Claims Association meeting this year illustrated the fact that the legal aspects of claim work are rapidly becoming subordinate to the larger phases of accident reduction. The claim agent has no reason to apologize for his existence. Humanitarianism comes within his ken as well as the making of a just settlement. He is perfectly willing, on behalf of his company, to acknowledge fault in case of accident, if such exists. He wants justice for the present, and knowledge of how to avoid a repetition of the accident for the future. If we gage the situation correctly, these were the underlying principles of this year's association program. The Accountants' Association meetings are discussed in the next column.

The convention is over, and we hope that the managements of our electric railway properties will realize the importance of having their subordinates assimilate the fruits of this convention and lend a hand in carrying out the plans which are being formulated.

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FACTS—AND THE WIDER VISION

Running through all the varied papers presented before the Accountants' Association this week was the idea that actual facts are needed for the solving of many electric railway problems. The efficient ascertainment and collation of facts through the use of an expert statistician, the thoroughly consistent use of facts instead of mere opinions in going value and other valuation matters, the frank presentation of facts to the public on franchise, investment and operating points—all these were among the matters touched upon at the several meetings.

Utility accountants are accustomed to dealing with facts, but those officials who in general determine public relations policies do not all rigidly adhere to facts in their publicity work. Too often argument and opinion take the place of actual data, or debatable theory the place of indisputable actuality. Moreover, the public often acts through prejudice, distrust or mistaken opinions about utilities. Such, of course, should not be so in either case. As Professor King stated, the modern utility and the public both have duties that are by no means antagonistic. On the one hand, the utility should present at all times facts and facts alone; on the other, the public should base its judgments on facts and nothing but facts. In no other way will the public relations of utilities show the desired improvement.

The association this year showed commendable progressiveness in the desire to secure criticisms from outside experts capable of analyzing its work in an unprejudiced way. There seemed to be, however, a tinge of disappointment when one speaker touched upon what he deemed to be inconsistencies and fallacies in commission accounting regulations, thus indirectly hitting at some of the provisions of the electric railway classification of accounts. We are not in accord with some of his criticisms, but, leaving this aside, we wish that the accountants had met more directly the points at issue.

The standard classification of accounts, without doubt, represents the laudable achievement of men trained by actual experience as to the needs of the industry, and changes in it should be made only after a most considerate examination of their worth. On the other hand, it will doubtless be susceptible of at least slight modifications under the laws of progress, and it is quite possible that with his wider vision the certified public accountant may in time see fundamentals underlying all industry to which the electric railway classification should be brought more closely in accord. Whether the future may bring actual changes or not, however, it is vitally necessary that the members of the Accountants' Association continue to hold an open mind on the subject, and that in mutually felicitating themselves as to past accomplishments they do not neglect to consider with all seriousness the best in modern accounting, wherever developed or by whomsoever suggested. Blind worship of the past or a Pharisaic attitude of superiority would only dim the luster of past accomplishments.

MANUFACTURERS IN THE ASSOCIATION

Although progress was made at Atlantic City this week in determining the future status of the manufacturers in the American Electric Railway Association much remains to be done. The Manufacturers' Association will be continued, and this we consider a wise move if for no other reason than that it provides a medium through which the manufacturers may exchange views as regards matters which come up in association work of special moment to them as a group. Later it may seem wise for the Manufacturers' Association to apply for an affiliated association charter, although such a charter necessarily would have to be quite different from those of the existing affiliated associations, as the purposes of the Manufacturers' Association are different from those of the present affiliated associations.

It has also been decided that manufacturers' representatives will be eligible for appointment upon any of the committees of the parent and affiliated associations where the services of such representatives would be of value to the industry and that the manufacturers as a whole will be represented by five members on the executive committee of the parent association. As this committee has consisted hitherto of nine members, this will mean that the committee will be increased to fourteen and that the representation of the manufacturers will be more than one-third of the whole. In this connection it might be said that the aggregate amount of dues paid by the manufacturing companies for the ten months' period of the association ended Aug. 31, 1916, the period shown in the secretary-treasurer's last report, were about 11½ per cent of the aggregate of those paid by the railway companies. But last year was a half year for the manufacturers, and with a full year and the same membership the dues would amount to practically 23 per cent. If the rent of exhibit space is added, it would make an additional 26 per cent, while the money contributed through advertising in *Aera* would add another 25 per cent of the annual dues of the railway companies during the last fiscal period. The total of these contributions then would be 75 per cent of the dues of the railway members, if we assume the same membership this year as last year.

We do not quote these figures as an argument for a larger representation of the manufacturers on the executive committee now because we realize that the representation need not be exactly proportioned according to the funds paid into the association's treasury and also because we realize that many details of the organization still remain to be worked out. Indeed, this is one of the principal duties of the incoming executive committee. We believe, however, that certain main principles should be recognized in this reorganization. One of these principles is that member companies, both railways and manufacturers, are on the same basis so far as privileges and responsibilities of office are concerned. The association is no longer one of railway men alone, and while it may seem strange for manufacturers to be eligible for the vice-presidencies or the presidency of the association we see no alternative if the member companies are to be equal in every respect.

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Achievements and Prospects*

A Review of the Activities of the Association During the Past Year—Effects of the European War on the Electric Railway Industry

By CHARLES L. HENRY

President Indianapolis Cincinnati Traction Company, Indianapolis, Indiana, and of the American Electric Railway Association

Mr. Henry began his speech with a reference to the meeting last year in the Far West and spoke of the impressions made on those who took the trip, of the marvelous electric railway transportation systems inspected, the royal entertainment provided to the delegates, and the pleasure of the many meetings with friends, old and new. Taking up the problems of the industry he continued as follows:

THE twelve months' cycle now ending is one that will be long remembered. The great European war, in which there are now fourteen countries involved and which has been in progress more than two years, still continues with unabated fury. So wonderful and far-reaching has been the influence of this war that the United States not only has not escaped from its influence, but, on the contrary, every channel of business, all the industries of the country, all the people of the country—bankers, tradesmen, manufacturers, workmen and farmers—all to a greater or lesser extent have been and are vitally affected. Many of our manufacturing industries are crowded by the production of war munitions and other war supplies. Exports of the products of our factories and farms, furnished to the nations at war, have in turn brought back a stream of gold into the pockets of the American producers. The profits arising from this export business, occasioned by this unusual and extraordinary demand from across the sea, have been such as to intoxicate the American people, and spreading out from the business centers, into almost every channel of trade and into every community throughout the land, there has developed a feverish, unnatural and unhealthy condition, until the American people have almost lost their moorings.

Prices of all commodities, products of the farm and workshop, have increased to such an extent as could not have been anticipated in a country not in actual war; speculation of all kinds has been stimulated, and a quiet people, who have heretofore always been content with ordinary business conditions, have been carried away into the whirlpool; usual every-day business has become insipid, and nothing in a business way that does not promise quick returns and immense profits seems to satisfy their desires. Employment under ordinary conditions and at even reasonably advanced wages is by the workmen looked upon with contempt. In order to secure the necessary workmen in factories producing war supplies bringing enormous profits, wages have been abnormally advanced and workmen have been enticed thereby from their ordinary avocations. The whole industrial body has become restless and dissatisfied, demanding increased wages, sometimes justified, but in many cases wholly without the bounds of reason. This very naturally has been accompanied by a decreased interest in the work, and altogether there have been created conditions which make it impossible for an ordinary business to be conducted in a successful and profitable manner.

From the injurious effects of this general condition our industry has not escaped. The cost of all supplies for maintenance of our properties has been greatly increased; it has been necessary to increase the wages of employees in order to hold them and to help them, as far as at all possible, to meet the advanced cost of living with which they have been brought face to face; taxes have been made higher because of reckless appropriations and expenditures by legislative bodies and public officials, this being always incident to such conditions as now surround us. From all these we suffer and are not able in turn to increase the price of what we have to sell. Almost all other lines of industry, when the cost of production increases, can save themselves from the effects thereof by increasing the price of their product. The prices we receive for transportation of passengers, freight and express are fixed by ordinance, by law or by the regulations of some commission. Between the increased cost of production on the one hand, and no increase of compensation on the other, many

*Abstract of address of the president of the American Electric Railway Association delivered on Oct. 10, 1916, before the convention in session at Atlantic City, N. J.

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of our companies have suffered almost to the point of utter destruction.

Even in communities where, by reason of the stimulated business conditions, there has been a great increase in the number of passengers carried, the increase in income has been greatly, if not entirely, offset by the increased cost of operation.

CONDITIONS TO BE MET AFTER WAR

When the European war will close; whether we ourselves may not yet be drawn into it; or what may be the final effects upon our business conditions, are all matters of speculation, about which none of us can possibly speak with anything like certainty. This much we do know, however, that even if the war comes to an end in the near future, its baneful effects upon our business and industrial life will remain with us as a curse for many future months, if indeed it does not remain in perpetuity to injure and hamper us in many devious ways. Only after many years can we at all hope that the people will again be satisfied with ordinary business conditions such as they were accustomed to before the war, and during all of those years our industry, like others, will suffer from the conditions born of the war.

In the European countries, now being devastated, there is being forced upon their people, by reason of the demands growing out of the war, the most wonderful industrial efficiency that the world has ever seen. May we be permitted to hope that this country will not stand idly by and suffer the serious effects of the keen competition which this foreign efficiency is sure to bring, but will use every means possible not only to protect our home markets but to build up our own industrial efficiency to its highest point, so as to equal, if not surpass, the industrial efficiency of our European competitors. If this hope can be realized, we may see such a development in a business and industrial way within this country as has not heretofore been dreamed of. If this is done, we shall attract to our shores many people from the better portion of the population of foreign countries, who will be anxious to escape from the destructive taxation sure to follow the war, and we shall become a greater nation than ever contemplated by the wildest imaginations of our most enthusiastic citizens. It is to the future growth and development of the country that we must look for the curing and overcoming of evils coming to us as a result of the European war.

Surrounded, as we have been, by many discouragements during the past year, this association has gone steadily forward working for the industry it represents, holding what ground it could and advancing wherever possible, and has made a record for the year of which it may well feel proud.

MEMBERSHIP OF MANUFACTURERS

As an outgrowth of a recommendation made by President Allen at the San Francisco convention, the association, last February, at the mid-winter meeting in Chicago, changed its constitution so as to admit to full membership in the association companies and individuals engaged in the manufacture and sale of electric railway supplies. For a number of years past the American Electric Railway Manufacturers' Association, composed of manufacturers and sellers of electric railway supplies, had done active and efficient work in connection with this association in providing for and taking care of the exhibits and the entertainments at the annual meetings of the association and in many other ways aiding in the work in which we were engaged, but until the amendments to the constitution referred to were made, we did not have these people as members of this association, meeting with us around the council board, discussing and helping to shape the policies of the association, and uniting their efforts with the railway members in the committee work and other activities of the association. Today, as a result of these amendments, for the first time in the history of the association, we have seated with us, as full-fledged members, men engaged in the manufacture and sale of electric railway supplies. This increased membership has brought and will bring to us greatly increased strength and efficiency. The wisdom of the change has been strongly shown by the ready and enthusiastic work which has been done by the various committees largely composed of manufacturers, to whom was intrusted the arrangements for the exhibits at this convention, and by whom the various entertainment features have been provided. No more prompt and effective work has been done by any committees of the association during the past year, and this week you are the favored beneficiaries of this work.

The association committee on company membership consisted originally of railway men only, because when it was appointed the membership of the association was limited to railway men. To this committee there was added a like number of manufacturers, and they at once entered upon the work intrusted to them and have exhibited great efficiency therein. The success of the convention proper, the wonderful exhibits prepared for our inspection and the heretofore unsurpassed program of entertainments, all attest the enthusiastic spirit with which our enlarged membership has taken hold of the work. Recently, when it was found necessary to send

Getting at the Root of the Labor and Wage Problem

In his presidential address at Atlantic City this week President Charles L. Henry made the following trenchant suggestions:

THE companies engaged in the electric railday business are quasi public corporations doing for the state and people a work delegated to them. They stand in an entirely different position from manufacturing and other strictly private business enterprises. A dispute or disagreement about wages or conditions of labor should never be allowed to develop into such a state as to interfere with the operation of these properties because, if for no other reason, this is an injury to the public from which the companies have received their commissions to construct and operate their properties.

What is needed is that there shall be a duly authorized public body to which either party feeling aggrieved may apply for relief and have the matter fairly determined without a resort to a strike or a lock-out.

There should also be legal inhibition of all strikes and lock-outs on public service properties.

If the cause of such strikes and lock-outs is removed, there is no reason remaining which will justify either a strike or a lock-out.

Let us, as representatives of this great electric railway industry, take a stand in favor of a just and orderly solution of these problems and we shall in so doing not only do a good thing for our employees and ourselves but also for the great public which we serve.

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out a hurry-up call to the members of the association to assist in securing the exemption of electric railways from the provisions of the threatened so-called eight-hour law, recommended by President Wilson, the manufacturing members quickly responded to the call with the same enthusiasm shown by railway members.

The work of amalgamation of the railway and manufacturer members has been but commenced and the complete amalgamation can be brought about only in the course of tie. I have no definite recommendation to make at this time except to say that the manufacturers must be represented eventually on the executive committee. There is no constitutional provision at present by which they can officially be members of this committee, but I suggest that this meeting the association elect two from among the manufacturer members who can sit *ad interim* with the executive committee and aid with their advice.

Necessity of Concerted Action

At no time in the history of the association has the need of its work been better exemplified than during the recent months. The growth of the nation's population, accompanied by the increased magnitude, multiplied numbers and diversification of its industrial and business interests, has created such a condition as makes it impossible for any business or industrial interests to make themselves heard or felt in matters of legislation and administration, whether national, state or municipal, unless they are grouped together in a compact, organized form, thus being able to present promptly and effectively their views on any matter in which they are interested. Nor is it possible that they can in any other way exert the necessary and proper influence upon the public at large which will bring about a clear understanding of controverted matters and cause the people to see, as they should, the questions under consideration. "United we stand, divided we fall," is truer to-day than ever before.

Our association, as the organized representative of the electric railway interests of America, in this day of organizations, stands out strongly and has been and is doing more effective work than any other similar organization with which I am acquainted. The form of its organization and plan for carrying on its work commends itself more and more, year by year, for its efficiency and the results attained. Learning from the experience of legislative and other bodies, it has adopted the plan of doing through committees much of its work which requires careful investigation and study. Following this plan, not only the American Association itself, but also its four affiliated associations have from time to time constituted committees to consider and report upon matters of special interest as well as those questions which are more constant in the attention which they require. This organization and this plan of work make it possible to take up and give proper attention to any question in which the industry is interested, and to develop plans for the benefit of the various member companies.

Progress During the Year

During the past year the work has been carried forward by various committees on some of the most pressing subjects, among which I may name that of valuation, electrolysis, overhead construction, public relations, operation of motor vehicles, compensation for carrying United States mail, insurance and taxation, and on most of these much progress has been made. During the year a number of questions have come up before Congress and the Interstate Commerce Commission in which we were interested, and the manner in which they have been handled by the association, through its federal relations committee, is a marked illustration of what can be accomplished by intelligent, painstaking and united effort. Only a few weeks ago we were suddenly apprised that the President would recommend to Congress the passage of the so-called eight-hour law for interstate carriers. At once it was evident that there was great danger that electric railways doing interstate business might, very disastrously to them, be included in the provisions of such a bill, and as but few days remained of the session of Congress, whatever action was taken would be quickly taken and without very much consideration. The association, led by its committee on federal relations, at once took up the question and succeeded in getting the electric railways of the country exempted from the provisions of the bill. How close a call we had you will understand when I tell you that the bill, which finally became a law, when introduced in the House, did in its general terms include such electric railways, and it was only through the influence of this association, exerted as stated, that an amendment exempting them was secured on the floor of the House.

Last Mid-Year Conference

The mid-year conference of the association, held in February at the city of Chicago, in respect to the attendance, the spirit manifested, the program produced, and the work accomplished, was perhaps the best mid-winter conference the association has ever held. A large number of members and invited guests were seated at the dinner given at the Congress Hotel and were addressed by speakers of prominence, to the very great interest of all present. Senator Underwood of Alabama did the association the honor of being present at the dinner, and delivered a very interesting, valuable and instructive address. These mid-winter conferences are constantly increasing in their value and benefit to the association, and those of you who have not been attending them should in the future avail yourselves of the privilege.

Bureau of Information

The bureau of information, maintained at the headquarters of the association, has been of great and far-reaching benefit. It has usually been able, on request by various companies, to supply promptly desired information on every phase of the electric railway industry. It is at all times provided with a vast amount of valuable information on operating and other questions collected from the member companies. If the information requested is not available and on file at the time, special investigations are conducted and the information secured with a minimum of delay. Many companies more and more avail themselves of this service, which costs them nothing except the dues which they pay as association members.

Problems of Public Relations

There is no part of our work but in some manner brings us in contact with the public. The very nature of our business is such that we constantly, at every turn, deal with some portion of the public, either directly or through their official representatives. Congress, the Interstate Commerce Commission, State legislatures and public service commissions, city and town governmental bodies, all have to do with matters regulating our business and are all to a great extent influenced by the attitude of the citizens themselves. Passengers riding on our cars, shippers of freight and express, damage claimants, trespassers on our rights-of-way, travelers on the public highways where our

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tracks are laid, are all parts of the great public, and with all of these we must deal. The people at large are interested in the kind of service we give and are always ready to complain of what is wrong, if even sometimes slow to praise what is right. If we are unjustly taxed, it is usually because the great body of citizens, either from want of knowledge on the subject or on account of prejudice, thinks we should be thus taxed. In case of labor trouble, the attitude of the public is of the greatest importance. Indeed, it would be difficult to point to anything connected with our business which does not bring us in some way to deal with the public. How great is the importance, therefore, of our public relations is perfectly evident to all of us, and all of us have, with more or less success or failure, been using our best endeavors to smooth out whatever difficulties arise between our various companies and the public we serve. The ELECTRIC RAILWAY JOURNAL and *Electric Traction*, as well as the *Aera*, our association magazine, have given great and constant attention to these matters, and much valuable work has been done by them. The association, through its committee on public relations, has in successive years been considering some of the greater questions lying within this field, and while they have not accomplished as much as they desire, they have made substantial progress along several important lines. The best thought that can be brought to bear on these questions should be devoted to their study, to the end that we may discover and put into use and operation the most desirable plans for bettering our situation in relation to the public.

VALUE OF COMPANY SECTIONS

The development of the company section movement in the association still continues very promising. During the year a number of new company sections have been organized, and the interest in the old as well as the new sections has been increasing. Nothing in the work of the association gives better promise than the enlargement and development of this movement. It was my privilege during the year to visit a number of the company sections and address them at their meetings. This gave me an opportunity to study better than I ever had been able to do before the work of the movement, and with this increased knowledge of the work I wish to impress urgently upon you the desirability of the organization of company sections among the men of your various companies. By becoming members of a company section, they receive direct the *Aera*, and get various other benefits, but the greatest advantage perhaps is that they feel that they are actually personally members of this association and, therefore, take greater interest in its work.

Aera, during the four years of its publication, has been growing steadily stronger in the work which it is doing and constantly gaining from the association members a higher appreciation of its usefulness and benefit to them and all interested in the industry. As was expressed very clearly in an article in the magazine by the president of the Transportation & Traffic Association, this magazine gives us a "convention all the year round," as it forms a medium of communication between association members on any and every subject relating to the industry. It now occupies a position from which it is having a valuable influence directly upon the public mind as well as through the medium of other publications influenced by it throughout the country. The cost of its publication has been somewhat increased during the past year, more especially on account of the advanced price of paper, but even with this it is remarkable that so good a publication has been issued without greater expenditure. You will be pleased to know that the receipts from advertisements during the past year have been increasing constantly, and the margin between the amount received from advertisements and the total cost of the publication is growing smaller and smaller. The indications are that, in the not distant future, the publication of the magazine will cease to be any financial burden to the association.

You will no doubt listen with great interest to and be pleased with the report of the advisory committee having charge of this publication. Its work has been constant and painstaking, and the association is justly proud and appreciative of its success.

AS TO CARRYING OF MAIL

There is one matter which, year after year, has occasioned a great deal of work and much anxiety on the part of our committee having the subject in charge. I refer to the compensation paid to electric railways for carrying United States mail. As shown by the report of the committee at this convention, the last Congress cut down the amount of the former appropriation for carrying of mail by electric railways within cities. In addition to this, the compensation paid interurban electric railways for the carrying of United States mail is not and never has been reasonable, even as compared with the compensation paid steam railroads. There seems never to have been a clear understanding in the Post Office Department of the value of the service rendered by electric railways in the carrying of mail. It will be necessary to do some very active and efficient work in connection with this matter if the electric railways are to be fairly treated, and I request your hearty co-operation in these matters. As illustrative of the situation regarding mail service by interurban roads, let me read to you a letter from Vice-President Collins of the Michigan United Traction Company, stating fully a case in point:

> Referring further to our conversation with regard to the compensation received for carrying United States mail, beg to advise that while we were operating the Michigan Railway Company as a steam road between Augusta (called Gull Lake Junction) and Allegan, we were paid on a weight basis and received for this service compensation of $2,232.01 per annum, service being six round trips per week, and the distance between Gull Lake Junction and Allegan 34.81 miles, which would figure per annum 21,791.06 miles, making the receipts per mile carried of 10.24 cents. However, we did not carry the mail from Gull Lake Junction to Allegan, but carried it from Gull Lake Junction to Monteith, a distance of 21.91 miles. This later was changed from Gull Lake Junction to Doster, a distance of 14.45 miles. The compensation received for this service was $2,232.01 per annum, the same as though the mail was carried through to Allegan.
>
> However, when electric operation was put into effect on this division, notice was received from the Postal Department that we were to carry the mail two round trips daily except Sundays between Gull Lake Junction and Doster, a distance of 14.45 miles, for which service a compensation of $542.74 per annum was to be paid, making the receipts per mile carried of 3 cents. In other words, in place of paying $2,232.01 per annum for this service they are now only paying $542.74, and we are making two round trips daily instead of one. The electric railway, therefore, is furnishing additional service, and receiving for the same $1,689.27 per annum less.

WORK OF COMMITTEES AND ASSOCIATIONS

Our four affiliated associations have been doing great work. The programs for the various meetings which they will have during this convention make it desirable that you should all attend such of the meetings as possible, and by so doing you will become fully advised of the valuable work that these associations are doing.

The report of the committees of the American Association, and also of the affiliated associations, are full of interest and should be carefully read by every one interested in the work of the association. It would not

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be wise for me to undertake to give a synopsis of any of these reports; they should be read in full and carefully studied in all their bearings.

In this connection I want to call your attention to a matter deserving your most earnest consideration. As I have indicated, a very great part of the work of the American Association and of its affiliated associations is, and must necessarily be, done by committees, and this work is of the very greatest importance to the association and to the industry. It cannot be properly attended to and the desired results secured unless members accepting appointments on the committees attend the meetings of the committees and otherwise give the necessary attention to the work in hand. This we know will require some sacrifice and some trouble, but they should make this necessary sacrifice and go to this necessary trouble, and give their best efforts to the work. I especially appeal to the management of the various member companies that they urge such of their people as may be committee members to give to the work of the committees the proper time and attention. This, in many cases, has not been done, and the association work has correspondingly suffered.

Co-operation of the Technical Press

As the years have come and gone the association and the industry have had in the ELECTRIC RAILWAY JOURNAL and *Electric Traction* staunch and constant friends and forceful supporters, and to them we owe, and all feel, a heavy debt of gratitude. It is pleasant to know that the companies publishing these magazines were among the first to become full-fledged members of the association under the amended membership provisions adopted last winter. The owners of these publications and their staffs of able assistants have always been vigilant, every-day friends of the association. By their counsel and advice, as well as by their public advocacy, they have been many times of the very greatest help.

Assisting the War Department

Within the last few months the word "preparedness" has been worn almost threadbare and has been made to cover some of the most foolish suggestions before the American people. The first general use of the word was, however, the outgrowth of the loyal and patriotic feeling of the nation that the present European war was a warning to us which should be heeded; that we should see to it that we did not allow ourselves to remain in a helpless condition not able to make proper defense in case of attack by any outside power. Some, yes, many things, have been accomplished looking to this which give great promise for the future, even though along with them other things have been done which are serious elements of weakness. It is our duty, as a part of this great people, to do our proper share of the work necessary to see that our nation is prepared to protect itself against all comers. During the past year a committee was appointed, with General Harries as chairman, to co-operate with the War Department in laying plans for help by electric railways in the defense of the country in case of war, and this committee has been at work along these lines with indeed very satisfactory results. In to-day's program a place has been given to the consideration of our duty in the general work of preparedness.

Labor and Wages

With the recent war prosperity there has come renewed and intense wage and labor agitation with the usual resulting bitter controversies and strikes. The conditions have in many instances reached an unbearable stage, so much so that now, more than ever before, the people at large have become aroused and alarmed, as the very foundations of society seem threatened. The result is that the best thinkers among our patriotic citizens are seeking for a remedy that shall avert the threatened evil results.

The companies engaged in the electric railway industry are quasi-public corporations doing for the State and people a work delegated to them. They stand in an entirely different position from manufacturing and other strictly private business enterprises. A dispute or disagreement about wages or conditions of labor should never be allowed to develop into such a state or condition as to interfere with the operation of these properties because, if for no other reason, this is an injury to the public, from which the companies have received their commissions to construct and operate their properties.

In order to avoid the oft-threatened injury to the public two things are necessary. There must be as a first step a way provided whereby all controverted questions about wages and labor conditions, concerning which the immediate parties in interest cannot agree may be considered, determined and settled by some duly authorized public body that will carefully and conscientiously weigh all of the matters bearing upon the questions under controversy and in its decision do even and exact justice between the parties concerned, including the great body of the people. The old and usually resorted to system of arbitration does not meet the needs of the hour. Usually it is not resorted to until much of the damage to the public, the companies and the employees is already done; and when resorted to the decision of the arbitrators is frequently unsatisfactory to all parties because it is not always based upon the exact principle of justice and right which in such matters as well as all others should ever prevail.

What is needed is that there shall be a duly authorized public body to which either party feeling agrieved may apply for relief and have the matter fairly determined without a resort to a strike, or a lockout. Both employer and employee I know will hesitate to yield this point but such a procedure is necessary for the proper and orderly conduct of the business on which the people so much depend, and the time has come and is now here when there should be agreement upon this point. In all cases in disagreement the parties opposed must finally yield to the decision of some other person or persons, unless the controvery is to be kept up to the point of destruction. Why not then willingly, assent to a plan whereby such an outside decision may be had in an orderly way and prevent all of the injuries which now result from the present situation?

The other point to be reached is a necessary result of the first, and that is that there should be legal inhibition of all strikes and lock-outs on public service properties. If the cause of such strikes and lock-outs is removed there is no reason remaining which will justify either a strike or a lock-out.

Let us as representatives of this great electric railway industry take our stand in favor of a just and orderly solution of these problems and we shall in so doing not only do a good thing for our employees and ourselves but also for the great public which we serve.

Three days from now I shall turn over to the new president, whom you will have then elected, the gavel which you placed in my hands one year ago at San Francisco, and this is the last time that I shall formally address you as your president. To say that I have appreciated highly the honor you conferred upon me and the confidence shown in me by choosing me as your presiding officer would be only a weak expression of my real feelings. This association represents an industry second to none in importance. The city electric railway

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service and the interurban electric railway service are perhaps of more value to the people than any other single industry. It is a great honor to us, as an association, to represent this great industry, and I have felt the heavy weight of the responsibility resting upon me during the year while acting as your president.

LOOKING TOWARDS THE FUTURE

The future work of the association and its usefulness depend entirely upon the continued interest of its members and the efforts which they will put forth to carry forward the work. It already, in its membership, represents a very large per cent of the electric railway people of the country, but there are many companies, some large, but mostly small, which should be but are not members of the association. It is practically impossible to present the desirability of membership in the association to non-member companies otherwise than by personal conference and personal solicitation. It is for this reason that I request of you that during the coming year you will look about in your various localities, learn what companies are not members of the association and personally take it upon yourselves to see the officials of these companies, show them the benefits to be received by being members of the association and the duty that rests upon them to join with other companies in this great work. If you will all do this, the end of the next association year will see very few electric railway companies in the United States not members of the association. I also want to make the same earnest request of the manufacturing members of the association. If you do the missionary work among your fellow manufacturing companies over the country, the number of manufacturing members can be largely and rapidly increased, and it will not be long until, with our combined membership, we shall be a much greater power in all the affairs in which we take part than we have ever been before.

I cannot take my seat without referring to the most remarkably loyal support given me by members of the association, both railway men and manufacturers. It has been a constant surprise to me and has urged me on to the best efforts I could put forth. Almost without a single exception, whenever I have called upon either a railway man or a manufacturer to assist in any part of the work, he has given me that assistance, not grudgingly but enthusiastically.

To your capable, efficient and hard working secretary and treasurer, Mr. Burritt, I desire, in this public way, to return not only my personal thanks, but the thanks of the association at large for the wonderfully able, loyal and untiring way in which he has looked after the affairs of the association. To his associates in the office at New York, one and all, I also desire to express my appreciation of their loyal and efficient work.

And now, as I close this, my last address to you, let me say that it has been a real pleasure for me to work with you for the association during the year about to close, and that I look forward to the future development of its power and efficiency with the very greatest interest. I shall carry with me during the future years of my life most happy recollections of the time when you permitted me to serve you as your president.

"THERE is no part of our work but in some manner brings us in contact with the public. The very nature of our business is such that we constantly, at every turn, deal with some portion of the public, either directly or through their official representatives. Congress, the Interstate Commerce Commission, state legislatures and public service commissions, city and town governmental bodies, all have to do with matters regulating our business and are all to a great extent influenced by the attitude of the citizens themselves. Passengers riding on our cars, shippers of freight and express, damage claimants, trespassers on our rights-of-way, travelers on the public highways where our tracks are laid, are all parts of the great public, and with all of these we must deal. The people at large are interested in the kind of service we give and are always ready to complain of what is wrong, if even sometimes slow to praise what is right. If we are unjustly taxed, it is usually because the great body of citizens, either from want of knowledge on the subject or on account of prejudice, thinks we should be thus taxed. In case of labor trouble, the attitude of the public is of the greatest importance. Indeed, it would be difficult to point to anything connected with our business which does not bring us in some way to deal with the public. How great is the importance, therefore, of our public relations is perfectly evident to all of us, and all of us have with more or less success or failure, been using our best endeavors to smooth out whatever difficulties arise between our various companies and the public we serve."—*President Charles L. Henry.*

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Overhead Charges in Valuation Work*

Only charges directly associated with cost of reproducing physical and corporate elements of property are discussed. Amounts to be allowed. What charge should not be depreciated

By PHILIP J. KEALY
President Kansas City (Mo.) Railways

THERE are many ways of determining the value of public utility companies, and irrespective of how much weight it may have been given in the final determination, the one premise by which the value is generally judged is that of the "cost of reproduction new." An inventory or listing of the structural units of a property is comparatively easily ascertained, and the completed cost in place of the various structural units is somewhat more difficult to correctly establish. The determination of the cost to reproduce new the complete plant of a public utility corporation, however, is a matter not only difficult of finding out, but one which calls for sound business judgment and expert knowledge of the particular business in question far beyond that required in merely ascertaining the number or value of the individual structural units going to make up the completed whole.

The cost of reproduction new of public utility corporations is generally ascertained by the following three steps: (1) Obtaining bare cost of material and labor in place; (2) addition of various percentages to the items listed in (1), so as to give the total cost of the physical property, and (3) addition of those intangible elements of value which are always found in a complete going concern. There is very seldom any material difference between either side of a controversy as to the value of (1), and if the work of the engineers or accountants who prepared the various inventories be properly and correctly done, there should be practically no difference in this item. However, opinions frequently differ as to the amount of percentages to be added in (2). These are generally referred to as "overhead charges," and, considering the extent to which the cost-to-reproduce-new theory has been applied, or the broad way in which it has been used in gaging the value of public utility properties, it is indeed surprising that more definite information upon the subject is not available.

This is undoubtedly due to the fact that the old book costs of public utility corporations seldom, if ever, correctly furnish a gage of the amount of these costs and for good reasons. Most such properties represent a gradual development. The cost-to-reproduce-new theory assumes that the plant is instantaneously (or primarily so) developed. In a gradually growing business those charges which correctly formed a part of the cost-of-reproduction-new were generally absorbed in the daily operating expenses of the company. Legal expenses arising from the promotion of subsidiary companies or the expansion of the existing one; engineering charges, interest during construction, contingencies, all were usually charged directly into the cost of the work, without being distinctly or separately set out. Nor had the science of accounting reached its present stage of development. Certainly there was not then the uniformity of accounting practices that now exists, and consequently these items, which are now recognized as proper capital charges, were largely, if not entirely, charged to operation. Moreover, at the time plants now under investigation were constructed and developed, the vital necessity of correctly determining and properly segregating such charges was not realized. Therefore, in determining the cost of reproducing a property, the appraiser is but slightly aided by existing records as to the proper amount of overhead charges, and must rely largely, if not entirely, upon his individual experience and judgment in such matters.

*Abstract of a paper delivered before the Atlantic City Convention of the American Electric Railway Association on Oct. 11, 1916.

So-Called Intangibles Not to Be Considered

Many authorities or authors have considered as "overhead charges" items which by others have been included in the cost of the physical elements. Thus, in defining the subject, they consider every additional allowance other than the mere cost of unskilled labor and the structural cost as an "overhead charge," *i.e.*, they consider that the cost of installing track, poles or switchboards should properly include the expense of labor installing same. But the expense of the engineer who laid out the design, or of the lawyer who secured frontage consents permitting the installation of track or poles, is not so considered, but is referred to as an "overhead charge." Others assume the term to cover only the expense of items which have to do with the creation of the entire enterprise, as, for example, the legal expense in connection with the incorporation of the enterprise and its successful financial launching Similarly, interest during construction, or carrying charges, are frequently so termed. Again, "overhead charges" are referred to as covering those intangible elements of value associated with every going concern, including such items as good-will or going value, cost of attaching the business, franchise value, accrued deficit, etc.

In this article, without desiring to introduce additional phrases into a subject already overrun with them, I want to clearly distinguish between the two kinds or varieties of "overhead charges": (*a*) Those which are directly associated with the cost of reproducing the physical and corporate elements of the property; and (*b*) Those which arise in producing its business. This article will confine itself to describing or defining those "overhead charges," so-called, of the first character, and there will be no discussion of those of the second character, more generally referred to as intangible values.

How the Terms Are Defined

Each of the following enumerated charges forms a definite tangible portion of the cost of every physical entity going to make up a property. In many cases they can be so allocated as to apply directly to the particular unit, in which case it is preferable that they

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should be so applied. In other cases they can be applied to a class of units. Others of them, having to do more with the creation of the company itself, cannot be so applied, but wherever it can be so done it is far better in making an appraisal to weave into the individual unit costs as much of the so-called structural "overhead charges" as it is possible so to do. Many of those charges hereinafter enumerated duplicate each other, and it is not intended that all of them should apply in any one property to the various elements going to make up the completed whole.

1. *Engineering and Superintendence:*

This item includes the cost of preparing working plans, specifications and contracts, supervision, progress reports, estimates for payments, together with the expense of shop inspection, tests and field engineering. No sum should be added to cover this expense where a separate allowance is made for architect's fees, on materials which are carried in stock, or upon furniture and fixtures, automobiles and miscellaneous utility equipment. It is difficult to attempt to set out a percentage which should be allowed to cover this expense, since the conditions surrounding the work largely determine it. The size of the enterprise will also have considerable effect upon the amount which should be allowed, as it is apparent that the cost of engineering and superintendence upon a small concern will be proportionately much greater than upon a large one.

Moreover, this percentage will vary greatly according to the particular enterprise in question. Illustrative of this fact, a firm of Philadelphia engineers were recently allowed 4 per cent to cover the cost of engineering and superintendence during the erection of a power house which was constructed at an approximate cost of $2,500,000, located in a Middle Western city, while a large Eastern concern was allowed 8 per cent to cover the cost of engineering and superintendence on the value of all labor and material going into the erection of a hydroelectric power plant. In the construction of the Pennsylvania tunnels the cost of engineering amounted to 7 per cent; in the reconstruction of the Chicago traction system the engineering cost was approximately 3 per cent; in the construction of the New York subways the cost of engineering has exceeded 6 per cent, in which figure is included the expense of the Public Service Commission; and a firm of Boston engineers who have had a broad construction experience undertake engineering work on percentages ranging from 6 to 15 per cent, depending upon the amount and character of the work involved.

Thus it is apparent that the amount which should be allowed to cover engineering costs will depend almost entirely upon the local conditions surrounding the property under consideration and is a matter for the appraiser to determine at the time the valuation is made.

2. *Incidentals or Contingencies (Omissions):*

This charge should cover expenses outside the contract cost, particularly extras. Such expenditures may be due to change in design, interference in construction for various causes, cost of trial operation, expense of removing unseen obstacles, delays in work, labor troubles and other kindred items, which are not easily discernible at the time of the appraisal. There should also properly be covered under this head an allowance for omissions in inventory, because, no matter how careful or how detailed the inventory may be, there is bound to creep into the same more or less error, owing to the fact that it is impossible accurately to inventory the property under consideration.

Illustrations of items which fall under this head are numerous and familiar to all engineers engaged in construction work—unexpected fills, removal of gas and water mains, sewers, removal of drains and other obstacles, cave-ins, floods, cloudbursts and various other incidents too numerous to mention. All engineers have encountered in their work cases of this kind not foreseen at the time the work was begun, and unless an allowance for such contingencies is provided, work will be completed at a financial loss. The trouble, expense and delays experienced in the construction of the Panama Canal well illustrate this point. During a recent hearing before the valuation committee of the Interstate Commerce Commission, Mr. Holbrook, chief engineer Union Pacific Railroad, stated that after the completion of the Lucin cutoff across Great Salt Lake, he had his engineering staff estimate the cost of the work already completed and the highest estimate was 40 per cent under the actual cost.

3. *Organization Expense:*

Included under this head is the cost of general office expense, securing of bids, preparing of contracts, estimates on the cost of material, inspectors, watchmen, timekeepers, paymasters, the salaries of officials and the legal expenses directly attributable to construction. This charge should also include the cost of tools used up or lost during construction (frequently a very costly item), as well as all transportation expense directly associated with construction cost, *i.e.*, carfare, livery, living expenses of men in field, railroad fare, etc. If the property is constructed by a general contractor and an allowance is made for his services, then the amount which should be allowed to cover this item will be considerably reduced, owing to the fact that some of the duties falling under this head are performed directly by the contractor's organization.

4. *Architect's Fees:*

This item provides for the cost of designing, drafting and general supervision of all work incident to the construction and equipment of buildings. Where an allowance of this kind is made, no sum should be added to cover the cost of engineering, since that expense is absorbed by the allowance made to the architect. Care should be exercised, however, to see that the allowance which is made is sufficient to cover whatever expense is necessary incident to the general inspection and approval of the work. There is no uniformity in the percentage allowable to cover this item and the appraiser in determining it must be guided largely by his own experience in such matters, as well as the custom prevailing in the locality in which the property he is valuing is located.

The American Institute of Architects has established a schedule of proper minimum charges which reads as follows: "The architect's professional services consist of the necessary conferences, the preparation of the preliminary studies, working drawings, classifications, large scale and full-size detailed drawings, and of the general direction and supervision of the work, for which a minimum charge, based upon the total cost of the work complete, is 6 per cent. The total cost of the work is interpreted as the cost of all materials and labor necessary to complete the work, plus contractor's profits and expenses, as such work would be if all the materials were new and all labor fully paid at market prices current when the work was ordered. Certain of the Eastern architects are now considering a plan whereby the expense of all draftsmen and engineers shall be charged direct to the job under construction and the architect allowed a percentage on the cost of the work when completed.

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5. *Real Estate Expense:*

This expense covers the cost incident to the selection of the site, search of title, survey, purchase and legal fees incident to the acquiring of the property, as well as the expense of juries, commissioners or arbitrators in condemnation cases, cost of removing buildings, cost of plats, abstracts, notarial fees, recording deeds and the examination of titles, cost of abutting damages and agents' commissions. The customary allowance for such expense will vary according to the character of the property under consideration. It is obvious that the cost of procuring a right-of-way through a very populous territory for an interurban line would be much greater than the cost of procuring isolated tracts of land upon which to locate carhouses or substations. The appraiser, in determining this allowance, must necessarily be guided by the local conditions surrounding the property which he is valuing. For example, most localities have real estate boards, which have certain fixed fees covering the purchase of lands. In Kansas City, Mo., the commission is 5 per cent on sales of $3,000 or under, and upon sales of more than $3,000 it is 5 per cent upon the first $3,000 and 2.5 per cent upon the amount in excess of this sum.

6. *Purchasing and Handling (Includes Stores Expense):*

Included under this item is the expense incident to receipt, inspection, care and distribution of all materials and supplies, and such adjustments as may be necessary on account of overcharges, breakage or shortages. An allowance is made to cover this expense only on materials which are carried in stock, upon furniture and fixtures, automobiles and other miscellaneous utility equipment, and upon large units, such as power-house equipment, upon which a separate contractor's profit has not been allowed. This item may be subdivided as follows: (*a*) Purchasing; (*b*) inspection of material; (*c*) stores and store yard expense, and (*d*) loss and breakage in stores.

7. *General Legal and Corporate Expense:*

This includes fees and expenses incident to the incorporation of the organization, securing certificates of public necessity and convenience, cost of printing securities, payments to trustees, expenses incident to marketing securities and the general legal expenses necessary and incident thereto. It is difficult to arrive at an estimated percentage which will properly take care of these items, but it is obviously an expense bound to occur in building up every business. The corporation must be properly and safely organized; it must be put upon a sound basis for operation; reliable legal advice must be obtained to do this, as well as continually to advise the management of the company during the process of construction. It is certain that these expenses have, during the last few years, greatly increased, owing to the establishment of public service commissions or other regulatory bodies.

In the recent reorganization of a street railway system in the Middle West, this expense was well demonstrated. The property was in the hands of receivers, who negotiated a new franchise ordinance with the city, later adopted by a vote of the people. These negotiations extended over a period of practically two years, during which time the utmost publicity was given to the same, all at considerable expense. After the franchise had been adopted, the question of refunding the old obligations was taken up with the representatives of the various classes of bondholders, and a year and a half of continual negotiations ensued before a plan of reorganization was finally agreed upon by all parties thereto. This plan of reorganization was then submitted to two public service commissions for approval, and certificates of public necessity and convenience were obtained. Afterward a decree of foreclosure and sale was ordered, the property was sold and finally new mortgages were prepared covering the securities, which were issued under the plan of reorganization. Many similar steps were taken in the reorganization of the Chicago Surface Lines and the Cleveland system, where like expenses were incurred.

8. *Contractor's Profit (Labor and Material):*

Included under this item is the profit of contractors and sub-contractors for supervision, direction and completion of specific construction work. Generallly this percentage is applied to all units excepting those purchased complete from the manufacturer, and even on such items a contractor's profit is usually applied on the labor costs of installing the unit, provided the manufacturer's price did not include installation. No contractor's profit should be allowed on items carried in stock, on furniture and fixtures, automobiles and other miscellaneous utility equipment, if, upon all of which, there has been an allowance made to cover the cost of purchasing and handling. The term is, however, only a general one and includes the expense of purchasing, handling, managing and preparing estimates of the construction of any property. Consequently this expense will occur, no matter whether property is constructed by the company itself, or by a contractor.

9. *Taxes During Construction:*

This includes all real, personal and other taxes, special or otherwise, payable to the government, state, county, or city authorities, on the property during process of construction. The amount which should be allowed to cover this item can often be obtained by employing the same method of assessment as that used in the vicinity where the property is located. If company vouchers are available, the amount of taxes paid during the construction should preferably be so determined.

10. *Insurance During Construction:*

This insurance covers the cost of fire and casualty, public and employers's liability, tornado, workmen's compensation, flood and all other forms of insurance which are necessary adequately to protect the property during the process of construction. The amount of the fire insurance can be determined by eliminating from the appraised value of the property the non-insurable items and applying thereto the legal rates applicable to the kind of insurance involved. The cost of the other forms depends upon the particular requirements of the state where the work is performed, as well as upon the nature of the property being appraised.

11. *Interest During Construction (Carrying Charges):*

This includes a percentage to cover interest lost upon the money expended during the construction of the property and prior to its operation. Interest occurring on idle capital, no matter whether the same be represented by plant or cash, preparatory to putting the property in service, has been time and time again included as an element of the cost of reproduction new by public service commissions and courts. The only debatable question in regard to this is the period over which the interest allowed should extend and the rate which should be fixed. In order to determine accurately the amount of this charge, it is necessary for the appraiser to prepare a chart showing the estimated time of reproduction, separately listing the different elements which make up the property, and then, by a construction program, to ascertain the amount of money which will be required and the time when it must be available for use. After these amounts have been determined as accurately as possible, by applying the legal rate of interest for the state in which the property is located.

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it is purely a matter of calculation to determine the amount which should be included in the appraisal to represent this element of value.

CARRYING CHARGES OR INTEREST DURING CONSTRUCTION

BASED ON A THREE-YEAR PERIOD WITH INTEREST AT 6 PER CENT PER ANNUM

0 Years 1 2 3	Total Investment	Interest per Cent	Total Interest
Overhead distribution system (except services) of Kansas City Electric Light Company	$923,213	9.0	$83,089
Underground distribution system	793,309	9.0	71,397
Steam heat distribution system	330,962	9.0	29,786
Real estate	215,481	6.75	14,544
Buildings	409,837	6.0	24,590
Power Plant	.....	....	.....
Equipment	1,724,341	4.5	77,595
Transformers	276,642	4.5	12,448
Lighting fixtures	109,001	4.5	4,905
Services	260,614	4.5	11,727
Meters	436,480	3.0	13,091
Total	$5,479,887	....	$343,180
Average interest	.....	6.24	.....

The manner of calculating the amount of interest during construction is graphically shown in the accompanying table, which represents the manner in which interest during construction was determined in the appraisal of the Kansas City Electric Light Company. The assumption in this particular instance was that, the reproduction of the plant having been determined upon, the various distribution systems would be first constructed, their construction extending over the longest period of time. After this work was well under way, the real estate was next acquired. It was further assumed that work on the buildings would be started shortly afterwards. After the buildings had reached a certain state, the installation of the power plant equipment was commenced, the last step in the completion of the entire plant being the installation of the meters at the residences of the various customers. Interest was figured at the rate of 6 per cent for one half the time each of these various portions of the system were under construction. For instance, the interest on the overhead distribution system was figured at 9 per cent, its construction extending over a period of three years, whereas the interest on the meters was figured at but 3 per cent, it being assumed all meters could be installed in one year's time.

12. *Promotion Expenses:*

Included under this head are the initial engineering, legal and financial expenses preparatory to the organization of the concern. By this is meant the expenses incident to preliminary surveys and studies of location, tentative completion of maps, profiles, plans, specifications and estimates; the expenses incident to the procuring of franchises, consents, permits, easements, releases and options, and the expenses incident to the preparation of prospectuses and other expenses of a similar nature. The character of the utility involved will largely determine the sum, if any, which should be allowed to cover this expense.

13. *Cost of Financing:*

This head covers two items of expense (*a*) the actual discounts arising from the sale of securities; and (*b*) the cost of brokerage. Included in the latter is the actual commission paid to underwriters for the sale of securities, for, regardless of whether securities are sold at a large discount or at a premium, the expenses of getting them into the hands of investors must be paid for by the company issuing the securities.

At this time the question of the inclusion of bond discount is debatable, and there appears to be no fixed rule regarding whether it should be included as an element of value in the cost of reproducing a property or should be entirely excluded. Some public service commissions have taken the first position and some the latter, but that the investor should be allowed a sufficient return upon his investment, that will offset any discount which may have been incurred in marketing the securities, is admitted by both. It has frequently been stated that the amount of bond discount represents simply an adjustment of the interest rate. The Interstate Commerce Commission has required that bond discount be written off within a period equal to the life of the bonds and the actual amount so written off be charged to interest account. This, however, does not meet the question as to the inclusion of bond discount in the original cost-of-reproduction-new, for there is a tremendous difference between writing something off which is already included as against not including it. In other words, the writing off of bond discount does not differ from the amortizing of the value of the entire plant, provided the profits are large enough to permit, but unless a direct penalty is to be imposed upon the investor and a part of the cost to him of putting his plant into condition to serve the public is to be confiscated, he must be allowed a fair return on the entire investment he has assumed, which, necessarily, includes the discount in the price at which his securities were sold.

In a late decision handed down by the Privy Council of England in the case of the National Telephone Company, Ltd., *vs.* His Majesty's Postmaster General, this question was very ably and thoroughly discussed. The question at issue here was whether there should be an allowance made covering the discount upon bonds. The court in discussing this matter said: "It has been said that it cannot be an element adding to the value of the plant. The thing desired here is the plant in *situs*, and the cost of construction, less depreciation, is the method by which the value has to be ascertained. It follows that every expense which is necessary, in order to construct, is an element to be considered and has to be considered because it is necessary in the process of construction. The thing to be transferred, say a pole, must be procured, transported and erected; each of these steps is necessary to the existence of the pole in *situs;* each of these steps costs money, and raising this money is itself an expense, and one as necessary to the existence of the pole as any of the other steps."

AMOUNT OF OVERHEAD TO BE ALLOWED

While there is by no means a unanimity of opinion as to what amount of "overhead charges" should be allowed, the present tendency is to include some such charge as a part of the cost of reproducing the physical property and, as the science of valuation is developed, as more thorough research is undertaken and more careful cost analysis made, the more evident is the need of such allowance and the more seeming willingness on the part of public service commissions and regulatory bodies to include it. The following percentages have at different times been used by engineers in valuation work and, subject to revision for local conditions, will adequately provide for "overhead allowances":

1.—Engineering and superintendence	5-15 per cent
2.—Incidentals or contingencies	5-20 per cent
3.—Organization expense	5-15 per cent
4.—Architect's fees	5-10 per cent
5.—Real estate expense	5- 7 per cent
6.—Purchasing and handling	2 per cent
7.—General legal and corporate expense	5 per cent
8.—Contractor's profit (labor and material)	10 per cent
9.—Taxes during construction	1½ per cent
10.—Insurance during construction	½ per cent
11.—Interest during construction (per annum)	Legal rate
12.—Promotion expense	8 per cent
13.—Costs of financing	5-15 per cent

These percentages cannot be added to obtain a total overhead charge, since the first six items will apply

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only to certain classes of physical property while the remaining ones apply to the enterprise as a whole. Moreover, many of the charges discussed apply only to material costs, others only to labor costs, while some in turn apply to both material and labor expense. Some of the charges also will not apply if others are used, *i.e.*, architect's fees replace engineering expense. It might be well to reiterate at this point that the first six items above given should be so far as may be possible worked into the individual unit costs. Properly they should not be referred to as "'overhead charges."

While these percentages will vary somewhat, according to the size of the property involved and the location in which the same is situated, still, as a general average, they represent charges which should be added to the cost of material and labor in place, in order to obtain the total cost of the physical property.

Depreciating Overhead Charges

Just as there is considerable difference of opinion as to the amount of "overhead charges" which should be allowed, so also there exists a difference as to whether or not they should be depreciated in determining the cost-to-reproduce less depreciation of public utilities. While it is clear that certain of the "overhead charges" (so-called) discussed in this paper should be depreciated, a full consideration of the subject permits no escape from the conclusion that certain others should not be depreciated. For instance, the cost of engineering and superintendence, expense of purchasing and handling, real estate expense, architect's fees, etc., can generally be allocated to the individual physical elements or classes of elements going to make up a property. When these elements are renewed or replaced certain "similar charges" will again arise in the replacement and, therefore, it follows that the "overhead charges" pertaining to or bearing upon the article replaced should be depreciated with it, since they (the "overhead charges") in this sense are depreciated.

On the other hand, "overhead charges" of the nature of legal expense incurred in initiating the enterprise, interest, insurance and taxes during construction, and costs of promotion do not depreciate and should not be depreciated. This is for the reason that most public utilities are continuous operating entities. As far as it is now within our foresight and judgment, they will be in operation and serving the public for generations to come. The enterprise will not have to be renewed. The individual physical elements going to make up the plant rendering this service will be renewed, but never again will the corporation be re-incorporated; nor will frontage consents, for example, have to be secured, nor will certificates of public necessity and convenience have to be obtained from public service commissions.

In order to simplify accounting, interest during construction should not be depreciated. Otherwise, absurd practices would arise in utility accounting, for it would then be necessary to ascribe to each individual physical element of the property its proportion of the total interest during construction charge, and as a pole, or a stretch of track, or a portion of a water main was renewed, the proportionate amount of interest during construction originally charged would be charged off for the replacement of each piece and again added on for the renewal. In short, interest during construction is generally included as a lump sum, is not allocated to individual physical elements, does not arise in renewals and betterments, and should therefore not be depreciated.

Another phase of this subject is this—for each depreciable item of plant an allowance should be made in the amount of depreciation charges annually set aside. Therefore, if it is considered that "overhead charges," such as interest, taxes and insurance during construction, and similar charges do depreciate, it would be necessary for the management (for the utility's protection) to set aside a depreciation reserve to cover the same. Yet this would never be used, since the charges never re-occur. Consequently the operating expenses would be unnecessarily increased and the cost of service to the consumer higher, because of this practice. Therefore, in considering the depreciation of "overhead charges," it would seem most fair that those items of overhead expense directly chargeable to the physical elements should be depreciated, but that those "overhead charges" incurred in initiating the enterprise and which cannot, either conveniently or properly, be directly charged to the various physical elements, should not be depreciated. And this must be the practice, in fairness not only to the public utility corporation but to the consumer.

How Overhead Charges Have Been Applied

As previously stated, courts and public service commissions by their recent decisions have recognized that "overhead charges" should properly be added to the construction costs of the property in order to determine its reproduction value. The only difference of opinion between these bodies is what should be termed "overhead charges" and what percentage should be allowed to cover the same. In the following I have selected at random various appraisals which have been made during the last ten years, which very clearly show that even as yet these questions have not been definitely decided:

Wisconsin Railroad Commission:

The engineering department of the Wisconsin Railroad Commission has almost uniformly allowed the following "overhead charges" in its valuation work:

Engineering and superintendence	4 per cent
Organization and legal	2 per cent
Interest during construction	4 per cent
Contingencies	2 per cent
Total	12 per cent

Chicago Elevated Railways:

In its appraisal of the Chicago Elevated Railways, Prof. G. F. Swain added 30 per cent for "overhead charges," including engineering, legal expenses, contingencies, taxes, insurance administration, promotion, organization, interest during construction and brokerage. The valuation committee, consisting of J. J. Reynolds, John Ericson, E. C. Shankland and Geo. Weston, added 18 per cent for "overhead charges" to cover substantially the same items.

Metropolitan Street Railway, Kansas City, Mo.:

(Total value approved by Judge W. C. Hook and the Missouri Public Service Commission.)

In his appraisal of this property, Bion J. Arnold added an average of 11 per cent to cover the cost of organization, engineering and incidentals. In addition thereto, 3 per cent was allowed as carrying charges and 2 per cent for general legal and organization expense. Also 5 per cent was allowed for the costs of financing. Total "overhead allowance," 22.3775 per cent.

Kansas City Electric Light Company:

In the appraisal of this property, an average of 9.6 per cent was added to cover the cost of engineering, organization and incidentals. In addition thereto, 6 per cent was allowed as carrying charges, 1 per cent for general legal and organization expense, and 3 per cent for contingencies, which included insurance and taxes during construction. Moreover, 7.5 per cent was allowed as the costs of financing. Total "overhead allowance," 29.602 per cent.

In making an appraisal of this same property, the Missouri Public Service Commission, in addition to the general contractor's profit of 10 per cent made an overhead allowance of 6 per cent for interest during construction, 1.5 per cent for taxes, 0.5 per cent for insurance, 1 per cent for

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legal, 5 per cent for engineering and 2 per cent for contingencies, making a general "overhead allowance," exclusive of an allowance for contractor's profits, of 16 per cent.

Chicago Surface Lines:

Appraisal made by Bion J. Arnold, M. E. Cooley and A. B. DuPont. Interest during construction, legal expense, contingencies and brokerage, 10 per cent. Organization, engineering and incidentals, 11 per cent.
Total "overhead allowance," 21.7 per cent.

Chicago Consolidated Traction Company:

Appraisal made by Bion J. Arnold and George Weston. Organization, engineering and incidentals, 14.6 per cent. Legal expense, interest during construction and contingencies, 5.8 per cent. Expenses incident to conducting the work, furnishing equipment and brokerage, 18 per cent. Total "overhead allowance," 38.4 per cent.

Cleveland Railway:

Decision by Judge Robert W. Taylor. Specific "overhead charges" to cover contingencies, uncertainties, purchasing and handling, 5.88 per cent. General "overhead charges" to cover financing, engineering, legal expense, organization, administration, insurance, superintendence, interest during construction, delays not covered by specific allowances, consents, litigation with property owners, incidentals and contingencies, 16.30 per cent. Total "overhead allowance," 22.18 per cent.

Puget Sound Electric Railway:

Appraisal by the Washington Railroad Commission. Total "overhead allowance," including engineering and superintendence, supervision and management, contingencies, legal and general expense and interest during construction, 19 per cent.

Michigan Railroad Appraisal:

Appraisal made by Prof. M. E. Cooley.

Value of the physical property, exclusive of any "overhead charges"	$170,291,556
Overhead allowance	32,424,706
Total	$202,716,262

	Amount	Per cent of structural cost
Engineering	$ 5,386,772	3.2
Contingencies	18,428,759	10.8
Legal	673,349	0.4
Interest during construction	5,290,549	3.1
Organization	2,645,277	1.5
Total	$32,424,706	19.0

Minnesota Railroad Appraisal:

Appraisal by D. C. Morgan, engineer of commission.

Physical property, exclusive of "overhead charges"	$345,260,419
Overhead allowance	61,264,765
Total	$406,525,184

	Amount	Per cent of structural cost
Engineering, superintendence and legal expense	$12,133,642	3.5
Contingencies	17,869,703	5.2
Interest during construction	31,261,420	9.0
Total	$61,264,765	17.7

Des Moines Water Company:

Value fixed by Judge Smith McPherson.

Physical property, exclusive of "overhead charges"	$1,452,092
Overhead allowance	233,856
Total	$1,685,948

	Amount	Per cent of structural cost
Engineering, superintendence and general legal expenses	$116,928	8.0
Interest during construction	116,928	8.0
Total	$233,856	16.0

New York, New Haven & Hartford Railroad:

Appraisal made by George F. Swain.

Inventory reproduction cost	$259,635,934
Overhead allowance	40,333,824
Total	$299,969,758

	Amount	Per cent inventory cost
Engineering	$ 5,574,038	2.2
Contingencies	5,574,039	2.1
Interest and brokerage	23,554,678	9.0
Legal expense	2,475,389	1.0
General expense	3,155,680	1.2
Total	$40,333,824	15.5

Coney Island & Brooklyn Railroad:

Decision by Public Service Commission of New York.
Total "overhead allowance," including contractor's profit, engineering, organization and incidentals, 24.81 per cent.

Milwaukee Electric Railway & Light Company:

Appraisal by Wisconsin Railroad Commission.

	Per cent
Contingencies and omissions	3
Interest	3
Engineering	4
Organization and legal	2
Total overhead allowance	12

Coney Island & Brooklyn Railroad:

Appraisal by Frank R. Ford.

	Amount	Per cent of physical cost
Physical property	$6,558,447	...
Promotion and legal expense	421,200	6.42
Property owners' consents	278,500	4.25
Organization expense	195,640	2.98
Incidentals	276,460	4.22
Engineering expense	230,792	3.52
Contractor's profit	527,514	8.04
Interest and taxes	561,345	8.56
Total	$9,049,898	37.99

Detroit United Railway (City Lines):

Appraisal by Robert B. Rifenberick.

		Per cent of structural cost
Material and labor	$18,663,536	....
Incidentals	1,050,294	5.62
Contractor's profits	1,148,777	6.16
Liability insurance	114,264	.61
Builder's risk	17,243	.09
Architect's fees	62,551	.34
Cost of acquiring land	79,463	.43
Engineering	720,955	3.86
Organization	1,092,122	5.85
Carrying charges	2,064,111	11.06
Financing	1,999,894	10.72
Total	$27,013,210	44.74

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Training Men for Supervisory and Executive Positions*

Minor officials need to be trained along certain definite lines, under guidance of executive operating official. Men should be raised from ranks for supervisory work. One-man organization discourages original thinking

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THE purpose of this paper is to discuss, in a general way, the training of employees who have as a part of their work the observation, supervision or control of other employees in the transportation department. The importance of proper training of this class of employees is very great, as upon it, to a large extent, depends the efficient operation of the road. When the trainmen leave the school of instruction and become regular motormen and conductors on the cars, they are then dependent wholly for further development, their attitude toward the company, satisfaction in their work, upon this class of employees. To supplement the training that they, individually, have received, it is important that they be placed under men whose ideas and methods have been developed with similar care.

SELECTING MEN FOR SUPERVISORY AND EXECUTIVE WORK

The selection of men for supervisory and executive positions should be made from the ranks wherever it is possible. The main reason for this is that it creates an incentive for good service on the part of the subordinate employees. To make this a sufficient incentive, the selection should be based upon good service. The most competent employee, all qualifications considered, should be selected to fill the vacancy in the supervisory position. Selections should be made from the ranks for the additional purpose of getting the value of knowledge already gained as to the local methods of operation.

It has been the general rule in street railway operation, in promoting employees from the ranks to supervisory positions, to give very great weight in selection to the quality vaguely known as executive ability. The exact definition of executive ability, from the standpoint of the average person who has the right of selection, is sometimes of a very indefinite nature. The old idea that executive ability is sometimes born in a man and cannot be created or developed, is a fallacy. The average hero-worshiping biography, intended for school-boy consumption, states that the subject of the work was a leader from boyhood. As a matter of fact a great number of our boyhood leaders have sunk away somewhere into insignificant positions, and many positions which call for the direction of numbers of men are filled by those who never evinced a single symptom of leadership in the playground or school yard sense.

In the street railway business, more than in almost any other, the old idea has survived that the inspector or supervisor must be a boss, and that being a boss, he must have the heavy jaw or undershot chin that proclaim his boss-ship. In almost every other business, however, it has been demonstrated that the ideal executive is the man with the keen observation, alert mind and intelligence enough to study and learn the ways in which a man can gain and hold the loyalty, respect and confidence of those over whom he has supervision and who seek direction from him.

In selecting men from the ranks, therefore, for supervisory positions, consideration must be given not only to competent service, loyalty and appearance, but also to keen observation and that quality of intelligence which might be denominated "teachableness"—that quality by which a man can learn not only from the direct instruction of others but from observation and experience.

TRAINING TRANSPORTATION OFFICIALS

The Transportation & Traffic Association committee on the training of transportation employees in its report for 1912 recommended that supervisory officials be trained along certain lines, which I have taken the liberty of rearranging as follows: Handling of subordinates; details of operation; comprehensive control within the limits of designated authority; demonstrative methods; economic innovations, and company policy. Each of these will be taken up in turn.

Handling of Subordinates:

The proper handling of subordinates is, of course, the "crux" of the official's ability. If he is incapable of handling subordinates, he is not a proper official. It is in this phase that the need of training is greatest and the need is least served. We would not think of making a man an inspector who had never run a car or who did not know something about the objects or ideals of a street railway organization, but we do take a man on the strength of his individual work and attainments and give him a position of directing others, although he may have had no previous experience in this line. The direction of subordinates is something that can be taught just as easily as the mechanical operation of a car, and much wear and tear on the machinery of an organization can be saved by taking the minor official in hand at the proper time and systematically and carefully pointing out the way by which he can properly direct his subordinates.

Up to the time that one is given a supervisory or executive position, his whole progress has depended upon the work which he, individually, can accomplish. What is more natural, then, than for him to continue to strive to show how much work he, individually, does after being given the supervisory position. One of the first things that should be inculcated in him is that he is not to be judged by the work which he, individually, does, but by the results secured from the work of his subordinates. The first quality, therefore to be developed in the supervisory official is self-effacement—in other words, the losing of his identity in the results to be accomplished, the gaining of loyalty and respect from his subordinates by seeing that they are given the credit for results secured and the minimizing of

*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Transportation & Traffic Association on Oct. 10, 1916.

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personal achievement to the usefulness of the official's organization.

The second quality to be inculcated in the minor official is that of patience. For an individual working with a piece of machinery, impatience with slow results is sometimes a worthy quality, but men are different from machinery and in order to secure satisfactory results from them it is not only necessary to have an ideal to reach, but the patience to wait for the accomplishment of that ideal. Men are not machines. They learn by mistakes. They can be made to do better work through the suggestive knowledge that they have made mistakes, and that they are too intelligent to repeat them. Individual handling of men means patience, and this is the essential quality of the executive official. The firmly closed lips of the average great executive do not denote obstinacy or pugnaciousness, but are the result of patient waiting, year after year, for the results previously visualized in the mind. The impatient executive is avoided as much as possible by all high-minded employees; while the man who is patient is lovable and wins the hearts of his fellow employees. Not all patience is a virtue, however, and exaggerated patience may easily become a vice.

The third quality to be inculcated in the supervisory official is sympathy, not in a sentimental sense, but in the sense of a genuine understanding of the men whose efforts he directs and a sincere intention to aid in the problems and the working out of his ideals. One cannot be a true executive who does not possess this sympathetic understanding and aim. If a man is working under the direction of another who understands him and his troubles and who seeks to aid and advance him in every way possible, then his work becomes a part of his life, and a desire to work properly and successfully becomes as strong as the desire to live properly and successfully. This sympathy frequently gives understanding as to the cause of breaches of discipline, and through this understanding of causes, the ability to prevent them.

The fourth quality to be developed is appreciation. A man cannot be a true executive without being grateful for efficient work on the part of his subordinates, and he also should have the desire and ability tactfully but certainly to make the employee aware of the fact that his efforts are appreciated and in due time will be rewarded. The employee should be made to feel that his appreciation is impartial and just; that his good work is not to be used for the glory or advancement of his superior, but that the credit goes to the man who produces the good work. The appreciation should not be captious or uncertain, depending upon the whim or feeling of the executive or supervisor. It should not be too lavish, for compliments, of themselves, indiscriminately bestowed, lose their savor. Nor should it be too sparing, because the isolated compliment does not atone for months of apparent indifference.

(2) *Details of Operation*

A comprehensive understanding of the details of operation is, of course, necessary to any official. This understanding must be an intelligent one that comprehends not only all facts and methods in regard to the system's operation, but the reasons for these and also the reasons why other methods are not used instead. This complete understanding can be reached, not only by interested observation of the road upon which the official is employed, but by the study and observation of street railway methods and history in general, this study being facilitated by the reading of journals devoted to street railway business; by trips of inspection to other street railway systems and by attendance upon state and national conventions.

In this connection I cannot but deplore the tendency in many street railway companies of allowing only what might be termed the higher officials to attend these conventions, thus depriving the rank and file of the executive and supervisory officials of the benefits of hearing the papers and discussions on timely topics at these conventions. The more the supervisory and executive employee knows about the details and methods of operation of street railways in general, so much the more efficient does he become in the scope of his duty. Consequently, it becomes the duty of the manager to make access to wider knowledge for this class of employees easy and attractive, and in no manner is this access made easier than by attending these conventions.

(3) *Comprehensive Control within the Limits of Designated Authority*

It is equally important in the satisfactory development of the minor official that, within the limits of his designated authority, his control be comprehensive; that he feel this responsibility and not be afraid to exercise his authority. This is directly the antithesis of the practice pursued on those roads in which there is a general manager or a general superintendent who feels that no single detail can be attended to without his personal supervision. Such a manager or superintendent may, by unusual ability, have a well-managed railroad, but this method stifles the development of the unfortunate individuals who are supposed to be holding minor official positions on that road.

Such an organization, depending as it does upon an unusual genius, must go to pieces when that genius is removed from such sphere of activity. The road then is disorganized and must work like a wrecked piece of machinery until its owners can discover some other rare genius to take the place of the one removed, or else submit to the slow and tedious process of building up an organization, founded upon common-sense and modern systematic methods, in which the development of the official force of the road is contemporaneous with and equivalent to the demands made upon the ability of such force.

The machinery of a well-balanced organization is not damaged, or even slowed down, by the removal of any member, no matter how important his position. It is a rational scheme, composed of intelligent human beings, co-operating toward a common end and not depending upon the unusual natural ability or talents of any one member. The one-man organization can never be as efficient as that organization in which all the officials, within the scope of their designated authority, have more or less of a free rein.

"The Message to Garcia" would never have been delivered if the sender thereof had outlined the full course of the journey from start to finish and had prescribed the methods by which the bearer should meet each obstacle as it arose. The message was delivered because it was put up to the individual to deliver and he did so. The same reasoning applies to the work of the minor official. He can never be developed unless the full responsibility for the results to be secured by this work is placed upon him and it is left to him, through his own individual attainments, training and judgment, to carry on the work for which he has been selected.

(4) *Demonstrative Methods*

Familiarity with the details of operation of the road on which an official is employed, as well as an intelligent conception of the methods and advances made in the street railway industry as a whole, will inevitably, in the natural evolution of ideas, place the minor official in such mental condition that he will be a continual

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schoolmaster to the men under his control or in his department. The old saying that "Out of the fullness of the heart the mouth speaketh" could be well paraphrased to mean that "Out of the fullness of the mind comes the best teaching."

(5) *Economic Innovations*

Similarly, from a sound understanding of conditions as they exist, comes the best suggestions for improvements in conditions. Here again is a field where a great many mistakes have been made by managements in the past in discouraging suggestions for improvements or betterments on the part of minor officials. Of course, it should be well grounded in the mind of the executive and supervisory force that before suggestions are made as to changes in methods or equipment, the advantages and disadvantages probably resulting from such change should be well considered, and that the suggested improvement should be advanced only after careful consideration, and should be accompanied by intelligent reasons for adoption. Ideas, even of the most revolutionary description, should not be discouraged. On the contrary, original thinking should be encouraged, but such thinking should be trained and developed along lines that will tend to make such thought productive. The greatest handicap of the one-man organization is the fact that original ideas are but rarely developed. The one-man executive is too busy to have original ideas of his own, or, if he has such ideas, he has not the time to study them out carefully, while his desire to keep control in his own hands discourages original thinking on the part of others.

(6) *Company Policy*

By no means least in importance is the proper training of supervisory and executive employees along lines of public relations. Their sphere of usefulness, under proper direction, is unlimited. Moreover the training is imperative, if we would take full advantage of our available resources. The Code of Principles sets forth clearly the responsibility of public utilities and commits the member companies to a high standard of business obligation. Whether the spirit behind the principles has been universally adopted I do not know, but assuredly if street railways under private ownership and operation are to carry out their functions properly, the principles enunciated must be disseminated among the people.

I sometimes fear, however, that the doctrine of the code appeals only to that class of our citizenship whose intelligence enables them to comprehend the intricate details of financing and management. No one questions the soundness of the principles, but I am one who believes the work of education or co-operation should start with our own employees. It is safe to say that a vast majority of the 300,000 employees engaged in street railway service in this country (a formidable army for disseminating correct information), have no intelligent conception of the aims and purposes of the companies for which they work.

A notable example of the policy of informing the supervisory and executive employees as well as subordinate employees on all matters pertaining to public relations is that of Mr. Lillienthal of San Francisco. Recent events have fully demonstrated the wisdom of his course.

In one of the larger cities of this country a franchise election was held, and I am reliably informed that a substantial majority of the subordinate officials and employees were wholly uninformed as to the merits of the controversy. These men, from their very attitude desired to render service, but their statements in reference to the matter were pathetic in the extreme. Needless to say, the election was unfavorable to the company and failure to enlist the active interest of the employees was unquestionably one of the contributing factors. Loyalty and enthusiasm, rightly directed, will surmount many difficulties.

If the policy of any company is understood and believed in by the executive and supervisory force, they will in turn imbue the individual employees with an understanding and feeling of such policy. In this case, then, the company will cease to be a cold, unfeeling corporation, with purely paper policies, and become an aggregation of sympathetic, human beings, actually living and working out this policy day by day.

Motormen and conductors, learning the principles of the air brake and controller in schools of instruction, may learn how to operate a street car and become familiar with schedules, but the true learning of the expression of the company toward the public must come after they have begun to work upon the cars, through their association with each other and with the individuals who immediately direct their activities. It becomes, therefore, a matter of prime necessity that the inspector, the instructor, the supervisor, the division superintendent and similar officials should understand, appreciate and impart this spirit of the organization.

METHODS OF TRAINING MINOR OFFICIALS

Manifestly, in all except the very largest of street railway organizations, it would be impracticable to have a formal school for a supervisory and executive employee. It is not clear that in any case such formal school would be desirable for this class of employees. In my opinion, this training must be systematically imparted by the executive operating official of the individual company, whether this official be termed manager, general superintendent or by other title. This training must be kept in mind in all the relationship of such executive to the minor official, and should be supplemented by regular, stated meetings of this class of employees, at which there should be discussion and instruction on the training subjects previously enumerated.

These meetings should not be held so often as to partake of the nature of a schoolroom, but should be held often enough for the impressions formed from meeting to meeting to overlap, so that the minor official is continually conscious of the principles set forth at these meetings. It would be the wisest plan to have these meetings called for other purposes than that of instruction. For instance, a regular series of accident meetings, to discuss accidents that have occurred and methods of eliminating them; safety-first meetings, called at stated times for the purpose of minimizing accidents; or company luncheons, at which some paper is read or a talk made to assist the minor official along the lines here suggested. I cannot emphasize too strongly the need of social or semi-social gatherings as a splendid medium for humanizing the official force It is essential if harmony, team work and the fullest development is to be obtained.

While I have suggested that this work of education should be carried on by the executive operating official, it is by no means necessary that such official always give these lectures or discussions himself. The reading of articles by other persons, touching these subjects; the discussion of these subjects by the members of the supervisory force themselves, or the discussions of such subjects as are touched upon from time to time in trade publications, would all be of use and effect.

This direct training of the minor official, however, must be supplemented by observation and encouragement of the minor official in the handling of his individual problems as they may arise, such observation

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being always in the form of sympathetic interest and not a solution of his problems for him. This training should also be supplemented by a broadening of the minor official's knowledge and training, through the medium of the street railway publications and of the state and national conventions. The members of this class of employees should be encouraged with every chance to prepare a paper or to participate in the discussion of subjects at these conventions. His contribution should be made the subject of comment and discussion by the entire official family of the company. It could well be distributed among all the employees of the company, for the work or attainments of one member of the company might well be considered the property and pride of the whole company.

In conclusion, no organization should lose sight of the fact that its success and prosperity is due to the work of its combined forces, and no man in its employ who has risen in any degree whatsoever above the ranks should be too unimportant to have his growth and development followed with careful and individual concern. The employee may not know that his natural talent is being studied; that his character is being developed; that his training is being systematically carried on by advice, counsel, or by direction. He only knows that as he becomes qualified the position of greater responsibility awaits him; that as more responsibilities fall upon him, greater avenues will open for him to become acquainted with the manner in which to meet such responsibilities; that as the time arrives when he has exhausted the possibilities of the line of work in which he is engaged, he may many times, without previous request, be transferred to other work, opening up possibilities for a new development. He further knows that so long as he is ambitious to advance, he need not worry about his position, and thus he has that peace of mind which is the best environment for the growth of ideas.

The Engineering Development of the Electric Railway*

Beginning with the researches of Prof. Joseph Henry, the author traces the history of electric traction in this country and abroad, and tells in detail of the Richmond electrification in which his company lost $75,000 *on a* $110,000 *contract*

By FRANK J. SPRAGUE
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SPEAKING generally, the whole electrical industry, so far as it is dependent upon dynamo electric machinery, may be said primarily and largely to rest upon the researches of the famous American scientist, Joseph Henry. The first real suggestion of the electric railway in the United States seems to have come from a Vermont blacksmith, Thomas Davenport, who is reported to have operated a toy motor on a small railway in 1834. In 1838 Robert Davidson, a Scotchman from Aberdeen, began the construction of a locomotive equipped with a motor. His engine attained the respectable speed of 4 m.p.h. in a trial conducted on the Edinburgh-Glasgow Railroad. Among other pioneers were Prof. Moses G. Farmer and Professor Page, the latter with the government aid constructing a small primary battery car which reached 19 m.p.h. on a road between Washington and Bladenburg.

The above and other experiments were doomed to commercial failure not alone because the source of power was the primary battery, but because the motors were of crude design and construction, based upon the attraction of keepers or solenoids. Between 1845 and 1870 the self-exciting dynamo was developed and between 1867 and 1872 its reversibility was discovered. However, in the quarter century ending in 1875 there appeared to be a complete cessation of electric railway experiments.

EARLY COMMERCIAL WORK

Among the European concerns engaged in building dynamos for lighting and other purposes that of Siemens was the most prominent. In 1879 this firm showed at the Berlin Exposition a small car operated from a third-rail with track return. Soon after among other inventors Stephen D. Field and Thomas A. Edison began electric railway experiments. Priority of invention was awarded to Field, who early contemplated the operation of street cars in San Francisco. In 1880 Edison built a small road at his Menlo Park laboratory, and in the following year Siemens and Halske established a 1½-mile, one-car line at Lichterfelde, near Berlin. The latter may be considered the first commercial electric railroad. This equipment was followed by one at the Paris Exposition where overhead distribution was used for the first time.

In 1881 I constructed at the torpedo station, Newport, a dynamo which had two armature circuits and a plug switch by means of which series-parallel combinations could be made. Tests of the machine under these conditions were made, first as a dynamo and later as a motor. Some years later there was combined with the simple series-parallel control the variation of current strength by varying a resistance in the circuits of the motors. The validity of the patent on this invention was not established for some time, and in the end an adjudication of the claims of rival inventors was avoided probably by the combination of the contending interests.

In the early eighties other inventors were becoming active, among them Dr. Finney of Pittsburgh, Professors Ayrton and Perry of England, Dr. Fleeming Jenkin of Scotland. Siemens and Halske constructed an experimental road near Meron, in the Tyrol, to demonstrate the possibilities of electric traction for the St. Gothard tunnel, and also small lines at Frankfort and Molding.

In 1882, while connected with the United States Navy, I procured an assignment to the *Lancaster*, sailing for the Mediterranean, then received leave from my ship, and subsequently obtained orders to the British Elec-

*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Association on Oct. 12, 1916.

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trical Exposition at Syderham. While riding on the underground road I conceived an ideal of electric propulsion based upon the use of the tracks as one conductor and for the other a system of rigid overhead conductors all in one plane. Soon after, resigning from the Navy, I returned to the United States and, after spending nearly a year with Mr. Edison, formed the Sprague Electric Railway & Motor Company. At the same time the Edison and Field interests combined to form the Electric Railway Company of the United States, and operated a small locomotive, the "Judge," which ran around the gallery of a building at the Chicago Railway Exhibition. In the winter of 1882-1883 a Belgian woodworker, Charles J. Van Depoele, conducted experiments in or near his works in Chicago with a small car, the current being taken from a wire laid in a trough. This was exhibited at the Chicago Industrial Exhibition. He is also reported to have tried an experiment in which he used an overhead wire with an underrunning contact wheel, and this formed the basis of a hard-fought interference between him and myself.

Among the active workers of this period was Leo Daft, who made his first experiments at his company's works in Greenville, N. J., in 1883. In November of that year, he ran a locomotive, the "Ampere," on the Saratoga & Mount McGregor Railway, where it pulled a full-sized car. There was considerable activity during the following two years in Great Britain and in this country. For example, in August, 1885, Messrs. Bentley and Knight, who had conducted some experiments in the yards of the Brush Electric Company at Cleveland in the previous autumn, installed a conduit system on the tracks of the East Cleveland Railway. This was operated at intervals during the winter and then abandoned. John C. Henry also installed and operated in Kansas City a railway supplied with two overhead conductors on each of which traveled a small trolley. He later, elsewhere, used the rail return.

In the early part of 1885 Prof. Sydney Short of Denver began a series of experiments on a series system, a constant current being sent through all the motors of the line, but later adopted the multiple distribution. He also attempted the use of gearless motors, but soon reverted to the geared type. In August of this year Daft began his work on the Hampden branch of the Baltimore Union Passenger Railway, which, I believe, was the first regularly operated electric road in this country. Encouraged by his success, he undertook the equipment of a 2-mile section on the Ninth Avenue Elevated Railroad in New York. Here, during the latter part of 1885 he operated a locomotive called the "Benjamin Franklin," which, pulling a train of cars, made several trips. A speed of 25 m.p.h. was sometimes obtained, and on one test an 8-car train was pulled up a grade of nearly 2 per cent at a 7-mile gait. During this and the following year Van Depoele installed a number of small roads.

THE RICHMOND ROAD AND PRECEDING EXPERIMENTS

After separating from Mr. Edison in 1884 I formed the company already mentioned, which had a nominal capital of $100,000, and from which I received a salary of $2,500. At first the stationary motor business was developed, but my mind soon reverted to railway problems.

In a paper read before the Society of Arts in Boston in 1885 a novel scheme of operation for the Manhattan system was outlined involving the now universally used "wheelbarrow" system of motor suspension. The opportunity later arose to try the experiment in which at first Jay Gould, one of the principal owners of the Manhattan Elevated, was interested. The experiments, which were first made on a short track between the walls of a sugar refinery, were later transferred to the Thirty-fourth Street branch of the railway. They were witnessed in May, 1886, by a large number of officials of the Elevated and other enterprises, among these officials being Cyrus W. Field and the Duke of Sutherland.

After this test I disposed of a sixth of my interest in the company for $50,000, a very acceptable help in a time of need. The experiments were continued, but the stockholders and directors of the road took no further interest in them, and I turned my attention to trolley problems.

A New York politician, who had secured a franchise for an electric railway in Richmond, Va., had associated with him in the enterprise a banker and a merchant in railway materials. A short time before my company had taken a small contract for the Union Passenger Railway at St. Joseph, Mo., and secured the one for the Richmond Union Passenger Railway in May, 1887. The latter called for the completion in ninety days of the equipment of a road having about twelve miles of track, at that time unlaid, and with the route only provisionally determined, the construction of a 375 hp. power plant, and the furnishing of forty cars with eighty motors and all appurtenances necessary for their operation. Thirty cars were to be operated at one time, and grades up to 8 per cent were to be mounted. Finally the payment was to be $110,000 if satisfactory.

My immediate assistants on the Richmond work were Lieut. Oscar T. Crosby, a West Point graduate, and Ensign S. Dana Greene, from the Naval Academy. On account of an attack of typhoid fever I was, at a critical period, absent from work nine weeks, being almost the entire burden on my associates. When the contract was undertaken we had only a blueprint of a machine and some rough experimental apparatus.

After overcoming difficulties one by one, we began experimental runs in November, 1887, but various troubles had brought us to the end of the following January when it had become vital to begin regular operation. At this time we prepared to open the line with about ten cars. As a preliminary to regular operation we spent a day carrying loads of children, and about February 2, 1888, in a drizzling rain, we opened the line for regular service. The day was one of disappointments, as difficulties in operating the equipment developed. Troubles with gears, commutators, brushes, etc., had to be overcome. We managed, however, to keep the cars moving and gradually our greater difficulties began to lessen, even if new ones cropped up. By May 4 there were thirty cars in operation, and finally forty cars.

A most important experiment of banking the cars occurred one night on the occasion of the visit of President Henry M. Whitney and a number of directors of the West End Railway of Boston, Mass. General Manager Longstreet of the railway was a strong advocate of cable operation and had doubted the possibility of handling the cars electrically when badly bunched. On this occasion twenty-two motormen started their cars at the extreme end of a section of the line designed for four. This test was conclusive and the fate of the cable in Boston was settled. Richmond's troubles were buried under an immediate financial loss to my company of $75,000, fully compensated for in the subsequent unparalleled growth of a great industry. Among the characteristic features established by this installation were: the main and working conductors and feeders, with bonded rails and earth return; the universal movement, reversible trolley in the center of a car; double-ended control; axle-suspended motors; series parallel group-

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ing; variation of field resistance; fixed end-contact brushes, and lightning arresters.

The final success of the Richmond road, the rapid equipment of a number of others, and especially the adoption of electricity on the West End road of Boston by Mr. Whitney, whose first installation was part conduit and part trolley, and to whom must be awarded the credit for initiating the modern consolidations of street railways, were followed by a period of extraordinary activity in commercial and technical development in which for a time the Sprague and Thomson-Houston companies were principal competitors.

The progress made in the United States soon commanded the attention of the old world, and work was begun along the same lines in Italy, where I installed the first road, the Florence-Fiesole, in 1889. The first road in Germany was installed at Halle, by our agents, the Allgemeine Elektricitäts Gesellschaft, but it was not until a number of years later that there was any general adoption of the electric railway in the more conservative countries.

Meanwhile the Sprague Electric Railway & Motor Company was absorbed in 1890 by the Edison General Electric Company, and soon after I severed my connection with it and took up the development of high-speed passenger, freight and automatic house electric elevators in opposition to the hydraulic trust. The Edison Company was later combined with the Thomson-Houston Company and others in the General Electric Company. The Westinghouse Company had meanwhile actively entered the field, and for a number of years these great companies have done the larger part of the electric railway work in this country and abroad. The record of the succeeding years is largely that of an extraordinary industrial development, with continuous improvement in the service rendered and increase in the size of apparatus.

HEAVIER TRACTION

Soon after the use of electricity for single cars had proved successful, heavier operations were naturally attempted, and as early as November, 1890, a line on the South London Road, which was originally designed for cable, was opened, the trains being pulled by electric locomotives equipped with a pair of gearless motors having armatures mounted on the axles of the drivers. Meanwhile, I was keenly interested in the rapid-transit problem, and urgently advocated a four-track underground electric railway for New York. I also offered, under heavy forfeiture, to install on the elevated road a train to be operated by a locomotive car, also one to be operated by motors under the cars under a pilot control, and to make an express speed of 40 m.p.h.

Two years later the Liverpool overhead railway was put in operation. Here the trains were composed of two-car units, each car having one motor, the two being operated by hand control. In the spring of the same year, 1893, the Intramural Railway was constructed at the World's Fair, Chicago, the equipment being supplied by the General Electric Company. Motor cars with hand control were used to pull trail cars and a third-rail supply with track return was adopted. In 1895 the Metropolitan West Side Elevated Railroad in that city was equipped on the same general plan. In the following year the Nantasket Beach Road, a branch of the New York & New Haven Railroad, was put in operation, and in September the Lake Street Elevated of Chicago followed. Soon afterward electric service was instituted on the Brooklyn Bridge, motor cars being used to handle the trains at first at the terminals, and later across the bridge.

There were few attempts, however, to replace steam operation on regular roads, and only occasionally were electric locomotives used and then only for some special reason.

These various equipments, all following steam precedents, seemed a pitiful falling short of the possibilities of electric train operation. Upon taking up the development of electric elevators I adopted distant control of the main motor-controller from a master switch. Pondering over the elevated railway train problem one day, the thought suddenly flashed upon me: Why not apply the same principle to train operation? That is, make a train unit by the combination of a number of individual cars, each complete in all respects, and provide for operating all the controllers simultaneously through a train line from the master switch on any car. Here was a way to give a train of any length all the characteristics of a single car, with every facility of operation demanded by the most exacting conditions of service and capacity.

After two abortive attempts to get the privilege to demonstrate the advantages of the system at my own expense on the Manhattan road in New York, an unexpected opportunity suddenly arose in the spring of 1897, when I was requested to act as the consulting engineer of the South Side Elevated Railway at Chicago.

I hastily drew up a report, the main feature of which was an argument in favor of the abandonment of locomotive cars and the adoption of individual equipment under common control—in short, the multiple-unit system. As an earnest of my confidence I supplemented the report by an offer to personally undertake the equipment of the general plan outlined, which set with the indorsement of the engineers. This was followed by a visit to Chicago, but the contract was not concluded until after I left for Europe, and then only after a very bitter fight with various companies and under most onerous conditions, supplemented by a $100,000 bond for performance.

On July 16, 1897, two cars were put into operation on the tracks of the General Electric Company at Schenectady, and on the 26th, the half-century anniversary of Professor Farmer's test of a model electric railway at Dover, my ten-year-old son operated a six-car train in the presence of the officers and engineers of the South Side Elevated Road at Schenectady. In November a test train of five cars was put in operation in Chicago. Three months later locomotives had been entirely abandoned, and the whole 120 cars were in operation, the local work being largely supervised by my assistant, Frank H. Shepard.

The controllers for the original Chicago equipment were of the ordinary street car type, operated by pilot motors automatically retarded by any excess of current in the motors during acceleration. The train line contained three speed and two direction controlling wires terminating in couplers at each end of the car. The disposition of the control wires and their connection to the master switches was such that whatever the number, sequence or end relation of the cars there was never any change in the connection of the speed circuits, but when the cars were reversed the direction controlling circuits were automatically reversed. So, also, whatever the grouping of cars, like movement of the master switch with reference to the facing of the track produced like relative direction of movement. These principles are fundamental, whatever the changes of physical details.

As an alternative construction the Westinghouse Company first used a step-by-step pneumatic motor to operate the controller, and later, on account of the increase of duty, both the General Electric, which finally absorbed the Sprague Company, and the Westinghouse Company replaced the single cylinder form of controller

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by a combination of individual contactors each under a magnetic blowout.

STEAM RAILROAD ELECTRIFICATION

Following a serious accident in the yard tunnel of New York Central road some years ago, the first great step in main line electrification was taken when electricity was adopted for operation at and for some distance from the main New York terminal. Up to that time all motors used for railway purposes maintained a fixed relation between the armature and the field, but when this project was finally taken up a plan for a new type of locomotive was adopted by the General Electric Company, originally proposed by Mr. Batchelder. This called for the use of bi-polar motors, in which the fields of the motors were carried in a horizontal plane, were supported by, and made an integral part of, the locomotive frame and were carried above the suspension springs.

The armatures were rigidly secured to the axles and the fields with flattened pole pieces and a comparatively large air gap, and were free to move up and down relative to the armatures. These locomotives were the first to be equipped with the multiple-unit control so that two or more could be operated together. On this equipment was first developed the Wilgus and Sprague standard under-contact third rail.

Even in the early days of electric railroading it soon became apparent that at the prevailing electric pressures commonly used, from 450 to 600 volts, the field of operation would be restricted by the large investment required for copper, not, of course, within ordinary city limits, but as soon as the distance became considerable. I was, therefore, always an advocate of improvements looking to the use of higher potentials, and especially urged the raising of direct current potential to its practical limit. For a long time this seemed to be impracticable.

Meanwhile the system of polyphase alternating current transmission and conversion to direct current at substations through the intermediary of step-down transformers and rotary converters or motor generators had been developed, and many engineers became the ardent advocates of the abandonment of all consideration of the use of direct current for interurban and trunk line operation and urged the adoption for this purpose of single-phase alternating current operated at high potential on the trolley wire, speed control to be attained by the use of a step-down transformer.

The great difference of opinion among engineers and manufacturers early gave rise to bitter controversies. During a long period of doubt among many as to the results of single-phase operation, my attention was called to the developments which were taking place in variable-speed motors for ordinary industrial purposes by making use of my old inter-pole winding, localized to small extra poles carried between the main field of the motors, and in consequence I urged a test of this practice on railway motors. The first results were so remarkable that I instantly saw the possibilities of a great increase in the potential which could be used in direct-current operation. On account of certain inherent defects in the single-phase motor it also seemed likely that it would gradually be abandoned, and since its sole claim for use had been based upon the economy of installation and transmission, direct current would maintain a supremacy not alone on urban and interurban roads, but also in trunk line operation.

The experience of the past few years seems to have demonstrated the soundness of these conclusions, for while the New Haven system has been, necessarily, maintained and extended, most of the other single-phase installations in the country have been abandoned, while, on the other hand, some of the most difficult and extended freight lines, deemed by many engineers barred to direct-current operation, have now adopted direct current at from 2500 to 3000 volts working potential, as illustrated by the Butte, Anaconda & Pacific Railway and the 440-mile section of the Chicago, Milwaukee & St. Paul Railway.

There are, of course, alternative methods which are still in use, as, for example, the polyphase system used on the Great Northern Railway, important installations of which have been made in Switzerland. One of the most ambitious attempts of this character was that by two German companies, thirteen years ago, on the Zossen military line, where was made the highest record for speed of a car carrying passengers, about 126 m.p.h., the current being collected at 10,000 volts from three overhead wires by sliding contacts. The multiplicity of conductors, however, distinctly militates against this general system as a solution of the larger railway problem, despite the high ratio of motive power to weight and the easy use of the motor for braking by regeneration, quite independently of other limitations affecting trunk line transportation in general.

Additional methods of using single-phase alternating currents on the working conductor have been proposed and put into practice, but these eliminate the single phase motors entirely. Among them is the introduction on a locomotive of apparatus for changing the energy of the single-phase current into two-phase current to be used in a polyphase motor, as on the Norfolk & Western Railway. Conversion into a pulsating direct current by the use of a mercury rectifier carried on the locomotive has been tried out quite extensively in experimental equipments, and also the use of mercury rectifiers operated from polyphase currents at substations, in both cases in connection with direct-current motors.

Following the general plans suggested by me in a study of electrification for the Sacramento Division of the Southern Pacific Company a number of years ago, the Chicago, Milwaukee & St. Paul locomotives use, instead of the ordinary series motors, independent excitation of the field magnets from motor generators, which makes it possible not only to use the motors for brakes in a circuit closed around the armatures when disconnected from the line, but also to regenerate current on down grades while connected to the line.

THE FUTURE

Despite the enormous advances made and the results accomplished in electric railway development it would be folly for the electrical engineer to assume that we have arrived at the limit of invention or improvements. The urban and interurban fields, with the constant linking up of smaller systems into more extended systems, goes on apace, but the trunk-line systems are still largely steam operated. It is possible, and quite probable, that irrespective of any improvements which may develop or any new inventions which may appear the financial question will continue, as heretofore, to largely govern the question of change of motive power in the more extended fields.

It is certain that there must be co-operation in the important matter of power supply, and it is probable that the whole trunk line problem will appear less formidable with the elimination of the requirements of the installation of individual power houses with their necessary reserves, and the use of current from great power houses properly linked together which in addition to their reliability can make full use of the diversity factor in a multiplicity of demand.

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Accounting Inconsistencies and Fallacies*

Author uses projective test to show up fallacies in so-called principles. Criticizes commission provisions for appropriation accounts, sinking fund reserves, amortization of debt discount and expense, and other points

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INCONSISTENCIES and fallacies in accounting are the results of indifference, vacillation, ignorance, expediency, casuistry or dishonesty of purpose. Indifference, vacillation or ignorance may produce either or both, but where expediency, casuistry or dishonesty of purpose govern, principle does not abide in accounting or other human activity, and the inevitable result is fallacy.

Inasmuch as comparison is the measure of efficiency in human endeavor, conclusions drawn from comparisons will be fallacious if consistency is not maintained even to the highest refinements. Consistency cannot be maintained where indifference or ignorance prevail. Vacillation in regard to the maintenance policy may produce inconsistencies unless there be accounting provisions against them. Such vacillation may run back and forth between two extremes, but, while it may not change the total maintenance expenditure in a given period of time, alert, competent and scientific accounting may so keep the accounts in adjustment as to prevent distortion in graphic chart expression of their relations, if only it is given authority approximating that of the actuarial function in life insurance.

INCONSISTENCIES INVOLVING MATERIALS AND SUPPLIES

Inaccuracy or unreliability in accounting for the use or consumption of operating materials and supplies is not an unusual source of inconsistencies. Many who are charged with the function of management lay great stress upon integrity and accuracy in the handling of and accounting for cash, but fail to realize that consistent comparisons of operating costs are dependent upon the application of the same qualities to the handling of and accounting for materials and supplies. It seems never to occur to them to place the accounting for materials and supplies under the jurisdiction of the officer charged with the general accounting function, even to the extent of supervision over the inventory tests of the accounts.

As bearing upon the need for such supervision, I once came in contact with a very unusual situation—unusual because the developments were quite the opposite of the ordinary. Inconsistencies in comparisons brought about investigation, and the development was that, because the company was enjoying some unusual revenue prosperity, an operating officer whose range of control was sufficient for the purpose conceived the idea of charging out more operating materials and supplies than were being used. He did this not with dishonest intent but with the end in view of accumulating a secret reserve for use without effect on expenses when a recession in revenue might be experienced and when there might be greater watchfulness over the relation of the operating costs thereto.

The "principle" in accounting to which I made reference in the opening paragraph is the one defined in the Century Dictionary as: "A truth which is evident and general; a truth comprehending many subordinate truths; a law on which others are founded, or from which others are derived; as, the principles of morality, of equity, of government, etc. * * *" Lexicons give the application of definitions to law, to engineering, to architecture, to chemistry, to medicine, to mathematics and to society, but not to accounting. Some day, perhaps, a practical man will be drawn upon a lexicon review board, and recognition then will be given to accounting as one of the sciences. An accounting application of this definition would add to the first clause "or which will stand the test of logic, as in accounting."

This would give rise to the question as to how to make the test. The best method I have found is to widen projectively the relations between quantities or factors and consider the result. A notable situation for illustrative purposes is the requirement in an accounting order of the Interstate Commerce Commission directed against steam roads that the balance of the "Hire of Freight Cars" account, arising solely from debits and credits for the interchange use of such equipment, shall not enter into the operating results of the respondent carrier but shall be treated as income derived from sources other than operations—in other words, shall not be included in or be set off against the operating revenue, according as the balance may run; and the further requirement that the respondent's entire cost of maintaining its freight cars (repairs, depreciation and retirements), shall be charged to operating expenses.

For a projective widening of relations, assume that a connecting railroad 100 miles in length, which has been operated under the ownership of 600 freight cars with a need for twice that number, and under the condition of charging the hire of other carriers' freight cars to non-operating income, has been producing net operating revenue at the rate of $600,000 per annum; and that this railroad, discovering a large shortage of freight cars throughout the country and finding itself in an exceptional position thereby, acquires and places in service 10,000 additional freight cars. Inasmuch as the hire derived from these additional freight cars is required to be credited to non-operating income, and inasmuch as the normal cost of owners' repairs (distinguished from users' repairs under interchange rules), depreciation and retirement are required to be charged to operating expenses and would amount to more than $600,000 per annum, the result would be to convert the previous net operating revenue into a net operating loss.

Such a change would be wholly illogical in the light

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of the cause and conditions. If the "Hire of Freight Cars" account as set up were charged and credited *per contra* with the amounts necessary to make the operating expenses represent the true costs of operating maintenance for both the other carriers' freight cars and the respondent's own freight cars, there would be no difference in the net operating revenue, whether the respondent owned 600 freight cars or 10,000 freight cars. Furthermore, the "Hire of Freight Cars" account would reflect a true non-operating income. It is by such projections that tests of principle may be made and fallacies be avoided.

THE FALLACY OF APPROPRIATION ACCOUNTS

I have wondered why the Interstate Commerce Commission, in its 1914 accounting classification for electric railways, substituted "Corporate Surplus" for "Profit and Loss Surplus," and made a subdivision into five primary accounts, viz.: No. 447, "Additions to Property Through Surplus;" No. 448, "Funded Debt Retired Through Surplus"; No. 449, "Sinking Fund Reserves"; No. 450, "Miscellaneous Fund Reserves," and No. 451, "Profit and Loss—Balance"—unless it was to lead the electric railway companies into the trap of definite appropriations to accounts 447 to 450, to be later closed by legislative prohibition against any use of the credit balances therein for dividend purposes, or to be held subject to the commission's permission of transfers back to the "Profit and Loss" account. Whether or not a profit and loss surplus is available for distribution depends upon the cash position, certainly not upon acts of appropriation. The fact that these appropriation accounts were not made mandatory stands as evidence that the Interstate Commerce Commission did not believe that it could enforce them.

Let us apply the projective test for the purpose of ascertaining whether or not there is anything fallacious in this plan of appropriation accounts with apparent intent to limit dividend distributions to the resultant profit and loss balance. Inasmuch as it appears that the "Sinking Fund Reserves" account is but intermediary to the "Funded Debt Retired Through Surplus" account, we may assume for the purpose that the entire funded debt has been retired and that the sinking fund reserves have been closed. Assume also that the original issue of the funded debt exceeded the tangible value of the property, *i.e.*, covered a part of its franchise value, and that upon the last redemption and retirement of the funded debt the franchise value had been entirely amortized. Assume also that throughout the period of the redemption and retirement of the funded debt and the amortization of the franchise value, large expenditures were made for additions to property and that amounts equal to those expenditures were transferred by appropriation from the "Profit and Loss" account to "Additions to Property Through Surplus" account. Assume further that as a result of these appropriation transfers and amortization charges there is a debit balance or deficit in the "Profit and Loss" account. It is too obvious to be gainsaid that since the amortization of the franchise value took nothing from the company's treasury, there should be a substantial amount available for dividend distribution. The fact that, in the face of such a condition, there is a debit balance, or deficit, in the "Profit and Loss" account exposes the fallacy of this appropriation scheme.

Apparently there did not occur to the Interstate Commerce Commission the practical proposition of setting up a group of accounts, as "Common Shareholders' Accounts," consisting of "Common Capital Stock Outstanding," "Common Capital Stock Conversion Obligation," "Common Capital Stock Premium or Discount," "Governmental Grants in Aid of Construction," and "Profit and Loss Surplus" the total of which would represent the capital interest of such shareholders in the business as though collectively they were an individual and sole proprietor.

In the interest of the shareholders of the companies affected by the Interstate Commerce Commission classification, and of the other companies whom you represent, I send by the members of this association a message to executives and directors to beware of appropriation accounts and acts of appropriation. They should be shunned as fallacious and dangerous. That the surplus of a corporation is the excess of its assets over the sum of its liabilities and capitalization has been accepted and recognized as a fact for as long as corporate organization and accounting have existed. It is immaterial whether the account representing this excess is entitled "Profit and Loss" or "Surplus." Whichever it may be, it needs no subdivision in its finality. The only purpose of preceding either with the primary accounts of revenue, expense and income is to have ready at hand, in accounts, the data necessary for determining the causes of gains or losses, thereby avoiding for such purpose recourse to analysis of a single account, the former method being more accurate and economical than the latter.

COMMISSION RULES SHOW LACK OF HARMONY

As illustrating the lack of harmony as between the Interstate Commerce Commission and the state public service commissions, and as between many of the latter, the full correction of which never will be realized excepting through a greater nationalism in our political organization, it is noticeable that in the accounting order of the Ohio Public Utilities Commission directed to electric utilities, there is a grouping of accounts under the general title "Proprietary Interests, Reserves and Profit and Loss." This accounting order does not require or make provision for appropriation accounts other than one for miscellaneous appropriations, which are specified as optional appropriations from surplus for gratuities, gifts and reserves. While this order provides an "Income and Profit and Loss" account for the current period, it is further noticeable, however, that this is a temporary account to be closed into the final "balance sheet account" designated as "Surplus" or "Deficit," according as the balance may run. The Wisconsin Railroad Commission saves itself from like criticisms by the omission of the "Profit and Loss" account from its accounting orders.

SINKING FUND RESERVES ARE VIOLATIVE OF PRINCIPLE

There is similarity between the federal commission and the Ohio commission and several others in regard to sinking fund reserves, and this is one of the greatest fallacies to be found in commission accounting orders. This occasion does not warrant the time necessary to an adequate discussion of the subject. Instead, I will call your attention to an article by my esteemed partner, Charles S. Ludlam, which appeared in the March, 1914, issue of the *Journal of Accountancy*, under the title "Treatment of Sinking Funds," and in which he makes very clear the fallacy of the sinking fund reserve. Obviously if a sinking fund reserve is fallacious, the accounting orders of some of the commissions which provide that the increment to the sinking fund shall not go into the corporation's income account are equally fallacious and violative of principle.

AMORTIZATION OF DEBT DISCOUNT AND EXPENSE

I cannot leave the Interstate Commerce Commission without calling attention to an absurd inconsistency

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which has been copied by some state commissions in regard to the amortization of funded debt discount and expense. The requirement is that the income account for this amortization shall be charged during each fiscal period with the proportion of the unextinguished discount and expense on funded debt obligations applicable to that period and that this proportion shall be determined according to a rule, the uniform application of which throughout the interval between the date of sale and the date of maturity will extinguish the discount and expense on funded debt; that the charge to this account for any period shall not be either greater or less than the proportion applicable to that period, so long as any portion of the discount and expense remains unextinguished; and that the accounting company may, at its option, charge to "Profit and Loss" account all or any portion of the discount and expense on funded debt remaining at any time unextinguished.

Can one conceive of anything more illogical than that the income account may be wholly relieved of charges for the amortization of funded debt discount and expense but may not be partially relieved therefrom through a write-off to "Profit and Loss" of a portion of the total discount and expense and amortization of the remainder throughout the interval between such write-off and the maturity of the debt? I do not believe in the write-off to "Profit and Loss" of any part of funded debt discount and expense, because I cannot clear from my mind the fact that it is just as much a part of the cost of using borrowed money as contractual interest, and because it should not be omitted from the net income to be considered in rate cases, or from the net income subject to the federal income tax.

In sustaining an application for validation of bonds to be issued and sold under a mortgage the counsel for a company included, in addition to property expenditures, a considerable amount of discount on bonds previously validated under the same mortgage. The commission accepted the explanation of reimbursement for such discount which was presented and validated bonds to the amount of the application. Awakening later to the fact that they had validated an over-issue of bonds by reason of the inclusion and their acceptance of the item of discount, an order was issued requiring that, pro-rated over a period of six years, the company should write out of its "Road and Equipment" account and charge "Profit and Loss" account the amount of the discount item. This was done in total disregard of the fact that the discount in question had not been charged to the "Road and Equipment" account but, on the contrary, had been written off against "Profit and Loss" account prior to the application for validation. Apparently it did not occur to the commission that it was improper so to write down the "Road and Equipment" account, and that the proper remedy would have been to reduce correspondingly the validation of bonds upon the occasion of another application which the conditions made altogether probable.

In another case a ruling was made to sustain the text of the commission's accounting order and was to the effect that while interest maturing on the day next succeeding the date of the balance sheet should be included in current liabilities as interest matured and unpaid, the amount of bonds maturing on the same date, and to which the interest attached, should not be included in current liabilities but should be included in funded debt unmatured.

Lest one form the impression that I am opposed to commission accounting orders from all angles, let me say that such is not the case and that I believe they contain much that is good. I do not disagree with commission orders, but I do disagree with their inconsistencies or fallacies.

The Work of the Statistician*

Separate branch to handle electric railway statistical work is a step in the right direction, owing to commission requirements and the need of comparative data and exact costs. Examples of work of a statistician

By W. E. JONES
Statistician The Connecticut Company, New Haven, Conn.

ACCORDING to the Century Dictionary the definition of a statistician is "one who is versed in or collects statistics."

The officers of the Connecticut Company reached a conclusion that it would be a most excellent idea to have a man of this type to collect and compile statistics in order to assist the officers and fortify them with knowledge so they could plan to meet the high operating expenses of present day operations and have something left for the stockholders of the company. They realized that it would be necessary to have not only the ordinary results of operations from the accounting department, but also many detailed statements and statistics, going back over a number of years.

METHODS FOR PRESENTING STATISTICS

In the presentation of statistics, there are generally two common methods employed: (1) By adhering strictly to a plain display of facts, classified under proper headings in condensed form and showing such continuity or sequence in time and incident as to show clearly a result, the source and genuineness of which is not subject to doubt or surmise. (2) A second method is frequently adopted by speculative statisticians who use as a basis the accounts of a fiscal period, and by process of extreme analysis, endeavor to build a statistical fabric with the object of proving or disproving certain theories.

A plain relation and classified presentation of principal facts, as portrayed in the first mentioned plan, is immeasurably preferable, inasmuch as the plain truth thereof is sufficient for the mind of any average street railway man to grasp, and adequate for the purposes of mental comparison and conclusion. The second method, while based upon a foundation of facts, is, as a rule, so colored or accentuated in many ways, and so burdened

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with unnecessary detail and obtruse analysis, as to tend to mislead the open-minded railway official who is seeking facts only, and induce him to accept what may be erroneous or biased conclusions, thereby falling short of a comprehensive grasp of prominent facts and truths. Needless to say, the first method is followed in all of our work.

MORE MINUTE STATISTICS NEEDED

Street railway officials all over the country have found that the cost of labor, material and everything pertaining to the production of transportation has increased, while the fares have remained the same. Therefore, it is necessary under present operating conditions to have information showing unit costs of power production, maintenance of track and roadway, maintenance of buildings, upkeep of rolling stock, and this does not mean merely the figures which are ordinarily compiled in the accounting departments of street railways, but further unit costs so as to enable the officers to know the relative efficiency of various types of equipment. Moreover, a great many times it is necessary to know the cost of operating one particular line, or even a single car on a line. This information is not necessary in the ordinary sense, in order to compile information for the state commissions, or for the Interstate Commerce Commission. Competition has also developed in the form of motor transportation, and this has added to the necessity of compiling more minute statistics.

EXAMPLE OF STATISTICIAN'S WORK—MILEAGE RECORDS

In most street railway companies the statistical information is compiled under the jurisdiction of the general accounting official. Such information was formerly compiled by some of the clerks in the comptroller's office of the Connecticut company. It seemed desirable, however, to have it compiled by an accountant who made it his entire business to look after statistics, and a new branch was established in charge of a statistician, under the jurisdiction of the comptroller. In order to show more clearly the work of the statistician, I will outline briefly a few methods followed and refer to a number of subjects that have been analyzed where the statistics have brought to our attention valuable information.

In most street railway statistics the unit of cost is the car-mile, and the question of single or individual car mileage is one of the first steps taken after opening the statistician's department. A great many companies merely compile car mileage from the regular running schedule, plus or minus interruptions and extra cars run, but there are a number of companies which compile mileage on the single or individual car basis and for the benefit of some of the accountants, the method followed is briefly outlined. The mileage is figured from the conductors' day cards from day to day, and the day card compared with the schedule running time of that day and such adjustments made as may be necessary due to loss of time on a given route in that day's operations. If more than one car has been used by a crew on a certain route, the exact mileage is figured for each car and recorded on a form provided for that purpose under route heading. This mileage is then transcribed on to a form which is sent to the statistician's office, and recorded on one of two different colored cards as a permanent record for the various equipment. A white card is used for the passenger car mileage. A salmon colored card is used for express, freight, work cars, snow plows, sand cars and other miscellaneous equipment.

The mileage is posted daily and a running total is kept in order that a report may be made from time to time for the inspection of the equipment. The chief engineer of power and equipment designates the number of car-miles that each type of equipment should be operated before being reported for inspection. Some of the cars are reported on an 800-car-mile basis and others on a 1000-car-mile basis, while there are a few cars on interurban lines that are inspected on a 1500-car mileage basis. Most of the cars, however, are inspected on a 1000-car-mile basis. A daily report is prepared in the statistician's office covering the cars to be reported for inspection. The form is made up in quadruplicate copies. The original is sent to the manager or superintendent, the duplicate to the master mechanic and the triplicate to the barn superintendent or foreman, while the quadruplicate is retained in the general office files. This report is prepared to show the various cars that have run approximately the number of miles allotted to their type of equipment, and to have the operating department arrange for the proper inspection. The report is sent out one day in advance of the inspection to enable the operating departments to line up the cars for inspection the following day. This inspection system has shown that there is a saving in the inspection department, and our equipment is kept in much better condition than it was under the old system of inspection.

WHEEL, AXLE AND SIMILAR RECORDS

Another branch of statistics or cost accounting which is under the jurisdiction of the statistician covers the wheel, axle, gear and similar records. This information is compiled so as to give complete information as to when car wheels are pressed on the axles and when the axles are placed under certain cars. A form is filled out by the foreman in the wheel department and sent to the master mechanic, showing the wheel numbers, axle number, date, number of tons pressure, number of the mate of wheel, type, size, etc. This report is recorded on a car wheel and axle record. When the wheels and axles are placed under the cars a report is sent by the truck foreman to the master mechanic, and a record is then made on the car wheel record and axle record, showing the date and number of car wheels that are placed under the equipment. These records are then put into the operating equipment file and remain there until these wheels or axles are removed. Then the same forms are used again by the foreman, and their record is transcribed onto the car wheel records and axle records in such a manner that the master mechanic is able to determine how long the wheels or axles have run.

At the end of each month a report is made by the master mechanic to the statistician, advising him as to the date when the car wheels and axles were removed from service during the month. The statistician then prepares a statement for the supervisor of equipment, showing the car wheels and axles that have been removed from cars on all divisions, giving the mileage made, and he (the supervisor of equipment) can then judge what make or type of wheel is best for service on each division.

STATEMENTS CONTAINING USEFUL STATISTICS

The statistical department also prepares monthly statements which contain useful statistics for the operating officials. A few of these statements are as follows:

(1) A comparative income statement. This shows increases or decreases in the revenue and operating expenses for the month and period to date, as well as a number of statistics, these being the percentage of operating expenses to earnings, daily average receipts, daily average expenses, revenue per car-mile, operating expenses per car-mile, total car mileage, revenue passen-

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gers and transfer passengers carried. This statement (which is in addition to the regular income statement made out in accordance with the Interstate Commerce Commission classification of accounts) is used for the convenience of the officers to pass information to bankers or others interested. (2) Earnings and statistics by lines. This gives earnings per car-mile and per car-hour and density of riding, etc. (3) Detailed power station expenses and costs.

Further light on the work of the statistician may be given by enumerating a number of special statements prepared, such as charts showing high points in operating expenses of certain power stations; a statement of lay-overs on some of the divisions, showing the per cent of time lost on account of the layover, the total hours lost and the total hours that would be lost, if certain schedules were to be continued for one year; statements compiling statistics of other companies for comparative purposes, and statements of expenditures on account of municipal requirements for a period of years.

It is to be noted that substantially all of the above statements are merely along the line of statistics and not what, in the ordinary sense of the word, could be called bookkeeping work, or general office work which all street railways are obliged to have done in order to comply with state or commission requirements. As stated in the first part of this paper, competition is keen, costs are high and no portion of a street railway can be operated profitably under the present conditions unless the officials know absolutely just what every operation costs.

In addition to the minute statistics required by the officers of the companies, the commissions have in some instances extended their requirements, and this has put a further burden upon the accounting department which brings out the fact that the establishment of a statistical branch in connection with the accounting work of street railway companies is a step in the right direction, and a number of accounting officials have recognized this and are establishing such departments. Officers are realizing more and more the value of statistics, and as the demand for this sort of information increases, it would seem that the presidents and operating officials, as well as the accounting heads, will realize the necessity of the statistician. It is predicted that more appointments to such offices will undoubtedly be made in the near future.

The Census of Electrical Industries*

Census Bureau has unique record of United States electrical development. Gross value of products and income amount to $1,201,000,000 annually. No other industry changed so rapidly or completely in one generation as electric railways

By WILLIAM M. STEUART

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THE United States, the British Empire, Germany and France are by far the most important industrial nations. In magnitude and diversity of industry, the United States ranks first. While the multiplicity of inventions, the closer commercial relations of nations, the more general and thorough education of the masses, the utilization of natural resources and other conditions have aided in this general advancement, we believe that electricity has been the most important single factor. Those of us who are fifty years of age can remember when the telephone was coming into commercial use, and the small experimental central stations were being installed in the most favored localities. Less than thirty years ago practically all of the street cars were drawn by horses. With the exception of the telegraph, all the industries depending upon the commercial use of electricity have come into existence and been developed during the present generation.

The development of the telephone has been the wonder of the age. Equally astonishing has been the expansion of other industries in the electrical field. There are now about 1,500,000 automobiles registered in the United States, and the reports of manufacturers indicate that the annual production will amount to 1,500,000. The increased popularity of the automobile is due largely to the application of electricity. Practically every car now produced is equipped with an electric self-starter and lighting system. The hand crank and oil acetylene lamps are rapidly disappearing. The United States easily takes first place in the production and utilization of electric current for commercial and industrial purposes. Our central stations, electric roads, telephone and telegraphs now give direct employment to approximately 1,000,000 people, and the industrial, commercial and social well-being of the country is dependent on them. We can conceive the conditions that would exist if electricity should suddenly lose its power.

IMPORTANT TO HAVE STATISTICS

It is contended by some that these conditions are well known, and it is not necessary—in fact, serves no useful purpose—to compile statistics in regard to them. Fortunately, we are not all of this opinion. It is important to the nation as a whole to know the amount of capital invested in electric railways, the miles of track, number of cars, persons employed, etc. Each company has these facts for its own properties and cannot do business without them, and the nation is very much in the same position. We cannot know what our combined efforts amount to, whether the net result of successes and failures in business is a gain or a loss, unless the government compile statistics to show the magnitude of operations for representative periods. Certainly we would not be an up-to-date people unless we knew to a reasonable degree of certainty the extent of our various industries.

With but few exceptions, the companies now appreciate this and furnish the data without question. A few years ago there was an entirely different feeling,

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and the majority of the companies contended that statistics concerning their operations were of such a personal nature that they would not furnish them to the government. The first complete census of the electric industries covered 1902, and I remember that many companies were not inclined to make reports. Some were very disagreeable about it and made it as difficult as possible for the agents to secure the data. The bureau sought the advice and assistance of the Accountants' Association and others who appreciated the value of statistics. A spirit of co-operation was finally established, but after trying for somewhat more than a year to secure satisfactory returns for all companies, the census was finally printed without the data for some important companies.

MULTIPLICITY OF STATISTICS DEPLORED

The absence of statistics for the early periods of our history makes it impossible to show the actual conditions existing at that time, but we are now in danger of giving too much attention to statistics. We are often met with the assertion that reports are required by government agencies that answer no useful purpose, and that some arrangement should be made to standardize the reports required by the various governmental bureaus, so one report would answer for all. It does seem unnecessary for the United States, the states, and in some instances cities and counties. to secure reports containing, in part, the same information. The Census Bureau appreciates this and is constantly working for co-ordination in the compilation of statistics. We hope that before long some scheme will be devised to avoid the multiplicity of reports.

UNIQUE RECORD OF ELECTRICAL DEVELOPMENT

The Census Bureau has made a complete record of the development of the electric industries in the United States from their incipiency. It is a record that can be referred to with pride, because it is based entirely on American ingenuity and enterprise. No corresponding record has been made by any other nation, or for any other industry in this nation. These records contain separate totals for the manufacture of electrical machinery and apparatus, the telephone and telegraph industry, the central electric stations and the electric railways.

THE ELECTRICAL MANUFACTURING INDUSTRY

These industries all depend upon the manufacture of electrical machinery and apparatus. The number, variety and scientific accuracy of these machines has increased enormously during the last twenty years. In no other branch of manufactures has there been such rapid increase in the number of different kinds of machines, and at the same time such a standardization of products. The scientific precision required has tended to specialization, and it is now one of the most highly specialized industries of the country. Most of the products are made in a few perfectly equipped factories. While there are more than 1000 establishments manufacturing these products, the majority of them are small and make a specialty of a particular machine or part of a machine. The capital invested in the industry exceeds $360,000,000, it gives employment to about 150,000 people, and the annual production is valued at approximately $400,000,000. It covers the entire field, from the smallest piece of the most delicate measuring instrument to the complete locomotive and the equipment required for a modern central station.

5221 CENTRAL STATIONS IN 1912

The last census, that of 1912, enumerated 5221 central stations which furnished electrical energy for light, power and heat; for manufacturing, mining, and other commercial enterprises; for private dwellings, and for public use in lighting streets and parks. In addition to these there are many thousands of stations, some think as many as 75,000, operated by mining companies, factories, hotels, large stores and other enterprises. There are also a few stations in governmental institutions established for the exclusive use of the institutions that are not covered by the census. While the number of electric railways doing central station work has increased, there has been a still greater increase in the magnitude of such work, and the annual income from the sale of current by the electric railways in 1912 was nearly $36,500,000. The total annual income of central stations from electric service and that of electric railways from the sale of current amounted to $323,480,000.

Central stations are operated under such a variety of conditions that it is necessary to make some grouping of the plants in order to bring together the statistics for those engaged in the same class of work. The primary grouping shows separate totals for plants operated under private and government ownership. The government plants are operated largely by municipalities. They frequently extend their operations into the commercial field and sell electricity to the general consumer, but they are conducted under conditions radically different from those of the privately owned plants. There were 1562 municipal stations enumerated at the census of 1912, and their prime movers were reported as having 559,000 hp. During the five years from 1907 to 1912 there was a net gain of 310 in the number of these stations. Of this number 301 were new. There was an increase of nine brought about by the difference between the number whose ownership had changed from commercial to municipal and those that had changed in the opposite direction, from municipal to commercial, and seventeen then went out of business. Thus far the municipal stations have been successfully conducted in the smaller cities and towns where the methods of doing business are the topic of general discussion, and the transactions are on a limited scale. We, therefore, find that the majority of these stations are small, and while they form about 30 per cent of the total number of all stations, the horsepower of their prime movers forms only 7.4 per cent of the total power. The municipal stations have, during the past decade, increased more rapidly than the commercial stations, but relatively, in the magnitude of work done, they have been stationary, and in some respects have retrograded. In 1902 the kilowatt capacity of their dynamos formed 9.4 per cent of the total from all stations. By 1912 this proportion had been reduced to 7.7 per cent. These stations are well distributed throughout the country—they were found in every state, but the largest numbers are in Michigan, Minnesota and Ohio. While the competition with commercial stations is pronounced in some localities, it is of minor importance in the country as a whole.

Considering the private and government owned stations, we are surprised to find how completely the map of the United States is covered with them. With the exception of the remote sections of the country, where there is no industry, wiring for some electric purposes, telephone, telegraph, railway or central station work is found in practically every township. The advances made in long-distance transmission of electricity and its application to industrial processes in rural districts has greatly extended the central station field of activity. The prime movers in the central stations in 1902 had only 23 hp. to every 1000 of the population. In ten years this ratio increased to 79. The ratio of horsepower to population is highest in the Western states, where it is about 200, and smallest in the South Central, where it is about 25.

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In investment, equipment and work done during the year, the electric railways are of far greater importance than the 5112 central stations. To begin with, the electric railways had a great advantage over other branches of electric industries. They took over plants already in existence and more or less adapted to their work. With them it has been a remodeling and extending process. For the central stations, telephones and telegraphs, entirely new plants had to be installed, new fields of work developed and new methods of business devised. The census, therefore, found the railways more perfectly organized and in better position to furnish statistics of their operations than the others. This condition was due largely to the efforts of the Accountants' Association. It quickly appreciated the value of census statistics and appointed a committee to co-operate with the bureau.

How the Electric Railways Have Grown

The reports for the last four censuses contain a very interesting detail history of the electric railways. They show the conditions of operation during each census year, the investment, equipment, work done, receipts, expenditures and the improvements in machinery and methods perfected during the period between the censuses. In 1890 animals, cables, and steam were used as motive power. Horse roads operated 5660 miles of track. These have now virtually passed out of existence; the gasoline motor has come into operation, and various other kinds of motive power have been tried. They have practically all been superseded by electricity. In 1912 there were 943 companies operated by electricity, twenty-one by cable, thirteen by animals, nine by gasoline motors and nine by steam. The use of electricity has so extended the field of operations and made such radical changes in the methods of business, that the roads of to-day serve an entirely different purpose from the street railways of twenty-five years ago. They are no longer confined to cities, but are fast absorbing the interurban and rural traffic. There were 16,365 miles of interurban and 24,966 miles of city and suburban track at the last census. As a considerable portion of the city and suburban track is located outside the corporate limits of cities, it is probable that half the trackage is operated in rural sections, but handling a class of traffic that could not be handled by the steam roads and meeting requirements of construction and operation that could not be complied with by any other class of roads.

The capitalization of electric railways is now $5,000,000,000; it was more than $4,700,000,000 in 1912; in 1890 it was $450,000,000. The increase in capitalization is hardly a true indication of the increase in the industry. The number of revenue passengers carried increased from 2,000,000,000 to 9,500,000,000, and the income from operations from $91,700,000 to $585,900,000. The number of passengers carried on these roads in 1890 was sufficient to give thirty-two rides to each inhabitant of the United States. The number carried in 1912 was sufficient to give 100 rides to each inhabitant. It is safe to say that no other industry has increased so rapidly and undergone such a complete change within a generation.

Just half (50.8 per cent) of the railways produce their own power. The census shows that there is a tendency, more marked in some localities, to purchase power from central stations. The rapid increase in this practice is evidently based on economics not possible by roads that operate their own power plant.

Operating Ratios and Income Deductions

In presenting the financial statistics the bureau adopted the grouping according to size of companies that is used by the Interstate Commerce Commission. In addition, separate totals are shown for (1) companies that do not operate commercial lighting plants; (2) those that do operate such plants; (3) those operated only a part of the year, and (4) horse railroads. The grouping of the companies according to size enables a definite statement of relative importance of the large and small companies. It appears that only 9 per cent of the operating companies had an annual income from railway operations of $1,000,000 or more, but they operate 51.9 per cent of the track of the entire country, and their gross income forms 75 per cent of the income of all companies. This group includes the companies operating in urban districts of highest density, and their track mileage, passengers carried, income and expenses have increased more rapidly than those of any other group. It is instructive to compare the different items of income and expenses for the companies in the several groups. These items are shown in detail for each group and then summarized in convenient form. For example, the operating ratio for all companies is given as 58.7, for the large companies 56.7, for the medium size companies 61.7, and for the small companies 68.3.

The separate showing for companies doing exclusively railway work, those doing central station work, and those operated only a part of the year or under abnormal conditions assists in an exact analysis of the returns for legitimate railway business. The operating ratio of the companies in the first of these groups was 59.2, of those in the second group 56.0, and those in the third group 73.4. These percentages differ very much from those shown for the companies grouped according to size.

Considerable interest has recently been attached to the statistics for deductions from income. The census includes in these items taxes, interest, rent of leased lines and terminals, charges for sinking funds and various miscellaneous deductions. During the ten years from 1902 to 1912 these items increased by 146 per cent. The three largest items are interest, $98,000,000; rent, $45,000,000, and taxes, $35,000,000. The largest amount of increase is shown for interest while the highest rate of increase (168 per cent) is shown for taxes.

The census has made a very careful analysis of the financial statistics of electric railways. Probably it is more elaborate than is necessary for practical purposes, although the committee that was appointed by the Accountants' Association to make recommendations for the improvement of the report would not give any suggestions other than those for the modification of the schedules. The bureau desires to publish these statistics in a manner that will be of greatest interest, and we hope you are considering the report of 1912 with the intention of making some recommendations for 1917.

Telephone and Telegraph Development

The other two branches of electric industries, the telephone and the telegraph, are unique. The country is full of small telephone companies. Many of them are small farmer lines, operated under a co-operative arrangement or mutual understanding. They have no regular employees or no income, but are maintained by assessments. It is impossible to collect statistics concerning the financial operations of these small systems. The bureau succeeded in collecting statistics of wire and number of instruments for 32,233 systems. More detailed statistics were collected for about 2000 of the larger companies. There were more than 20,000,000 miles of wire and about 9,000,000 telephones in use in 1912. At the beginning of the census year 1880 the industry was of little importance, but at the end of 1912 it represented one of the greatest interests of the coun-

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try. It has continued to develop probably more rapidly than any other industry in the country, and the statistics for 1912 are no indication of its present magnitude.

The telegraph is the oldest of the four industries devoted to the commercial use of electricity. There were twenty-seven commercial land and ocean telegraph systems in operation in 1912. There were 1,800,000 miles of wire in use, and about 110,000,000 messages transmitted during the year. The total annual income amounted to $64,762,843. The telephone has long since outdistanced, and in some respects superseded, the telegraph.

The census includes the fire alarm and police patrol signaling systems of the cities, but these are not operated commercially and the statistics relating thereto have little in common with the other electrical industries. There were 1397 signaling systems in 1912 operating 90,000 miles of wire and more than 80,000 boxes or signaling stations.

Aggregating the four commercial branches of electric industries, we have 8424 establishments, companies or systems in operation; they give employment to 582,000 salaried officials, clerks, and wage earners; pay out annually in salaries and wages $383,000,000, and the gross value of products and income amounts to $1,201,000,000.

Commission Valuation for Rate Purposes*

Author discusses origin of fair-value rule. Cites cases allowing going value when actual costs are proved. Makes plea for free presentation of facts by companies

By JOHN E. BENTON

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So well understood now is the constitutional principle that no state through legislature or commission may reduce rates to a point where a fair return on the fair value of property cannot be earned, that it may surprise some to be reminded that such was not always the law. The fourteenth amendment was ratified by the requisite number of states in 1868, but in 1877, almost a decade later, the United States Supreme Court, in Munn *vs.* Illinois (94 U. S. 113), held that a state might regulate rates exacted for the use of any property devoted to public service, and that what was reasonable compensation for the owner was a question for the legislature to determine and not for the courts. Neither the majority nor the minority opinion then grasped the idea of a legislative power to regulate curbed by a judicial power to protect against confiscation. That idea was developed gradually.

Finally, in 1894, Reagan *vs.* Farmers' Loan & Trust Company (154 U. S. 362), the United States Supreme Court reviewed the facts, found that the railroad concerned had $15,000,000 of bonds and $9,755,000 of stock outstanding; that both represented actual investment; that the stock had never paid any dividend; that the rates before in effect had been insufficient to enable the company to pay all the interest on the bonds; that the stockholders had been obliged to pay an assessment to avoid foreclosure, and that the commission rates had operated to reduce the revenues so substantially that the company could not pay more than one-half the interest on its bonds. "Can it be," said the court, "that a tariff which under these circumstances has worked such results to the parties whose money built this road is other than unjust and unreasonable?" The rates were unanimously held invalid as in violation of the fourteenth amendment.

Thus did the United States Supreme Court, almost thirty years after the amendment was adopted, for the first time hold rates invalid as confiscatory within the meaning of the amendment. This first case is interesting because the facts emphasized by the court were the facts shown by the accountant's records—the amount invested and represented by stock and bonds; the interest and dividend record, and the financial history of the corporation. The court was acting, and made that fact clear, to safeguard the investment. But as yet no rule was laid down for application in future cases.

ORIGIN OF THE FAIR VALUE RULE

It was in 1898 that Smyth *vs.* Ames (169 U. S. 125) was decided. In that case the Union Pacific Railroad was contesting rates prescribed by a statute of the State of Nebraska. Oddly enough, the State, represented by William Jennings Bryan, was contending that any return to which the company might be entitled must be computed upon the reproduction cost of the property, while the company was contending that it should be computed upon the original cost, which it claimed to be shown by the amount of its stock and bonds outstanding. The road had been constructed in war times, when everything was high. The court seems to have been unwilling to accept capitalization or original cost as the base upon which to compute the ratio, because it might be unfair to the public. It was also unwilling to accept the cost of reproduction because it might be unfair to the owners of the property. The result was the fair value rule which was laid down by the court as follows:

> We hold, however, that the basis of all calculations as to the reasonableness of rates to be charged by a corporation maintaining a highway under legislative sanction must be the fair value of the property being used by it for the convenience of the public. And, in order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property. What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience. On the other hand, what the public is entitled to demand is that no more be exacted

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from it for the use of a public highway than the services rendered by it are reasonably worth.

These cases show that no one can afford to be dogmatic about what the law is. Law is not immutable but is constantly being molded by the courts to meet the needs of society as those needs are conceived by the judges. The "fair-return-on-fair-value" rule was devised by the court with the intent to compel the legislative branch of the government, in the exercise of the rate-making power, to avoid confiscating investments made in property devoted to public use. The rule does not purport to be a formula which can be applied mathematically to all cases. Original investment, as a base upon which to compute the return, might be fair in some cases and not fair in others; so also might the reproduction cost, or the amount or the value of the securities outstanding. Accordingly, the court followed the more cautious course of saying that all of those factors ought to be taken into account and given such consideration as was just and right in each case. This left the ultimate value to be determined as a question of fact upon considerations of justice in view of all relevant evidence.

TERM "VALUE" HAS LED TO UNCERTAINTY

The use of the term "value" has undoubtedly been the cause of much uncertainty as to the real intent and meaning of the rule. The owners of public service properties and their representatives immediately perceived that if the term were to be taken in the sense of exchange value, not much latitude for the regulation of rates was left. This would necessarily be true because the earning capacity of a property at such rates as could be collected from the public would determine its exchange value. If these rates could not be so reduced as to prevent the earning of a return upon that value, no legislative reduction of rates would be possible. Naturally such owners and representatives have earnestly contended for that construction, while those who desired the legislative power of regulation to be unimpaired have argued for some other construction.

EXCHANGE VALUE NOT DETERMINING FACTOR

Candid consideration of the entire opinion will, however, satisfy most persons that the court intended to use the term "value" in a somewhat special sense. To begin with, it is not to be supposed that the court intended practically to take away from the states the power of rate regulation—a power which in the Munn *vs.* Illinois case the court had said the legislature in common law countries had exercised from time immemorial. Nor can it any more be supposed that the court intended to declare a rule which would prevent the reduction of exorbitant charges, if made, merely because the return from those charges had been enjoyed long enough to give the property a greatly enhanced exchange value. The language of the opinion is inconsistent with the idea that the court intended that exchange value should be accepted as the determining factor. The market value of all the stock and bonds which represent a given property show the market value or exchange value of that property. The court said that this was to be considered, but that the weight to be given it was only such as was just and right in each case.

One reason why exchange value cannot be safely accepted as a controlling factor in fixing the base amount upon which to compute a return has just been indicated. If the charges have been excessive, they tend to give an excessive exchange value. On the other hand, unforeseen difficulties of construction may be encountered and unavoidable losses incurred, so that the property, when completed, may represent twice the actual investment of another property serving some other community of equal size. The earning capacity, and therefore the exchange value, of those properties will be approximately the same, but it would be a hard rule of law that the more expensive property might not, if it could, earn a return on its full cost to the owners, even though such cost greatly exceeded what the property could be sold for.

It is not market or exchange value any more than the original cost, or the reproduction cost, or the capitalization of the property that is to be taken as a measure for earnings. All are to be considered, and a base value adopted that shall be fair alike to the owners of the property and to the public. There can be no mathematical formula to govern. The fixing of such fair value is, and must always be, an act of judgment to be exercised by the officials intrusted with the powers of government to that end. But the exercise of that judgment is subject to judicial review, and the value fixed in any case may be set aside if it appears that due weight has not been attached to those evidences of value which justly ought to be considered.

MOST WEIGHT HAS BEEN GIVEN TO REPRODUCTION COST

In attempting to follow the law laid down by the court in Smyth *vs.* Ames, commissions appear to have given most weight to evidence of the cost of reproduction. The reason for this may lie partially in the fact that such evidence can always be secured, whereas evidence as to original cost is often difficult to produce. I believe, however, that the reason lies principally in the fact that it has accorded with our generally accepted notions of justice to say that the owner of a property devoted to public use should be permitted to receive a return upon an amount equal to what it would cost to reproduce that property if it should be withdrawn from public service.

Along with this idea another has been almost universally held. It is that the owner ought at least to be allowed a return upon the full amount of his investment. It is questioned by some who would establish the cost of reproduction of physical properties as the sole measure of value for rate purposes, upon the ground that if the owner is to gain through the increase in unit costs and land values he should bear the risk of loss through decrease in such costs and values. And, of course, that is logical.

In Smyth *vs.* Ames there is no suggestion of the consideration of preliminary and development costs incurred by the owners in establishing and developing the business connected with the property to be valued. In condemnation cases, however, the courts have made it clear that, in valuing a property taken, allowance must be made for the element of value inhering in the property by reason of the established business which it is doing. For a long time it was urgently insisted by the owners and representatives of public service properties that the same rule applied in the valuation of such properties for rate purposes. The commissions seem to have been impressed with this contention, and, in one way and another, to have endeavored to make their decisions in valuation cases conform to the rule as laid down in the National Water Works case (62 Fed. 853) and the Omaha case (218 U. S. 180). Still several commissions frankly refused to make any allowance for going value, and others made wholly inadequate allowances, assuming the same to have been intended to cover the substantial expenditures ordinarily represented by the cost of establishing the business on a paying basis. This attitude on the part of commissions was due probably to the facts that the costs of establishing a business have not been well understood, and

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that it consequently has seemed to the commissions not just that substantial allowances should be made on account of business which appeared to be the result merely of a public demand for service.

COMMISSIONERS AND PUBLIC OPINION

It must always be remembered that public service commissioners are very human folk. They know that the offices they hold were created to protect the public from the supposed danger of overcharges or of neglect of duty on the part of public service corporations. They naturally have no desire to be considered conspicuously unfit to occupy those offices. They do not desire to be considered by the public either as biased in favor of the corporations, or as well intentioned persons whom it is very easy to impose upon. This is as it should be. If they were indifferent to public opinion they would be unfit for their offices, for they can be useful only so long as the public has confidence in them. They probably do more good in the line of promoting an understanding upon the part of the public of what it is reasonable to expect from the corporations, and on the part of the corporations of what it is reasonable for the public to expect, than by the exercise of their powers to make regulatory orders. It is, therefore, in the highest degree to be desired that the decisions which they may make should be based upon evidence which the public can understand.

Few commissions care to issue a report in substance like the following:

> We have spent many months investigating the proposed rate increase. We have inspected all the physical property of the company which we can find, and have carefully estimated the cost of reproducing the same; we have made due allowance for omissions which may have occurred, for overhead costs and for working capital. We have determined the net income and have allowed a deduction for depreciation greater than the company has itself ever seen fit to set aside for that purpose, and still we find the balance of income remaining sufficient to pay a fair rate of return upon the value of all the property we could find, with the allowances we have made. This would lead us to forbid the proposed increase, but for the fact that the company at the hearing produced the evidence of an engineer of very high standing, who testified that it was his opinion that the fact that the railroad is a going concern, having an established business, with patrons who ride, gives it an intangible element of value, commonly called going value, which is equal to one-third of the value of the physical property. He also testified that in his opinion the company must have incurred a cost in securing the business equal to his estimate of its value. Upon consideration of this evidence we have added to the value of physical property one-third of its amount. This gives us a total value so large that we find the existing rates to be insufficient to yield a fair return. The proposed increase must, accordingly, be allowed.

The commissioners know that the public, if no costs are shown, will not easily understand why the fact that they ride upon the street railway should be treated as a reason for increasing the fares they are called upon to pay, if the company is already earning enough to make a reasonable return upon the value of all the property the commission can find. It is in accordance with commonly accepted ideas of justice that the company should have a return upon what it contributes to the service of the public, and it is contrary to those ideas that a company enjoying a monopoly should be allowed a return upon the capitalized value of the demand of the public service. It is to be expected that commissioners, being no different than other people, will be affected by these ideas commonly held by the communities in which they serve, and will feel little disposed to make much allowance for going value when nothing except opinion evidence is offered in support of the claims therefor. They do not question that established business adds very materially to the exchange value of any property, but they are not satisfied that considerations of justice require that such increased exchange value should be taken as the measure of the company's rates.

BASING GOING VALUE ON THE COST OF BUSINESS

Now, if instead of basing the demand for an allowance for going value upon the fact that established business is worth money to the corporation, the demand for such allowance is based upon the fact that the business has cost money to the corporation, the result will be very different. If it can be shown by proof of actual costs that the business represents investment by the owners, just as truly as the physical property does, the commissioners and the public will concede that considerations of justice require an allowance therefor.

Proof of this sort must be given by the accountants. It requires careful and laborious work. But, if it is necessary as a part of any rate case to establish a substantial going value, a thorough review of the entire financial history of the corporation should be made. Exhibits should be prepared and presented showing: (1) All expenditures made for the purpose of building up the business of the company, and not paid as operating expenses out of revenues. (2) All expenditures or losses made during the history of the property, not paid out of earnings, and not reflected in the reproduction cost of physical properties covered by the inventory. Losses resulting from washouts, floods or other acts of God, or from sudden changes in the equipment demanded by the public, are a part of these expenditures. When they have occurred, are not attributable to the fault of the company and have not been recouped, they ought to be considered as expenditures made on behalf of the community, and given due weight, the same as existing property. Otherwise such losses, more or less of which are certain to occur in the history of any large property, could never be recouped. (3) Such deficiency of dividends below a fair return as the company appears to have suffered during its history, together with interest thereon to the date of the hearing. The amounts shown by these exhibits may not be accepted by the commission as the measure of the going value. They will, however, inevitably receive substantial weight, so generally conceded is it that actual sacrifices made in supplying public service ought to be requited.

If there has been no deficiency of dividends, but there is accrued depreciation unprovided for by any depreciation reserve, an exhibit should also be made showing that the dividends paid during the history of the company have not exceeded a fair average return for the whole period, if such be the fact. If this is demonstrated to the satisfaction of the commission, then, in justice to the company, no account ought to be taken of accrued depreciation—or more accurately speaking, the accrued depreciation ought to be regarded as a part of the cost of establishing the business of the company, and a weight attributed to the intangibles on that account sufficient to offset the accrued depreciation. This principle was very clearly recognized by the Massachusetts commission in the Middlesex & Boston case (Mass. P. S. C. Reports, 1914, page 99), and by the New Hampshire commission in the Manchester case (N. H. P. S. C. Reports, Vol. V.).

If instead of depending upon opinion evidence to secure adequate allowance for going value, the companies will present to the commissions proof from their own accounts of the actual investment which such going value represents to their stockholders, I believe that instead of either being denied any allowance, or of receiving allowances which are merely nominal, they will generally receive allowances which will be full and ade-

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quate. The public service commissioners throughout the country, speaking generally, are a body of men of substantial ability, who are very earnestly endeavoring to work out the problems of public regulation in a way that will result in full justice to the public and to those who have invested their money in the service of the public. The utilities will ordinarily get just treatment at their hands if evidence is presented which gives them a full knowledge of all the facts. This knowledge with regard to the so-called going value element can only be given by the accountants.

GOING VALUE NOT GRANTED WITHOUT PROOF

If the investments represented by the intangible elements of value before referred to are placed before the commissions, and proper allowances are not made, the record will then be in such shape that the courts can correct any failure of the commissions to do justice. This is not true where the going value claim is rested upon opinion evidence instead of upon proved facts. To illustrate this I want to refer to three court decisions.

The first was the last decided, Des Moines Gas Company *vs.* Des Moines (238 U. S. 153). In that case Judge Sloan, who sat as master, in the first draft of his report to the court valued the physical property at the cost of reproduction less depreciation, and added an item of $300,000, as "its worth over and above its physical value, and more than a plant would be worth that had to develop its business." In this item, it was said, "no interest during construction is allowed, nor anything which is included in the 'overhead charges,' which are part of the physical value."

Before the final report was filed, the United States Supreme Court handed down the decision in the Cedar Rapids case, and this caused Judge Sloan to eliminate the item of going value, leaving his report as it otherwise stood, with the plant appraised merely at the amount of its reproduction cost less depreciation. "This value," the master said, "is reckoned upon the fact that the plant was in 'successful operation'—otherwise its value would be much less. The 'going value' is that enhancement which results from a well-developed and paying business." With the "going value" item eliminated the income was found to be sufficient so that the rates prescribed by the ordinance, which were under consideration, were not confiscatory. If the going value item had been included, the rates would have been found confiscatory. The case was taken to the United States Supreme Court, and that court sustained Judge Sloan's valuation.

Until this decision was made, there was a confident expectation upon the part of many able attorneys that when the question involved came squarely before the court it would hold that attached business must be appraised at its financial worth or value, using value in the sense of "exchange value." But in the Des Moines case the question was squarely before the court, and an entire disallowance of going value was sustained. The decision, however, went upon the ground that the proofs did not show unrequited losses, rather than upon the ground that unrequited losses might be disregarded. The court said:

> That there is an element of value in an assembled and established plant doing business and earning money over one not thus advanced is self-evident. This element is a property right, and should be considered in determining the value of the property upon which the owner has a right to make a fair return. * * * Included in going value * * * is the investment necessary to * * * establishing the business. * * * In this case * * * the inception cost of establishing * * * a going concern has long since been incurred. * * * For aught that appears in this record, these expenses may have been already compensated in rates charged and collected under former ordinances. It is not to be presumed, without proof, that a company is under the necessity of making up losses and expenditures incident to the experimental stage of its business.

COSTS PROVED—GOING VALUE ALLOWED

I will now refer to two cases where proofs of these costs were supplied, and where the commissions were reversed for a failure to make allowance for going value. One of those decisions was rendered in the new and supposedly somewhat radical state of Oklahoma; the other in the citadel of conservatism, New York.

In Pioneer Telephone & Telegraph Company *vs.* Westenhaver (29 Oklahoma 429, 30 L. R. A. [N. S.] 1209) decided Jan. 10, 1911, it appeared from the evidence produced before the commission that for several years the earnings of the company were insufficient to provide for depreciation, or to pay dividends. The commission, however, had made no going value allowance. The court said:

> Few industries * * * can be made self-sustaining from the first day of their operation. * * * During the time of development there is a loss of money actually expended and of dividends upon the property invested. How shall this be taken care of? * * * The public cannot expect as a business proposition, or demand as a legal right, that this loss shall be borne by him who furnishes the service.

The court held, therefore, that the use of the property and the expenditures made during the non-expense-paying and non-dividend-paying period should be treated as an element of value of the property upon which fair returns should be allowed.

The next case is People *vs.* Wilcox (210 N. Y., 479, 51 L. R. A. [N. S.] 1) decided March 24, 1914. This was a rate case before the New York Public Service Commission for the First District. The commission fixed the value of the property by ascertaining the cost of reproduction less accrued depreciation. Preliminary and development expenses prior to operation were included, but no allowance was made for the cost of developing the business. The books covering much of the history of the company were not available, but it was shown that from the beginning of the business in 1889 until 1907 no dividends were paid. Opinion evidence was also offered as to the cost of building up the business.

The Supreme Court and the Court of Appeals held that allowance for going value, in addition to the physical value, must be made. The following is from the opinion of the Court of Appeals:

> It takes time to put a new enterprise of any magnitude on its feet, after the construction work has been finished. Mistakes of construction have to be corrected. Substitutions have to be made. Economies have to be studied. Experiments have to be made, which sometimes turn out to be useless. An organization has to be perfected. Business has to be solicited and advertised for. In the case of a gas company, gratuitous work has to be done, such as selling appliances at less than fair profit, and demonstrating new devices, to induce consumption of gas and to educate the public up to the maximum point of consumption. None of those things is reflected in the value of the physical property, unless, of course, exchange value to be taken, which is not admissible in a rate case. The company starts out with the "bare bones" of the plant. * * * By the expenditure of time, labor and money, it coördinates those bones into an efficient working organism, and acquires a paying business. The proper and reasonable cost of doing that, whether included in operating expenses or not, is as much a part of the investment of the company as the cost of the physical property.
>
> The investors in a new enterprise have to be satisfied as a rule with meager or no returns while the business is being built up. In a business subject only to the natural laws of trade, they expect to make up for the early lean years by large profits later. In a business classified among public callings the rate-making power must allow for the losses during the lean years, or their rate will be confiscatory, and, of course, will drive investors from the field.
>
> If a deficiency in the fair return in the early years was due to losses or expenditures which were reasonably neces-

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sary and proper in developing efficiency and economy of operation, and in establishing a business, it should be made up by the returns in later years. If there was a fair return from the start, the corporation has received all it was entitled to, irrespective of how much of the earnings may have been diverted to the building up of the business. * * * If the shareholders have been deprived of a fair return on their investment because of the time and expense reasonably and properly required to build up the business, they have, to the extent of that deprivation, added to their original investment, and are entitled to a return upon it. If, however, a fair return in addition to the expense of building up the business has been earned from the start, the public, not the shareholders, have paid the development expenses. We are dealing, not with exchange values, but with the value upon which the company is entitled to earn a return. * * * The term is not important. The point is that in some manner and under some appropriate heading a due allowance must be made for the investment in those elements. No inflexible rule will in the long run be just both to the public and the corporation. The right to limit the corporation to a fair return fixed by public authority necessarily involves the correlative right in the corporation to be assured of that fair return during all the time that its capital is employed in the public service.

ACCEPT THE SITUATION AND GET THE FACTS

This is one of the best discussions of going value to be found in the books. While opinion evidence was offered, and the court held that the same was proper, it clearly rested its decision on the fact that early unrecouped losses were shown. This case was decided March 24, 1914, and was cited upon the briefs of counsel in the Des Moines case, which was decided June 14, 1915. The Des Moines case is not in conflict with the Oklahoma and New York cases. In these cases, the fact that there were early unrecouped losses appears to have been shown by evidence introduced. In the Des Moines case it appears that the gas company depended not upon evidence of facts, but upon opinion evidence alone. The holding of the court was that because it was not shown in the record that the inevitable costs of developing the business had not been recouped, the failure to make allowance for going value could not be held confiscatory.

The refusal of the United States Supreme Court to give to the term "value," as used in rate cases, the same meaning as "exchange value," may or may not be regrettable. As to that I express no opinion now, because that is beside the point of my present remarks. Some companies may have been so fortunate that no unrecouped losses or expenditures can be shown. To them the present state of the law may seem to be unfortunate. So substantial, however, are the usual costs of establishing a business, especially when dividends foregone are included in those costs, as they properly should be, that I believe most companies, if their accounts are properly studied and analyzed, will be able to show with certainty that they are entitled to receive substantial allowances for going value.

Whether we approve or not of the present state of the law upon this subject is really of little consequence. The law, for all practical purposes, is what the courts say it is. It is never wise to refuse to adapt ourselves to any situation which we find actually existing. In the preparation and presentation of rate cases, we must adapt our proofs to the requirements of the courts, if we expect the companies we represent to receive the protection of the courts in the enjoyment of their constitutional rights, we may believe that the courts ought to base their allowance for going value on the increased worth in money which attached business gives to plant. This would obviate the necessity for an analysis of the early accounts of the company. But in the face of the decision in the Des Moines case, to the effect that the going value element may be wholly disregarded in a rate case when it is not proved that, in the actual experience of the property valued, the cost of establishing the business has not been recouped, it requires optimism in the highest degree to expect that public service commissions will generally make such allowance when such proofs are lacking.

TRANSFERRING GOING VALUE BY SALE

There is much that remains to be made clear by the courts concerning this subject. For example, there are decisions of commissions and courts which hold, or indicate, that no weight should be attributed to losses and costs during the development period, provided the property in the meantime has changed hands, and provided it is not necessary to consider such losses and costs in order to establish a value equal to the full investment of the present owners. But I do not think this can be the law. If a property has been established as a going concern at an unexpectedly large but necessary expense to the owners, so that a reasonable return cannot possibly be earned upon the full investment, but there is a possibility that business may some time increase to a point where such return can be earned, it does not seem just to say to the owner: "You may yourself have a return upon your full investment, but you may not convey the right to receive that return to any purchaser unless he will pay as a purchase price the full investment."

It is self-evident that a property with the right, if possible, to earn a return on $400,000 is worth more than the same property with the right to earn a return on only $350,000. If the physical value of the property is $300,000, and the intangible value is $100,000, but $300,000 is all the property can earn a return upon, a purchaser may be willing to pay $350,000, provided he can acquire the right to receive a return on the full $400,000, when the business becomes sufficient to enable him to earn such return. It is certain, however, that he will not pay $350,000 if he can not now earn a return upon that amount, and will never in any event be permitted to earn on more than that amount.

To say that a man may not transfer his property to another for such price as is satisfactory to him, with all of the attributes of value which it has in his possession, is partially to confiscate the property. That the courts will ultimately so recognize, I believe. Of course the price paid for the property by the present owner is entitled to consideration in determining the value for rate purposes, but it ought to be considered in connection with the entire investment represented by the enterprise by whomsoever that investment was made.

DUTIES OF PARTIES IN RATE CASES

The problem always before the commission in a rate case is to determine what is just to the company and to the public in view of the investments in the enterprise, and of all the relevant facts affecting the particular case. If it is just that substantial allowances shall be made on account of intangible elements of value, it is the duty of the company to aid the commission by a showing of facts which will enable the commission intelligently to determine what that allowance ought to be. In Knoxville *vs.* Knoxville Water Company (212 U. S. 1) the United States Supreme Court stated the duty resting upon the commission and upon the company as follows:

Regulation of public service corporations * * * is a delicate and dangerous function, and ought to be exercised with a keen sense of justice on the part of the regulating body, met by a frank disclosure on the part of the company to be regulated. The courts ought not to bear the whole burden of saving property from confiscation, though they will not be found wanting where the proof is clear. The legislatures and subordinate bodies, to whom the legislative power has been delegated, ought to do their part. * * * On the other hand, the companies to be regulated will find it to their lasting interest to furnish freely the information upon which a just regulation can be based.

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F. W. HILD

T. S. WHEELWRIGHT

Symposium on Company Publications

The Authors Discuss the Value of the Company Publication as a Medium for Improving Public Relations and for Creating Initiative Among Employees—Suggestions for Standardization Under a General Editor.

At the Transportation & Traffic Association session on Thursday, Oct. 12, F. W. Hild, T. S. Wheelwright, Leake Carraway and James H. Braden delivered papers on the general subject of "Company Publications" in which they outlined the editorial policy essential for the success of such publications, their value as a means of creating better public relations and the opportunity they afford employees for suggesting improvements in service. The interest of the public, too, is evidenced by the fact that the papers placed in cars and waiting rooms for general distribution are quickly disposed of.

LEAKE CARRAWAY

J. H. BRADEN

Use and Value of Company Publications*

By F. W. HILD

General Manager Denver (Col.) Tramway

IN the electric railway field company publications may be divided into three classes: (1) "Good-will" periodicals, intended primarily to promote among the public good relations and better understanding of the utility problems, and, secondarily, to advertise the company's business. (2) House organs, intended for the employees and the investors of the company. (3) Traffic and safety promotion publications, such as booklets, folders, leaflets, time cards, dash signs and car posters.

As between the first and second the writer is inclined to give preference to the "good-will" periodical, as that will circulate among the employees as well as the public. If the publicity appropriation will permit a house organ, however, its publication is strongly urged as a means of greatly improving and promoting beneficial relations between the company and the employees, and also of interesting the more prominent stockholders.

POWER OF PUBLIC OPINION SHOULD BE MORE APPRECIATED

Many of the difficulties which confront utilities would be much less if those who direct and control the larger business interests appreciated more keenly the tremendous power and value of public opinion, and would keep more clearly in mind two fundamental facts: First, that the legislator, whether municipal, county, state or national, is elected to execute the will of the people and not merely his own individual ideas, and, second, that the press rarely if ever initiated any great movement. It has been and is what it should be, a mirror reflecting and developing public opinion.

Just consider for a moment what might be taken as the typical procedure of the average leader in corporate endeavor as it has come to pass in recent years. Let us assume that a movement of some kind adversely affecting the interests of a public utility corporation has begun to gather headway. The leader of this company, let us call him the executive, calls in his staff, presents to them the problem, and thereby brings trained minds to bear upon its analysis. In due time a solution is suggested to the executive—nine times out of ten the correct solution, and often meaning that some legislation may be necessary or must be opposed. The executive then goes to the legislator, discusses the situation quite fully and explains the proposed solution of the problem, and nine times out of ten the legislator will agree as to the correctness of the proposed remedy. The executive, knowing that legislation is a matter of routine and might be helped along if the newspapers would take hold as he wished, then proceeds to visit the editor, who also nine times out of ten agrees with him. But, contrary to the executive's hopes, nothing happens, or when it does happen, the legislation is usually adverse and the press comment is non-committal or adverse. The executive then takes his case to the court, and is sustained eight times out of ten, or was until recently. Hence the executive has got into the attitude of saying, when anything of this sort occurs nowadays: "Oh, what's the use? We will have to settle it in the courts anyway." But even the courts in these days are becoming more responsive to public opinion than to strict and legal interpretation of the facts and justice.

The executive himself is primarily at fault for this situation. He has lost sight of the fact that in the last analysis the public finally decides all the important questions, and if the decision be wrong it is because the

*Abstract of a paper delivered before the Atlantic City convention of the American Electric Railway Transportation & Traffic Association on Oct. 12, 1916.

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public is acting upon misinformation or insufficient information, for the writer is firmly convinced of the absolute and fundamental fair-mindedness of the American people. The executive has failed to appreciate that it is necessary to acquaint the public as well as the individual legislator and the journalist with most if not all of the facts pertaining to the utility's problem.

PROPER AND INTELLIGENT PUBLICITY IS NEEDED

The remedy is unquestionably proper and intelligent publicity, and this resolves itself into the question of ways and means. Proper and intelligent publicity as a means of thoroughly informing the public of the problems and difficulties of the executive's business is just as necessary as the careful planning of power-house construction, the operation and schedules of cars, the analysis and study of electric rates, gas rates, services, and so on.

The writer's study of this problem has led him to the conclusion that the transportation companies have available to them the most superior and effective means for reaching the public with their arguments that exist—namely, the cars, depots, waiting-rooms, etc.—and that a small pamphlet distributed periodically on the cars will be read by the public and have a splendid circulation. Such a pamphlet should not exceed four pages, and the size should be small in order that the subject matter may be perused within the duration of a street car ride. Furthermore, the public will more readily absorb and digest the rather dry and heavy matter which must necessarily form a presentation of the facts relating to utility economics, provided it be brightened and accompanied by semi-humorous matter. The "good-will" periodical should carry no paid advertisements whatsoever.

HOUSE ORGANS AND OTHER PUBLICATIONS

The purposes of the house organ are as follows:

1. To weld together the work and interests of employees.

2. To increase their ambition and improve the efficiency and spirit with which they do their work.

3. To better the relationship between the company and the employees by telling them about little known and imperfectly understood departments of the company and conditions that confront it.

4. To introduce employees to one another and to the management.

5. To prevent misunderstandings by explaining beforehand.

6. To carry public praise for employees and practical instruction for men in operating, selling and shop departments.

7. To give employees personal and company news.

This is a field in which the American Electric Railway Association, by co-operation among its members, can bring about quick, tangible and quite substantial benefits, not the least of which would be distinct monetary savings, not very large, to be sure, but in many cases enough to pay the cost of membership dues in the association.

Observation of about twenty house organs shows a great variety in size, appearance, subject matter and type. Only six are snappily illustrated. The covers of only three are attractive and changed monthly, among the best of which is the *B. R. T. Monthly*. The typographical make-up and appearance of all excepting this one, the *Railwayan* of Kansas City and the *Interborough Bulletin* and the *New York Railways Employees' Magazine*, are between "just fair" and "very poor." Only four contain inspirational articles. Only nine contain educational matter, and but four of the nine lay appreciable stress on this.

In general the house organ should be made attractive in order to appeal to employees. It should have the attention of a trained editor or writer, who has both the time and enthusiasm to make the magazine worth the full cost to the company.

Of the third class of company publications, that is, those booklets, folders, pamphlets, time cards, dash signs, posters, etc., intended to promote traffic and safety-first, there are some splendid examples of the advertising man's technique and the printer's art, but in the majority of cases this class of electric railway printed matter reflects conscientious though obviously painful effort of men who clearly know a whole lot more about schedules, cars, transfers and other important features of operation than about salesmanship or the art of creating in the mind of the patron the desire to utilize the service offered by the company.

The possibilities which are to be found in the proper development of company publications have led me to request J. C. Davidson, publicity agent of the Denver Tramway, to prepare the following remarks setting forth some definite suggestions on syndicating material for company house organs. At the same time I would suggest that the possibility of syndicating the claim department and safety-first printed matter be carefully studied and investigated.

Mr. Davidson tells me that there are two reasons for standardizing certain features of electric railway house organs. The first is one of economy, and the second is one of more efficiency in the use of such publications. This conclusion that standardization is desirable and possible has been reached through recent efforts to improve our own house organ, the *Tramway Bulletin*, and to make the money spent on it secure the fullest possible benefit. We first studied, month after month, all the house organs we could find that were published by electric railways. From that we progressed to a thorough study of what could be done with the *Tramway Bulletin*, and the many economies and improvements which we found to be practicable led us to suggest that the association appoint a committee on standardization of company publications, which could, through similar studies, recommend standardization for house organs alone that would result in considerable savings and betterments for every individual company which co-operated in the plan.

POSSIBLE LINES OF STANDARDIZATION

For example, such a committee could study and recommend a standard for: (1) Page size for company publications; (2) style of make-up for standard publications; (3) standard series of cover designs for all; (4) typographical style and arrangement, and (5) ideal contents, so balanced that proper space will be allotted to inspirational, educational and news stories.

The committee might work out a plan for drawing, from the best sources among the companies, good inspirational and educational articles that would apply in all electric railway companies. These should go, perhaps, to a central editor. This central editor should have charge of the work of syndicating the cover designs and special articles. These would be set up in the standard style recommended by the committee, and proofs of the matter would be sent to all company publications participating in the standardized plan. Editors of company publications would go over the proofs, select the articles that they wished to run in the next issue of their magazine, and order electrotypes of those articles and of the cover. Because of the standard page size,

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standard make-ups and standard typographical style and arrangement, this "boiler plate" from the central editor would fit in and harmonize exactly with the remainder of the pages in the magazine.

PLAN WOULD FACILITATE LAYING OUT AN ISSUE

This would immediately have the effect of raising the quality of the contents of every company publication and of making possible a full realization of everything which a company magazine can be made to do. Instead of being hard pressed for material and clipping and pasting haphazardly anything that "looks good," the editor of each company publication would be able to sit down the first of the month and plan his coming magazine something after this fashion, which is given for a twenty-page publication (9 in. x 12 in.) merely to illustrate roughly the ideas offered:

Inspirational story in semi-fiction form. Furnished by central editor in plate form with illustrations included. .....2 pages

Leading local articles of month, educational in nature and pertaining to work, rules, selling plans or departmental activity. .....2 pages

A full-page, large-type talk to the company's employees by the president, general manager or sales manager, to promote good-will. .....1 page

Inspirational article or description of how some top-notch street railway does the things every company's employees do. Furnished by central editor, illustrated. .....1 page

Explanation and reiteration of rules or of forthcoming changes by superintendent of transportation or heads of other departments handling large number of men. .....1 page

Notes of new ideas, methods of progress in electric railway world which would be of general interest among all companies and which would be calculated to make employees think. Furnished by central editor, illustrated. .....1 page

"Question Box" regarding the various phases of work of the transportation department or shops or some other group large enough to justify publication. Many of these questions may be general enough to be furnished from the central editor, but this matter will be furnished in script and not in plates, so that the local editor can add manufactured questions to suit local conditions. All these questions and answers will have to be created entirely by the editors for probably a year before the employees get the habit of sending in their own questions...1 page

Courtesy, safety, transfer, shop or other general articles. Furnished by central editor. .....4 pages

News notes, articles by local company's men, personal notes, athletic notes, association or club notes, advertising, etc., plus index and cover. .....6 pages

Inspirational article or story. Furnished by central editor. .....1 page

This plan will apply as well and as economically to a magazine of eight pages as to one of forty. The central editor should find it necessary to devote but very little time each day to his end of the job. In other words, it is not necessary to have a high-priced man devoting all his time to this work. He should be reimbursed for stenographic time used in corresponding with contributors and with company editors, and for his own time in editing contributions according to the needs of his clients and in overseeing the setting up, illustrating and ordering of material. The printing of any magazine, naturally, will be done in the local company's city.

The practical value of these suggestions can be better appreciated when the actual facts, figures and present publications as issued are studied. Details have been left out of this brief paper because the purpose of the writer is to suggest only the opportunity offered by the idea and to outline a small and undeveloped field in which the American Electric Railway Association might make itself very helpful to its members.

Worth of Company Publications*

By T. S. WHEELWRIGHT
President Virginia Railway & Power Company
Richmond, Va.

MORE than ten years ago there was published and distributed on the cars in Norfolk, Va., a small bulletin resembling in its essential features the street railway publications of to-day. While hardly more than a simple folder, it was the prototype of the numerous public utility periodicals now published in this country and Canada. The Norfolk publication was short-lived, and nothing further in this direction was attempted by the Virginia Railway & Power Company until early in 1915, when it began the simultaneous publication in Norfolk and Richmond, respectively, of *Public Service Chat* and *Public Service News*. Both of these papers are published bi-weekly and have appeared continuously since March, 1915.

PAPERS ARE ADDRESSED TO PUBLIC

It is from our experience with these two publications that I base my observations on the use and value of company periodicals. *Public Service Chat* and *Public Service News* are eight-page papers bound in magazine form. They are distributed on the cars through metal holders placed immediately above the push-buttons at alternate seats.

These papers are addressed primarily to the traveling public. Indirectly only do they reach the employees. Other companies make use of publications addressed directly to their employees and dealing with subjects immediately related to their work and welfare. There is, however, a fairly well-defined distinction between the two classes of company publications. They require different treatment and different subject matter. Material that would be entirely appropriate for publication within the family would in many cases be undesirable for general distribution among the public. This company has not so far undertaken the publication of an employees' paper, although it has already felt the need of some such medium. A beginning has been made recently by the formation of a general safety committee and sub-committees in the several departments throughout the system, and the installation of a safety-bulletin service in which bulletin boards located at the shops, carhouses, terminals, etc., are used for the display of posters illustrating typical accidents and methods of prevention.

The street car papers, however, are used for the publication of news matter dealing with the activities of the employees' relief association, Y. M. C. A., picnic and sports. In the Richmond paper, *Public Service News*, a regular department is devoted to communications from patrons commending individual employees for praiseworthy conduct in connection with the railway service. To this extent the street car papers are also employee periodicals.

MAKE-UP IS BASED ON CERTAIN PRINCIPLES

In the make-up of the paper we follow certain well-defined lines. We carry no advertising. To do so, we believe, would divide the interest. It might needlessly antagonize private enterprises engaged in the various branches of the advertising business who would resent the intrusion of a new advertising medium controlling a "closed" advertising field, and might be construed to be in violation of our car advertising contracts. We religiously avoid recrimination of any kind, believing that sharp attacks on governmental bodies or individ-

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uals are productive of more harm than good, and that a continuous setting forth of our argument in dispassionate, unoffending language will in the end prove the wisest policy.

In every issue we carry a reasonable amount of light material—jokes, anecdotes, photographs, illustrations and epigrams. Our aim is to make the paper readable. The most common mistake of company periodicals designed for public reading, in my opinion, is the cramming of the publications with heavy statistical matter which the car-rider finds it difficult to digest. Since a printed message is valueless unless it is read, too much care cannot be taken to make the paper attractive and interesting. Once the passenger is attracted enough by the "light" features to look for recurring issues; once he contracts the habit of reaching up to the metal holder for the new numbers as fast as they make their appearance on the cars, the battle is won. It will be only a matter of time before he will read also the prepared articles and the arguments which the company is interested in setting before the public. It is the well-established newspaper policy of placing advertising next to reading matter applied to street car papers.

PUBLICATION PERFORMS VALUABLE FUNCTION

Edited along these lines, the company publication performs a valuable function. It is the natural vehicle for special articles and arguments which can find admittance to newspaper columns only as paid advertising. It brings the message to the reader's notice when his attention is not distracted by competitive advertisements and news matter, as is the case when he is reading the daily paper. In offering a forum for the discussion of grievances, it advertises effectively the company's disposition to deal squarely and openly with its customers—an impression that cannot be fostered too assiduously. Properly edited, it personifies the company and accents its human and responsive character in a way that is not possible through the employment of any other means.

COST OF PUBLISHING PERIODICALS IS AN INVESTMENT IN GOOD-WILL

From the beginning we looked upon the cost of publishing our street railway periodicals as an investment in good-will. We expected no immediate, direct returns. The value of the public's good-will lies in the fact that it is a plant of slow growth and slow death. Years of persistent publicity backed up by years of square-dealing are required to bring it to maturity. Once attained, the public's confidence is not easily shaken and stands as a bulwark between the company and malicious efforts to misrepresent it in its relations with the public.

Have the publications paid as an investment in good-will? Are company publications on firm ground as fosterers of a better understanding between the corporation and its patrons? Do they justify their cost? To these questions, looking at the matter in the light of our own experience, I answer in the affirmative. Many signs strengthen me in this belief. The publications are readily absorbed by the traveling public. In Richmond we distribute 25,000 copies of each issue of *Public Service News*, and the edition is exhausted three or four days before the following issue appears. Observation has shown that the papers are eagerly read. They enjoy the rare advantage of finding the passenger in a receptive mood—in a ten or twenty-minute period when he has nothing to do and is willing to be instructed and amused.

Copies of each issue are mailed to the councilmen, city officers, clubs, lodges and associations maintaining reading rooms, and to the managing editors of the local newspapers. Frequently the newspapers make use of the material in the preparation of news stories, and occasionally the subject matter of the street car periodicals has supplied editorial writers of the local daily papers with material or inspiration for commendatory editorials.

COMMUNICATIONS FROM PATRONS SHOW THAT PAPERS ARE ATTRACTING NOTICE

That the material carried by the street car papers is attracting notice is evidenced by the increasing number of communications received from patrons. Allowing for "crank" letters, communications from persons who make a practice of "writing to the editor," and notes commending individual trainmen, written by "inspired" personal friends, there is a growing number of serious communications from persons really interested in some phase of the service problem, who are encouraged through the street car publication to establish a valuable personal relationship with the company. Voluntary expressions of approval from experienced business and advertising men strengthen us in the belief that the street car publications are performing a useful service. Invariably, these make the statement that the little street car paper is a "friend-maker," that it establishes a genuine personal link between the company and the patron.

Most of the street railway publications are still less than three years old. A few are in their third volumes and not more than two or three are veterans of four years' standing. It is too early, therefore, to pass final judgment on their efficacy. No one who is familiar with the years of relentless repetition that are necessary for the popularizing of a trade-mark, for the upsetting of a deep-rooted conception, for the dissipation of long-entertained prejudices, would expect a modest street car periodical to bring about over night the era of broad tolerance and sympathetic co-operation for which all public utility companies in this modern day are striving. The street car paper is only one of the several agencies upon which we must rely for this achievement.

FACTS WELL SERVED, TO APPEAL TO VARIED TASTES, ARE NEEDED

For publicity of any kind to accomplish any results it is essential that we have a genuine desire to state the facts, and that the information be so served as to appeal to the varied tastes of the readers. We must remember that the minds of our patrons are the products of a great variety of environments and there must be considerable and continual variety in the mental menu.

We must be careful to launch our subject in such manner and form as not to arouse that spirit of perversity or prejudice which might cause it to be rejected or opposed without consideration, thus rendering our further efforts of no avail. We must be careful always to avoid any suggestion of grouch or threat. These are the weapons of the weak and are only resorted to where the cause that is being upheld lacks both reason and justice.

Let us just tell the truth cheerfully and persistently, according willingly to the other fellow his right to pass judgment, and trust to the justice of our cause for the desired result. To the extent that we are prompted by a genuine desire to serve, just to this extent will our success in gaining public favor and confidence be measured. In short, we are at all times the masters of our own fate.

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Getting Out a Company Publication*

By JAMES H. BRADEN
General Agent Northern Ohio Traction & Light Company, Akron, Ohio

CHIEFLY in the interest of improved public relations, the Northern Ohio Traction & Light Company issues twice each month its company publication, *The Traction Bulletin*. I say "chiefly" in the interest of better public relations, for there are other interests which we try faithfully to serve. These are the promotion of our safety-first work and the advancement of business through advertising.

How the Paper Was Started

It was only after a long period of doubt and hesitation that we launched *The Traction Bulletin* nearly three years ago. The chief motive back of the paper's beginning was the hope of correcting some impressions which were both false and unjust, and overcoming, if possible, some of the prejudice that had largely resulted from misinformation which had come to pass current without discount because the truth had never been presented. We chose to make our paper one of four pages because in the space so afforded we believed we could cover all the subjects it might be desirable to present in any one issue and not burden the reader. Moreover, we have aimed to keep our cost well within limits, and a four-page paper costs 30 per cent less than one of eight pages. For similar reasons we adopted a size of page which permits the paper to cut out of regular 28-in. x 42-in. stock with very little waste. This paper stock is known as "machine-finished book," and runs 50 lb. to the standard ream. It will take halftones nicely, and, of course, costs less than a finer grade, though at the same time it costs more than some goods which we might use but which are too cheap for the purpose. Our paper will always be taken as representative of the company, and we try to bear this in mind both as to the physical appearance of our printed messenger and as to its contents.

Circulation and Cost Figures

Our paper is issued twice each month only, instead of weekly. This was decided upon, in the first place, because the publication was somewhat of an experiment. We have continued on a bi-monthly basis not because we believe this to be equal to a weekly issue, but for the reason that the bi-monthly is all we have time to issue and do it well in our present organization. Our first issues were of 15,000 to 20,000 copies each, but before the first year was over we were printing 25,000 of each issue, and this year our editions are usually 30,000 copies—never less and sometimes more. We could distribute a greater number if we kept the little boxes or pockets in the cars filled for the entire two weeks or more between publication dates, but we would rather have the boxes empty at least a part of the time. It helps to maintain interest in the paper and leads patrons to notice the appearance of a new number.

Our original price for printing was $2 per 1000. We agreed to furnish and do furnish two sets of cuts for each edition in which illustrations are used, as the printers run two-on in their press work. Time does not permit the electrotyping the forms, and two sets of type are obtained by casting each line twice on the type setting machine. Originally the paper stock, which our printers purchased in 2-ton or 3-ton lots, cost them 3.8 cents a pound, but now the price is 10.75 cents. We consented to meet the advance at the rate of actual increase to the printers.

The first boxes or pockets placed in our cars for the distribution of the bulletin, and bearing the invitation "Take One," were of cast aluminum. They cost 25 cents each in quantities of 200 at a time. Later we obtained and now use altogether a box of pressed sheet metal neatly painted in aluminum, and the words "Take One" lettered upon them in black. These cost us from 8 to 10 cents each. The painting and lettering is extra and is done in our own shops.

To sum up the cost question—we printed last year approximately 720,000 copies at a total cost of a little less than $3,200—including a part of the salary of the general agent, who is the editor; a portion of his stenographer's salary, cuts, and the posters used in the car windows to call attention to each new issue. On the basis of 2 or 3 per cent for waste—that is, for copies left over in cars or for other reasons not reaching the hands of patrons—we placed in the hands of actual readers 700,000 papers at a cost of about $4.50 per 1000.

Comparatively Low Advertising Cost

The cost of this work is extremely low as compared to the price paid by other advertisers. The big problem of every advertiser is to get his message to the possible customer. He uses the newspapers for general work but for concentrated effort he circularizes. And he must pay, on top of his cost for preparation and printing, $12 per 1000 at the very least for stamps, envelops, addressing and mailing. Furthermore, a large part of his expense is lost. The mails are so full of circular matter that even the best things often go to the waste basket unopened. For *The Traction Bulletin*, however, we are at practically no expense for distribution, and we know our message reaches our audience, because that audience takes the papers out of the little pockets in the cars without urging.

We have our say to our customers at the moment when they are ready or willing to hear us, while the general advertiser must hope to be heard when a score of other advertisers are at the same moment clamoring for attention. In the 700,000 copies of the bulletin we carried light, power and railway advertising worth a great deal to us—advertising which if done in the newspapers would have cost at least $100 per month. Moreover, we were able to place announcements of new schedules, changes, etc., before our patrons in a way and place in which they could not miss them even though they did fail to see the newspaper announcements, which not infrequently is the case.

How to Edit a Company Paper

A company publication is of little account unless we have something of interest to say. Moreover, we must be very careful and thoughtful as to what not to say. We are dealing with one of the most subtle and most tremendous powers known to mankind—the power of suggestion. If not properly handled, it may easily do more harm than good. A substantial citizen criticised *The Traction Bulletin* because we did not put enough red pepper and ginger in it. His remark emphasizes my point, for in most things we write about we must take great care to keep the pepper out, though there are times when we hit and hit hard. In the main our tone is that of good nature, kindliness and sincerity—always that. We do not try to "put things over," as the street phrase goes. We do boost our good works with emphasis but never in a spirit of self-complacency. We aim for the truth always. We try to have a preponderance of new local matter in every issue. On matters

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of real news importance we never try to beat the newspapers. If we have something we know they want, we send them advance proofs.

Simply talking with the general manager, the superintendent and department heads about work that is going forward and other matters that will make good material for the company paper, is a job which any reasonably bright reporter can handle. To know what not to print, however, and how to present the things which are printed, requires a greater training. In our own experience we have consigned to the grave yard more than one piece of careful composition which on first thought appeared decidedly worth while. We aim not to be clever but persuasive, not argumentative but true, admitting faults when we must present them as freely as we chronicle our virtues, mindful ever that under the best of circumstances, out of the cars and right in our offices, we may have done those things which we ought not to have done and have left undone those things which we ought to have done. We try to be instructive without being pedantic, and above all things and at all times we realize that a touch of human nature makes the whole world kin.

Preparing and Publishing Company Publications*

By LEAKE CARRAWAY
Director of Publicity Southern Pacific Company
Charlotte, N.C.

THE subject of preparing and publishing company periodicals divides itself naturally into two general sections, the first concerning the actual gathering and writing of the data which goes into the publication, and the second, the printing and circulating of the finished product. It would be difficult to determine exactly which of these factors is of the more consequence and exerts the greater influence upon the employees of the company and the public at large.

Handling Division News Through Reporters

The first division of the subject may, in turn, be subdivided into sections dealing with the various interests to be served. For instance, there are in our company a number of interests involved, electric lighting, electric power, gas for illumination and power, street railways and a water system. To attempt to gather data covering these interests in the same way and manner and from the same people would, manifestly, be little short of foolishness. Therefore it is necessary to secure the co-operation of the employees in the various lines, to the end that they will assist in gathering the data which interests that particular department.

As a rule, however, the employees of a public utility company are not newspaper men by training or nature, and the data secured by them are, in the main, only the elemental facts upon which may be built an interesting "story." While the plan of appointing reporters on the various properties has not been abandoned, it is found to operate, in some instances, against full and free access to the editor on the part of the great mass of the employees. For this reason we visit each city and town operated by the Southern Public Utilities Company at least once each month, and more often when special occasions arise. On these visits we come in contact with a large percentage of the men in all the departments. We discuss with them not only matters of interest to the company and to themselves as employees but also matters of more personal import, and often the most interesting articles of the month are developed in this manner.

Reporting Monthly Railway Meetings

In each of the cities in which street railways are operated we attend a meeting in the form of a smoker or dinner, held on an average of once each month. At these meetings a program, arranged by the employees with the approval of the management, is put on; platform men discuss their troubles on the line, the carhouse men discuss their problems and the men from other departments bring to this round-table all manner of subjects for discussion, with the result that discoveries of value to the street railways in the other three cities are made and passed along through the pages of the magazine. While these meetings are called for the primary purpose of getting the street railway men together, the employees of all other departments are invited and it is often the case that an employee in the accounting department gives or receives a suggestion that is worth the attention of the officers and employees of the entire system. The vehicle through which this goes to the employee-body is the magazine.

Other Topics Covered by Magazine

In addition to the foregoing sources of news the employees are invited and urged to write articles of interest for publication in the magazine. Some of these articles do not deal with the questions which confront public utilities in their primary form, but in every instance there is an indirect, and in some instances, a more effective appeal to the men for closer co-operation, greater loyalty, better living conditions and cleaner moral relations, which as a general rule are read with interest by the majority of the employees.

From time to time the pages of the magazine are thrown open to the operating officers for the discussion of matters in which both the employees and the public at large are interested. It is found that these communications or signed articles from officers are read carefully by the employees, and the public comes to a more nearly accurate estimate of the efforts of the company toward the ideal efficient service.

Official orders governing any feature of operation are given place in the magazine, and reports of new construction with drawings, photographs, maps or other illustrations are shown from time to time. New equipment is reproduced for the information of the public when it is put into service, and developments along any line are given all the space they will legitimately fill.

Employees who, by their unusual efficiency, come into notice are given public commendation, and wherever it is possible photographs of such employees are used. For example, in the case of a motorman who by co-ordinated head and hand work avoids what would doubtless have been a most serious accident, his photograph is reproduced to illustrate an article describing just how he was able to avoid this particular accident. This, read by the other employees of the company and by the public, results in every other employee keeping a watchful eye to windward in an effort to duplicate this act or to perform some other which will bring to him the commendation which has just been accorded his associate.

In addition to these intra-company data we invite communications from the public in the cities in which we operate, giving the boards of trade or chambers of commerce space to lay before the public matters of especial import. Ministers of the gospel occasionally prepare a sermon for public utility employees to be preached from their pulpit and later to be reproduced in the pages of the magazine. Public-spirited citizens

*Abstract of a paper delivered before the American Electric Railway Transportation & Traffic Association on Oct. 12, 1916.

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who desire to discuss any matter of general interest are invited to use the magazine, and in this manner the publication comes to be much more interesting and more generally read.

PRINTING AND CIRCULATING POINTS

Second not even to the type of matter used and the method of its preparation, is the printing of the publication. The best printer is the cheapest, when a publication for the employees of a public utilities company is to be published. There are those who hold that a printing department within the company is the proper method of handling the work, but it is our opinion, based upon long experience both in corporation and fraternal publicity, that a contract let to a reliable printer is far more satisfactory from every possible viewpoint. Better work for less money may be had by contracting with a printer whose equipment is capable of handling the job than in any other way.

Our "copy" goes to the printer in job lots, beginning soon after the issuing of the last magazine. By the thirtieth of the month 99 per cent of the copy for the following month's issue is in the hands of the printer and galley proofs have been taken. On the morning of the third of the month the conductors' efficiency reports, as shown by the Ohmer fare registers on each car, are received, together with the report of the efficiency in car operation shown by the records of the Sangamo meters, and these percentages go to the printer the same afternoon. Page proof is had on the sixth of the month; the printing is done on the seventh and eighth, the binding on the ninth and the mailing on the tenth, the date of issue.

At first our mailing list was made up from the payrolls of the company in the sixteen cities and towns in which we operate. From the beginning we received many requests, from people who were not in any way connected with the company, to be put on the mailing list. In this manner we have built up a list from among the best citizenship in every city and town. That these citizens read the magazine with at least some interest from month to month is evidenced by the complaints which we receive when, for any reason, a month's issue fails to reach them.

Public libraries all over the country are also on our mailing list at their own solicitation. Early this year Harvard University was added to the list in order that the magazine might be used in the courses on public utilities in the Graduate School of Business Administration. To the management of similar companies throughout the country, the magazine is sent whenever request is made for it.

EXECUTIVE SHOULD BE RESPONSIBLE FOR PUBLICITY

As to the management of a publicity department we are firmly of the opinion that in every instance the company should employ a practical, trained newspaper man of wide experience rather than endeavor to use "a bright young man" already in the service, who is said to have inclinations toward journalism. And not even to a trained publicist should the policy of the publication be intrusted. The manager of the department, editor or special agent, whatever he is called, should be located near to and within easy reach of the highest executive of the company, and he should be under the direct orders and instructions of this officer at all times.

Through this officer all announcements concerning the activities of the company should be made, and all advertising agreements with newspapers should either be made by him or with his knowledge and approval. The preparation and publication of company periodicals means much more than the mere writing of the matter and supervising its printing. It means, or should mean, the maintaining of the proper relations between the company and the newspapers, to the end that the newspapers may be furnished with legitimate news and not publish unfounded rumors which might easily give rise to trouble of a most serious nature.

Accounting and Modern Industry*

Accounting has played and is playing an important part in industrial development. Business without knowledge of financial transactions means failure. How accounting can serve administration

By JOHN R. WILDMAN

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HISTORIANS say that no nation has ever become highly civilized without having developed commercially. It is suggested by Woolf in his "History of Accountants and Accounting" that "the higher the stage of culture and development attained by a community the more elaborate are its methods of account. Accounting is the mirror of the age, and in it is reflected much of a nation's commercial history and social conditions." While there is doubtless something in this contention, I am not sure but that Woolf is overenthusiastic even though honest in his conviction as to the important part which accounting has played in the world's history. There is, however, reason to believe that accounting has played and is playing a somewhat important part in the development of modern industry, especially in the United States.

As a country develops commercially and industrially, so apparently does accounting, in its application especially, make progress. Germany, slow to develop industrially, has never been noted for prominence in accounting. England, on the contrary, has long been an industrial and commercial leader. It is in Great Britain that, until recently, accounting and accountancy have taken the greatest strides. The United States as a commercial and industrial country is comparatively new; consequently accounting is relatively speaking in an undeveloped stage.

Modern accounting of a constructive character may almost be said to date from the beginning of the trust movement. Brown in his "History of Accounting" speaks of some of the so-called ledgers preserved from

*Abstract of a paper delivered before the Atlantic City Convention of the American Electric Railway Accountants' Association on Oct. 12, 1916.

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the period 1300 to 1400 as being "obviously intended to serve only as aids to the memory in retaining the details of numerous transactions." So doubtless will future historians speak of some of the financial statements of the period from 1492 to 1898 in the United States. With the exception of the steam railroads, which must be given credit for the pioneer work which they did, very few concerns prior to 1898 used their financial data, granting that they recorded and compiled it, as a basis for solving the various problems of administration.

The trust movement in the United States began in 1898. During the three years which followed 149 large combinations with a total capitalization of $3,578,650,000 were formed. Many writers and some fairly prominent authorities predicted failure. It was agreed that no one man or board of directors could successfully administer such huge organizations. The United States Steel Corporation and the United States Rubber Company could scarcely be called failures. Accounting made it possible for the executives who were placed at the heads of these giant corporations with their many constituent companies to have laid before them information as to what was being done. Accounting made it possible to run a huge business as intelligently as a small business had previously been run.

FORWARD MOVEMENT IN LAST FIFTEEN YEARS

The last fifteen years in the United States have seen a tremendous forward movement in accounting. The Interstate Commerce Commission as well as public service commissions throughout the country have adopted systems of accounting as a means of obtaining information as a basis for control of public utility companies. No longer is the detection of fraud and error the chief aim of an accounting system. It has been discovered that it will gather information which will not only permit comparison of companies of the same class, but also serve the purposes of the company manager and the investor, present or prospective, not to mention the taxpayer. A. W. Dimock in his book, "Wall Street and the Wilds," relates how he traveled about from Chicago in 1873, when "conductors owned the railroads and the thought of friends of theirs paying toll on their lines would have sounded the depth of inhospitality." It is doubtful if the accounting system of to-day permits hospitality to such an extent.

In other lines the progress had been equally marked. The street railway industry was among the first to recognize the need for and to work out a uniform accounting system. The National Retail Dry Goods Association has heard the call and answered with a system for its members. The Harvard School of Business Administration through its research laboratory has provided a system for the shoe industry, and is now at work on one for the drug trade. The American Telephone & Telegraph Company, with its lines and property spread over the entire United States, has a most comprehensive accounting system, without which the administration of such an organization would be impossible.

Everywhere is manifested interest in accounting. The economic cause of the interest is undoubtedly competition. Except in undeveloped or unexploited fields or industries where large profits come through force of circumstances and not good management based on facts, accurate information must be had. An instance came to my attention four or five years ago where a picture postcard concern continued in business for two years without any books. Such cases, however, are rare. One of the first steps in the organization of any concern is to organize the accounting department. The American International Corporation, recently organized but destined probably to be a force in the world's commerce of the future, gave attention among the very first things to the organization of the accounting and auditing department.

The federal government by passing the federal income tax law served to draw the attention not only of the corporation but the individual to the necessity of keeping better financial records. Moreover, with the prosperity of the country after the present war in question, the Federal Trade Commission is urging upon business men the importance of enlarging their knowledge of accounting and improving their accounting methods. With this end in view the commission has recently issued two notable pamphlets. One is entitled "A System of Accounts for Retail Merchants"; the other, "Fundamentals of a Cost System for Manufacturers."

WHAT ACCOUNTING DOES TO SERVE ADMINISTRATION

As a concrete illustration of what accounting has done to serve administration, it may be interesting to note what Henry P. Schuit, a factory cost expert, wrote the author concerning some of his work in a plant out in Pennsylvania. Mr. Schuit says:

"On my present engagement I have had an interesting experience in the handling of stores and in the establishment of a control of them. This company has been manufacturing a line of goods on which they owned all patents and therefore had a monopoly. As the patents ran out, however, competition entered the field with a consequent reduction in prices. During the period that the company enjoyed the monopoly, the profits were large and no attention was paid to quantities of goods manufactured or to the wastage.

"This loose habit of management had become so fixed upon the executives that they were not handling the operating end of their business properly. It took me a long time to convince them of the necessity of the establishment of stock rooms, for they offered such excuses as that it was cheaper to have the material near the machines, that it would be an unnecessary expense to have a stockman, that it was too much trouble to keep a stock record, and many other similar ones.

"I finally got the stock-room started. There are now three, the first one having proved their necessity. After accumulating all of the product of one line of goods, we found to the surprise and consternation of all that there were more than 160,000 pieces of this one line alone, when 10,000 pieces would have been an ample working stock. This material was found in every conceivable place, around machines, under benches, in gangways, in out of the way nooks, and even in scrap piles in the blacksmith shop. The stock, of course, was the accumulation of years, manufactured in advance during their period of prosperity and then stored away and forgotten. No accounting was made of it excepting at inventory time, when it was merely lumped.

"This product was in every imaginable condition, some of it just started, and from that stage to every degree of completion up to the finished article. It took several months to gather this product and even roughly classify it. I had it classified sufficiently merely to serve the present practical purposes. It will take a year or more to sort it into the classification in which it will be ultimately required.

"As soon as we got the product together and began drawing on it, there was a difference immediately. It had been the custom, before I came here, to take an order and make it from raw material, an attempt rarely

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being made to find it in stock. From 85 per cent to 90 per cent of the orders were manufactured from raw material; now the amount seldom exceeds 3 per cent. The department that has been working on raw material is now devoted to other purposes. Not a bit of raw material has been purchased since the new system was started, and it will not be necessary for a long time to come. In fact, the unfilled orders have been canceled.

"Another result that has been effected through this control is the cheapening of the cost of manufacture. As soon as the stockrooms were established and the controlling stock ledgers started, all orders were sent to the stockkeeper for him to fill and deliver to the department that was to work upon them. To the surprise of all we began to discover the great amount of spoilage, and by the very employees that were supposed to be the best men. Nothing was said to them, in the belief that the moral effect would change them. It did; these men, realizing that the automatic working out of the system would show up the results of their work, became more careful workmen. By the end of two months the percentage of spoilage became a figure hardly worth mentioning.

"Another saving that has been made is in the time of the employee. All material is now delivered to him, and he loses no time looking for his material or going to the first department which formed the raw material for him. In fact, the men have no business away from their machines or benches. Formerly the men reported time working on stock, which they frequently did when work was slack. Now this is a thing of the past. Every bit of work goes through on order. Raw material or partly finished product brought to a greater degree of completion receives the same attention as the customer's order.

"This control of labor and materials has brought about most surprising results. The profits are hardly believable. Before I came here the management was considering the advisability of discontinuing this line of business. It has turned out the most profitable. I am writing you this letter to give you an illustration of the results that can be obtained by establishing an effective and simple control of stock, and to show that a stock record does not mean a mere record of the stock on hand, but as well one of the mediums for controlling the operations of a factory. In this case it even made better workmen of the employees."

KNOWLEDGE WITHOUT ACCOUNTING IMPOSSIBLE

Industry everywhere in the United States seems to be awakening to the need for accounting. The possibilities of accounting, which the big combinations were quick to see and make profitable use of, are now being realized by the rank and file of industrial organizations. The experience of the concern related by Mr. Schuit is rapidly becoming the experience of many concerns. Good accounting with intelligent use of the information presented increases profits and stimulates industry. Business is a mass of financial transactions. Business without knowledge concerning these transactions means failure. Knowledge without accounting is impossible.

The Development of Schedule Makers*

Proper schedule making is the foundation of efficient operation and maintenance and of low capital charges, yet the science is of recent growth. The author urges the training of young men for this work

By H. C. DONECKER
Assistant General Manager Public Service Railway, Newark, N. J.

IN ordinary commercial enterprises, there is a recognized ratio between the selling price and the manufacturing cost, with an attendant fluctuation in the price of commodities. Our business thus far has allowed of no such adjustment of selling price to cost of production. Our price, which is our rate of fare, is stationary regardless of production expense. Thus there remains for an electric railway operator but one course and that is to offset the high price of labor and materials by the inauguration of the most rigid economies and the avoidance of waste.

This brings us to the theme of the paper, and we will discuss briefly what an important part the development of capable schedule makers plays in bringing about efficient operation, remembering that efficient operation demands not alone that a good standard of car service be given, but also that such service be provided at a cost which will assure a fair margin of profit, if such a thing be possible.

Personal observations and experience satisfy me that up to comparatively recent years the time-table or schedule was perhaps the most neglected single unit of cost in our classification. There is still, I believe, a tendency rather to under-rate its importance with the result, so far as investigations show, on relatively few properties have really energetic endeavors been made to train what we might describe as traffic engineers. Let us look at the history of our own electric railway association. It was only in 1910, I think, that the question of schedules and time-tables had any place in our annual programs. Perhaps consideration of it would have been still further delayed had it not been for the suggestion of Mr. Sergeant, of the Boston Elevated Railway, that the matter be taken up. Even then it was with rather hazy ideas of just what the committee had to consider that the matter received a definite place in the activities of the association. Does all of this not indicate that we railway men may have been somewhat lax in our analysis of such a serious phase of our work?

In just what ways does this question of schedules merit the importance we are now giving to it? Let us see. We have in our classification some eighty-eight accounts. Which is the one which calls for the greatest outlay in cash? Is it not account No. 60, wages of

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trainmen, which represents some one-third of our total operating cost, and all of it is billed out through our schedules and time-tables department.

What is the second item of substantial size? The power bill. Can there be any question of the influence of schedule on power consumption? Power will perhaps account for from 10 to 15 per cent of the operating costs. Next, perhaps, in importance is the question of accident cost which may run anywhere from 7 to 10 per cent of operating cost.

I think that we all agree that time-tables prepared without due regard to those elements which determine the reasonably safe speed of our cars make for results in damage claims that elicit many wild howls from the president down. We thus see that in these three items alone the schedule affects more than 50 per cent of the outlay in expenses. This is not the end, however. The ramifications of the time-table extend into practically every element of cost.

A proper schedule provides: First, a distribution of labor that provides the best possible working conditions for trainmen; second, a speed that touches the maximum consistent with safe operation and demands a reasonable minimum of power use; and third, a headway and capacity that brings about reasonable waits for passengers and a consistent maximum of comfort.

These appear to be simple elements, but think of how far-reaching they become. They embrace the maintenance accounts because a poorly constructed schedule will call for a greater number of cars than is necessary and brings with it comparable increases in attendant facilities, such as power house, carhouse and repair shops and thus automatically produces higher maintenance charges in such cars and equipment, including power stations.

Track maintenance will, perhaps, not be affected to the same extent but will undoubtedly be increased because of the greater number of cars operated or at an unduly high speed, particularly over special work. More than this, cars operated in excess of what an efficient schedule would provide requires, as stated above, added carhouse and shop capacity, thus bringing about additional maintenance and operating cost in such departments and, of course, as the property facilities grow, so does the outlay for insurance and taxes, to say nothing of the added fixed charges which the company has to assume. In the final analysis, therefore, it is safe to say that no other one department exerts such an influence for good or evil upon the welfare of our properties.

The influence of schedules does not end with the matter of direct expenses, however. Think of its power in molding that intangible but much to be reckoned-with public sentiment. Then, in addition, much as the administrators of the street railway and of the public as well are concerned in this schedule, there is one other great class which it vitally affects in both a financial and physical sense. I refer to our great army of trainmen who are not alone personally affected but whose families are in a great measure seriously concerned in the good working conditions of the wage earners. All of the above are accentuated by the tremendous problem of the rush hour. But that is another story.

THE WORK REQUIRED OF THE SCHEDULE MAKER

So much for the rôle of the time-table in making for the success or otherwise of a street railway company. Now for the work required of the schedule makers. The schedule is no longer the simple setting down of columns of figures indicating a certain number of trips to be made by given crews and providing a capacity which is estimated to be equivalent to a demand based upon a more or less cursory observation of traffic and not the result of any special study of the real requirements of the line. What are the exactions placed upon the schedule maker of the present day? He must first make close observation of the residential and business characteristics of the district through which the line runs. He obtains data showing the passenger demand throughout the full period of operation each day, securing at the same time a record of the riding habits of the people which brings out the origin of the business and its destination points. An analysis of the possibilities of the line in the way of speed must be determined, this work involving an accurate account of the number and time of stops, the physical characteristics of the route as to grades, etc., the records of congestion, consideration of the cars and equipment available, possibilities in the way of coasting and by no means last in importance, the requirements of safety first. Having such material in hand, most of it probably obtained by subordinates but carefully checked by the personal observations of the man in authority, all must be properly co-ordinated and at last the preparation of the basic time-table, itself, is under way. This completed, patches are made for use as the exigencies of weather or other conditions require diminished or increased service. Then commences perhaps the most difficult task of all which is the nice allotment of the capacity provided to take care of the patrons into periods of work for the men which will be as satisfying as possible from the two standpoints of wages and comfort.

After the table is in effect we have its periodical checking to determine its success in actual operation, this requiring the development of traffic counts, observations of running time, etc. Running time becomes a variable factor largely contingent upon the amount of congestion in the streets at different periods of the day and necessitating different sets of running times as the difficulties of operation increase or recede. Our schedule department is also charged with other duties including the preparation of charts and tabulations of conditions to meet complaints, the preparation of data for use in cases before utility commissions, the development of subordinates along the line of ability to appear as witnesses before commissions or other regulatory bodies and as our cities grow and districts change in character come studies of the movement of passengers particularly transfer movements to form the basis for the possible re-routing of cars.

WHERE CAN SCHEDULE-MAKERS BE OBTAINED?

It will be seen from the above how varied are the duties of a really efficient schedule making force, and we are thus faced with the problem of the character of the men to assign to such work. Under present conditions it is probably true that most of the recognized expert time-table men are recruited from the ranks of the platform or street supervisory forces, men who by their personal knowledge of conditions of traffic, their ability in knowing how to meet sudden changes in demands, their knowledge of the psychology of the traveling public and the energy which has made it possible for them to advance in life, provide us with schedule makers who have "just growed up." We might likewise apply this same phrase to some of the schedules that are operated. Is this field still available? Or because of certain enlarged technical knowledge demand must we penetrate into other fields to obtain the men who will best prepare the diversified data now required from our transportation department? Lately, there have entered many young engineers who, taking what is styled a cadet course, passing through the various departments of electric railways have finally been established in the transportation department specifically assigned to the department of schedules and time-tables, placed under

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men who for years have observed the grinding demands of passenger transportation. These men are taught the mechanics of schedule making in so far as such instruction may be obtained within the confines of an office. Combined with this training has been their assignment to work directly on the streets and on the cars. All of the phases which we have indicated hereinbefore as necessary in present day schedule-makers are brought to the attention of these young men whose work is checked or rather corroborated by other men working independently along parallel lines. The instruction given by their superior officers, the conferences carried on almost continuously to discuss ways of meeting new conditions constantly arising, the time spent directly on the ground along the various lines of the company, the energy that they are required to expend because of having to meet assignments at all hours of the day, the experience derived from attendance at public utility commission hearings at which the public sets forth its criticisms together with the enthusiasm that the study of transportation problems inevitably develops if a man is temperamentally suited to such work, the application of his engineering knowledge in the preparation of charts and the development of formulas of travel, and the knowledge of the different departments of the property acquired through the cadet course—all these factors have produced for one company a set of young men whose worth has definitely fixed the status of the traffic engineer.

Hampered though such an engineer is with the absence of long years of experience in actual transportation work, there is no question that the success of the plan I have herein somewhat generally described would not have been accomplished or at least would have required a very extended period of time without the assistance of the wise old heads whose direct experience with the problems right out on the ground enable them not alone to produce efficient time-tables themselves, but to impart their knowledge to the young men and this they have done unselfishly and well. The answer would appear to be that a company, and perhaps this is more applicable to companies of the larger size and especially those with high rush-hour peak demands in order to secure maximum efficiency, would do well to consider the acceptance into their service of technically trained young men loyal and energetic who are tempermentally suited to fit into the transportation field. The qualifications for such work include first, good judgment and ability to be a mixer, and to work without friction under or with all other men in our car service departments, ability to observe just how the old man on the street handles his job, sufficient initiative successfully to meet critical conditions quickly and with judgment, horse sense and an unbounded energy and ambition which makes it a pleasure to get away from the idea that a man should work only regular hours say from nine to five, and have his Saturday half holidays and his Sunday to himself.

National Issues in Local Franchises*

Pessimistic views of regulation, protection of investment and rate of return are ill-founded. Future franchise protecting investment will be well received. Utilities quasi-public as to privileges, performances and risks

By PROF. CLYDE L. KING
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FRANCHISE policies must necessarily be based on judgments as to future conditions. This is just as true of the restricted franchise as the unrestricted, the term franchise as the indeterminate. In some fields there are sound facts or known traditions on which judgments can be based; in other fields judgments must necessarily be little more than guesses. Hence the element of speculation in past franchises, as the financial histories of utilities show. Anyone securing or accepting a franchise of any kind where a permanent investment is to be made must necessarily ask certain questions as to future conditions. Among these questions at this time these three are paramount: what has the next twenty-five years in store as to (1) regulation, (2) protection of investments and (3) rate of return? As will be the answer to these questions so must be the policy toward franchises.

The answers to all of these questions are determined largely by national and, indeed, to an extent, by international conditions. For not only are there national issues in every local street railway franchise but there are international issues as well. The one big factor in future utility policies is the coming internationalism. Just as plant or animal species have survived because protected by natural barriers, and are destroyed when new means of transit overcome those barriers, so not only local but national economic peculiarities due to isolation will vanish with increasing rapidity before the present and future world-wide economic internationalism.

It is easy to take a pessimistic view of the future in the street railway world as to regulation, protection of investment and rate of return. It can be held that regulation will be by the politicians for the politicians, or by the corporations for the corporations, or by the rate-payer for the rate-payer—in any such case to be discredited and finally abandoned, not for non-regulation, for no one would now expect that, but for public ownership as the only way for all the parties having real interests to safeguard those interests. The pessimist can prophesy at least a partial destruction of street railway values by competition of the flying machine, the trackless trolley, the motor bus; or by the automobile alone, giving especially to the lower price of automobiles, the increased purchasing power of the public and the rapid increase in good roads. Or the pessimist can hold that the suburbanizing of cities and the growth of manufacturing in the small towns will tend to make the average street railway haul in excess of a profitable haul for 5 cents, and that the 5-cent fare is such a deep-seated American tradition that intense public antagonism will be aroused against street railways which

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seek to increase the fares, abolish transfers, adopt the zone system or shorten the haul. And as to the rate of return, the pessimist may urge that, after the European war is over, America will be a creditor country, with plenty of money to invest at low rates of interest in domestic affairs, a more promising return on money to be secured only through investments in foreign countries, and that this situation will tend to force by public opinion a relatively low rate of return on public utilities. If such conditions are to prevail in one or more of these fields, then to be sure street railway franchises must be framed accordingly and perhaps with a view to public ownership.

VITAL FACTS, HOWEVER, ARE OVERLOOKED

But these pessimistic views leave out of consideration some very vital facts. Certainly with the growing increase in efficiency in government and in the rapidly rising standards of governmental conduct, both the public and the corporations can be relied upon to see that regulation is not in the interest of the politician. With the dissemination of information as to unit costs in utilities, it certainly can be expected that selfish regulation, whether for the corporation or for the rate-payer, cannot persist. Only if facts shape the regulative judgment will regulation continue. In the announced policy of the American Electric Railway Association to give out all the facts lie the hope and the promise of sane regulation. For in this matter the taxpayer and the utility must make common cause. Rights are derivative, not innate. They are derived from government and expand to higher planes only as government is efficient, and are protected only in so far as government is competent—a fact that business men sometimes forget.

Government cannot be partisan where one wants it to be partisan and non-partisan when administrative competency is desired. Government cannot be "political" in local matters and non-political in State or national regulation. The taxpayers, the business man, the utility manager must unite to place and keep government on a plane of non-partisan competence in administrative and executive matters. For unless regulative bodies have the independence and the poise of administrative courts, all who put their trust in regulation must suffer none so much as the companies, for in politics in this issue the larger number of voters are on "the other side." And, it must be repeated, competence in regulation is secured only through competence in every phase of government. He who pulls down city or local government imperils state and national regulation. He who pushes forward competency in government in any one field pushes it forward in another. It's the salients that count. One can safely assume, therefore, in drafting franchise policies, that the present-day plan of regulation, while still on trial to be sure, will persist in a way acceptable to the parties at interest only because all men in business will increasingly unite with one another to make all government competent.

A study of motor costs will indicate that the motor buses cannot haul passengers at a profit for the distance that street cars can haul them. This fact alone will prevent any devasting competition from motor buses. Certainly the very immobility of capital itself will prevent any devastating competition from motor petitor in the next two decades, even assuming that the experiences of the present war put the flying machine on a commercial basis. Inasmuch as the expenditure of more than three-fourths of American families for recreation and amusement cannot be in excess of $100 per year, the competition from the privately owned automobile can be disregarded. At least it will be counteracted by the natural growth of the riding habit.

These pessimistic views not only leave out of consideration certain very vital facts, but they also leave out of consideration what is still more important, certain deep-seated American traditions and attitudes. One of these traditions is a wholesome respect for property and property rights. In no country on earth is there such a wholesome respect for property as in the United States. This tradition finds its basis in that American belief that all who now are not may become property owners. It is a safe prediction that the increasing wages of American earners will tend for some time to keep up this tradition and to prevent the organization of large numbers of voters entirely antagonistic to capital, such as is the rule in continental countries. More abiding because more fundamental than any law or set of laws or any court decision or set of court decisions, this American tradition will compel a continuing respect for properties that represent actual money investments. Such wholesome traditions, molded as they will be by the increasing stability of protected utility investments, can be counted on as continuing, and these traditions, it can be confidently expected, public service commissions and other public service and regulative bodies will reflect.

The rate of interest will be determined very largely not only by national but by international conditions. It will, no doubt, be true that the impatience of Europe to restore normal industrial conditions will tend to raise the rate of interest after the European war. It is probable, also, that the rate of interest in foreign investments will tend to be much higher than the rate of interest in domestic investments, and this for the very simple reason that the American nation will probably be increasingly a creditor nation with the same laws as to a relatively lower rate of interest on investments in the home country than in foreign countries, as has been true in the European creditor nations in the past generation. But that the domestic rate of interest will become unenticing to investors (as distinct from speculators) in American public utilities does not seem at all probable. It is a conservative statement that efficiency in management alike in all public and private industry is in its infancy. The pick-up through efficiency in organization is to be the great industrial gift of the next quarter of a century. This competency in management the war-ridden countries and those blessed with peace will, no doubt, reward amply.

PROTECTION OF INVESTMENT IMPLIES HIGH STANDARDS FOR ALL

On the other hand, just because we shall have passed the unsettled conditions of a debtor country, and just because we shall have come into the more stable views of a creditor country, the American people, if they have a modicum of the Yankee shrewdness with which they are credited, will insist that their recognition and protection of property rights, which they yield so generously, be on the basis of actual investment as far as their serving utilities are concerned. Respect for utility property by the public implies a mutual respect on the part of utility owners for the public and the rate-payer. Instead of accrediting the successful "anti-Wall Street" or "anti-corporation" campaign solely to the cussedness of the propertyless, it might be now and then worth while and infinitely more wholesome to think of these campaigns as due in a measure to the determination of one Yankee not to fall too easily for the tricks of another. If the corporation is asked to file a report open to public inspection and then it is found that these

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reports have been cunningly "doctored," what will the average American decide other than that such doctoring impugns the integrity of the investment? And will he not tend to conclude that the more astute the cunning, the less his obligation to protect the investment? What will the average American—if he has any of the tendency to look to his pocketbook with which foreign critics credit him—what will any average American decide if he should find that what he has been respecting as property represents but little actual investment or but the re-investments of moneys received from rate-payers? Protection of investments implies high standards on the part of all. Integrity inspires confidence; sharp practices undermine it.

"I am a believer," wrote Thomas A. Edison to William D. Marks in a utility matter about fifteen years ago, "in insuring the permanency of an investment by keeping prices so low that there is no inducement to others to come in and ruin it. There seems to be a law in commercial things as in nature. If one attempts to obtain more profit than the general average, he is immediately punished by competition." This law will remain in operation, even though the company has a complete monopoly. To force the rate of agreed return to a point beyond what the public will regard as fair is to invite contrasts between the interest on public bonds and the return to privately owned utilities. Comparison with other countries or with other industries—is a deed, the very existence of technical knowledge—is a competitor. And this knowledge is to become not only international but easily mobilized. Technical knowledge is to be the fair yet positive arbitrator of the future. Successful experiments in other countries, whether of public or of private ownership, whether in management or in economics in generation or distribution of current, will flow as swiftly from continent to continent as formerly from county to county. Future policies must be shaped in the light of mobile and accurate technical information which will be as accessible to the public as to the corporation.

The American spirit toward capital is wholesome, genuine and generous. But a stable social and industrial life simply will not sanction the large returns and the capital inflations that the risks of a frontier life gladly sanctioned. The American's views toward property, while generous, are slowly but surely shaped by his environment and business interests. These views, therefore, even more in the future than in the past, for the middle class income of the future will be more stable and more thriftly guarded, will probably hold that those in the public service shall write down squarely what their money investments are and ask for a rate of return comparable to the risk in the enterprises, and in related private businesses as modified by the protection to the capital invested in the public utilities guaranteed by the laws and by public service commissions. This, so far as I can read the attitude of the next generation, will be the only limitations, if limitations they be, upon the American tradition of absolute and complete respect for property. It cannot be expected that the rate-payer of a stable creditor country will give through the state a guarantee to utility investments such as he gives to no private industrial investment and then also give to the utility investor all of the increments or advantages that necessarily flow to competitive businesses where such protection is unknown.

PUBLIC OWNERSHIP WITHOUT ITS RISKS

The question has not been asked as to the future in public ownership. If the public can fix a rate value at less or even the same as a condemnation value, if the public can regulate the rate of profit, the amount of capitalization, the ratio of stocks to bonds, the exact time and charge for the haul, the character of service, the politeness of the platform men—is this not public ownership in essence? Public ownership in the sense of public control is not a force to be feared; it is a force already here. It is not public ownership, to be sure, in the sense that properties may be confiscated, or in the sense that service can be compelled at a loss, though in legal theory this can be done. Nor, and this is more to the point here, is it public ownership in the sense that the public must necessarily assume all the risks of ownership.

What this country has under regulation is in fact at least quasi-public ownership that makes all street railway operators in a sense public officials. If the public wants to be selfish about it, regulation has in it possibilities for the public not possible in public ownership. That is, the public may have its cake and eat it, too; the advantages of ownership without its risks. The public and the operator will both be the better off the sooner the public character of street railway service and operation is completely recognized. The real question is not as to the future of public ownership. The real question is whether under regulation there will be public ownership without the responsibility of ownership or, on the other hand, a regulation that does not regulate. Under conservative franchise policies one can rely on American traditions, business sentiment and sense of fair play to see that neither extreme is followed.

SOME M. O. PROPAGANDA ERRONEOUS AND FUTILE

In view of this situation, however, it may well be questioned whether the payment of money to magazines for fallacious propagandic work against public ownership, such as certain utilities, more especially utilities other than street railways, have been and are doing, as far as I know, is that type of stupidity for which one should apologize as my cook did when she poured milk into a sieve, and she had the good conscience to know that her stupidity was all the more culpable because some one else paid for the milk. In the first place, utilities are in law quasi-public. Just to the extent that they are in law or in fact quasi-public, their operators and managers are quasi-public officials. And the extent to which these properties are quasi-public and the extent to which services can be compelled measure the extent to which the properties are already in fact though not in fee public properties. Government is a partner in all twentieth century business, and in quasi-public businesses particularly it is far from being a silent partner. And does it come with good grace for one in one kind of public service to complain of some other kind of public service, by "news" that is erroneous? The erroneous statement in the magazine supported in whole or in part by assessments on utility companies reflects on the sworn statement. This may be an unhappy fact, but it is nevertheless the sort of social fact that those in public businesses must recognize.

Moreover, is it at all unlikely that America may become as England, France and Germany had become, a creditor nation, with opportunities for lucrative investments abroad? And is not possible, as has been the rule with creditor nations in the past, that the rate of return in foreign investments will be more enticing than the rate of return on domestic investments? The wide extent of public ownership in Great Britain, France and Germany is to be accredited in part, and to a larger part than is usually conceded, to the fact that investors found larger returns in other fields and pre-

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ferred to sell their utilities to the public in order to release their money for more profitable investments elsewhere. That is, public ownership did not come with the opposition of the owners of utilities but with their sanction, the real question being as to what the sale value should be. Can anyone say that these nations are not the stronger because public credit was used (where it could be used) for quasi-public ventures, and private credit (where private credit only could be used) for commercial and industrial development? Can anyone say with finality that American investors may not find more profitable fields for their money than stable and regulated domestic utilities with their competition from a low interest rate on public bonds? Is it, therefore, unthinkable that the investors themselves may within the next generation find it to their interest to sell to the public? And should they want to sell, may not this very propagandic literature rise to plague them? Or at least rise to insist that, since public operation is less competent than private operation, the selling price to the public must be, therefore, considerably lower?

Or let us assume that this kind of propaganda is in good taste and is good business. For, of course, it is sound business to combat public ownership that destroys properties by competition with the money furnished by the taxpayer. But is it effective and worth while for the utility company to do this? Can opposition to public ownership be measured by the number of clippings needful editors take from a gratuitous news service? May not that very kind of activity lead the public to ask questions as to the private profits of concerns that needs must spend so much money to oppose by erroneous statements another kind of ownership and operation? And may it not give to the friends of public ownership popular support on the stump-worn doctrine that such activities are a sort of poisoning of the wells of public information?

From any point of view it seems to me that this sort of propaganda is not to be expected of the type of clear-visioned able utility operator which the next generation will need and is going to have and which this generation already has in such growing abundance, in no utility so much as in the street railways. These queries are not put out as an argument for public ownership but as queries as to the conservative attitude toward public ownership under conditions where public ownership in possible results exists anyhow. Of course, the citizen in any business will proclaim facts where public interests are involved—proclaim them from the house tops if need be. But why impugn righteous activities with an erroneous, needless and futile propaganda?

FRANCHISES TO PROTECT ACTUAL INVESTMENT

If these views as to what the next twenty-five years have in store as to regulation, utility investments and rate of return are sound, what do they indicate as to franchise policies? Is it not this in substance—that franchise privileges should be so drawn or interpreted as to safeguard actual money investment with a sufficient rate of return to keep and attract capital? With franchise policies along these lines, public utility managers and operators will unquestionably find adequate support alike from investors and public. With franchise policies along the lines of justifying speculative elements past or future, however, utility managers and operators can expect from both the investor and the public an attitude of increasing criticism and suspicion.

THE INDETERMINATE FRANCHISE OF THE FUTURE

In the main there are two kinds of franchises, the term and the indeterminate. What do these influences and traditions mean when applied to each? With the indeterminate franchise, where public ownership is possible only through purchase of the existing utility, they mean particularly stability in valuations. If the foregoing represents at all the views of the next generation, the advice of those engineers who have helped to boost valuations through imaginary reproduction will be looked upon in its after effects as short-sighted.

A Chinese student has recounted to me the cordial public approbation bestowed on the noted Chinese statesman when he framed and secured the passage of the American-Chinese exclusion treaty, and the contempt and indignation at the treaty and its author at the present time. Why? There was an honorable and ancient Chinese tradition that he who gave up his country for another was guilty of the gravest act against his government, an act that was not merely unpatriotic but treasonable. But that tradition, even before this treaty was signed, was crumbling away before the advancing opportunities afforded by western industrialism. Within an incredibly short time, China awoke to the fact that this treaty, howsoever sanctioned by tradition and precedent, was subvertive of her industrial future and opportunities. The Chinese statesman who framed the act was, no doubt, acting on what he regarded as immemorial precedent. He did not realize that what was most acceptable in the present might be most harmful within even a decade. Or possibly he knew the tendencies but did not believe that China would yield so soon or so readily to the push of western progressivism.

The valuation theories and methods that go out to make valuations far in excess of cost can but breed suspicion, not confidence. Already their day has passed. It may be questioned whether even now the engineers advocating them are called on for other important engineering duties. Not long ago I read this advice to a western utility of an engineering firm that looks to the morrow as well as the day: "Be conservative. Have not an item, a unit cost or value that can be successfully combatted. Don't build up more than you expect in the hope of having something to bargain with. Put values where values actually are and stand by them." Thus runs the tenor of the advice and, viewing the future as I do, I regard it as most wholesome. It must be said, however, that not all the blame of excessive claims for valuation should be placed upon the engineer. Part of this policy is due to the more or less flamboyant methods of the lawyer, methods that may work before a jury but soon end before specialized tribunals.

For what can be expected in the long run of the confidence of the investing as distinct from the speculating world if the fair values fixed by public service commissions continue to run far below the values claimed by the companies or far below the capitalization placed on the properties by the companies? And how can the suspicions of the public that have been admittedly justified by past instances be allayed when rate cases become merely struggles for the recognition of inflated values by the reproduction route? Moreover, and this is the crux of the whole matter, can anyone look into the future and assert with confidence that over a twenty-five or thirty-year period reproduction values will continue to be in excess of original cost values? In the long run, all precedents to the contrary notwithstanding, will not cash investments prove the standard to which values most nearly approach? At least is this not sufficiently probable that utility policies can most safely be based upon it? If such is the case, then, under indeterminate franchises, future franchise policies will be based on stable values, shorn of their speculative

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elements and hewed closed to actual costs. With such a situation, one could certainly expect an enthusiastic reception by investors and also a wholesome co-operative spirit on the part of rate-payers and the general American public.

THE COMING TERM FRANCHISE

As to term franchises it would seem that the contract stating and protecting the sum invested and limiting the power of the public to purchase at an agreed price, would be preferred by the investor. The vital protection to the utility owner in both the term and the indeterminate franchise is the alternative of public ownership to public competition. If the public is to give up the safeguard that lies in the actual or potential competition through public ownership, it can reasonably expect in return the stabilizing of values in its contract agreement. I can see that the lawyer for the public may urge that it is not to public interest to enter into such a contract on the ground that rate value will be less than condemnation value. I can understand many situations where the company would not want to enter into such a contract. On the whole, however, I believe that investors particularly will increasingly recommend this type of contract.

This procedure for absolute guarantee of the actual investments in both term and indeterminate franchises leaves the public to bear the risk. This the public can well afford to do, for if it does not squarely assume these risks and if utility investments are not guaranteed, then the risk must be expressed in higher capitalization and in a higher rate of return, to be paid for in both ways by the rate-payer. His share in the risk of these industries the average American city resident will be glad to take in order to insure stability and development in his public utilities and particularly his transit facilities.

MUTUAL DUTIES OF UTILITIES AND PUBLIC

These policies in franchises require a corresponding attitude on the part of the public on the one side and the managers and operators of street railways on the other. These utilities are quasi-public, say the courts. This must not mean that they are quasi-public as to privileges and private as to performances, or quasi-public as to public services and private as to risks. It must mean that these utilities are quasi-public alike as to privileges, performances and risks. It does mean, or if not it must come to mean, that the manager or operator of these utilities is in spirit and in truth a public official who goes to his work with the spirit and with the zest of a competent public official under all the advantages belonging to a public business privately owned.

Of the duties of the public utility we have heard much; we have also heard much of the duties of the public and the rate-payer. But we have not learned that these duties are mutual, and we are not awake to the fact that fundamentally they may not be antagonistic. It is the duty of the citizen to know facts as to his utilities; it is the duty of the utility to furnish those facts rock-ribbed and unassailable. It is the public duty to protect money investment; it is the corporate duty to ask that money investment only be protected. It is the utility's duty to serve all who come at just prices without discrimination; it is the rate-payer's duty to learn from the sources enough facts as to rates, operating difficulties and labor costs to have a fair judgment as to what a "just" rate and "adequate" service are. It is the new corporate duty to give publicity to facts and facts alone; it is the new public duty to base judgments on facts and facts alone. Herein lies the hope of urban development and the stability of utility investments. When the public sees the utility as a public asset and the operator and financier does his work on the high plane of a public privilege well performed, the seeming obstacles to security investments will vanish and these vital public services will be put on a plane of permanency and highest efficiency. This may sound idealistic, but policies must be shaped in the shadow of ideals. Otherwise they are not policies; they are schemes.

I have but expressed what I know to be the spirit of a large and rapidly growing number of street railway investors, managers and operators. I have had in mind throughout the investor, not the speculator, for the law of speculation will remain unwritten. I believe that conservative franchise policies that protect investments with the alternative to public ownership and operation will tend to preserve the best in regulation, will give such a stable and adequate return to street railway investments as to make them enticing, and will place the business of owning and operating street railways on a plane of dignity and stability that will invite a mutually cordial attitude between the public and the operator.

"IT is the public duty to protect money investment; it is the corporate duty to ask that money investment only be protected. It is the new corporate duty to give publicity to facts and facts alone; it is the new public duty to base judgments on facts and facts alone. Herein lies the hope of urban development and the stability of utility investments. When the public sees the utility as a public asset and the operator and financier does his work on the high plane of a public privilege well performed, the seeming obstacles to security investments will vanish and these vital public services will be put on a plane of permanency and highest efficiency."—*Prof. Clyde L. King.*

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Proceedings of the American Association

PRESIDENT CHARLES L. HENRY

The Atlantic City Meeting Was Characterized by Several Speakers as the Best in the History of the Association. Representatives of the United States Army Spoke on Preparedness, the Technical and Financial Development of the Electric Railway was Considered, and Publicity Was Not Neglected.

THE thirty-fifth annual convention of the American Electric Railway Association, held in Atlantic City, N. J., from Oct. 9 to 13, 1916, was called to order by President Chas. L. Henry at 9.30 a. m., on Tuesday, Oct. 10. Mr. Henry first read his presidential address, an abstract of which forms the leading article in this issue. This was followed by the reports of the executive committee and the secretary-treasurer, which were read by E. B. Burritt. The report of the executive committee, which consisted of the minutes of the meetings held during the year, was read by title.

PROGRAM

TUESDAY

Annual Address of the President.
Annual Report of Executive Committee.
Annual Report of the Secretary-Treasurer.
Report of committees:
Convention—Thomas Finigan, chairman.
Education—H. H. Norris, chairman.
ADDRESSES—Coast Defences—Capt. Walter King Wilson, U. S. A.
Employment of Trolley and Electric Transportation in Military Service—Col. Chauncey B. Baker, U. S. A.
Report of committees:
Federal Relations—Arthur W. Brady, chairman.

WEDNESDAY

Reports of committees:
Representing Association at American Good Roads Congress—Gordon Campbell, chairman.
National Joint Committee on Overhead and Underground Line Construction—W. J. Harvie, chairman.
Cost of Passenger Transportation Service—J. D. Mortimer, chairman.
Company Membership—George W. Knox, chairman.
Electrolysis—Calvert Townley, chairman.
Award of Company Section Medal—H. R. Fehr, chairman.
Conditions of Anthony N. Brady Medal Contest—Arthur W. Brady, chairman.
Valuation—J. N. Shannahan, chairman.
PAPER—"Overhead Charges in Valuation," P. J. Kealy.
Report of committees:
Compensation for Carrying United States Mail—Henry S. Lyons, chairman.
Company Sections and Individual Membership—Martin Schreiber, chairman.
Public Relations—C. Loomis Allen, chairman, subcommittee's reports.
ADDRESS—"Publicity," Ivy L. Lee.
Report of committees:
Aera Advisory Board—H. C. Donecker, chairman.
Changes in Constitution and By-laws—General George H. Harries, chairman.
Operation of Motor Vehicles—Britton I. Budd, chairman.
Insurance—A. H. Ford, chairman.
Standards for Car Loading—S. W. Huff, chairman.
Street Traffic—J. K. Punderford, chairman.

THURSDAY

Report of committees:
To Confer with the United States Bureau of Standards as to Safety Code—W. J. Harvie, chairman.
Taxation Matters—Henry S. Lyons, chairman.
ADDRESS—"The Physical Development of Electric Railways," Frank J. Sprague.
ADDRESS—"The Financial Development of Electric Railways," A. B. Leach.
Reports of convention committees:
Unfinished business.
Election and installation of officers.

REPORT OF THE SECRETARY-TREASURER

Following the amendment to the Constitution and By-laws at the Chicago meeting which permitted the entry into full membership of manufacturing companies, President Henry extended a cordial invitation to the manufacturers to enroll their companies. The response to this invitation was most gratifying and a large number of companies promptly forwarded their applications for membership. Subsequently, the committee on company membership was increased by the addition of seven manufacturers, one of whom was designated a co-chairman and this branch of the committee took charge of the membership work in connection with the manufacturing companies.

The manufacturers generally have appreciated the opportunity to co-operate in the service which the association is performing for the industry. Already they have given practical evidence of the value of that co-operation in connection with the successful efforts of the association in bringing about the exclusion of the electric lines from the operation of the eight-hour law recently enacted. Their response to the association's call was prompt and effective.

To date we have 208 manufacturing companies enrolled in and working with the association.

With the taking into membership of the manufacturing companies, there devolved upon the association the management of the exhibit and matters in connection therewith. To assure the faithful performance of this duty, the president appointed a general convention committee with a manufacturer as its chairman. Subcommittees of this general committee, each with a manufacturer as chairman, were placed in charge of the exhibit, entertainment and the exhibit finances and worked out the details of these matters. To handle the details of the exhibit, Fred C. J. Dell was employed and has been engaged on this work since May 1.

The convention opens with an exhibit occupying 55,694 sq. ft. of space. In size this compares favorably with exhibits of past years, and in the quality of the appliances and equipment displayed and their interest to the railway man, former exhibits are surpassed.

MEMBERSHIP, COMPANY AND INDIVIDUAL

The work of soliciting the membership of non-member railway companies has been vigorously followed up during the year—principally by means of circular letters. In addition, many special letters have been written from the secretary's office. The result has been the enrollment of nineteen companies—of these the membership of four will date from Nov. 1, the beginning of the association's next fiscal year. Business conditions have been unfavorable with a large number of those companies remaining outside of the association and as conditions improve with them, it is believed that a considerable number will enroll.

The association at the last convention reduced the annual dues of members of company sections from $5 to $2. The change was favorably received and has brought good results.

The committee on company sections and individual

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membership has been actively at work throughout the year and has been instrumental in organizing four new company sections among the employees of the following companies: these being at New Haven, Conn., Washington, D. C., Portland, Me., and Hampton, Va.

The total enrollment of company section members is now 1473. A number of companies have indicated their interest in this movement and are now considering the organization of sections on their properties.

The committee has also been active in the work of securing additional individual members. Selected lists were prepared and to these lists were addressed a number of letters. Literature in the form of a pamphlet and folder were circulated extensively. The individual membership now stands at 1513. This shows a decrease from last year for two reasons.

Many individuals formerly members are connected with manufacturing companies which have not yet joined the association and as individuals connected with non-member companies are ineligible for membership, it was necessary to drop these from the rolls. In the case of individuals connected with member manufacturing companies a number of these have not renewed their membership because this was only incidental to securing a convention badge, and this year the badges will be issued to railway and manufacturers' delegates alike and without further requirement than that their companies shall have enrolled. In other words, the $5 payment which carried with it an individual membership, formerly exacted of all manufacturers at conventions, is not required under the present arrangement.

OTHER ACTIVITIES

The bureau of information at association headquarters is steadily widening its scope and increasing in its value to the membership. An important work accomplished during the year was the compilation and issue to member companies of a comprehensive bulletin on wages of motormen and conductors. The information in this bulletin was secured from 756 companies, a large number of non-member companies contributing data. The information is being kept up-to-date, and another edition of the bulletin will be issued early in the coming year. In accordance with instructions from the executive committee, there was also collected information relating to company publications.

We have received during the year 447 requests for information from 168 member companies and from thirty outside sources. In many cases it was necessary to undertake special investigations to secure the data. In all cases the requests were promptly met. In connection with the bureau is maintained a file of commission decisions which is kept up to date. This information has proved of considerable value and is frequently called for by member companies. The bureau is also continuing a part of the work formerly carried on by the Bureau of Fare Research in collecting operating statistics of member companies.

During the year the revisions of the Engineering Manual were published and issued free to member companies and at cost to those individual members requesting them.

The committees appointed during the year by the five associations and numbering sixty-four, have been at work on a great number of important subjects. The results of their labors are embodied in their reports to be presented to this convention and the industry will find them to be of the greatest interest and value.

At its meeting of Feb. 3, the executive committee authorized the president to appoint a committee to cooperate with the War Department, the purpose of this committee being to collect such data regarding the electric lines of the country as would be of service to the

STATEMENT OF MEMBERSHIP

	Company: Railway	Company: Mfg.	Company: Total	Individual
Number of members Nov. 1, 1915	349	...	349	2,682
Number of members reinstated	4	...	4	33
Number of new members	19	208	227	41
Total	372	...	580	2,756
Resignations	11	...	11	629
Changes to company sections	...	...	...	614
Grand total	361	208	569	1,513

FINANCIAL STATEMENT
For Ten Months Ending Aug. 31, 1916

Cash balance, Nov. 1, 1915			$11,055
Revenue to Aug. 31, 1916			97,598
			$108,653
Expenses to August 31, 1916		$72,902	
Other disbursements for items now shown as inventories:			
Badges purchased	$443		
Less badges sold	57 $386		
Furniture and equipment	633		
Paper	138		
Petty cash	500	1,658	74,561
Cash in bank September 1, 1916			$34,092

INCOME STATEMENT
Ten Months Ending Aug. 31, 1916

Revenues		
Admission fees:		
Railway companies	$110	
Manufacturing companies	1,820	$1,930
Annual dues:*		
Railway companies	$49,493	
Manufacturing companies	5,835	
Individual dues ($5.00)	6,121	
Company section members ($2.00)	2,274	63,725
Miscellaneous income:		
Rent of convention exhibit space	$13,497	
Convention donation	375	
Interest on deposits	488	
Sale of advance papers, annual reports and year book	475	
Sale of "Engineering Manual"	251	
Sale of "Cost of Transportation Service"	522	
Sale of "Bibliography on Valuation"	130	
Sale of other pamphlets	307	
Public relations fund	3,200	19,247
Aera:		
Advertising	$12,525	
Subscriptions	152	
Sale of extra copies	10	
Sale of binder	6	
Other pamphlets	....	12,695
		$97,598

*Includes $9,109 received as *Aera* subscriptions.

EXPENSES
Ten Months Ending Aug. 31, 1916

American Association:		
Salaries of general office staff	$13,258	
Salary and expenses of Washington representative	416	
Rent of office and store room	3,381	
Stationery and printing	2,222	
Postage	2,363	
Repairs to furniture and equipment	46	
Office supplies and expenses	893	
Telephone, telegraph and messenger service	503	
Express, freight and cartage	192	
Exchange	90	
Traveling expenses of secretary	14	
Miscellaneous general expenses	1,010	
Advance papers, annual report and year book	1,745	
Committee expenses	4,545	
Mid-year meeting	1,203	
Annual dinner	506	
Bureau of fare research	870	
Engineering manual	814	
Publication of "Cost of Urban Transportation Service"	1,132	
Bibliography on valuation	675	
Printing miscellaneous pamphlets	18	
Accountants course	1,256	
Annual convention	1,873	
Exhibit expenses	1,668	$40,706
Accountants Association:		
Advance papers and annual report	$526	
Committee expense	365	
Miscellaneous expenses of secretary	1	893
Engineering Association:		
Advance papers and annual report	$3,462	
Committee expenses	3,267	6,729
Claims Association:		
Claims advance papers and annual report	$556	
Committee expenses	362	
Miscellaneous expenses of secretary	124	
Hooper-Holmes Index Bureau	563	1,606
Transportation and Traffic Association:		
Advance papers and annual report	$902	
Committee expenses	1,426	2,329
Aera		20,637
Total		$72,902

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War Department in time of emergency. This committee will shortly undertake its work.

The association has continued as its Washington representative, the firm of Clark, Prentiss & Clark, who have kept in touch with the progress of matters affecting electric railways before Congress and the Interstate Commerce Commission.

The association's subscription to the Hooper-Holmes Bureau was continued for 1916. Fifty-six companies made 18,062 reports, the bureau returning reports on 1578 names.

Acting under instructions of the executive committee, your secretary has co-operated with the Utilities Publication Committee in the endeavor to secure a wider circulation of the Public Utilities Reports Annotated. The membership was advised by letter of a special subscription offer made by the company and mention was made of this in *Aera*. The magazine also called attention at various times to the value of the reports.

On May 1 the association headquarters was enlarged by the addition of two office rooms. This provided much needed space for the offices, which were overcrowded.

President Henry next called for the report of the general convention committee of which Thomas Finigan is chairman and in his absence Secretary Burritt abstracted the report. This was largely a statement of the meetings and transactions of the committee. The sum of $2,500 was appropriated for the expenses of the exhibit committee and $5,500 for the use of the entertainment committee. The report contained an itemized account of how most of this money was expended. The report also stated that 57,392 sq. ft. of space had been sold for exhibit purposes to 142 manufacturing companies. Also as a result of the work of the membership committee 218 manufacturing companies were enrolled as members. This report was accepted and approved.

H. H. Norris, associate editor ELECTRIC RAILWAY JOURNAL, chairman of the education committee, then briefed the printed report of his committee which was largely presented as information.

EDUCATION

The committee on education reported progress with the correspondence courses which have been in use since last year and gave statistics as to the number of students who had completed the several sections of each course. The courses, in which no material changes have been made since last year, comprise the electrical shop course, the mechanical shop course, the combination of these two courses, the line and track work course, the power-house and substation course, and the combination of the last-named two. The power-house and substation course is the most popular, with seventy-five students enrolled, and the electrical shop course is next with fifty-two students.

The committee reported the results of a canvass of students and employers to learn as to the practical results of the courses from the points of view of both. Both employers and students believed that the courses should be continued. A number of interesting comments on the courses were secured from students and in the report the committee took up in some detail some of the more important of these. In view of the year's experience it was recommended that the courses be continued for another year, that an effort be made to enlist the co-operation of employers in supervising the work of students as suggested by several managers, and that the committee work out some plan for familiarizing the students with appropriate parts of the Engineering Manual. The report was signed by H. H. Norris, chairman; H. A. Bullock, Martin Schreiber, W. L. Robb, A. M. Buck and V. Karapetoff.

At this point in the program President Henry read a telegram from Major-General Leonard A. Wood, New York City, expressing regret because he could not attend the convention. In his stead Walter King Wilson, captain of the coast artillery corps, read a paper on coast defenses. An abstract follows.

COAST DEFENSES

The first purpose of coast fortifications is to free the navy, which should be able to go out on the high seas to meet the enemy's fleet and destroy it. The second purpose is to protect naval bases and anchorages where the battleships can be under the protection of the coast guns. A third purpose is to prevent the bombardment of important seacoast cities. The fourth purpose is to protect the harbors which otherwise might be used by the enemy as a base of operation. To prevent a landing at unfortified places along the coast, sea-coast guns mounted on railroad cars would have to be used to be run from point to point along the coast line to be used against ships covering such a landing. For this service all existing railways which are available would no doubt be needed. Many large electric railways connect many of the fortifications with nearby cities, and the co-operation of the management of these railways with the military authorities would be essential for the efficiency of the sea-coast armament. Moreover, in time of war, when our harbor boats are being used for planting mines and for other purposes which are strictly military, the electric railways which connect our fortifications with nearby cities would be of vital importance in transporting supplies. Captain King then showed a series of stereoptican views and pictures to illustrate modern coast defenses and the actual firing of guns, mortars and mines.

At the conclusion of Captain Wilson's address, Lieut.-Col. Chauncey B. Baker of the Quartermaster's Corps read a paper on the "Employment of Trolley and Electric Transportation in Military Service."

In this paper, Colonel Baker first described the importance of sufficient means of transportation in military movements, as shown not only in this country but in Europe. During the recent movement of troops to the border a system was employed arranged between the office of the quartermaster general and the officers of the American Railway Association, the latter working through a committee known as the Special Committee on Co-operation with the Military Authorities. This committee established its headquarters in Washington where it was in constant consultation and communication with the military authorities. The results were very satisfactory.

The steam railroads are at an advantage, however, for military purposes over the electric roads inasmuch as their business makes it necessary for them to exchange traffic with one another, and all of the machinery for this purpose is in existence. To utilize the electric roads satisfactorily and effectively in connection with the military movements an advisory body or bodies should be formed from organizations already in existence whose duty it would be to bring to a uniform practice all of the roads at least in what might be called military districts upon the following points, (1) military tariffs, (2) settlement of accounts, (3) operation of the roads, (4) track and yard facilities, (5) collection of data, (6) reserve corps.

The tariffs should cover all classes of military requirements including every class of equipment required in military service. Such tariffs have been arranged between the government and the steam roads during each period when our country has been at war. Similarly, there should be a clear understanding with regard to the settlement of accounts. As regards operation, pro-

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vision should be made for operating all of the lines as a single system so that the cars could go wherever it would be found most advantageous to the military service. This work should also include the preparation of schedules and an understanding of the extent to which commercial traffic will be suspended and the military traffic given the right-of-way. Studies should also be made of each district covering all points connected with operation, including trackage, spurs and side-tracks, terminals and grades.

In providing for track and yard facilities, mobilization, concentration and probable embarkation points should be fixed. They should be so located as to have thoroughly satisfactory service by rail and should be owned by the government. Then the necessary facilities at entraining and detraining points can be provided. Another important function of the committee suggested would be to collect all information of military value concerning the railroads, including the preparation of plans for prompt conversion of existing cars into that class of cars that would be most urgently needed at time of mobilization. Finally, there should be a liberal number of electric railway men who would be willing to place their services at the disposition of the war department for joining the reserve corps. Members of this corps would have duties similar to those which they perform in time of peace in commercial traffic. They would receive, however, such military training as would be necessary. It is believed that the nominations for positions in such a corps should be passed upon by a proper body of this organization. The suggestions made require no new and radical legislation.

OTHER BUSINESS

At the close of Colonel Baker's paper J. J. Stanley, president of the Cleveland Railway Company, Cleveland, Ohio, moved a rising vote of thanks be presented to these United States army officers for attending the convention and presenting their interesting papers. President Henry then read telegrams from Gen. George H. Harries, expressing regret at his inability to be present and stating that the committee preparing plans for co-operation with the War Department would complete its report in a month. A. W. Brady, president Union Traction Company, Anderson, Ind., chairman of the committee on federal relations, read its report.

FEDERAL RELATIONS

According to the report of the committee on federal relations, the session of Congress recently ended was fruitful of legislative measures affecting the electric railways of the country. These measures touched on numerous phases of electric railway affairs, as reviewed in detail in the report. They applied to the cars operated, to the tracks over which those cars are run, and to the signals by which they are protected; to the clearances between cars and other objects; to the hours of service of the motormen and conductors running the cars and of the dispatchers governing their movements; to the wages paid; to the settlement of differences between company and employee, and to the compensation of employees when injured; to the rules of operation; to the rates chargeable, and to the stocks, bonds and other securities which the electric railways might issue. In the case of the street railways of the District of Columbia such measures even provided for the taking over and operation of those properties by the public, a proposition upon which, the report states, there is a possibility of ill-considered action on the part of the House of Representatives. The report also mentions the Newlands resolution for an investigation concerning transportation lines and government ownership, and court decisions relative to the jurisdiction of the Interstate Commerce Commission over electric lines.

The report emphasizes the point that the influence of every member of the association should be actively exerted whenever opportunity occurs to secure sound and reasonable action touching electric railway affairs by Congress and the Interstate Commerce Commission. It is said that few companies, when they consider the rapidly widening field of federal activities and the expanding views concerning the acts which make a carrier one engaged in interstate commerce, can feel assured that they will not eventually find themselves within the scope of the federal legislation. Congress should adopt the principle of excluding electric railways from the operation of the various measures of railway regulation unless there is an especial reason for inclusion. Every bill applying to common carriers by railroad introduced at the recent session (three only excepted) applied to a 20-mile interurban line engaged in interstate commerce equally with the great trunk line railroad systems of the country. That, the report concludes, is wrong. The early legislation bringing carriers within the jurisdiction of the Interstate Commerce Commission with respect to rates, accounts, accidents and like matters of a general nature, was, properly enough, sufficiently broad to include electric railways. The present legislation, however, relates as a rule to details of construction, operation or management, and the defects aimed at are those claimed to exist in connection with steam railroads. Electric railways differ so greatly and in so many important respects from steam railroads that it is seldom safe and is often grossly unreasonable that an act relating to any of these details should put the two into a single class.

The report was signed by A. W. Brady, chairman; E. G. Connette, Geo. H. Harries, E. C. Foster, L. S. Storrs, F. W. Brooks, H. H. Crowell, F. R. Ford, L. S. Cass, F. T. Griffith and H. E. Chubbuck.

At this point President Henry adjourned the meeting with the statement that the remainder of the program intended for the Tuesday morning session would be taken up Wednesday morning.

Wednesday's Session

The first part of the Wednesday morning session was taken up with the presentation of reports postponed from Tuesday.

GOOD ROADS CONGRESS

Gordon Campbell and J. M. Larned, the committee appointed to attend the Sixth American Good Roads Congress and the thirtieth annual convention of the American Road Builders' Association, held in Pittsburgh on Feb. 25, 1916, reported that the committee attended these gatherings and recommended that the Road Builders' Association continue to receive the attention of the American Association.

The two papers of special interest to members of the association were one on "Railway Track Construction in Paved Streets," by R. Keith Compton, chairman paving commission, Baltimore, Md., and one on "The Control of Openings in Pavements," by N. S. Sprague, chief engineer Bureau of Engineering, Pittsburgh, Pa. The first-named paper was discussed by Messrs. Larned and Campbell as representatives of the association.

JOINT COMMITTEE ON OVERHEAD AND UNDERGROUND CONSTRUCTION

The report of the representatives of the association on the national joint committee on overhead and under-

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ground line construction consisted simply of a statement, made by the president, to the effect that the national committee is making progress with the work which it has on hand.

COST OF PROVIDING PASSENGER TRANSPORTATION SERVICE

The committee on cost of passenger transportation service reported the completion of the book by F. W. Doolittle which formed part of its report last year. Other work accomplished by the Bureau of Fare Research, while it was in existence, was the establishment of a filing system for financial information, now a part of the general files of the association, the collection of information and the supply of data for several committees of the association, and the preparation of a number of signed articles, editorials, reviews and comments for the press. The total expenditures by the Bureau of Fare Research during the twenty months of its existence were $10,477, of which $6,802 was contributed by the association and $3,675 was raised by subscriptions that were received from five electric railway companies.

The report was signed by J. D. Mortimer, chairman of the committee.

COMPANY MEMBERSHIP AND ELECTROLYSIS

The report of the committee on company membership was next received by title. This was in the nature of a statistical statement showing that fifteen railway companies and 208 manufacturers had joined during the year, the present membership being 357 railways and 208 manufacturers.

For the committee on electrolysis, President Henry stated that this committee had met during the year and suggested a number of changes in the report of the American electrolysis committee, most of which have been accepted by the latter committee. The report of the American electrolysis committee is now in galley form and will be completed soon.

AWARD OF MEDAL FOR BEST PAPER PRESENTED BEFORE A COMPANY SECTION

The committee appointed to select the best paper read before a company section, based on its value to the electric railway industry, reported that it had carefully reviewed the twelve papers submitted, and in the unanimous opinion of the committee the medal for the year 1916 should be awarded to Bert Hall of the Milwaukee Electric Railway & Light Company for his paper, entitled "Employees' Co-operative Activities," presented before Company Section No. 1 on May 26, 1916. This paper was abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 9, 1916, page 441.

The committee also selected for honorable mention the paper entitled "Snow Fighting," by Harold Bates of the Connecticut Company, and "Construction Accounting and Its Relations to Other Departments," by H. N. Balfour of the Connecticut Company, the papers having been presented before Company Section No. 7 on Jan. 4, 1916, and April 4, 1916, respectively. These papers were abstracted in the issues of the ELECTRIC RAILWAY JOURNAL for Jan. 22, page 162, and April 22, 1916, page 770, respectively. The report was signed by H. R. Fehr, chairman; P. S. Arkwright and James H. McGraw.

On behalf of the committee Mr. McGraw said that the committee believes strongly in the possibility of the company section movement and wished to do everything possible to encourage it. In Mr. Hall's absence, the medal was presented by Mr. McGraw on behalf of the association and the committee and was received by R. B. Stearns, general manager Milwaukee Electric Railway & Light Company. Mr. Stearns accepted it in a short speech, in which he suggested that Mr. Bradley's paper on "Training Men for Supervisory and Executive Positions" furnished excellent material for company section consideration. He suggested that this paper be divided into, say, a dozen sections for consideration at a corresponding number of company section meetings.

CONDITIONS OF AWARD OF THE ANTHONY J. BRADY SAFETY MEDAL

The next report received was that of the committee on the conditions of award of the Anthony N. Brady safety medal, and was presented by Arthur W. Brady, Union Traction Company of Indiana, Anderson, Ind. The report stated that the conditions of the competition remained substantially as heretofore but that there has been a change in the forms supplied for filing data by competitors. Formerly booklets and application forms were furnished separately. This caused some confusion, and as the committee wished to get as many data as possible to supplement numeral statistics, the new form was devised. The actual award of the medal was made by the American Museum of Safety on the recommendation of a committee appointed by the Museum.

PAPER ON OVERHEAD CHARGES

The report of the committee on valuation was then presented by P. J. Kealy. This report was accepted. Mr. Kealy also presented by title his paper on "Overhead Charges in Valuation," which had been prepared in consultation with the committee on valuation. He stated that he did not read this, as the paper was already in print and the subject is one of limited interest. He said that many seem to want to postpone consideration of the subject until it is absolutely necessary, but all companies should be prepared to have their properties valued. Mr. Kealy's paper is abstracted elsewhere in this issue.

VALUATION

During the year the committee on valuation decided to confine its activities to three things, as follows: (1) The production of a bibliography, brought up to Jan. 1, 1916; (2) the preparation of a code of definitions for the terms necessarily used in valuation work, and (3) a paper to be prepared on "Overhead Charges."

The bibliography was prepared by the library of the American Society of Civil Engineers, which had published the most recent and comprehensive one, and was published by the American Electric Railway Association early in this year. A copy was sent to each member company, and additional copies are available at a nominal price in the office of the secretary.

One of the causes contributing to the widely diversified decisions of commissions and courts on the various phases of valuation work has been the great confusion in the use of terms. A list of more than 300 various terms in use was prepared by C. G. Young, and an examination of this list discloses the fact that there are seventy-four kinds of value, and similarly other terms are used in many ways. The committee felt that if a code of definitions, twenty or thirty in number, could be formulated and generally agreed upon, it would be a long step toward the placing of valuation work and literature on a scientific basis. Such a code was therefore prepared by the committee and is attached to its report as Appendix "A."

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The twenty-one definitions proposed include the following:

1. *Public Utility:* A business operated under a public grant and performing a stipulated public service for compensation.

2. *Franchise:* The grant by a public authority of the necessary rights to do a specific business, and including the use and occupancy of some portion of the public lands.

3. *Property:* That which is owned by a company or individual by virtue of legal rights through possession, title or lease.

4. *Ownership:* The legal title to, or possession of, property.

5. *Value:* Worth (see definition of worth).

6. *Valuation:* Act of determining worth.

7. *Worth:* Exchangeable value (Webster).

Including every item of value entering into and affecting the value of a property, tangible and intangible, physical and non-physical, also every kind of value from whatsoever sources derived, or by whatsoever means or cause affected, favorable or unfavorable, and as of the present time and including full consideration of past performance and future probability.

NOTES.—(a) It is seen that worth (value) is not constant, but is affected and increased or diminished from time to time by a number of conditions and circumstances.
(b) That worth (value) is dependent, among other things, on earnings and therefore on rates and tariffs charged for the services rendered
(c) That worth (valuation) thus defined cannot be made the basis of the amount on which a reasonable return is to be allowed by courts.
(d) That an appraisement only shows a part of the worth of a property.
(e) The word "value" should not be used except when worth is intended.

8. *Investment:* The total amount of cash, or its equivalent, that has gone into the creation and development of a property, from whatsoever source derived, including new money used for obsolescence and development.

9. *Capital:* The total number of shares of a company, preferred, ordinary or otherwise.

NOTES.—When these shares have a stipulated par or face amount, the total aggregate sum expresses the capital of the company.
(a) The capital face amount of a company may be more or less than the investment, and is divided into more or less shares for convenience of increasing or decreasing the fractional partnership divisions.
(b) Capital shares have no fixed relation to the investment.

10. *Sinking fund:* An accumulative fund, set aside from earnings from year to year, out of which monies are paid for amortization of investment.

11. *Amortization:* The repayment from time to time of part of the investment by means of a sinking fund.

12. *Obsolescence:* The state of becoming obsolete (Webster). The replacement of property before it has reached its full period of usefulness due to,

(a) The advance of or changes in the art or process in practice, or
(b) Public legislation or demand.

13. *Depreciation:* Is the lessening in worth of physical property due to use or other causes.

14. *Appreciation:* The increased worth of any part of a property not due to additions to investment.

15. *Maintenance:* The cost of repairs and renewals for proper up-keep of a property. Maintenance is of two kinds:

(a) *Ordinary Maintenance.*—Those repairs which are made each year as needed.
(b) *Deferred Maintenance.*—Those repairs which cannot economically be made each year but which are made at frequent intervals.

NOTE.—Maintenance is a part of the cost of operation.

16. *Rate of return:* The percentage rate of return earned and paid on the total investment.

17. *Tariff rates:* The charges made and collected for services rendered.

NOTE.—The theory being that the rates should be sufficient to cover all operating expenses, repairs and maintenance, depreciation, obsolescence, rewards of management, legal expenses, accidents, insurance, taxes, and general overhead and miscellaneous expenses; also a stipulated amount for amortization and sinking fund, interest on bonds and other forms of indebtedness, and dividends to cover the rate of return allowable on the total investment.

18. *Inventory:* The count or measure of all separate items comprised in a property, including physical property as well as certificates or other evidences of ownership.

19. *Appraisal:* A complete study of a property showing the cost to reproduce new, based on inventory, and also showing depreciation.

NOTE.—An appraisal is but one of the factors to be considered in determining worth.

20. *Intangibles:* Such items of value of a non-physical nature which are not represented in the existent property but reasonably constitute a definite part of the assets of a corporate enterprise, such as contractual rights (franchise value), expenses incurred in development of plant or business, damages resulting from condemnation proceedings, etc.

21. *Overhead costs:* Such general and miscellaneous expenditures, forming a portion of the cost of a property, which, because of their nature, are not or cannot be included in the unit prices.

The report also includes a glossary of terms previously used by Bion J. Arnold (Transactions American Society of Civil Engineers, 1915), and definitions used by John W. Alvord (*Ibid.*, Vol. 79, 1915). Appendix "B" of the committee report consists of the paper on "Overhead Charges" prepared by Mr. Kealy and indorsed by the committee.

The report was signed by J. N. Shannahan, chairman; P. J. Kealy, H. H. Crowell, B. E. Tilton, C. S. Sergeant, W. H. Sawyer, C. G. Young and Martin Schrieber.

COMPENSATION FOR THE CARRYING OF UNITED STATES MAIL

The committee on compensation for carrying United States mail devoted particular attention to the Post-office Department appropriation bill and the reasons for the reduction in the allowance for the carrying of mails by electric and cable cars over that made last year. It seems that the Post-office Department estimated as necessary for its requirements for the fiscal year ending June 30, 1917, an appropriation of $316,364,879. After the bill had passed the Senate and the House of Representatives and points of disagreement had been eliminated by a committee of conference, it carried a total appropriation of $322,206,579 or $5,841,700 in excess of the amount asked for by the Post-office Department.

The committee quoted these matters in detail to show that the department is sufficiently supplied with funds to carry on its affairs, to pay its employees, and also to pay the corporations with which it does business a reasonable amount for services rendered. While it would ordinarily be taken for granted that the electric railways should receive some benefit from the increases allowed in the bill a careful analysis shows quite the contrary.

This year's appropriation for inland transportation of mail by electric and cable cars is $600,000 as against $784,000 for last year, and this notwithstanding the fact that there must be a normal increase in the carrying of mails by electric and cable cars over last year. The matter was taken up by the committee with the Senate members of the post-office committee to see if an amendment could not be made to the post-office bill when under consideration in the Senate, at least allowing electric railway and cable car companies the same amount of compensation for the fiscal year ending June 30, 1917, as was allowed for the fiscal year ending June 30, 1916, but this result could not be accomplished by the committee.

The committee particularly emphasized the difference in the situation between electric railway and cable companies and the railroad companies. The latter are represented by a very efficient committee headed by Ralph Peters, president of the Long Island Railroad. In spite of discouragement and opposition, this committee persisted in its efforts, and the bill as passed increased by $3,112,000 the appropriation for inland transportation of mail by railroad companies. The railroad mail service was allowed an increase of $304,610. The committee in charge of the railroads' interests is, there-

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fore, to be congratulated upon the effective campaign which it has carried on.

The reason for the reduction of allowances for carrying mail by electric and cable cars is, apparently, the expectation that automobiles will be increasingly used. Second Assistant Postmaster General Praeger has estimated the cost of carrying mail in automobiles at 15 cents per mile as against 21 cents per mile by electric cars. While assenting to Mr. Praeger's estimate of the cost of transportation by electric cars, the American Association committee disagrees with him as to the cost of automobile service. However, the post-office committees of the House and Senate have apparently followed to the letter the recommendations of the Post-office Department in reference to the carrying of mail by electric and cable railway companies, and these companies must either go out of the business of transporting the United States mail or continue to carry it for less than cost as they are now doing.

The committee calls attention to certain amendments to the post-office bill, particularly that giving the right of appeal to the Interstate Commerce Commission in matters of dispute between the Post-office Department and the railroad companies. The bill further provides for methods for modifications in weights and zones in the parcel post by referring the same to the Interstate Commerce Commission. This commission, therefore, will hereafter enter prominently into disputes as regards rates, space, zones and like matters. It would seem that under such a provision electric railway companies might have a chance for appeal.

In conclusion the committee recommended that a special study be made as to the right of electric railways to appeal as suggested above, and that if necessary the incoming committee be authorized to consult with legal advisors and ascertain what increase from the Post-office Department the electric railway companies can receive for carrying the United States mail by appealing to the Interstate Commerce Commission. It is further recommended that a special study be made of the need of electric railway companies in this respect and that their case be brought before the post-office committee at the next session of Congress. Particularly should the cost of automobile operation for carrying mail be ascertained to see how closely the figures of cost as given by Mr. Praeger have been adhered to.

This report was signed by Henry S. Lyons, chairman; George H. Harries, A. R. Piper, R. S. Goff and S. W. Ladd.

COMPANY SECTIONS AND INDIVIDUAL MEMBERSHIP

The committee on company sections and individual membership reported that during the last fiscal years 900 company section and other individual members have been added to the roll. The committee's efforts were directed toward forming new company sections, and four were inaugurated, namely: No. 7, the Connecticut Company at New Haven on Dec. 7, 1915; No. 8, Capital Traction Company at Washington on Jan. 13, 1916; No. 9, Cumberland County Power & Light Company at Portland, Me., Feb. 18, 1916; No. 10, Newport News & Hampton Railway, Gas & Electric Company at Hampton, Va., March 31, 1916. All are in healthy condition and enthusiastic in their work. The committee has planned to have an exhibit at the convention, known as a company section booth, showing the activities of these company sections.

The individual membership in round numbers consists as follows: American. 195; Accountants, 250; Claims, 125; Engineering, 1555; T. & T., 875; making a total of 3000. About half of this membership is made up from the company sections. The individual members, other than those of the company sections, are more uncertain in their tenure of membership, and the new members scarcely offset the withdrawals for various reasons. The committee believes that the real field for increasing individual membership lies in the formation of new company sections.

The report was signed by Martin Schreiber chairman; F. W. Bacon, J. E. Gibson, E. V. Blair and Henry H. Norris.

In commenting on the total membership, which is stated at 3000 in the report, Mr. Schreiber said that 100 new memberships had been added since the printed report had been prepared. In the discussion which followed, J. D. Mortimer, Milwaukee Railway & Light Company, inquired concerning the effect of the company section movement on the finances of the association. President Henry replied that it had created a net loss of about $3,000 and that this was largely due to the reduction in the membership fee for company section members from $5 to $2.

In reply to a question from Leake Carraway, Southern Public Utilities Company, Charlotte, N. C., asking whether companies owning several properties in a territory several hundred miles wide could establish with profit a single company section, L. S. Storrs, The Connecticut Company, New Haven, Conn., responded that this plan had worked out satisfactorily on his property and that where only a few department heads were members of the association prior to the organization of the company section there were now 230 such members. In response to another inquiry, Mr. Schreiber stated that approximately one-half of the members included in the 72 per cent increase in membership came into the association when the dues were reduced to $2. This concluded the discussion and the report was received and placed on file.

PUBLIC RELATIONS

C. Loomis Allen, Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., then outlined briefly the work of the committee on public relations. Commenting on this, he called particular attention to the marked increase and number of company publications which had been started in the past year.

The committee on public relations reported that it had held several meetings during the year and that at the meeting of Dec. 15, 1915, the following subcommittees were decided upon:

Sub-committee No. 1—Dealing with the dissemination of information or literature on subjects of general interest to public service corporations and sources of public education; members, Guy E. Tripp, chairman; T. S. Williams, E. W. Rice, Jr., and J. D. Mortimer.

Sub-committee No. 2—Dealing with similar committees of other public service associations; members, James H. McGraw, chairman; H. H. Vreeland and J. R. Lovejoy.

Sub-committee No. 3—Dealing with the publication in magazines and periodicals of popular articles on public service questions; members, T. S. Williams, chairman; T. S. Wheelwright and A. W. Brady.

Sub-committee No. 4—Dealing with questions of economic relations between employees, employer and the public; members, James D. Mortimer, chairman; H. G. Bradlee and E. W. Rice, Jr.

Quoting from the 1914 report of the committee on public relations, the following was given as the plan outlined for future work of the committee to be carried out as opportunity offered. Briefly the measures proposed were:

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1. The establishment under the auspices of the association of a bureau of public relations.

2. The dissemination of information in literature on subjects of general importance to public service corporations.

3. Co-operation with similar committees of other public service associations.

4. Influencing sources of public education.

5. The publication in magazines and periodicals of signed popular articles upon public service questions, by prominent workers in the electric railway industry.

6. Newspaper advertising when financially possible and advisable.

The committee pointed out that during the year 1915 a director of the bureau of public relations was appointed and syllabi of lecture courses both for technical and for popular uses were drawn up. The committee, however, was without means to pursue this work and no definite steps were taken to carry the recommendation into effect. At its first meeting the present committee raised among its members the sum of $1,950 for the preliminary work intrusted to it. Later an attempt was made to raise the fund to $25,000 per year for three years, but without success although pledges amounting to $14,200 were secured. In view of failure to secure the pledge required, the committee decided not to proceed with the program.

Very careful consideration was given to the proposition of a national campaign of publicity having for its object the presentation of the salient facts in connection with the industry, and the information of the general public as to the conditions which the electric railways of the country confront. There was presented to the committee a carefully considered and worked-out plan for a national campaign of publicity, in which use was to be made of the national advertising mediums, of street car advertisements, and of the facilities that member companies have for the distribution of literature. The committee expressed itself as of the opinion that the plans so outlined were the best that had yet been called to its attention along these lines. The committee concluded, however, that while the problem of public relations has a national aspect, yet in working out improved conditions, the unit is the member company, and that the general advertising or publicity campaign involving the expenditure of a large sum of money ($500,000 at the least) would not bring results commensurate with the expense. The committee and the association, however, can be of great value to the industry as a whole and to the member companies, in the collection and dissemination of information along certain lines—such, for instance, as that which is being undertaken by sub-committee No. 4, which presented a report of progress, and by supplying member companies with material for their local campaigns. For a comparatively small sum, a bureau could be equipped which will be of great value to the electric railways.

In the report attention was directed to the constantly increasing number of railway companies which are issuing periodicals of one kind or another for the information of the public, and for their employees, and of those companies which, through newspaper advertising, and in other ways, are working to secure the co-operation of the public. There is no organization existing in the country which has such facilities for supplying the material useful in such a campaign as the American Electric Railway Association. To place this information at the disposal of the member companies and to add to the channels by which the information is secured, would be the province of such a bureau.

The committee was, therefore, of the opinion that its efforts should be directed to the raising of the necessary funds for carrying this project into effect. Its cost would be comparatively slight and the value of its work would increase with years.

If it is possible—and in the committee's opinion it is possible—to secure the necessary revenue, outside of the dues of member companies, the following plan of procedure was proposed: (1) The engaging of a director, who shall, under the direction of the bureau of the committee on public relations, have charge of the work of the bureau, devoting all of his time thereto. (2) The preparation and distribution among member companies of absolutely authentic and attractively prepared information bearing on matters concerning public relations—to include the important features of public utility commission decisions; the utterances of public officers and of other authorities affecting public relations; statistics showing the tendency of railway earnings and capitalization accounts, and all other matters of interest in connection with public relations. (3) The director of the bureau to assist member companies in securing speakers to present the case of the electric railways before various commercial and civic bodies. (4) The supplying of articles and information to newspapers and periodicals upon public utility affairs. (5) The preparation of any material which member companies may desire in matters affecting public relations.

The above report was signed by C. Loomis Allen, chairman; T. S. Williams, J. D. Mortimer, J. H. McGraw, Guy E. Tripp, S. M. Curwen, E. W. Rice, Jr., J. K. Choate, Frank Hedley, Chas. N. Black, T. S. Wheelwright, Henry A. Blair, Arthur W. Brady, E. G. Connette, Geo. E. Hamilton, H. G. Bradlee, H. H. Vreeland, C. C. Peirce and P. F. Sullivan.

SOCIAL RELATIONS

J. D. Mortimer, Milwaukee Electric Railway & Light Company, then read extracts from an extensive report prepared by the subcommittee on social relations. This report discusses the principles of life, health and accident insurance, pensions, etc. At the conclusion of his presentation of this report Mr. Mortimer said that an installment on minimum wage was in the process of publication at the present time and would be ready for distribution shortly. Owing to the extent of the report of the subcommittee on social relations, its publication is omitted this week but it is hoped to include an extended abstract of it in the issue of next week.

IVY L. LEE SPEAKS ON PUBLICITY

At this point Ivy L. Lee, New York, was introduced and addressed the association on the subject of publicity. In his preliminary remarks Mr. Lee stated that his address would be in the form of an abstract of a paper which will be published in full later. The sudden appreciation that the public was taking an interest in the direction of all business was the reason for publicity. Electric railway companies in particular are carrying a heavy burden in the way of paving regulations which cost the company much money which the city should pay. Taxes have become excessive and an era of carelessness has increased the number of personal injury accidents. Superimposed upon this, the railways are confronted with an increased cost of materials, jitney competition, an inherited financial past in many cases from which they are unable to escape, and finally they have been limited to a 5-cent fare.

Publicity is a remedy for many of these difficulties, but it is not a shield against unfavorable opinion. To change the metaphor, it should be considered as an anti-

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septic to cure the disease rather than a bandage to cover up a sore. Or, to change the metaphor again, publicity is not a coat to cover up defects but an x-ray by which the public can really see what is inside the organization.

A company which inaugurates a publicity campaign must be prepared to take the consequences, because publicity cuts both ways. Unless the railway management is willing to tell everything, the publicity campaign had better not be started. A company cannot sing of prosperity to its stockholders and complain of poverty to its employees and to the tax assessors. Moreover, any policy of publicity should be pursued in a reasonable way, and if this is done the facts presented will cause the public to believe that the railway is doing the best it can to make good. In presenting such facts the railway must realize that the people as a whole are intelligent and fair and that when they have in their possession all of the facts regarding the situation, they will decide in the just way in the long run.

The public as a rule is moved by sentiment. A railway cannot expect to reason out its case with the public because it is not interested enough to analyze facts and figures. The best plan undoubtedly is to induce the people to believe in the management. How this should be done and the proper policy to pursue must be worked out by each company to meet its own local conditions. In other words, the management in each city must convince its public to believe that it is doing the best it can in the way of furnishing service. Often, of course, better service means an expenditure of more money, but that is not always the case. Courtesy to the public on the part of the employee is the first essential to better service. Courtesy in handling complaints and frankness in explaining the facts of any situation are always helpful in improving public relations. Finally, Mr. Lee suggested that it might be well to publish what he termed a "kicker's" bulletin, in which both complaints and the company's answers appear.

Another phase of the publicity problem is the personal attitude of the company toward the community served. If the public is led to believe the company is a machine without sympathy, it is inclined to deal more harshly with it than when it knows the management personally and favorably. A case in point is the past and present situation on the New Haven road. While the present service perhaps is no better than that of the past on this railroad, President Elliott has impressed his public with his desire to give them the best service possible and has gained their sympathy thereby. In publicity matters Mr. Lee did not believe that a manager should be primarily a talker but a doer, and this involved an attitude of open-mindedness. Here Mr. Lee criticised the kind of publicity used to eliminate jitney competition. He said that simply because the jitney bus could not be a financial success it did not cease to be of interest to the public. It supplied a demand which the railway did not furnish, and the only way to meet its competition was by giving a similar service, even if at a higher fare. He also mentioned the London Underground competition with auto-buses, and how their competition was turned into an asset by developing the auto-bus as a feeder service of its own.

Mr. Lee then took up the importance of being sympathetic especially in the case of accidents. The reports of accidents are in many cases too heartless. How much better some evidence of sympathy in these reports would be to both the company and the public. He also stated that the railway management must first of all be good citizens. He mentioned the attitude of the Western Union Telegraph Company when the question of government ownership was raised. It took the position that it did not know whether it was a good thing or not but believed that in case the government took over the property it would be fairly compensated. In the meantime it proceeded to furnish the best service it could. Such policy should be adopted in the street railroad contest. Frequently the public takes good service for granted and only complains when the service is not up to the standard. A railway should not hesitate to tell its story in printer's ink. Such stories, however, should contain human interest facts and not be a mere mass of argument and detail.

In any publicity campaign, Mr. Lee urged the railways to be human, be natural, and speak in the language of the people. At this point he offered a compliment to Billy Sunday at his methods of preaching the gospel. In dealing with many public problems, it is wise to avoid the services of lawyers. He said that he had seen many situations spoiled by the intervention of lawyers. Too often the legal mind disregards the people's tribunal. It is always best to let the people know that they are dealing with human beings. In publicity matters it is always a wise policy to tell the news first whether it is good or bad. Through the proper form of publicity even the 5-cent fare can be over-ridden. The public wants the service, and if it can't be furnished for a 5-cent fare it must be taught why this cannot be done.

In conclusion, he urged the railway management to take the newspapers into their confidence on a frank and candid basis. Free service to them creates suspicion. Charge them for a service they receive and pay them for the service that they render. The great value of advertising space in the publicity campaign is that the railway commands its own copy and location in the newspaper. Finally, to be and to do does more than to say in building up public confidence. A railway must believe that it is absolutely right when it goes into a publicity campaign if it expects to win.

In reply to an inquiry about the extent to which confidence in the public had been borne out, Mr. Lee stated that the attitude of most people is that they do not care very much about the other fellow's troubles so long as they are not affected. Nevertheless, he had great confidence in the desire of the American people to do the fair thing when they knew what it was. A presentation of the facts dissolves criticism in some cases, but it does not in others. In the final analysis, however, a railway must believe in the people; if the people cannot be trusted to be fair, the American democratic form of government is in danger.

James H. McGraw, ELECTRIC RAILWAY JOURNAL, inquired whether Mr. Lee knew of any publicity campaigns, based upon a frank statement of the facts, which had not won out. Mr. Lee replied that he did not know of any such campaigns that had failed except where the campaigns had been started too late. In response to another inquiry, he said that the abolishment of the "ambulance chaser" lawyer was a difficult problem, but that it was much worse for the railway to conceal the facts in regarding an accident. The policy of willingness to tell the press and any legitimate inquirer what they had a right to know tends to disarm them.

Leake Carraway, Southern Public Utilities Company, Charlotte, N. C., then inquired whether publicity matters should be left in the hands of an executive who is not a trained newspaper man or should he employ a man especially fitted to that work and direct the activities. He believed that executives are frequently so busy that they do not give the question of publicity the attention it should receive. Mr. Lee replied that the reason for his presentation of the subject of publicity at this time was based upon his opinion that the railway executives were not giving it sufficient attention. Re-

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garding procedure, he said that the president of the Pennsylvania Railroad never talked for publication orally, but always gave out interviews and opinions in writing. He believed that this was an excellent policy, but that it could not be followed to the letter and was not by the president of the Pennsylvania Railroad, because he was neither undemocratic nor unapproachable. When a railway employs a publicity man it should not do so because he has a wide acquaintance among the local newspaper men, but he should be employed for his technical knowledge and ability.

T. A. Wright, Wilkes-Barre (Pa.) Railway, said that about a year ago a strike was begun on his property and was still in progress. In order to contest this condition he had hired a trained publicity man, because he was of the opinion that publicity afforded the only means of reaching the public and gaining its confidence. In handling this publicity campaign, however, the newspapers had refused to accept some of his advertising material because 85 per cent of the labor territory was unionized and the newspapers feared for their circulation. Mr. Mortimer also mentioned a peculiar situation in Milwaukee, Wis., where his publicity department was so well organized that the opposition complained that the railway had subsidized the press.

Mr. Lee said that both of these questions were germane. Mr. Wright's situation was similar to the publicity campaign conducted by the steam railroads, where circular matter was largely used and proved very effective. In any publicity campaign it is wise to obtain a published expression of opinion from the opposition and trust to the soundness of one's own case. In any event, the argument in any contest must stand on the facts that if they are presented in the right way the public will make a just decision.

T. N. McCarter, Public Service Railway, Newark, N. J., asked whether Mr. Lee believed that if a railway showed that it could not earn a return on its investment would any amount of publicity help it to increase the rate of fare? In reply Mr. Lee said that he felt confident that it could obtain such a result in the long run if it had a good case.

Chief Engineer C. M. Larson of the Wisconsin Railroad Commission said that the commission had found that frequently the cases against public utilities were not representative of the public but were pushed by radicals. The public would be satisfied with much less than was demanded by these radicals, and the only way it could be reached personally was through a publicity campaign.

The discussion was closed by J. H. Pardee, J. G. White & Company, Inc., New York.

OTHER BUSINESS

H. C. Donecker, Public Service Railway, Newark, N. J., then presented the report of the *Aera* advisory committee, which was approved and then filed. President Henry next called attention to the changes in the constitution and by-laws, which he said were made necessary following the rather hasty action at the mid-year meeting in Chicago. These amendments were adopted without discussion. The report on motor vehicles was next submitted, approved and filed. In the absence of A. H. Ford, Cumberland County Power & Light Company, Portland, Me., and chairman of the committee on insurance, H. J. Davies abstracted the report, which was received and filed. The reports of the committees on standards for carloading and street traffic also received brief consideration, and the report of the committee conferring with the United States Bureau of Standards on the National Safety Code was postponed for consideration at a later meeting. Abstracts of these reports except that on insurance appear below. After the reports had been presented the meeting adjourned.

"AERA" ADVISORY BOARD

In its report the *Aera* advisory board stated that the names of 336 railway men appear in the list of contributors to Vol. IV of the association magazine which was completed with the issue of last July. Of the number mentioned 257 contributed to the question box section, in which during the year there were published 1479 answers to 216 questions. The circulation of the magazine has grown to more than 6000 copies per issue.

The report points out the importance of the magazine to the growth of the company section movement, which the board believes to be only at its start, and particular attention has been paid to company sections in the magazine. Section papers and addresses have been printed when they were of more than local interest. It has been the policy to appeal to company section members not only through the department devoted to the movement, but in the editorial and other sections of the magazine.

The report also directs attention to the expansion of the work in the additional space devoted to association news, the publication of statistics of electric railways and of synopses of important decisions of commission and courts affecting electric railways, and the extension of the scope of the department devoted to the interests of the manufacturers in the membership.

The report was signed by H. C. Donecker, chairman; T. P. Kilfoyle, John Lindall, R. E. MacDougall, H. A. Nicholl, Thomas Finigan and C. C. Peirce.

CHANGE IN CONSTITUTION AND BY-LAWS

The committee on changes in the constitution and by-laws of the American Association was requested by President Henry, with the sanction of the executive committee, to study and report upon the desirability of modifying the scale of dues of manufacturing companies so as to render more equable the gradations in the scale. A report, signed by George H. Harries, chairman; R. I. Todd and E. B. Burritt, was presented to the executive committee and approved on Sept. 5. The approved report was transmitted to the association by the executive committee.

Under the old scale, a company with gross receipts of $100,000 was required to pay the same dues as a company earning $1,000,000, and similar wide gradations prevailed throughout the scale. The new scale provides for minimum dues of $25 to apply to companies with net earnings under $250,000. The dues of companies having gross receipts in excess of this sum is to be according to the following scale:

Gross Receipts			Annual Dues
Between $250,000	and	$500,000	$37.50
Between 500,000	and	1,000,000	50.00
Between 1,000,000	and	2,000,000	75.00
Between 2,000,000	and	3,000,000	100.00
Between 3,000,000	and	4,000,000	125.00
Between 4,000,000	and	5,000,000	150.00
Between 5,000,000	and	6,000,000	175.00
Between 6,000,000	and	7,000,000	200.00
Between 7,000,000	and	8,000,000	225.00
Between 8,000,000	and	9,000,000	250.00
Between 9,000,000	and	10,000,000	275.00
$10,000,000 and over			300.00

The above scale is the same as that of dues paid by electric railways, and in order to incorporate it in the by-laws the committee recommended the amendment of Section XIV so as to include manufacturers with railway company members. Under the new scale some manufacturing company members will pay less, some will pay more, and the remainder will pay the dues provided in the old schedule.

OPERATION OF MOTOR VEHICLES

The subject assigned to this committee was the motor bus as distinct from the type of automobile known as

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the jitney, and it was considered, as a feeder, auxiliary or competitor of electric railways. A great deal of interesting data on the cost of motor-bus operation was collected and is presented in an appendix. The conclusions reached by the committee from these data are briefly as follows:

The motor passenger bus has two distinct fields, one in direct competition with city or interurban lines and one where it acts as a feeder to such lines or serves some community at a distance from steam, electric or water transportation. For the former service, the rate of fare is practically limited to the rate of fare obtaining on existing transportation lines, and in these circumstances these bus routes cannot be commercially successful, as shown by the operating costs and demonstrated by the long list of failures. Where there is no competition, higher rates can be established so that it may be possible to run such a line at a reasonable profit providing there is sufficient business and the rate of fare is not prohibitively high. These instances are so few as to be negligible.

The difficulties of motor-bus operation are further increased by the rapid depreciation of the equipment, owing to bad roads, and the difficulty of securing the services of reliable and careful men in their operation. Generally speaking, they are unable to exist if obliged to comply with regulatory laws such as electric railways are required to operate under, or to submit to similar taxation or other municipal charges.

The development of the gasoline motor truck for hauling freight, express and produce is another phase of the possibilities of the gas engine as affecting existing transportation companies. Where the roads and weather conditions are favorable, this form of operation is making an impression upon the earnings of electric and steam lines, and it is quite probable that the motor truck for freight will develop, first, as a competitor to existing transportation lines and second, as a feeder for them. The committee, however, has not had an opportunity to make a comprehensive study of this particular part of the subject.

In the appendix, information is given about sixty-eight routes for motor buses that have been put in operation. A number of these have not proved profitable and have been discontinued. An important exception is the Fifth Avenue Coach Company, whose earnings are given as 35.29 cents per bus-mile and expenses 24.6 cents per bus-mile with a 10-cent fare for between 6 and 7 miles. Figures are also given of the estimated cost of operation per seat-mile for motor buses, based on cars of five different types and prices, *i.e.*, from a $500 four-passenger car to a $4,000 twenty-two passenger car. The sum of the fixed charges and operating expenses per seat-mile are estimated to be from 0.95 cent to 2.42 cents.

STANDARDS FOR CAR LOADING

The committee on standards for car loading presented a very brief report. It had been found inadvisable to publish or attempt to formulate any standards because of the varied and complex conditions under which most of the member companies operate, so the committee had simply made a study of the standards which had been attempted by railroads and governing bodies. The result of this study has been filed with the secretary for the use of member companies. The data contain not only the orders formulating the standards, but so far as it has been possible to obtain it, testimony leading up to such orders in court decisions where such orders had been contested in the courts.

The committee consisted of S. W. Huff, chairman; E. J. Dickson, E. J. Cook and W. F. Ham.

Thursday's Session

The final session of the American Association was opened with the report of the committee to confer with the United States Bureau of Standards in matters relating to the Safety Code. This was presented by W. J. Harvie, Syracuse & Suburban Railroad, Syracuse, N. Y. After making brief reference to the contents of the report, he said that the committee recommended that the Engineering Association study the application of the safety code and recommend the changes desirable. The executives of the various member companies should advise themselves concerning the results of their study, through their respective engineers, and keep the American Association advised. President Henry indorsed this recommendation, and urged the members to apply with the recommendations committee.

TAXATION

Henry S. Lyons, Boston Elevated Railway, Boston, Mass., then presented the report of the committee on taxation matters.

This report gave the number of states (32) in which no legislative sessions were held during the year 1915-1916, the number (eight) in which there was no taxation legislation affecting electric railways, and the number (six) in which the legislatures passed laws on this subject. These states were California, Illinois, Massachusetts, New York, South Carolina and Virginia. Legislation was also passed by the Dominion of Canada and Manitoba. Abstracts of the provisions in this legislation are given in the report.

The committee says that in view of the unusual conditions in Canada on account of the war, it is unable to make any suggestions relative to the situation in that country. It finds, however, in the United States that there seems to be no inclination on the part of the states nor of the municipalities to lighten the burden of street railway companies. On the other hand, they are constantly imposing additional burdens. The committee calls attention to the fact that legislatures of every state in the Union, except Mississippi, will hold a session during the year 1917. If the companies in the various states are desirous of obtaining release from some of their burdens, the committee suggests that they begin to make preparation for such action.

The report is signed by Henry S. Lyons, chairman.

After presenting this report Mr. Lyons said that it was of utmost importance for members to keep in close touch with legislative bodies to prevent them from adding more paving burdens. He mentioned a situation which developed in Boston, where the Legislature requested the Public Service Commission to investigate the question of paving as it affected the street railway. Under the law, this company paid the cost of laying and maintaining paving between the rails and 18 in. outside. As a result of the commission's investigation it was recommended that the city install the pavement and keep it in repair, and submit an annual bill to the company. This recommendation was defeated in the Legislature through the efforts of the company.

President Henry then read letters from C. G. Clegg, the Oakwood Street Railway, Dayton, Ohio; Jere C. Hutchins, formerly president of the Detroit United Railway, Detroit, Mich.; John I. Beggs, formerly president of the Milwaukee Electric Railway & Light Co., Milwaukee, Wis.; H. H. Vreeland, a former president of the association; W. Caryl Ely and Gen. George H. Harries. All of these had been especially invited to attend this session of the American Association.

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Just before introducing the next speaker, President Henry said that the total registration up to Wednesday night was 2938, as compared with 2454 of two years ago. This increased registration was equally distributed among all of the affiliated bodies. Frank J. Sprague, New York, was then introduced, and addressed the association on the engineering development of electric railways. On his taking the platform he was given a rising reception. He gave a review of electric railway development, published in abstract on another page. It was illustrated by lantern slides.

He was followed by D. W. Nevin, Mayor of Easton, Pa., who spoke of the difficulties of early electric railway promotion.

MR. LEACH'S ADDRESS

A. B. Leach, A. B. Leach & Co., New York, was next introduced, and he addressed the association on the financial development of electric railways. After paying a high compliment to Mr. Sprague for his vision and great courage in the development of electric railway equipment, he opened his address with the statement that bankers stand in the market place only by what they can sell. The public has a dual relation with the railway, first as an investor and second as the public in commanding service. He next took up publicity and its value as an aid in solving public-utility problems. Mr. Leach was of the opinion that the railways do not press home the fact that they increase values. He said that the public did not appreciate this, nor the great obstacles which had to be overcome and paid for out of the fares. They continued to have burdens, and a case in point was the pavement. The cost of installation and maintenance of pavement, an outgrowth of horse-car days, did not belong to electric railways. This fact could be presented to the public in an understandable way. When the public demands service it should be reminded of the railway problem in obtaining the additional capital. The public is made aware of the railway difficulties. Better treatment can be expected. In spite of the destructive regulations with which practically every railway company has had to contend, Mr. Leach still had an abiding trust in the fairmindedness of the people. Too many misstatements of facts had been made in submitting the railway's side of the case to them, and this undoubtedly had prejudiced the public in many cases. When the public is convinced that better service means the obtaining of more money from a doubting public it would be more lenient.

Mr. Leach next predicted that the rate on the money necessary for future capital requirements would be higher in the future unless it can be shown that the investment is absolutely safe. New capital cannot be readily obtained as long as the reputation of street and interurban companies is that they are operating on a too narrow-margined profit. Furthermore, railways must obtain more reasonable treatment, or it will be practically impossible to obtain new capital. They must also establish the fact that the industry is on a fair and reasonable basis.

Unless additional money can be had for improvements, public ownership of railways is the only solution. A greater menace could not be brought into this country than public ownership of public utilities. The country has been built upon the theory of individualism, as symbolized in the record of the achievements of Mr. Sprague. Public ownership kills individualism, the best thing that America holds. Through it America has developed many useful things. In conclusion, Mr. Leach summed up his remarks by stating that a material change in public sentiment must be obtained by a fair statement of facts, and street railways must be put on a basis that will insure safe investment.

After the conclusion of Mr. Leach's address it was expected that a number of pioneers in electric railway development would speak briefly, but as the hour was late it was decided by vote to request these gentlemen to make written contributions to the discussion.

OTHER BUSINESS

Speaking for the committee on recommendations that was referred to in the president's address, J. J. Stanley, Cleveland Railways, read the following:

"Your committee, appointed to consider the recommendation of the president of the association in his address at the opening of the convention, with respect to the election of two representatives of the manufacturers to sit as members of the executive committee until the final plans are matured and provided to carry out the intention of the association in the admission of manufacturing companies, recommends that the president's recommendation be carried out, and, to that end, that the nominating committee select the names of five representatives of the manufacturers who have heretofore joined the parent association. We further recommend that before final action is taken with respect to permanent ways and means to preserve the continuation of the manufacturers' interests and their representation, that the member manufacturers be requested to confer with and advise the executive committee of their wishes in the premises on or before the next midwinter meeting, if possible. If not, at the earliest practicable date." [Signed] John J. Stanley, R. B. Stearns, L. J. Drake, Jr. (chairman).

The committee on resolutions presented a memorial to the members who had died during the year, and also expressed appreciation of the efforts of all who had contributed to make the convention so great a success. A special resolution referred to the work of the technical press.

The committee on nominations submitted the names of the following, who were duly elected: For president, L. S. Storrs, the Connecticut Company, New Haven, Conn.; for first vice-president,, T. S. Williams, president Brooklyn Rapid Transit System; for second vice-president, John J. Stanley, president Cleveland Railways; for third vice-president, J. H. Pardee, president Eastern Pennsylvania Railways, Pottsville, Pa.; for fourth vice-president, Richard McCulloch, president United Railways of St. Louis.

To carry out the recommendations of the committee on recommendations in the president's address, the committee submitted the following nominations for members of the executive committee, ad interim: Thomas Finigan, manager of sales, American Brake Shoe & Foundry Company, San Francisco, Cal.; James H. McGraw, president McGraw Publishing Company, New York; S. E. Curwen, president J. G. Brill Company, Philadelphia, Pa.; E. W. Rice, Jr., president General Electric Company, Schenectady, N. Y.; and Guy E. Tripp, chairman of the board of directors, Westinghouse Electric & Manufacturing Company, New York. This report was signed by A. W. Brady, J. R. Lovejoy, L. J. Drake, Jr., C. Loomis Allen, T. N. McCarter (chairman).

As there was no unfinished business, the secretary was instructed to cast a unanimous ballot of the meeting for the nominating committee's ticket, which he did. President Henry then asked the officers-elect to come forward, after which he declared the convention adjourned, stating that it was the best convention which the American Electric Railway Association had ever held.

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Meetings of Accountants' Association

PRESIDENT T. P. KILFOYLE

Accountants Listen to Views of Outside Experts on Matters Relating to Valuation, National Franchise Issues, Accounting Fallacies and the Sphere of Modern Accounting—Separate Statistical Department Said to Be Step Forward—Joint Committees on Engineering-Accounting and Claims-Accounting Make Laudable Progress

THE sessions of the Accountants' Association, which began on Monday afternoon, Oct. 9, and lasted up to and including Thursday afternoon, Oct. 12, had to do mostly with questions of general interest in the field of electric railway accounting. Joint sessions with the Engineering Association, the Transportation & Traffic Association and the Claims Association covered matters along the lines of valuation, prepayment systems and other traffic points, and classification of claims. The papers at the several sessions took up such points as the work of the modern statistician, commission valuation for rate-making purposes, commission accounting inconsistencies, the federal census of electrical industries, national issues in local street railway franchises and the part played by accounting in the development of modern industry.

PROGRAM

MONDAY

Annual Address of the President.
Annual Report of the Executive Committee.
Annual Report of the Secretary-Treasurer.
Reports of committees:
Accounting Definitions—John J. Landers, chairman.
Standard Classification of Accounts—H. L. Wilson, chairman.
Representing Association at Convention of Railroad Commissioners—W. F. Ham, chairman.
PAPER—"The Statistician," W. E. Jones, statistician.
PAPER—"Commission Valuation of Public Service Properties for Purposes of Rate Regulation," John E. Benton.

TUESDAY

Joint Session with Engineering Association.
Reports of committees:
Engineering-Accounting—F. H. Sillick and L. P. Crecelius, co-chairmen.
Life of Railway Physical Property—R. N. Wallis and Martin Schreiber, co-chairmen.
AFTER JOINT SESSION
ADDRESS—"Commission Accounting Inconsistencies," by Homer A. Dunn.
PAPER—"The Federal Census of Electrical Industries," by William M. Steuart.

WEDNESDAY

Joint Session with Transportation.
Reports of committees:
Cost of Rush Hour Service—J. V. Sullivan, chairman.
Fares and Transfers—C. S. Ching, chairman.
PREPAYMENT SYSTEMS—General discussion.
Reports of committees:
Express and freight traffic—F. D. Nodviel, chairman.
ADDRESS—"Some National Issues in Local Street Railway Franchises," Prof. Clyde L. King.

THURSDAY

Joint Session with Claims' Association.
Reports of committees:
Claims Accounting—H. J. Davies and H. K. Bennett, co-chairmen.
AFTER JOINT SESSION
ADDRESS—"The Part Which Accounting Has Played in the Development of Modern Industry." Prof. John R. Wildman.
Reports of convention committees:
Resolutions.
Nominations.
Election of officers.
Installation of officers.

PRESIDENT KILFOYLE'S ADDRESS

The opening session was called to order at 2.45 p. m. on Monday by President T. P. Kilfoyle, Cleveland Railway. In his annual address, President Kilfoyle referred to the death on May 7 of George G. Whitney, third vice-president, and to the resignation of H. B. Culloden, and to the appointment by the executive committee of I. A. May, The Connecticut Company, to fill the vacancy caused by the resignation of Mr. Culloden, and John J. Landers, York Railways, to fill the vacancy caused by the death of Mr. Whitney. He also spoke about the importance of committee work and urged the support and co-operation of all the members. He considered it their duty to accept appointments when tendered. Moreover, he suggested that officers who do good work should be continued in office and promoted if possible so long as their interest in the work continued. The only office to which a member should not be re-elected, in his opinion, was that of president. He felt, too, that it would be desirable to have some plan whereby the association could hold semi-annual meetings, and also recommended a closer relationship with the National Electric Light Association. In conclusion, he extended his sincere thanks to the officers and committee members for their co-operation during the year.

After the president's address the secretary of the association, M. R. Boylan, Public Service Railway, Newark, N. J., read the report of the executive committee and his own report as secretary-treasurer. The first report showed that the membership of 129 on Nov. 1, 1915, had been increased by four new members and twelve reinstated members to a total of 145, but that resignations and deaths totaled eleven and charges to company sections fifty-four, making a total loss of sixty-five and leaving a net total on Sept. 30, 1916, of eighty members. A statement of the company section membership showed 113 new members and fifty-four changed from the individual membership list, making a total of 167 members. The appropriation of $1,500 for the use of the Accountants' Association was more than enough to cover all expenditures for the year ended Aug. 31, 1916, amounting to $893.

President Kilfoyle then appointed a committee on resolutions consisting of W. G. Nicholson, Omaha & Council Bluffs Street Railway; T. B. McRae, Chicago Elevated Railways, and H. L. Sanders, Cincinnati Traction Company; and also a committee on nominations composed of the following past-presidents: W. H. Forse, Jr., Union Traction Company of Indiana; C. F. Mitchell, Pittsburgh Railways; H. J. Davies, Cleveland Railway; W. J. Ham, Washington Railway & Electric Company, and H. L. Wilson, Boston Elevated Railway.

COMMITTEE REPORTS SUBMITTED

Reports were then read for the committee on accounting definitions, by Mr. Landers; the committee on the standard classification of accounts, by Mr. Wilson; and

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the committee on representing the association at the convention of the National Association of Railway Commissioners, by Secretary Boylan. These reports were in general accepted by the association in the form submitted.

Acting on the recommendation made last year, the committee on accounting definitions called on the American Association of Public Accountants and secured the report of its committee on accounting terminology with the list of words and definitions as accepted a year ago by that association. This list, which is included in an appendix of the report of the committee on accounting definitions, contains definitions of greater interest to those concerned with general industrial accounting than to electric railway auditors, for which reason it is not reproduced herewith. In its report the committee made a request for terms which in the opinion of members should be included in a list of definitions and exchanged with the committee of the Association of Public Accountants. The report was signed by John J. Landers, chairman; George A. Harris, S. C. Stivers and J. G. Dobbins.

According to the report of the committee on standard classification of accounts, many cases were submitted to it during the year by the association, through the Interstate Commerce Commission or directly. The committee could not place its decisions before the member companies except through the publications in the electric railway field, and it therefore urged electric railway auditors to watch these. The Interstate Commerce Commission could not publish a bulletin frequently to cover accounting decisions, but the committee hoped that there would soon be a bulletin out to follow No. 9. The committee stated that while the text of the standard classification of accounts was not perfect, it had proved of great value and use to all interested in utility accounting and the financial statements of the electric railways of the country. The report was signed by H. L. Wilson, chairman; W. F. Ham, W. H. Forse, Jr., R. N. Wallis and P. S. Young.

The members of the committee representing the Accountants' Association at the convention of the National Association of Railway Commissioners held at San Francisco on Oct. 12-15, 1915, found no matters presented which required any special effort on their part. A report of the committee on statistics and accounts of electric railways, however, was presented at that convention and can be secured by those interested from the printed proceedings of the National Association of Railway Commissioners. The report to the Accountants' Association was signed by B. W. Fernald, G. D. Willcutt and W. A. Culloden, who acted as alternates at San Francisco for P. S. Young, C. L. S. Tingley and W. F. Ham, respectively.

After Secretary Boylan had read a report of a special committee on resolutions in regard to the late George D. Whitney, the papers scheduled for the afternoon were taken up. These papers, one by W. E. Jones, statistician The Connecticut Company, New Haven, Conn., on the subject of "The Statistician," and the other by John E. Benton, former member New Hampshire Public Service Commission, Keene, N. H., on "Commission Valuation of Public Service Properties for Purposes of Rate Regulation" are published in abstract elsewhere in this issue. At the conclusion of Mr. Benton's paper, a vote of thanks was moved to both speakers and the session was adjourned.

Tuesday's Session

The first part of the work of the Accountants' Association on Tuesday was given over to a joint session with the Engineering Association, called to order at 2.30 p. m. with Presidents Lindall and Kilfoyle in the chair. Two committee reports were considered, one on engineering accounting, which was read by Co-chairman L. P. Crecelius, Cleveland Railway, and one on the life of railway physical property, which was presented by Martin Schreiber, Public Service Railway, Newark.

The latter report stated that in the committee's opinion there was no reason to believe that greater success would now be met with in trying to collect experience data regarding the life of physical property than had been the case in connection with prior reports, and that such data would have the same restrictions on their worth as they would have had then. Moreover, in view of the existence of a valuation committee of the parent association, it was thought that the committee on the life of railway physical property possibly should be discontinued in order to avoid duplication of work, or that if continued its work should be defined so as to avoid conflict. It was decided, as recommended, to put the question of the continuance of the committee up to the executive committees of the associations that were concerned in the matter.

ENGINEERING-ACCOUNTING

The joint committee on engineering-accounting had assigned to it three subjects, as follows: (1) Interdepartmental charges; (2) consideration of the subdivision of accounts covering steam power station costs, as submitted by the 1915 committee on power generation, and (3) development of a property ledger looking toward the maintenance of a continuous inventory, this subject to be considered as applying to the entire physical property.

Inventory Department
Continuous Inventory Ledger

Page No.

Original Date of Acquisition or Installation Sept 16 1916 Section No. 206 Unit No. 506

Year	No. of Units	Description	Property Statement: Total Cost *	Annual Dep. %	Annual Depreciation Amount	Accrued Dep. %	Accrued Depreciation Amount	Total Present Value	Annual Changes Ensuring Years, other than Depreciation, Effecting Values in Property Statement: Installed Added to or Bettered — No. of Units Affected	Installed Added to or Bettered — Actual Cost	Retired or Replaced — No. of Units Affected	Retired or Replaced — Original Cost	Amount to be Added to or Subtracted from Tot. Cost	Corrected Total Cost	Total Present Value Based on Depreciation to Date	Present Value of Property Retired or Replaced	Present Value of Unchanged Property	Amount to be Added Covering Value of Changed Property	Corrected Total Present Value
19	500	#1 Chestnut Trees	64000	10	6400	10	6400	57600											
19	"	"	64000	10	6400	20	12800	51200											
19	"	"	64000	10	6400	30	19200	44800											
19	"	"	64000	10	6400	40	25600	38400											
19	"	"	64000	10	6400	50	32000	32000											
19	"	"	64000	10	6400	60	38400	25600											
19	690	500 #1 Chestnut Trees 190 #2 Chestnut Trees	90000			31	28000	62000	100	30000	300	24000	26000	96000	9200	7200	12000	30000	62000
19	"	"	90000	9	8100	40	36100	53900											
19	"	"	90000	9	8100	49	44200	45800											
19																			
19																			

* The cost if not actual should be qualified as estimated

CONTINUOUS INVENTORY—FORM I—SPECIMEN PAGE OF PROPERTY LEDGER

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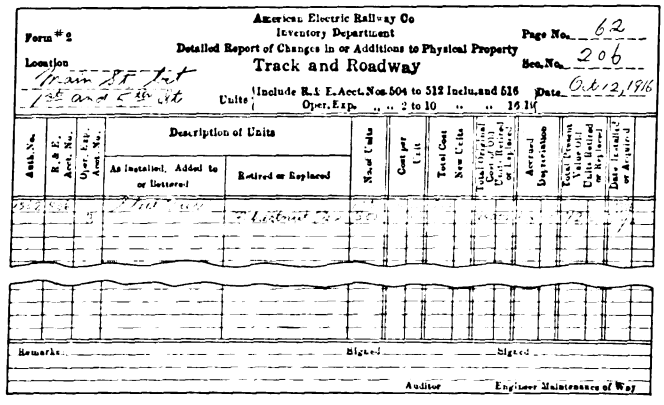
The action of the committee upon interdepartmental charges was to this effect. While the committee believed in the theory of including overhead expenses in interdepartmental charges, because of the great desirability of having an understanding of the true cost of work as a basis of comparison with work done outside, nevertheless it felt it inadvisable to enter such charges upon


American Electric Railway Co
Form *2 Inventory Department Page No. 62
Detailed Report of Changes in or Additions to Physical Property
Location Track and Roadway Sec. No. 206
Units (Include R. & E. Accts. Nos. 504 to 512 Inclu. and 516 Date Oct 12, 1916
Oper. Exps. " " 2 to 10 " " 16 19
Acct. No. | R. & E. Acct. No. | Oper. Exp. Acct. No. | Description of Units: As Installed, Added to or Bettered | Retired or Replaced | New Units | Cost per Unit | Total Cost New Units | Total Original Cost of Units Retired or Replaced | Accrued Depreciation | Total Present Value of Units Retired or Replaced | Date Installed or Acquired
Remarks
Signed
Auditor
Signed
Engineer Maintenance of Way

CONTINUOUS INVENTORY—FORM II—EXAMPLE OF DEPARTMENTAL FORM FOR REPORTING PROPERTY CHANGES

the records, because of the likelihood of disturbing their accuracy.

In regard to the subdivision of accounts covering steam power station costs, the joint committee voted that it be referred to the committee on standard classification of accounts of the Accountants' Association.

DEVELOPMENT OF A PROPERTY LEDGER

On the subject of a continuous inventory, the committee in its report said that their seems to be no question regarding the value of such an inventory as will show at all times the cost of the various units of railway property and also, if desired, the present or depreciated value. The report stated that the present value of property units is invaluable in cases of insurance and checking of tax assessments; that with a carefully prepared inventory actual costs in late work take the place of hurried estimates in making replacements; that such an inventory is useful in rate cases, security-insurance cases and for public information; that by calculating the weighted age of property units it is possible to interpret the maintenance accounts with greater accuracy, and that a continuous inventory provides an opportunity for studying unit costs and thereby helping to check operating efficiency.

The nucleus of the continuous inventory system suggested by the committee is the property ledger, a loose-leaf page of which is shown in Form 1 on page 615. Because more or less data are necessary regarding the description, location, etc., of each item entered, it was thought desirable to show this on a separate form, confining the ledger to the showing of the cost and present value of each item and these values as and how they change from time to time. The item is, therefore, designated by a section and unit number.

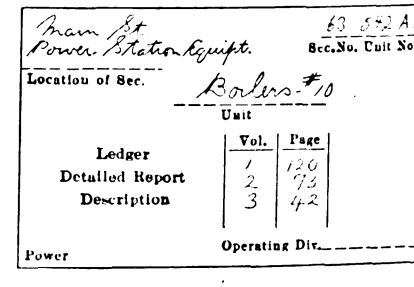
The size of the sections taken is optional and may be either a piece of track work, special work location, lot of land, a power station or car. It was considered essential for entering on the ledger that each section chosen should be divided into units or subdivisions thereof corresponding to the classification of the construction accounts used by the company. The classification used by the committee was the official Interstate Commerce Commission one for construction and operating expense accounts. Under this, for example, a section of track would be divided into the units of "Grading," Account No. 504; "Ballast," Account No. 505; "Ties," Account No. 506; "Rails," Account No. 507, etc. In some cases, such as power station equipment, it will probably be found desirable to subdivide into more units. In this way a check is obtained between the sum of like units on the inventory ledger and the total carried in the capital accounts by the accounting department.

DEPARTMENTAL REPORT FORMS

It was found that a continuous inventory could hardly stop at or rather begin at the ledger, but that it would be necessary to provide loose-leaf forms on which through the co-operation of all departments the necessary information for adding to and changing the values on the ledger could be obtained. It was thought desirable to divide the property for reporting on these forms into the divisions usually maintained by the various departments. Accordingly six forms are printed for "Land," "Track and Roadway," "Structures," "Overhead and Underground Construction," "Equipment" and "Power." The second of these is reproduced herewith as Form II. It will be noted that these forms show columns for the cost of new units, original cost of old units retired or replaced, accrued depreciation and present value. When these values are already set up on the ledger for all sections and units of the property, this information need not be furnished.

With a continuous inventory system such as proposed, the committee stated, it is not necessary for a company immediately to make a detailed appraisal of its entire property unless desired, but simply to put in the inventory all new work as it is completed and old work as it is appraised or the original cost determined, this latter work being done at the company's convenience. The point is that once an item of property is listed on the ledger its value is shown continuously throughout its life. Therefore, where a detailed appraisal of all the property is not made, these forms provide for an appraisal of the old material as it is replaced or retired, or can be used as appraisal blanks at any time when so desired.

To maintain the present value figure for each item on the ledger, it is necessary that replacements be reported on these forms, and in this connection space is provided to show the operating account chargeable. In the case of an addition or betterment which includes a certain amount of replacement, both the operating and construction accounts chargeable can be shown. These


Main St
Power Station Equipt. 63 582 A1
Sec. No. Unit No.
Location of Sec. Boilers #10
Unit

	Vol.	Page
Ledger	1	120
Detailed Report	2	73
Description	3	42

Power Operating Div.

CONTINUOUS INVENTORY—FORM III—SPECIMEN INDEX CARD FOR FACILITATING REFERENCE

forms should be filled out partly by the auditor, who should give the actual amounts charged to each account at the completion of the work, and the department handling the work, which should give the number of units affected, description thereof, and when necessary an appraisal of the old material replaced.

In addition to the six forms above outlined, the committee said, a form was considered necessary to describe in detail the physical characteristics of each section. In

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some instances it might be desirable to attach drawings or sketches, such as for special work layouts, parcels of land, etc. This form provides in the upper left-hand corner spaces for location data, and in the upper right-hand corner spaces for page number, section number and date. Instructions at the top state: "Give below a detailed description of section. If track, give type and weight of rail, kinds of ties, ballast, etc.; if land, detailed description of property; if overhead work, size of wire, and kind, etc.; if structure, size, type, etc. Where practicable, plans should be made, the size of this sheet, further to describe property and filed herewith in description loose-leaf binders."

All these detailed report forms made out by the various departments should, in the committee's opinion, be bound and kept by the inventory department in loose-leaf binders. In this way the original signed record is always at hand for reference.

CARD INDEX FOR READY REFERENCE

To complete this system properly, it was considered advisable to show a card index system by which any unit might be readily found either in the ledger or in the volumes for the other forms. The card system was divided under six headings, one for each class of property as represented by the six forms previously mentioned. One of the six cards, which it was proposed to file in duplicate under these headings, is shown in Form III on page 615.

In all cases, with the exception of "Equipment" and "Land," one set of cards is filed alphabetically by locations, with alphabet subtab cards under tab cards bearing the name of the unit. The unit may be as small as desirable, and if the classification used does not give a fine enough subdivision, some such scheme as annexing a subletter to the account number may be used. Under all six headings the second filing of cards is numerically by section numbers, with number tab cards. Of course, it will be seen that when a power station, for example, is taken as a section, there will be a number of cards bearing the same section number, but a different unit number, and all cards bearing the same section number should be filed together in the numerical order of the unit number.

As to the "Equipment" index, it was thought desirable to cross-index numerically by car numbers with subtab cards, under tab cards bearing name of the unit. For example, if it is desired to find the electrical equipment of car No. 1267, this will appear in numerical order of the car number under the tab card "Electrical Equipment." Because of the fact that it may not be desirable to use the car number as a number designating this sectional part of the equipment, as itemized in the ledger, but rather instead use a section number as in all other cases, these "Equipment" cards are planned to be filed in duplicate, the same as in the other five cases. The only difference in the "Land" index is that in the alphabetical filing, the tab cards bear the name of town or tax district instead of unit.

SEPARATE INVENTORY DEPARTMENT RECOMMENDED

It seemed to the committee that to handle and maintain properly such a system for a continuous inventory as outlined, a separate department should be created. The man in charge of this department should have a certain practical knowledge of engineering and accounting, and at the same time be more or less familiar with the physical characteristics of railway property. The cost of maintaining such a department and the number of men required will, of course, depend upon the size of the property and the extent to which the various units are subdivided.

The report was signed by F. H. Sillick and L. P. Crecelius, co-chairman; B. E. Bramble, C. H. Lahr, J. C. Collins, H. A. Gidney, Harold Bates, Norman Litchfield, J. P. Ripley and E. P. Roundey.

DISCUSSION ON ENGINEERING-ACCOUNTING FINDINGS

The discussion on the engineering-accounting report was opened by Edwin Gruhl, North American Company, New York, N. Y., who stated that too little attention had been paid to the perfection of details for property accounts. At the present time, owing to questions arising in connection with depreciation, valuation and the like, there were increasing opportunities for the use of such accounts in their most complete form. In his opinion, however, the report as presented by the committee was complicated, and a careful analysis of its fundamentals would have to be made before his company could recommend it for use by its various properties.

In the first place, Mr. Gruhl thought that the idea of a separate department for handling a continuous inventory was impracticable, for many records of original entry that would have to be used must at the same time be available for the accounting department. In his opinion a practicable system must provide for a department adjoined to the accounting department, with perhaps some visé by the engineering or construction department concerned in the work. In the second place, he criticized the portion of the report stating that sections or units to be used in the inventory would be optional with the various companies, and he suggested that the committee would do well to indicate the units for a moderately small company and a moderately large company. He felt, too, that the question of the proper units might well be extended to cover the question of where a line of demarcation should be drawn between maintenance and renewals.

Furthermore, as the third point deserving criticism he mentioned the provision for accrued depreciation in the property ledger, stating that the keeping of such a record would necessitate an enormous number of entries each year and the arbitrary writing down of the property. Studies had shown that depreciation depended upon other factors than age, so that the arbitrary calculation of accrued depreciation upon a life basis would cause the property ledger to show values misrepresenting actual conditions. A cause of especial complications would be scrap values, for the price of scrap varied considerably and this would upset all fine-spun considerations as to how much accrued depreciation existed in an item of property. Lastly, he stated that the report straddled the fence on the question of cost versus value. Accounting had always adhered strictly to actual costs and not estimates of value, and when a property ledger disclosed and divided the costs and associated them with the proper units, all had been accomplished that could be expected.

Mr. Schreiber took up first the question of interdepartmental charges and stated that without doubt such charges would involve a large amount of work and would upset the books. Engineers, however, should estimate such charges in comparing the cost of internal shop work with outside costs, and the auditing department and the purchasing agent should co-operate to see that such charges were fully considered in such cases so that no one should be misled as to the advisability of the company doing its own work. In regard to the property ledger section of the report, Mr. Schreiber observed that it practically assumed definite life tables for property, which the committee on the life of railway physical property had never favored. In his opinion, there was a serious question as to the worth of such an assump-

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tion. The time to consider depreciation was when a question demanding such consideration arose, for the subject involved too many variables for it to be settled in advance. In general, he felt that a ledger along the line submitted was very desirable and that the committee had accomplished much in the way of getting the work started.

Mr. Forse considered that the committee had blocked out the subject well and that the report was a good basis for future work. He suggested that the committee in formulating the property ledger consider the report for betterments and additions required by the Interstate Commerce Commission. He saw no reason why there should be a separate department to handle a continuous inventory, in view of the existing co-operation of engineering and accounting forces, and he thought that a separate department would not be needed unless the company were engaged in valuation work and needed a large staff for that purpose.

C. R. Harte, The Connecticut Company, New Haven, Conn., mentioned the fact that the valuation work now being done by the Interstate Commerce Commission for steam railroads would probably be extended to electric railways and that when the federal government and the states had come to a conclusion as to what principles would be applied in steam railroad valuation, the same ones would without doubt be applied also to intrastate properties. If it were decided that original cost should predominate in valuation findings, it would be highly important that companies should have charged in all interdepartmental items so that a company which did its own work should not be made to suffer, by having lower rates imposed upon it, in comparison with a company which contracted out all its work. Mr. Crecelius explained that the object of the property ledger was to provide the cost of all unit sections with due consideration of all factors in such cost, and that the difficulty in using interdepartmental charges was in connection with accounting for the credit of overhead charges to the department doing the work. Harold Bates, also of The Connecticut Company, stated that the complications in the report would depend upon the number of units that each company decided to use, that the property ledger had included a column for accrued depreciation simply because some companies had seemed to desire to show present value, and that the joint work in connection with a continuous inventory could be handled more understandingly by a separate department headed by a man having both an engineering and an accounting knowledge.

Harry E. Carver, assistant engineer in charge of appraisals, Board of Public Utility Commissioners of New Jersey, stated in a written discussion that the report of the committee outlined a system which would probably give excellent results if carried out, but that it could be simplified to save expense. His discussion made the following four points:

1. No place was provided on the property ledger, or summary sheet, by which term it might also be designated, to show from what detailed sheet the information was assembled. This appeared to be a very important omission. In lieu of this a rather elaborate system of card indices was suggested in order to locate various items in the inventory. If this information was desired for a certain item, at least the account in which it should be included was known or could readily be determined. The summary sheet for all property should show the sheets from which the total for the account in question had been derived, and these sheets should show the preliminary sheets from which the data there contained was found. In other words, if proper use were made of the system of accounts as a subject index and proper references were used in making up inventory sheets, a further system of referencing should be unnecessary except for such items as might be included in the inventory in groups. For items like rolling stock equipment, track special work, etc., card or individual records of some kind kept at present could probably be made an integral part of the inventory system. A list might also be made of various items which should be included under each account, and arranged alphabetically in order readily to classify them if this should appear desirable.

2. In the forms submitted it was proposed to identify the various sheets by a section number, a unite number and a sheet number. The "unit number" was evidently intended to be in practically all cases the account number or subdivision of a particular account, and the term "account number" would be more suggestive and would better be used. Moreover, data referring to one account only should be placed on any one sheet, except the summary sheet or sheets containing general information, which might be classified under Account No. 1 or some other number not referring to a particular account. If a holding company operating a number of different subsidiaries were involved, it would probably be advisable to substitute "file number" for the term "section number" to denote the company, and to designate the section or particular subdivision of any one company by a series of sheet numbers using as many series as desired with an index of each account. In many, if not all, cases the same series of sheet numbers in the various accounts could be used for the same section. If it should afterward prove that an insufficient number of sheets were allowed, a decimal could be used before and after the numbers. By combining a letter with the sheet number a separate and distinctive number could easily be given to each and every inventory sheet that might be in reference to any company in the state for a period of twenty-five to fifty years.

3. The forms suggested provided for the computation of the accrued depreciation for each item. While this would be useful information to have, and information which the federal or state commissions would probably be delighted to have a company keep, there was some question as to the advisability of making these detailed computations on each sheet. It would seem to be desirable to keep a record of the expected and actual life of each individual item, but the accrued depreciation or the present value of any single item appeared to be of little value except in making up an estimate of the total accrued depreciation or present value for the whole company or for a taxing district or other subdivision. It would probably be less work to make these computations at the time needed when making up a summary as a considerable number of items could probably be grouped for the purposes of computing depreciation.

4. Other problems in this work would involve the proper computation and allocation of labor costs; material costs when a large number of items were included in one contract, storeroom charges, tools and other miscellaneous small items, engineering, supervision, interest during construction, legal expenses, etc. All of these items would enter into the cost of any particular piece of property, and in computing accrued depreciation or in making withdrawals, etc., a proper allowance would have to be made for all of these items.

After this discussion the report of the engineering-accounting committee was accepted and the committee was continued. The meeting was thereupon ended in order that the Engineering Association might hold a joint session with the Transportation & Traffic Association, as reported under the head of the first-named

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association, and in order that the Accountants' Association might take up its separate program for the afternoon.

MEETING OF THE ACCOUNTANTS

After the joint engineering-accounting session the members of the Accountants' Association listened to a paper on "Commission Accounting Inconsistencies," by Homer A. Dunn of Haskins & Sells, New York, N. Y., and one on "The Federal Census of Electrical Industries," by William M. Steuart, chief statistician for manufactures, Bureau of the Census. These papers are abstracted elsewhere in this issue.

In the discussion of the first paper, F. W. Sweney, chief examiner of accounts Interstate Commerce Commission, took exception to Mr. Dunn's remark that the appropriation accounts might have been devised as a trap for electric railways, and Mr. Ham emphasized the fact that the commission had never tried to trick the companies and that some things regarding the classification which did not seem clear to outside experts might be easily explained by those brought up in the school of practical experience in connection with it. R. N. Wallis, Fitchburg & Leominster Street Railway, Fitchburg, Mass., commented on the frankness of the treatment accorded electric railways by Interstate Commerce Commission representatives. Mr. Sweney said that he appreciated the co-operation of the committee on the standard classification of accounts, for this committee had always presented constructive criticism instead of stopping with destructive criticism as many committees did.

Before reading his paper Mr. Steuart related various details to show the magnitude of the work carried on by the Bureau of the Census—work which costs $14,000,000 at the time of the regular census and $1,500,000 in the intervening periods. He suggested that schools should teach more about census work and other governmental activities, and urged the need of greater public co-operation. After the conclusion of his paper a vote of thanks was moved to both speakers of the afternoon and the meeting was adjourned.

Thursday's Session

The only meeting of the Accountants' Association on Wednesday was a joint session with the Transportation & Traffic Association, which was given over to reports of committees on the cost of rush-hour service, fares and transfers, and express and freight traffic, as well as to a general discussion on prepayment systems and an address on "Some National Issues in Local Street Railway Franchises" by Prof. Clyde L. King, Wharton School of Commerce, University of Pennsylvania. A more extended reference to all of these and the discussion thereon is made elsewhere in this issue in the proceedings of the Transportation & Traffic Association.

On Thursday afternoon the Accountants' Association held a joint meeting with the Claims Association, and afterward finished its individual program for the convention. The sole subject of discussion at the joint meeting was the report of the committee on claims-accounting, which was read by H. J. Davies, Cleveland Railway.

CLAIMS-ACCOUNTING

The joint committee on claims-accounting, as a result of the re-commitment by the Claims Association of a report in 1915 on this subject, this year presented a classification of accidents embodying the following groups:

1. *Collision with pedestrians.*
2. *Collisions at railroad crossing other than company's.*
3. *Collisions between cars of company.*
4. *Collisions with vehicles and animals:*

(*a*) Automobiles.
(*b*) Auto trucks.
(*c*) Taxi-cabs and buses.
(*d*) Horse-drawn vehicles.
(*e*) Motorcycles and bicycles.
(*f*) Animals.

5. *Derailments.*
6. *Defective equipment:*

(*a*) Spread rail.
(*b*) Broken rail.
(*c*) Broken brake beam.
(*d*) Broken axle.
(*e*) Broken journal.
(*f*) Gear pan dropped.
(*g*) Motor case dropped.
(*h*) Flashing controller.
(*i*) Broken trolley wire.
(*j*) Fuse blown out.

7. *Boarding cars.*
8. *Injuries on cars (not in collision):*

(*a*) Due to sudden start.
(*b*) Due to sudden stop.
(*c*) Going around curve.
(*d*) Fall in car over obstacle.
(*e*) Hit by missile.
(*f*) Hit by passing object.
(*g*) Hit by passing car.
(*h*) Hit by falling car parts (under defective equipment).

9. *Alighting from cars.*
10. *Falling from cars (not purposely alighting).*
11. *Stealing rides.*
12. *Doors, gates and guard rails.*
13. *Ejectments and disturbances.*
14. *Clothing damaged.*
15. *Employee accidents.*
16. *Miscellaneous.*

In commenting upon this outline, the committee stated that it endeavored to make the report broad in its construction and elastic enough for the most exacting company to be enabled to adopt it without confusion. The sixteen main groups, the committee believed, will embrace every accident that any company may ever be called upon to consider, and the divisions under each general head may be added to or taken from to suit individual requirements. Under Group 16, "Miscellaneous," the committee would place broken glass, broken fenders, burst air hose, gear pans and motors dropped, etc. Group 1, "Collisions with Pedestrians," would include every known kind of an accident of that sort. One question the committee was unable to solve and left to the association, this under the heading of "Defective Equipment." It was an open question whether broken rails, brake beams, suspension bars, etc., that cause derailments should be placed under this heading or under "Derailments"—in other words, whether the accident should be cataloged under the primary or secondary clause.

The report was signed by H. J. Davies and H. K. Bennett, co-chairmen; H. V. Brown, J. R. Pratt, G. B. Cade and H. S. Swift.

Acting President R. E. McDougall, New York State Railways, who was in the chair, read a letter from J. H. Handlon, United Railroads of San Francisco, who made numerous suggestions in regard to the recommended classification. H. V. Drown, Public Service Railway, Newark, N. J., stated that the classification was a composite of those used by the various companies, and it came as near to the object to be attained as possible. He believed that member companies should be able to find a way easily to observe the classification in their accounts so as to make possible comparisons with other companies.

Most of the ensuing discussion related to the propriety of certain primary divisions in the classification. President McDougall stated that "Defective Equipment" represented conditions, the accidents resulting from which were mostly covered by other heads, and this might make the classification confusing. W. F.

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Weh, Cleveland Railway, was of the opinion that in all cases the primary cause was the one to be considered in applying the classification. He said that while his company did not need primary divisions for "Stealing Rides" and "Clothing Damaged" some companies might find such items important and worthy of inclusion in the primary group.

A. G. Jack, Wilmington & Philadelphia Traction Company, asked why the first six headings under "Defective Equipment" could not be taken out, have "Bad Joints" and "Broken Flanges" added to them, and be placed under the preceding heading of "Derailments," thus leaving the heading of "Defective Equipment" to cover electrical equipment, which was usually the cause of injuries inside the car. Mr. Davies thought that the first six divisions under "Defective Equipment" might be placed under "Derailments," if derailments actually occurred. He thought, however, that it was inadvisable to use the word "defective" in any classification heading, inasmuch as it might seem to present *prima facie* evidence against the management. He suggested that "Equipment" be used as the sole word in the heading. He also brought out the point that the heading, "Accidents to Employees," did not designate the cause of accidents, and that this division should be omitted and the accidents thereunder distributed to the respective causes named or to "Miscellaneous." His opinions were indorsed by W. H. Forse, Jr., Union Traction Company of Indiana. A. H. Kayser, San Diego Electric Railway, thought that the heading of "Clothing Damaged" also did not show cause and could properly be placed under "Miscellaneous." These three changes were adopted and the amended report was accepted.

FINAL SESSION OF ACCOUNTANTS

The only paper scheduled for the final meeting of the accountants following the joint claims-accounting session was one on "The Part Which Accounting Has Played in the Development of Modern Industry," by Prof. John R. Wildman, School of Commerce, Accounts and Finance, New York University. An abstract of this paper is published elsewhere in this issue. After a vote of thanks to Professor Wildman, T. B. McRae, Chicago Elevated Railways, presented the report of the committee on resolutions, containing words of appreciation to all those who had helped to make the convention a success. This was adopted, and then Mr. Forse, for the committee on nominations, presented the following names: President, M. R. Boylan, Public Service Railway, Newark, N. J.; first vice-president, H. B. Cavanaugh, Cleveland, Southwestern & Columbus Railway; second vice-president, I. A. May, The Connecticut Company; third vice-president, John J. Landers, York Railways; and secretary-treasurer, S. C. Rogers, Empire United Railways, Inc. The executive committee nominees were: P. V. Burington, Columbus Railway, Power & Light Company; F. E. Webster, Massachusetts Northeastern Street Railway; F. H. Sillick, Hudson & Manhattan Railroad, New York, N. Y.; and W. G. Nicholson, Omaha & Council Bluffs Street Railway. The secretary was instructed to cast a unanimous ballot for these nominees, and, after short installation speeches, the session was ended.

Proceedings of the Claims Association

R. E. MCDOUGALL

In Four Largely Attended Sessions This Association Discussed the Fundamentals of Claims Work, the Relation of this Work to that of the Operating Departments, and Some of the Larger Questions Upon the Successful Answering of Which Permanence in Accident Reduction Must Be Based. The President Says Time Is Now Ripe for Accident-Prevention Organization.

THE annual meeting of the American Electric Railway Claims Association was opened on Monday afternoon by Acting President R. E. McDougall, claim agent New York State Railways, Rochester, N. Y. A brief abstract of the proceedings only is given this week. Abstracts of the papers presented will follow in a later issue.

MONDAY'S SESSION

The Monday afternoon session was called to order at 2.30 by Acting President McDougall, who first delivered his presidential address.

In his presidential address Mr. McDougall stated that with the increase in electric railway business during the last year there had come an even greater increase in the number of accidents, and that the time was now ripe for an active accident-prevention organization. Individual companies in the past have carried an accident

PROGRAM

MONDAY

Annual Address of Acting President.
Annual Report of the Executive Committee.
Annual Report of the Secretary-Treasurer.
Reports of committees:
  Employment—B. B. Davis, chairman.
  Ways and Means—J. S. Kubu, chairman.
PAPER—"Ohio's Compensation Act." R. C. Green.
  Written Discussion—Leonard J. Tynan.
  General discussion.
Joint Session with Transportation and Traffic Association.
Reports of committees:
  Claims Transportation—R. P. Stevens, chairman.

TUESDAY

PAPER—"The Near Side Stop," John J. Reynolds.
  Written Discussion—S. B. Hare.
General discussion.

WEDNESDAY

PAPER—"Automobile Accidents and Traffic Regulations," by H. G. Winsor.
Written Discussion—A. D. Brown.
General discussion.
PAPER—"Hooper-Holmes Index Bureau," by B. B. Holmes.

THURSDAY

Joint Session with Accountants.
Reports of committees:
  Claims-Accounting—H. J. Davies and H. K. Bennett, co-chairmen.
PAPER—"Claims Work"; Claim Agent—Past, Present and Future, Policies and Principles, Psychology. E. P. Walsh.
Written Discussion—C. G. Rice.
General discussion.
General business.
Election of officers.
Installation of officers.

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prevention campaign, but there has been little or no uniformity in the plan followed. Mr. McDougall asked why it would not be possible to get in such campaigns the co-operation of all interested, legislative and executive authorities, utility and industrial corporations, automobile clubs and others.

As a step in this direction Mr. McDougall suggested that a joint claims-transportation committee be appointed to determine what highway-crossing and warning signs could be standardized and where and how they could be placed to render them more efficient. Mr. McDougall also mentioned the indifferent use of the Hooper-Holmes Index Bureau by claim agents, and stated that they were making a mistake in not taking advantage of their opportunity. In conclusion he extended his thanks to the members and committees of the association for their support and help, mentioning particularly B. B. Davis and E. B. Burritt.

After the presentation of the report of the executive committee and the secretary-treasurer, the committees on resolutions and nominations were announced. The latter committee consisted of W. F. Weh, Cleveland, Ohio; H. M. Braun, East St. Louis, Ill.; and C. B. Proctor, Memphis, Tenn.

The committees on ways and means and employment then presented their reports, after which R. C. Green, accident department Cleveland Railway, read a paper on "Ohio's Compensation Act." The discussion, which was very extensive, was led by L. J. Tynan, Public Service Railway, Newark, N. J.

At 4.30 the Association adjourned to hold its joint session with the Transportation & Traffic Association to consider the report of the committee on transportation-accounting. This session is reported under the proceedings of the latter association.

TUESDAY'S SESSION

The meeting of the Claims Association on Tuesday afternoon was devoted entirely to a discussion of the relative advantages of the near-side and the far-side stop in electric railway service. The subject was brought before the association by a paper read by John J. Reynolds, claim attorney Boston Elevated Railway, followed by a written discussion by S. B. Hare, claim agent Altoona & Logan Valley Electric Railway.

A large number of those present engaged in the following discussion, the general conclusions reached being that for city traffic the near-side stop is preferable.

Before the conclusion of the session Acting President McDougall announced that besides the paper scheduled for Wednesday's session the association would listen to an address on the Hooper-Holmes Index Bureau from Bayard P. Holmes, president and general manager of the bureau.

WEDNESDAY'S SESSION

The meeting of the Claims Association Wednesday afternoon attracted a large attendance, there being more than sixty delegates present. The meeting was largely given up to the paper on automobile accidents and automobile regulation, presented by H. G. Windsor, superintendent of investigation and adjustments Puget Sound Electric Railway. Mr. Windsor's paper was followed by a written discussion by A. D. Brown, claim agent New York State Railways, Syracuse, N. Y., by oral discussions by a number of others. At its close the president suggested the appointment by the incoming executive committee of a special committee to formulate some plan by which the questions brought out in the paper and discussions could be settled.

As the next feature on the program Bayard B. Holmes, president and general manager Hooper Index Bureau, gave a talk on the bureau and its relations with the Claims Association. Owing to the lateness of the hour, the discussion on Mr. Holmes' talk was postponed until Thursday, when the president requested the members of the Claims Association to express their opinion as to the value of the index bureau, and whether the association is warranted in asking the parent body to continue the service.

A very pleasant feature of the meeting was the presentation to George Carson, claim agent Fifth Avenue Coach Company, New York, of a past president's gold badge, similar to those which have been presented to other past presidents of the association. The presentation came as a matter of great surprise to Mr. Carson. It will be remembered that Mr. Carson was elected president of the Claims Association last October, when he was claim agent of the Seattle Electric Company, but, as he resigned soon after from that company, he became ineligible to hold office in the Claims Association. Consequently, he resigned as president, and Mr. McDougall was appointed as acting president. Mr. Carson has done a great deal of valuable work for the Claims Association in the past, and mention was made of this work when the badge was presented.

THURSDAY'S SESSION

Early in the afternoon of Thursday the Claims Association met with the Accountants' Association for consideration of the report of the committee on claims-accounting. This session is reported under the proceedings of the Accountants' Association.

After the joint session, a paper on "Claim Work," by E. P. Walsh, attorney United Railways of St. Louis, was read by C. C. Mullin, Pittsburgh Railways, and was discussed at length by C. G. Rice of the same company.

Resolutions of thanks were next passed recognizing the work of the writers of papers and the subjects committee and the co-operation of the Mutual Information Bureau of Chicago. Officers were then elected as follows:

President, R. E. McDougall, claim agent New York State Railways, Rochester, N. Y.

First vice-president, S. B. Hare, claim agent Altoona & Logan Valley Electric Railway, Altoona, Pa.

Second vice-president, J. J. Reynolds, claim agent Boston Elevated Railway.

Third vice-president, W. H. Hyland, claim agent Fonda, Johnstown & Gloversville Railway, Gloversville, N. Y.

Secretary-treasurer, B. B. Davis, claim adjuster Columbus (Ohio) Railway, Power & Light Company.

Members of Executive Committee: C. G. Rice, assistant to president Pittsburgh Railways; H. D. Briggs, assistant claim agent Public Service Railway, Newark, N. J.; W. H. Renaud, claim agent New Orleans Railway & Light Company; J. H. Handlon, claim agent United Railroads of San Francisco.

The following committees were also appointed:

Subjects: C. C. Mullins, Pittsburgh Railway; R. C. Green, Cleveland Railway; H. M. Braun, East St. Louis & Suburban Electric Railway, East St. Louis, Ill.; L. J. Tynan, Public Service Railway, Newark, N. J.

Ways and Means: J. S. Kubu, New York State Railways, Utica, N. Y.; J. S. Harrison, Jacksonville (Fla.) Traction Company; L. W. White, Toledo Electric Railway & Light Company.

Employment: B. B. Davis, Columbus (Ohio) Railway Power & Light Company; C. B. Brunner, Easton (Pa.) Traction Company; A. D. Brown, New York State Railways, Syracuse, N. Y.

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Sessions of the Engineering Association

PRESIDENT JOHN LINDALL

The Program of the Engineering Association Consisted Entirely of Committee Reports. These Were Replete with Data and Were Accepted in General with Little Controversy. The Association Plans to Make a Strenuous Effort to Promulgate the Standards and Recommended Practices Which It Has Developed.

THE sessions of the American Electric Railway Engineering Association began on Monday, Oct. 9, 1916. President John Lindall, after calling the meeting to order, delivered the annual presidential address. This in part was as follows:

PRESIDENT LINDALL'S ADDRESS

"Owing to the abnormal conditions brought about, in part, at least, by the war in Europe, the past year has been one of unusual difficulties. The increased costs and scarcity of materials, the delays in freight transportation, and the conditions of labor have been such as to call for the most strenuous efforts by engineers in order that the railways might continue to be operated, and with some hope of profit. Notwithstanding this the work of the Association has been undertaken with increased energy. The subjects and executive committees were again confronted with more subjects than the standing committees could properly handle. These were carefully assorted but even then there remained a large number deserving of prompt attention. The latter were assigned to the committees with the understanding that they were to investigate and report upon as many as circumstances and time would permit.

"A part of the work of the committees is to review the Association's standards and recommendations. With changing conditions and the advancement of the art such revisions may frequently be necessary, and this part of the work must necessarily require more time. Likewise the committees' work in conjunction with other engineering bodies is extending and requires still more time. To meet this condition, at least in part, it has been suggested that arrangements be made for getting the work started more promptly after the close of the convention. To accelerate the work of the committees the executive committee has taken the steps necessary to enable the incoming officers to appoint committees and assign subjects soon after the close of this convention.

"The question of arousing a larger amount of interest in the use of the association standards and recommendations which are now available was referred to by President Crecelius in his address last year. It must be conceded that if the work of establishing standards and recommendations is properly done it is of very great value to the member companies, providing they make use of it. Not feeling satisfied that the member companies were getting all the value they could from this work, the executive committee caused the appointment of a sub-committee on the use of the association standards, and this committee has endeavored to further the use of standards by holding personal interviews with representatives of the railways, and by addressing local railway associations on the subject. They have also caused the matter to be given publicity through the columns of *Aera* and the ELECTRIC RAILWAY JOURNAL, and through a circular letter to members. Undoubtedly these efforts will be productive of some good results, but I feel it my duty again to call your attention to the very great importance of close co-operation in the matter by member companies, manufacturers and engineers. Of course, there are conditions which preclude the adoption of standards in some instances, but before dismissing the matter engineers should fully assure themselves that such conditions or reasons exist to such an extent as to outweigh the value of the standard.

"During the year the association has been in active co-operation with the following committees of other associations: American committee on electrolysis; national joint committee on overhead and underground line construction; national joint committee on standardization of method for determining the cost of power; committee on

PROGRAM

MONDAY

Annual Address of the President.
Annual Report of the Executive Committee.
Annual Report of the Secretary-Treasurer.
Reports of committees:
- Power Distribution—C. L. Cadle, chairman.
- Standards (on recommendations contained in above report).
- Special sub-committee, acting with the committee of the American Institute of Electrical Engineers, on Stranding Tables—W. W. Brown and C. L. Cadle.
- Standards—H. H. Adams, chairman.

TUESDAY

Joint Sessions with Acountants.
Reports of committees:
- Engineering Accounting—F. H. Sillick and L. P. Crecelius, co-chairmen.
- Life of Railway Physical Property—R. N. Wallis, Martin Schreiber, co-chairmen.

Joint Session with Transportation and Traffic Association.
Reports of committees:
- Block Signals—J. M. Waldron and J. W. Brown, co-chairmen.
- Standards (on recommendations contained in above report).
- Transportation Engineering—F. R. Phillips and W. A. Carson, co-chairmen.

WEDNESDAY

Report of committees:
- Power Generation—J. W. Welsh, chairman.
- Standards (on recommendations contained in above report).
- Way Matters—C. H. Clark, chairman.
- Standards (on recommendations contained in above report).
- American Good Roads Congress—J. M. Larned.

THURSDAY

Reports of committees:
- Equipment—W. G. Gove, chairman.
- Standards (on recommendations contained in above report).

FRIDAY

Report of committees:
- Buildings and Structures—C. F. Bedwell, chairman.
- Heavy Electric Traction—E. R. Hill, chairman.
- Standards (on recommendations contained in above report).
- Electrolysis—A. S. Richey, chairman.

General business.
Report of Committee on Resolutions.
Report of Committee on Nominations—Paul Winsor, chairman.
Election of officers.
Installation of officers.

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standard thread for pins and insulators; sub-committee on stranding of the A. I. E. E. committee on standards. In addition, a vast amount of work has been done in connection with the tentative safety code of the United States Bureau of Standards. The slogan 'Safety First' has been well established throughout the country. The work of reducing accident hazard is of great importance to the industry, but it can be carried beyond the point where the end would justify the means, and for that reason, as well as the desire to promote safety, this matter should receive very careful attention.

"The Association's official organ, *Aera*, has now been in existence for five years. That it is growing more valuable each year and that it is quite a necessary adjunct to the work, I am sure you will all agree. It is your publication, and I bespeak for it your hearty support. This does not necessarily mean that you are to become an author, nor does contributing to it require literary talent. You all have individual problems which you work out successfully. You have views on pertinent questions connected with your line of work. To inform your fellow-workers of what you are doing, to express your views through the columns of *Aera* in simple language is a help to the industry and a help to yourself in crystallizing your ideas. The Question Box also offers a very ready means 'for the interchange of ideas, to acquire and distribute information, and to promote uniformity of practices.'

"During the past year our relationship with the manufacturers has undergone a change, and we are this year glad to receive them into full fellowship. To the Engineering Association they have always been of great assistance, and under the new conditions will undoubtedly be more so. On behalf of this association I wish to take this opportunity to thank the manufacturers and their representatives for many favors past and present, and to offer to them a very cordial welcome to full membership in our association."

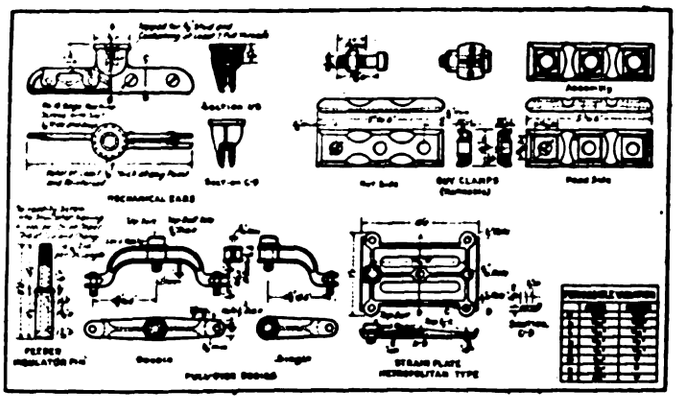
C. W. Stocks abstracted the report of the executive committee meetings held during the year, and read the report of the secretary-treasurer. This report showed that in 1915 there was a decrease of forty-six in the membership, and that in 1916 there was a further decrease, due in part to the loss of Manufacturers' Association memberships. Some of these memberships were not renewed because the associate members' companies had not joined the American Association. On Sept. 30 the engineering membership totaled 1030. President Lindall then appointed the following committee on resolutions: C. R. Harte, Connecticut Company, New Haven, Conn.; C. E. Fritts, Kansas City (Mo.) Railways, and E. H. Dusen.

POWER DISTRIBUTION REPORT.

C. L. Cadle, chairman, briefed the report of which the following is an abstract, and read the list of eight subjects which had been assigned to the sub-committees on Dec. 17, as follows: Review of existing standards and recommendations, consideration of such of the A. I. E. E. standardization rules as apply to the work of the committee, clearance diagrams for semaphore signals, derivation of deflection formulas and tables for tapered concrete poles, additional specifications for overhead line material, types of third-rail construction and data on twenty-two different installations, collection of data on high-voltage d.c. and catenary trolley construction, and the tentative safety code of the Bureau of Standards in so far as it affects line construction.

The committee stated that the proposed revision of the recommended specification for overhead crossings of electric light and power lines could not be made at this time. The object of the revision is to make the specification correspond with the work done by the national joint committee on overhead and underground line construction, and this committee is withholding the final revision of its specifications until the Bureau of Standard's safety code is in more permanent shape.

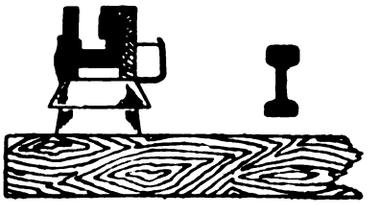
On the subject of the standard specification for rubber insulated wire and cable for power distribution purposes, the committee submitted a new table of temperature coefficients, the values in which are the reciprocals of the coefficients given in the original table. This gives a multiplying coefficient instead of a dividing one, thus making test computations a little easier. The coefficients were also specified definitely instead of the maximum and minimum limits being given. A new table was recommended for the required thickness of lead sheaths for cables, and it was recommended that the table giving the minimum number of wires in the conductor be revised to conform to the A. I. E. E. standard stranding.



HALF SIZE REPRODUCTION OF SAMPLE PLATE SHOWING DETAILS OF OVERHEAD LINE MATERIAL

The committee suggested certain changes in the A. I. E. E. definitions applying to the height and gage of third-rails. As to the suggestion of having a more definite dividing line between the transmission system, the distribution system and the substation, it was thought that this might lead to confusion and was therefore undesirable. The remainder of the A. I. E. E. rules considered were reported to be satisfactory.

Two diagrams were submitted and recommended for approval showing the location of signal masts and semaphores with reference to trolley poles, etc., for use on interurban roads. The diagrams covered the cases where trainmen were allowed to climb up the side and ride on the top of the car and where they are not allowed to do so.



PROTECTED, SIDE-CONTACT THIRD-RAIL CONSTRUCTION

The committee's report on the subject of concrete poles contained a brief history of the work done by previous committees, gave the general theory of flexure of beams as applied to concrete poles, and developed the formulas by which the dimensions, the allowable loading, the most effective position of the reinforcing rods and like factors were computed.

As pointed out by the committee, a concrete pole is essentially a reinforced concrete beam. It is assumed that the pole is tapered both in section and reinforce-

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ment, and that the general theory applying to reinforced concrete beams also applies to these tapered beams. Detail calculations are given by which the equations for the position of the resultant compressive stress, the location of the neutral axis, the value of the resisting moments and the allowable loading of the pole are derived. Detailed drawings of a steel form for 30-ft. and 35-ft. concrete poles were given in an appendix.

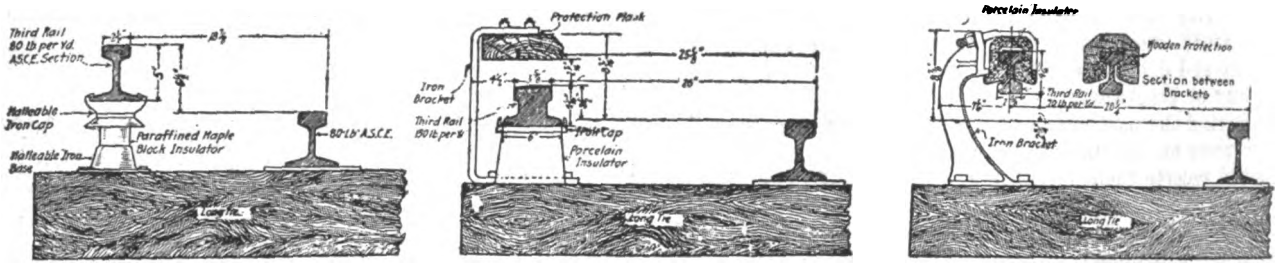
The committee submitted specifications covering the following items of overhead line material: Intermediate castings for feed-in points; strain plates and bronze castings for trolley wire equipment, including plain and insulated crossings, ears, feed-in hangers, frogs and splicing sleeves. Under the heading of porcelain for voltages not exceeding 3000, specifications were submitted covering strain insulators and large and small feeder insulators. The other specifications recommended were for the following material: Seven-strand steel cable, switch boxes, tree and cable guards, wood insulator pins and brackets and wood-break strain insulators. In order to make the specifications clearer, drawings, made up into seven plates each 3⅞ in. x 6¾ in., were included in the report. One of the accompanying illustrations is a half-size reproduction of one of these plates.

The committee stated that reports from member companies indicated that the majority find steel arms of higher first cost but cheaper in the end, as easy to obtain and install as wood, and requiring less maintenance. The committee recommended that the subject be broadened to include all metal arms and that specifications for the same be prepared. Certain minor changes, principally in the wording, were recommended in the general description of overhead line material and in the following specifications relating to 600-volt d.c. overhead trolley construction: Concrete settings, anchors in earth, anchors in rock, guy protection makers, trolley wire guy anchors, feeder supports, and lightning arrester grounds.

The committee did not consider it advisable to prepare a detailed specification covering third-rail construction. A general description of the development and the different types of third-rail construction was, however, submitted. It was pointed out that when electrification was extended to systems operating heavy cars at high speeds and over long distances, the overhead collector system as then used was not satisfactory. The adoption of the third-rail, however, solved the problem of providing a continuous conductor having a larger section than could be conveniently used overhead. This also allowed the use of a type of collecting device making the contact with the continuous conductor positive and not easily broken. The first practical use of the third-rail was in 1892, when patents were obtained in the United States by Charles H. McCloskey and Henry M. Brinkerhoff.

Third-rail construction were roughly classified by the committee as the overrunning, the underrunning and the side contact types, of which typical installations are shown by the accompanying illustrations. The early installations were of the overrunning contact type, a gravity shoe being used. Later it became necessary to provide protection for the rail, and the gravity shoe was no longer practical owing to the fact that the entrance to the contact surface had to be made from the side. A slipper shoe, held in contact with the rail by means of a spring, has taken the place of the gravity shoe on protected third-rail systems. The protection of the overrunning third-rail consists in a plank about 6 in. wide which is supported above the rail by means of brackets bolted to the ties. The underrunning type can be protected both on the top and sides, and this construction has the added advantage in that the rail is self-cleaning in stormy weather. The side contact was used on a 1200-volt electrification in England, but it has many disadvantages.

The conductivity of the rail depends on the percentages of manganese and carbon. Commercial Bessemer rail, having from 0.4 to 0.5 per cent carbon and as high as 0.7 per cent manganese, was at first used, and the specific resistance was from ten to twelve times that of copper. The compositions, since developed, have had a lower percentage of carbon and manganese and a greater conductivity. This gives a softer rail, and it was pointed out that there are certain disadvantages in the handling and installation where a soft rail is used.



TYPES OF THIRD-RAIL CONSTRUCTION, OVERRUNNING RAIL UNPROTECTED, OVERRUNNING RAIL PROTECTED AND UNDERRUNNING RAIL PROTECTED

In regard to the location of the third-rail the committee included in its report a plate showing the standard limiting clearance lines for third-rail, permanent way structures and rolling stock. Although this standard has already been adopted by the American Electric Railway Association, attention was called to the fact that there were certain conditions not covered by these clearance lines.

A table was included in the committee's report giving the characteristic third-rail data of twenty-two railway companies, and a partial list of bibliographical references on third-rail construction.

A large amount of important data on high-voltage d.c. and catenary construction had been collected by the committee, and it was its opinion that the problems involved were no different from those of 600-volt construction, except as to insulation and minor mechanical changes. Past experience, it was said, seemed to prove that the simplest form of sliding hanger and single contact wire is best for the lighter service, with the question as to whether it or the duplex wire is best for heavy service still open. Two tables were submitted, one giving a partial list of high voltage d.c. railways with construction data and the other giving a partial list of catenary installations with fundamental data regarding each. It was recommended that the 1916-1917 committee be instructed to prepare specifications for catenary overhead trolley construction.

Having kept constantly in touch with the work of the

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United States Bureau of Standards on the proposed national electrical code, the committee described briefly what had been done on the section on overhead and underground lines. In preparing this code, conferences were held with the representatives of light and power companies, electric railways, steam railways, telephone and telegraph companies, state industrial and public service commissions and the like, and the rules have been discussed from every angle. It was the bureau's suggestion that the code be adopted on trial for a period of one year, after which changes could be made. The committee emphasized the importance of studying the application of the code to existing conditions since after the year's trial state commissions might make the code mandatory. Instances were pointed out where the code differed from the standards of the association.

In completing the report the committee suggested the following subjects for reference to the succeeding committee: Additional specifications for overhead line material including high-voltage d.c. and catenary construction, continuation of the present committee on the subject of a standard thread for pins and insulators, and a further study of structural steel crossarms and fittings with a view to standardization. The report was signed by C. L. Cadle, chairman; E. J. Blair, E. J. Burdick, E. S. Gillette, C. R. Harte, M. J. Kehoe, C. R. Phenicie, R. H. Rice and C. F. Woods.

George W. Palmer, Jr., Bay State Street Railway, Boston, Mass., congratulated the association on the efficient and willing way in which the members of the power distribution committee had worked during the past year. He then referred to the thickness of lead sheaths for cables as recommended after the work of the 1915 committee. He noted that the present committee had decided to reduce the thickness of the lead sheaths in the larger sizes of cable, the reductions being about 10 per cent. He pointed out that on cables 2 in. in diameter and larger, the sheath had to withstand considerable rough usage, and he inquired on what experience the committee had based its recommendations for reducing the thickness of the lead sheath. He also inquired whether the A. I. E. E. had adopted the standard stranding rules to which the report referred. Mr. Cadle answered in the affirmative and also said that the proposed reduction in the thickness of lead sheaths was based upon the general experience of the committee members. For the larger cables the committee held the opinion that with the present standards the cables were too large, too expensive and too liable to breakage, therefore, the reductions in the thicknesses of the sheaths were favored.

Mr. Cadle also said that the definition given for the term "core" was that which best fitted the requirements of the committee. After general discussion the association approved as standard the specification for rubber-insulated wire and cable (Engineering Manual, D. S. 1 lb.), and the amendments to Sec. 17c and 22 and Tables I and VI shown on pages 6 and 7 of the report. President Lindall asked for the consideration of subject B and the recommendations of the standards committee, which were then given as follows:

G. W. Palmer, Jr., opened the discussion by asking whether the committee had taken up the matters relating to third-rail gage and elevation with the committee on heavy electric traction. He said that this committee had approved the American Institute of Electrical Engineers' rules on this subject. Chairman Cadle stated that this subject had been approved by the heavy electric traction committee, although no definite action had been obtained. H. H. Adams, Chicago Surface Lines, chairman of the standards committee, was also of the opinion that the other committees interested had approved this part of the report. In order to clarify this matter President Lindall requested the secretary to check up the action of other committees and report any conflict to the executive committee for its consideration.

Subject C of the recommendations and standards committee was then submitted for approval.

A. S. Richey, Worcester (Mass.) Polytechnic Institute, opened the discussion by referring to the specifications for wood insulators and pins, and asked whether the dimensions recommended would conflict in any way with the work of the committee considering standard threads. C. R. Harte replied that the diameter of the pin and the length of threaded portion did not limit the work of the special committee which was to standardize the pitch and contour of the threads. He said the matter of standardizing threads was not new because practically standard threads are being used but they have not been clearly defined. Now whenever the question of fit between the insulators and pins arose, it was impossible to fix the blame because there was no standard thread contour and pitch.

Mr. Palmer inquired about the mix for bronze castings recommended in paragraph 58 of the report; the standard pin referred to in paragraph 69; the manner of bringing the cables out of the switch boxes in paragraph 74, and the hinged hasp and the manner of fastening the molding on the cable to make it secure, and the offset in the outer end-casting. In reply Chairman Cadle stated that the specification for the bronze mix was obtained from a number of manufacturers, and that the manner of bringing the cable out of a switch box was common practice where cables are brought from underground to overhead lines. Mr. Harte stated that the rib on the trolley ear did not take into account the cap-and-cone-type hanger because that type is becoming obsolete. Regarding the form of the end casting, he said that the committee simply adopted a manufacturers' standard. After some further discussion on the threading wood-insulator pins, a motion to defer action on this part of the specification was defeated and Subject C was approved. Brief consideration was then given to Subject D and the recommendation of the standards committee following which it was approved.

Chairman Cadle next called attention to the recommendation of the committee that the data on concrete poles be accepted for publication in the Manual. He asked whether this had the approval of the convention. In reply Mr. Richey stated that data in this form could not be found in any other place and that it was too important to be omitted. Mr. Adams called attention to the large size of the present Manual and said that it was a question whether matter of this kind should be included. He said that the standards committee was considering the question of including in the index references to all matter of this nature contained in the annual proceedings. At this point the motion to adopt the report as a whole was approved.

Chairman Cadle then submitted the report of the special committee considering the revision of the standard stranding table. The three recommendations of the committee, which were approved by the standards committee, were adopted without discussion. Chairman Adams then submitted the report of the standards committee and called particular attention to that part of it relating to the revision of the Manual. He also stated that the whole question of the standards was up for a very thorough review in order to determine why they were not being used more extensively. L. A. Mitchell, Union Traction Company of Indiana, Anderson, Ind., was of the opinion that the present form of the Manual made it difficult to use for reference purposes and suggested a different binding. A. E.

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Harvey, Kansas City Railways, Kansas City, Mo., concurred in this and was of the opinion that the loose-leaf form with a different binding, perhaps the ring type, would put the Manual in more convenient form. In the discussion which followed it was the consensus of opinion that the loose-leaf form should be retained and that the binding should be changed to make the Manual open more easily. It was also believed the pages should all be of uniform size, including those containing standard sketches, and that thinner paper would reduce the size of the Manual. Finally, it was decided, upon motion, to refer the whole matter of revision of the Manual to the executive committee. This completed the program and the meeting adjourned.

ENGINEERING STANDARDS

Although the work of the committee on engineering standards forms a complete whole, it will be noted that the recommendations were considered in connection with the several other reports. An abstract of the standards committee report itself follows:

The report of the committee on standards included an outline of the proceedings during the past year and a report from the sub-committee on style which recommended minor modifications in the present form of specifications. The report of the sub-committee on revision of the Engineering Manual was also submitted in which it was recommended that the existing section devoted to miscellaneous methods and practices should be eliminated; that the Manual should be bound and printed for three years with yearly supplements; and that the present index be abolished and one similar to that found in technical periodicals be substituted. However, these recommendations were referred to the ensuing committee on standards for action.

The report contained a statement of the position of the committee on standards on a design for track construction submitted by the 1915 committee on way matters, on which no action had been taken by the 1915 convention. The committee on standards disapproved of the design, which provided for a 6-in. concrete slab underneath the stone ballast and ties, because conditions which would require such construction occur so seldom that the association is not warranted in adopting it.

The committee's action on current recommendations of the various standing committees was outlined in the report. The nature of this action has been published also as a part of each of the various standing-committee reports, which are abstracted elsewhere in this issue. The personnel of the standards committee is H. H. Adams, chairman; Martin Schreiber, vice-chairman; E. R. Hill, E. B. Katté, W. G. Gove, J. S. MacWhirter, C. F. Bedwell, J. W. Welsh, J. H. Hanna, C. H. Clark, R. C. Cram, C. L. Cadle and C. R. Harte.

On the revision of the recommended specification for overhead crossings of electric light and power lines, Mr. Cadle said that meetings had not been held because the national safety code covered similar ground. The committee thought it best to await final action on the code before proceeding with its work.

Tuesday Afternoon

Just prior to the joint session of the Transportation and Engineering Associations, the latter held a joint session with the Accountants' Association and the report of that meeting is contained in the proceedings of the Accountants' Association.

BLOCK SIGNALS

The joint session of the Transportation and Engineering Associations was opened with the report of the joint committee on block signals for electric railways. This was presented by J. M. Waldron, Interborough Rapid Transit Company, New York, and President Lindall presided.

The joint committee on block signals devoted the first part of its report to a review of existing standards and recommendations that had originated with it in previous years. Among other things it was recommended that the present standard covering the use of continuous track circuits for the control of automatic signals for high-speed interurban service should be removed from the Engineering Manual, the most important reason being that, as worded, this standard is misleading and does not give the proper information. In its place, requisites for automatic block-signal installations on high-speed interurban railways, as adopted by both the American Railway Association and the Railway Signal Association, were recommended as a standard.

The report contained also a digest of block-signal laws, giving references to the work on this subject that has been heretofore accomplished by the committee. From abstracts of the replies to an inquiry directed by the committee to the various commissions in the country, it was evident that there had been no legislation of importance enacted during the current year.

With regard to the subject of design of block-signal apparatus, the committee submitted a design for block-number figures arranged horizontally on a plate attached to the signal mast. The committee also submitted drawings showing foundations for switch indicators, and for signal masts with top-post and bottom-post mechanisms. Two standard clearance diagrams for semaphore signals were proposed for adoption as standard. One of these is designed to cover all cases where steam railroad equipment is operated over electric lines and trainmen are allowed to climb up the side of or ride on top of cars, while the other covers the case where permission is given to trainmen to ride upon the tops of cars.

Progress was reported in connection with the subject of block signal rules, a special committee having been appointed to confer with the American Railway Association to the end that joint consideration might be given to this subject, although up to the present time no opportunity has been afforded for mutual action.

Considerable space was devoted in the report to highway crossing protection, a large amount of data having been collected during the past year. The committee recommended, however, that the study of the entire problem, especially as regards the adoption of a standard aspect for highway crossing signals, should be continued by the incoming committee. The committee also proposed a list of desirable features which should be embodied in all types of crossing signals and suggested that with further study the list might be adopted by the association as a series of requisites for such installations.

With regard to light signals for interurban railways, the report stated that no radical changes had been made since the report of last year's committee except that a new type of lamp had been developed which made unnecessary the use of two lamps behind each lens. This new lamp is made with a semi-concentrated double filament in which one section has a higher resistance than the other and hence tends to burn longer, thus minimizing likelihood of both sections burning out at the same time. With regard to the size of lens the report stated that these now range from 5⅜ in. to 10⅜ in. in diameter and that, since the Railway Signal Association was considering the subject, the adoption of a definite lens size should be postponed pending further investigation.

In the report was included, also, a description of a series of tests which can be applied generally to trolley-contact signals to determine the reliability of design.

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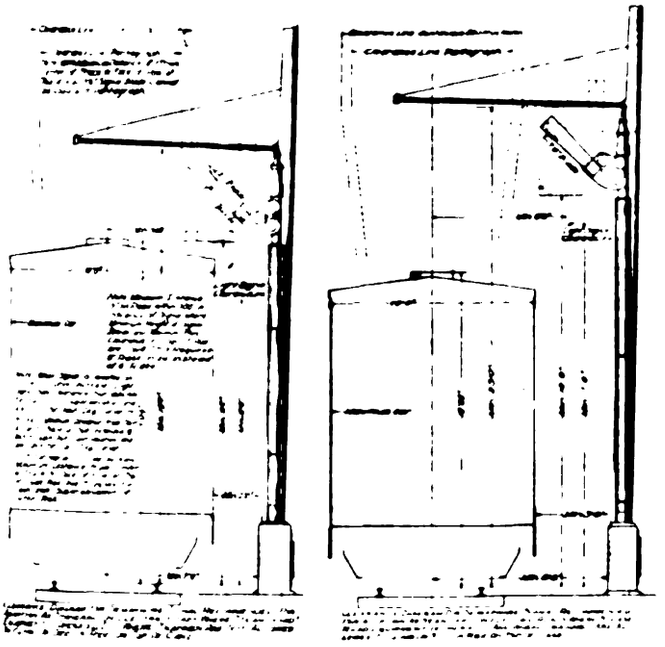
In this connection the committee stated that in all types of contactor signals the signals should have a definite indication showing that the block is unoccupied. This indication should be so arranged that on failure of power or dearrangement of the signals, no indication will be given. Signals should be so designed that as a car passes under the contactor when entering a block, the signal at the opposite end will display a danger indication and the signal at the entering end will show proceed.

The committee stated also that it had tried to further the standardization of aspects for trolley contact signals and to advocate those which would be easy of interpretation and incapable of being mistaken, and to this end certain aspects for contactor signals were recommended in the hope that the different manufacturers would lend their efforts toward standardization. The committee considered that the aspects which had been recommended for use in the past were the best that could be made practical in view of the development which the contactor-signal art had reached at that time. However, a means had now been suggested whereby it might be possible to use the standard high-speed signal aspects for contactor signals. [This scheme was described in detail in the ELECTRIC RAILWAY JOURNAL of Sept. 30, 1916.] Since the desirability of such aspects was obvious, the report included an outline of the scheme in order to ascertain the feeling of the members of the association as to its practicability. Apparently it is possible with these aspects to get full flexibility of operation and to cover all special movements as well as they can be covered with the present aspects.



CLEARANCE DIAGRAMS FOR SEMAPHORE SIGNALS

The report included, also, a summary of the work of the various joint committees on block signals from the year 1910 to the year 1915, giving in outline the recommendations of past committees and a brief abstract of the contents of each year's report. With regard to methods of drawbridge protection the committee submitted a set of requirements for the protection of traffic on movable bridges, together with a recommendation that they be adopted as a standard practice and included in the Engineering Manual. In addition the committee displayed a number of sketches to show the various methods of protecting drawbridges for the information of the member companies. With regard to the operation of single-track lines by block signals only, the committee stated that, during the year, it had continued its investigation of the subject and had found but little change to have taken place in operating methods. No appreciable extension of this method of operation had taken place, and the committee was without necessary information based on actual practice to make definite recommendations concerning the matter. Therefore the committee set forth its position as given in last year's report.

As appendices to the report there was a bibliography on block signals; a summary of some recent signal installations; a tabulation of replies to a data sheet giving the cost of maintenance of signal systems, their operating records and the schemes of organization of the signal department, and a review of the work of previous committees. The report was signed by J. M. Waldron, chairman; J. W. Brown, vice-chairman; J. B. Stewart, Jr., John Leisenring, G. N. Brown, J. J. Doyle, F. W. Coen and G. K. Jeffries.

In considering the above report separate attention was given to the clearance diagrams which were presented at the 1915 convention but were referred back for joint action. Upon motion these diagrams were adopted as standard and the remainder of the report was accepted as information.

TRANSPORTATION-ENGINEERING

The subject of one-man car operation was taken up at considerable length by the committee on transportation-engineering. The report consisted of a summary of replies from 101 companies to a request for data on one-man cars, together with the committee's comments. From these there appeared to be a general agreement that one-man cars are not suitable for operation where traffic congestion is great and where considerable loading and unloading of cars takes place. There is a saving in platform costs, but this may be offset to some extent by decreased schedule speed. It is probable also that the one-man car has an effect upon the riding habit, but no data on this subject could be obtained.

With regard to the cost of operation of one-man cars, a saving was reported by seven companies and in four other cases the saving was not offset by any disadvantages. Two companies stated that the reduction in cost had made it possible to operate in districts where this was otherwise impossible. In general, a favorable attitude was reported on the part of the public, but in some cases public service commissions were opposed to one-man car operation. In general, franchise stipulations were not restrictive.

No serious difficulties of operation appear. At grade crossings seven companies report the employment of flagmen and nineteen companies report flagging the crossing by the motorman. Two report the use of a derail device operated by the motorman, and thirteen require the car to make a stop before going over the crossing. With regard to the trolley operation, retrievers and trolley guards over railroad crossings are suggested as advisable. With regard to fare collection, it is generally agreed that some type of fare box should be employed. Fifty-three companies report the issuance and collection of transfers in the usual way, while fifteen companies report that no transfers are used.

According to the data submitted in sixteen of the replies, the average length of car is 30 ft., the maximum being 40 ft. and the minimum 21 ft. The average weight is 22,300 lb. as reported by nine companies, the maximum being 30,000 lb. and the minimum 11,000 lb. The average seating capacity as reported by twenty-two companies is thirty-five, the maximum being fifty-two and the minimum twenty-four.

In general, it appears that one-man cars reduce boarding and alighting accidents, although there is a

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question whether the reduction has been due to the new method of operation or to the use of inclosed platforms which are frequently used with one-man cars. Separate entrance and exit passageways are believed by the committee to be preferable, together with power operation for doors and steps. Nothing definite appears in regard to seating arrangement, nor with regard to the necessity for an emergency exit at the rear. Manual operation for brakes appears in the majority of cases, but the committee recommends power brakes, particularly where high schedule speed is necessary.

The report was signed by W. A. Carson and F. R. Phillips, co-chairmen; C. F. Hewitt, P. N. Jones, W. J. Harvie and J. W. Allen.

J. M. Bosenbury, Illinois Traction System, Peoria, Ill., opened the discussion. He said that when one-man operation was first considered by his company the question of converting old cars or buying specially designed new cars was raised. After a careful analysis it was decided to purchase new cars. This was done in 1912 and since that time much lighter cars have been built. Regarding the safety features he said that they had been included to counteract the criticism of city officials. By the change from two-man to one-man operation it had been possible to increase the service from 25 per cent to 40 per cent and at the same time show a saving of from 25 per cent to 30 per cent in platform and current consumption costs. The light-weight cars also permitted extensions to the service because cheaper track could be built and thus reduce the fixed charges.

Furthermore the small cars tended to reduce track maintenance costs by reason of their light weight, and the reduction in energy consumption affected overhead lines and power house requirements.

On the various properties where one-man car service had been inaugurated and the service increased thereby, the public was favorable to their operation. Mr. Bosenbury was also of the opinion that when this type of car had demonstrated its safety in operation regulating bodies would have no objection to its use. In no case did the Illinois Traction System disregard franchise stipulations in inaugurating one-man car service. In one instance, however, it was necessary to obtain special permission to operate them under an existing franchise. When they were first introduced the scheduled speed was reduced somewhat but as soon as the public became familiar with their operation this condition did not hold. He said that his company had not encountered any particular difficulty in issuing transfers or making change. Mr. Bosenbury was also of the opinion that longitudinal seats should be used in double-end one-man cars and cross seats in single-end cars of this type. In order to simplify the duties of the motorman air brakes are a necessary part of the equipment and air-operated doors and steps may readily be included in the air-brake system. As a matter of fact his experience had demonstrated that air-operated doors and steps were safer.

Chief Engineer Larson of the Wisconsin Railroad Commission said that the members of that commission were favorably disposed toward one-man cars where conditions warranted their use. The commission asked, however, that their operation at railroad crossings be safeguarded and that their design be made safe for passengers. Mr. Phillips then closed the discussion with the statement that a decrease in operating costs could also be obtained by reducing the weight of two-man cars. This would, no doubt, make the savings by one-man operation less attractive. He was also of the opinion that one-man cars tended to slow up the schedules and thus increase the cost of operation. This completed the program and the meeting was adjourned.

Wednesday's Session

The first business on Wednesday afternoon was the presentation of the report of the committee on power generation by J. W. Welsh, Pittsburgh Railways, chairman.

POWER GENERATION

The report of the committee on power generation comprised the results of a study of certain sections of the A. I. E. E. standardization rules, a comparison of the different types of rotary converters, together with the accompanying transformers, a tabulation of data on power-house operation, including costs, and a recommendation of approval of the A. S. M. E. boiler code as a standard.

Regarding the A. I. E. E. standardization rules, the committee pointed out a number of significant facts and made several recommendations for consideration by the institute. Attention was called particularly to the following points: The rating of motors is expressed in kilowatts at the shaft instead of horsepower; and a single rating, preferably the continuous rating, is made the standard for electrical machinery, but no provision is made for overload ratings except in the case of nominal ratings for railway motors and railway substation machinery. The standard ambient temperature of reference for air is 40 deg. C. instead of 25 deg. C. and no correction is made in the temperature rise in case of other ambient temperatures. An increased rating is permitted on water-cooled transformers for the same ultimate temperature by fixing the temperature of entering water at 25 deg. C. The thermal limit of electrical machinery is put on the basis of ultimate temperature and not temperature rise and these ultimate temperatures are respectively 95 deg. C., 105 deg. C. and 125 deg. C. for the several classes of insulating materials with specified corrections based on the method of measurement.

The committee recommended for consideration by the A. I. E. E. the following: That the limitations of noise and vibration be added under "Objects of Standardization" of electrical machinery. That the correction for change in resistance in air-blast transformers for entering air at temperature other than 40 deg. C. should apply to other machinery when the ambient temperature is other than 40 deg. C. That the momentary commutation limit on continuously rated machines be not less than 200 per cent of the continuous rating in amperes instead of 150 per cent. That the term "auxiliary pole" be added to the name plate information of machines when this type of construction is used. That the range in the setting of circuit breakers be specified in per cent below and above rating. That, in the tests of performance of lightning arresters, the minimum voltage at which they discharge be fixed in terms of a minimum and maximum percentage range of the normal voltage of the circuit they protect. That the limits of successful commutation be specified in connection with the nominal rating of substation machinery. A load of 300 per cent should be successfully commutated and carried for one minute without disqualifying the machine for continued service.

In comparing the advantages and disadvantages of 60-cycle apparatus with particular reference to commutating-pole rotary converters, the committee gave tables of data of 600-volt, six-phase railway synchronous converters, and rotary converter transformers of 1915 and 1913 of the single-phase 11,000-volt class, with 15 per cent re-

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actance. The following salient facts regarding converters were given: (1) The speed of the commutating-pole machine ranges from 33 per cent in the case of 60-cycle machines to 100 per cent in the case of 25-cycle machines higher than the non-commutating pole type. (2) The peripheral speed of the armature is approximately the same in both types. (3) The peripheral speed of the commutator is approximately the same as both types. (4) The floor space occupied by the commutating-pole type is approximately two-thirds of that required by the non-commutating-pole type. (5) The efficiencies of the two types are approximately the same but slightly in favor of the commutating-pole type. (6) The most noticeable gain is in the weights of these two types, the commutating-pole type weighing roughly only one-half as much as the non-commutating-pole type. (7) The price per kilowatt of the commutating-pole type ranges from 75 per cent in the 60-cycle machines to 50 per cent in the 25-cycle machines of that of the non-commutating-pole type.

On the subject of rotary converter transformers the committee states that the use of silicon iron has permitted higher flux densities without increased losses. Better means for conducting away the heat from transformer coils and core have been provided, and the standard rated capacity in transformers supplied to a given rated capacity in rotary converters has been reduced. The following deductions from the data tabulated are made: (1) The rated capacity of the 1915 transformers is approximately 10 per cent less than the 1913 transformers for use with the same rotary equipment. (2) The weight of the 1915 transformers is approximately 20 per cent less than the 1913 transformers of the same rating and frequency. (3) The floor space of the 1915 transformers is approximately three-fourths that of the corresponding 1913 transformers. (4) The efficiencies of the two types of transformers are approximately the same. (5) The price per kilowatt of the two types of transformers is approximately the same, but slightly in favor of the 1915 transformers.

A large part of the committee's report is occupied with power plant data in which total costs per kilowatt-hour, fuel costs per kilowatt-hour and labor costs per kilowatt-hour are given, as well as the following fundamental data: Net output from busbars in kilowatt-hours; maximum one-hour peak in kilowatts; load factor (one hour to average kilowatt-hours); capacity for two-hour peak in kilowatts; plant factor (average hour to two-hour capacity); pounds of coal per month; pounds of coal per kilowatt-hour; B.t.u. as received; B.t.u. per kilowatt-hour; cost of building; cost of maintenance; cost of employees' labor; cost of fuel for power; cost of water for steam; cost of lubricants, and cost of miscellaneous supplies. While the committee points out that this tabulation is incomplete, it is believed that the tables will be useful as indicating actual performances under various conditions of load factor, fuel costs, and types of equipment.

The above report was signed by J. W. Welsh, chairman; H. G. Stott, G. H. Kelsay, F. S. Freeman, A. B. Stitzer, G. T. Bromley, W. E. Rolston, L. E. Sinclair and J. G. Swain.

In the discussion L. P. Crecelius, Cleveland Railway, referring to the numerous factors entering into the design of rotary converters which have been largely responsible for putting this type of apparatus on an entirely new basis as regards a frequency of 60 cycles said substantially as follows:

Only a few years ago the requirement of 600-volt d.c. power from transmission circuits operated at 60 cycles made a combination for which rotary converters were poorly suited. Their use for railway purposes at least was to be avoided under the circumstances. This situation does not hold to-day and in fact it is now not only possible to make use of rotary converters for this purpose, but the higher frequency has several decided advantages, namely, standardization of frequency, low cost and high economy.

Sixty-cycle substation apparatus is considerably less costly than smaller apparatus designed for 25 cycles. Although the committee's report indicates an advantage in efficiency in favor of 25-cycle converters, on the other hand the 60-cycle transformers are somewhat more efficient. Consequently the respective combinations of converters and transformers are about on a par in this respect. In fact, 17,000 kw. of 60-cycle rotary converter equipments have been in continuous operation in Cleveland since January, 1913. Their operation has been entirely satisfactory and the efficiency is very high. The combined conversion loss is but 8.64 per cent of all the power delivered to the alternating current bus bars at the substations.

Mr. Crecelius stated that in studying the data of operation and the costs of railway power stations given in the report he had prepared a summary grouping the data according to the character of the plant and using

OPERATING DATA, VIADUCT POWER PLANT, CLEVELAND RAILWAY, ONE YEAR'S OPERATION, D. C. CROSS-COMPOUND CONDENSING ENGINES

1.	Output from bus, kilowatt hours	44,988,468	
2.	Maximum one-hour peak, kilowatt-hours	11,050	
3.	Load factor: one hour to average kilowatt-hours, per cent	46.5	
4.	Capacity for two-hour peak kilowatt	11,000	
5.	Plant factor average kilowatt-hours to two-hour cap.	.467	
6.	Tons coal (2000 lb.)	87,609	
7.	Pounds coal per kilowatt-hour	3.9	
8.	B.t.u. as received	12,530	
9.	B.t.u. per kilowatt-hour	48,801	
10.	Account No. 45, management and care	$4,331.53	$0.0096
11.	Account No. 46, buildings	980.67	.0022
12.	Account No. 47, maintenance	22,653.90	.0504
10.	Account No. 45, management and care	$4,331.53	0.0096
14.	Account No. 53, fuel for power	143,632.32	.3195
15.	Account No. 54, water for steam	8,057.83	.0179
16.	Account No. 55, lubricants	6,386.47	.0142
17.	Account No. 56, miscellaneous supplies	3,657.14	.0081
18.	Total above accounts	$240,679.83	
19.	Total cost per kilowatt-hour, cents		0.5356

percentage of total expense opposite the several accounts instead of dollars and cents. This table is reproduced herewith.

The summary includes the performance of a cross-compound condensing engine driven 600-volt d.c. generating plant, also shown in an accompanying table. He said at this point that it would be interesting to examine further into the expense of operating the two types of power plant represented, with a view to bringing out the influence of overhead expense upon the cost of operating them; giving also consideration to high tension distribution and conversion losses.

An analysis along this line showed that, all things considered, there is less than 5 per cent difference in expense between the operation of the best modern turbine plant as presented by the committee and that of an old direct-current engine plant. Nevertheless, the latter familiar type of railway power plant is fast disappearing. There are numerous important causes other than cost of operation which are at work. Most of the remaining power plants of this character were built fifteen to eighteen years ago and were located without regard to suitable water facilities.

It was of prime importance to locate these plants more with regard to accommodating the low-tension distribution system because of the severe restriction imposed by the 600-volt requirement. The range of mechanical usefulness of this type of plant in this regard was limited to a radius of less than 15,000 ft., in conse-

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ARRANGEMENT FOR COMPARISON OF POWER PLANT OPERATING AND COST DATA ACCORDING TO CHARACTER OF EQUIPMENT. (CRECELIUS)

	Modern Turbines					Engines			
Plant	A	B	C	D	Average	E	F	G	Average
Net output from bus, kw.-hr.	130,076,945	111,082,725	91,402,690	172,927,100	126,372,365	41,304,359	43,314,700	44,988,468	43,202,509
Maximum one-hour peak, kw.-hr.	42,000	33,240	23,000	46,100	38,085	13,900	8,500	11,050	11,150
Load factor, one hour to average kilowatt-hour	0.35	0.38	0.453	0.428	0.403	0.339	0.58	0.465	0.461
Pounds of coal per kw.-hr.	1.75	1.97	2.78	2.48	2.245	2.58	4.19	3.90	3.56
B.t.u. as received	14,459	14,250	13,000	13,300	13,752	14,165	13,100	12,530	13,265
B.t.u. per kilowatt-hour	25,300	28,100	36,200	33,232	30,708	36,400	54,889	48,801	46,697
Management and care: (All quantities below in per cent)									
Buildings	0.41	0.27	0.14	0.99	0.45	0.28	0.57	0.41	0.42
Maintenance	3.91	7.25	7.55	11.30	7.50	8.81	8.96	9.59	9.12
Wages	8.81	7.25	15.61	17.60	12.32	16.10	20.30	21.57	19.32
Fuel for power	84.58	83.84	72.48	64.30	76.30	66.50	55.40	60.77	60.89
Water for steam	0.78	....	0.00	0.62	0.47	5.60	11.37	3.41	6.79
Lubricants	0.17	0.61	0.79	1.10	0.67	1.14	1.54	2.70	1.79
Miscellaneous supplies	1.34	0.78	3.43	4.07	2.41	1.57	1.82	1.55	1.67
Total of above accounts	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

quence of which it was impossible to serve the average railway system from a single plant. The capacity of such plants was therefore confined to about 1200 kw. and the numerous plant sites thus created have now become immensely valuable as real estate but entirely too expensive to keep.

The addition of low-pressure turbines coupled to direct-current generators may in a few cases prolong somewhat the effective life of such plants, but taken on the whole the continued extension and growth of electric railway systems has outdistanced this type of plant because of its inflexibility. Thus at its best this old familiar power house must go, for it does not fit into the larger scheme of things.

After Mr. Crecelius' paper was read, C. L. Cadle, New York State Railways, Rochester, N. Y., suggested the importance of having some standard basis for load factor. Mr. Crecelius thought that this matter is already fairly well standardized, but, in any event, it will be brought up for consideration by the national joint committee on standardization of methods for determining cost of power. The representatives of the Engineering Association on this committee are Mr. Crecelius, Mr. Welsh and E. H. Scofield, Twin City Rapid Transit Company, Minneapolis, Minn. Continuing the subject of load factor, W. G. Carlton, New York Central Railroad, New York, N. Y., said that in determining load factor the 1-hr. peak as used by the committee is hardly fair, as far as boiler costs are concerned. A 15-min. peak would be better, as boilers can carry a peak for this period.

M. V. Ayers, Interstate Commerce Commission, Washington, D. C., suggested that to the statement of the committee to the effect that the price per kilowatt of the 1913 and 1915 transformers is but very slightly in favor of the latter there should be added that the later rotary converters are cheaper.

After Mr. Welsh had explained that the committee did not consider it wise to publish further the tables of power plant operating cost data, the report of the committee was accepted with thanks.

WAY MATTERS

The report of the committee on way matters containing 100 pages was confined largely to three sets of specifications, namely, those for all classes of special work, for several types of pavements, for preservatives and the treatment of woods and a review, with recommendations regarding ballast for suburban and interurban lines. In connection with the special work specifications the committee made a complete revision of this subject, particularly with respect to form, and also prepared specifications for plain bolted special work. In revising these specifications it was decided that the great variety of materials entering the manufacture of the various classes made it advisable to prepare a separate set of specifications for materials. In preparing these specifications the way committee had the counsel of a committee of special work manufacturers. In connection with the specifications for manganese steel special work, the manufacturers objected to the size of the test piece and the time of its heat treatment as provided in the 1915 specification. After consideration their criticisms were accepted and the specification changed. In addition this specification was amended to limit the wind or warp in the bearing surfaces of solid manganese steel pieces, and extraordinary care in this particular was recommended where the special work was to be laid on steel instead of wooden ties. These specifications as revised and enlarged were submitted as recommended specifications by the way committee and approved by the committee on standards.

REVISED SWITCH AND MATE DIMENSIONS

Under the subject of recommended design of layouts for switches, mates and frogs, the committee paid particular heed to the lengths of switches and mates as contained in the Engineering Manual. It found that in practice the modern rail sections, when made into switch pieces of the standard lengths, did not permit adequate opening at the heel for setting the joint plates and tightening the bolts. In order to obviate these difficulties the committee revised the table of lengths,

TABLE I—DIMENSIONS OF SWITCHES AND MATES

Standard Radius	Radius for All Gages	Dimensions							
		A		B and C		D		E and F	
		Suggested	Present	Suggested	Present	Suggested	Present	Suggested	Present
50 deg. Lat.	47 ft. 7½ in.	−6 in.	−6 in.	10 ft. 0 in.	10 ft. 0 in.	−6 in.	−6 in.	10 ft. 0 in.	10 ft. 0 in.
75 deg. Lat.	72 ft. 7½ in.	0 in.	0 in.	12 ft. 0 in.	12 ft. 0 in.	0 in.	0 in.	12 ft. 0 in.	12 ft. 0 in.
100 deg. Lat.	97 ft. 7½ in.	0 in.	0 in.	13 ft. 6 in.	12 ft. 0 in.	0 in.	0 in.	13 ft. 6 in.	12 ft. 0 in.
150 deg. Lat.	147 ft. 7½ in.	12 in.	12 in.	15 ft. 0 in.	14 ft. 0 in.	12 in.	12 in.	15 ft. 0 in.	14 ft. 0 in.
200 deg. Lat.	197 ft. 7½ in.	18 in.	18 in.	16 ft. 6 in.	15 ft. 0 in.	18 in.	18 in.	16 ft. 6 in.	15 ft. 0 in.
100 deg. Wye	97 ft. 7½ in.	−6 in.	−6 in.	10 ft. 0 in.	10 ft. 0 in.	−6 in.	6 in.	10 ft. 0 in.	10 ft. 0 in.
150 deg. Wye	147 ft. 7½ in.	0 in.	0 in.	12 ft. 0 in.	12 ft. 0 in.	0 in.	0 in.	12 ft. 0 in.	12 ft. 0 in.
200 deg. Wye	197 ft. 7½ in.	0 in.	0 in.	13 ft. 6 in.	12 ft. 0 in.	0 in.	0 in.	13 ft. 6 in.	12 ft. 0 in.
350 deg. Wye	347 ft. 7½ in.	12 in.	12 in.	16 ft. 6 in.	15 ft. 0 in.	12 in.	12 in.	16 ft. 6 in.	15 ft. 0 in.

NOTE.—It is recommended that the 100 foot radius Lateral and 200 foot radius Wye shall be used wherever practicable. It will rarely be found necessary to use others.

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which was unanimously approved by the committee of special work manufacturers. The diagram and the revised dimensions of switches and mates are shown in the table at the bottom of page 830.

The committee also called attention to the desirability of standardizing special work layouts with a view of minimizing the number of frogs having different angles. It suggested that the initial step toward accomplishing this result would be to adopt a standard spiral. Special work manufacturers were in sympathy with this recommendation, and indicated that they would be glad to accept a spiral adopted by the association. The dimensions of switches and mates were approved as recommended design by the standards committee.

BALLAST FOR OPEN TRACK

Ballast for suburban and interurban lines was also considered in this report, and the following conclusions were drawn and approved by the standards committee:

1. The best ballast is crushed stone or washed gravel ranging in size from $\frac{3}{4}$ in. to $2\frac{1}{2}$ in.

2. Crushed stone or washed gravel ballast should not be less than 8 in. deep under the ties for main-line tracks.

3. Bank-run gravel ballast should not be less than 12 in. deep under the ties for main-line tracks.

4. Cinder ballast should not be less than 12 in. deep under the ties for main-line tracks.

5. Any increase in the minimum depths of ballast stated in conclusions 2 to 4 inclusive should decrease the cost of track maintenance.

6. The greater the depth of ballast the better the drainage, which increases the life of ties, decreases maintenance, maintains better general track conditions, and decreases rolling-stock maintenance.

7. Drainage is of primary importance to maintain a stable subgrade.

8. The ballast section should be so formed as to provide surface drainage.

PAVEMENT SPECIFICATIONS

Pavement for use in connection with girder grooved and plain girder rail (T-rail) received thorough consideration and recommended specifications were prepared for brick pavement, granite block pavement and creosoted wood block pavement, and foundations for these pavements, together with specifications for cement grout filler, asphalt filler, gas-tar pitch filler and coal-tar mastic filler. These specifications were mainly adapted from those of the American Society of Municipal Improvements and the American Wood Preservers' Association. These specifications were submitted as information with the request that they be studied carefully in detail with a view of bringing out suggestions for their improvement. A continuation of the subject was recommended with a view to embodying such criticisms and suggestions in the specifications before they are finally submitted as recommended standard.

SPECIFICATIONS FOR PRESERVATIVES AND TREATMENT OF WOOD

Acting upon its instructions, the way committee submitted specifications for preservatives and the treatment of wood for inclusion in the Engineering Manual, taken largely from the standards of the American Railway Engineering Association, the National Electric Light Association and the American Wood Preservers' Association. The committee deemed this the wise course, because the specifications adopted by these associations have now been in general use for a number of years without requiring important revision. In adapting these specifications for electric railways, however, the committee recommended a number of modifications, the principal one of which was a simplified and readily obtainable apparatus for analyzing preservatives. This report, after discussing the fundamental principles and the advantages of timber preservation, sets forth ten general requirements, largely taken from the manual of the American Railway Engineering Association, and information regarding the importance of grouping timber and preparing it for treatment. The modified specifications submitted for adoption as recommended specifications include those for Nos. 1, 2 and 3 grades of creosote oil used as standard by the American Railway Engineering Association; a specification for creosote coal-tar solution, which is also a standard of the American Railway Engineering Association; a specification for the fractionation of creosote oil, one for tie treatment and treatment by the Bethell process. Specifications were also prepared for brush, dipping and open-tank treatments, including a specification for the creosote oil to be used when treatment is by these prorcesses. This subject was referred back for further consideration of other materials and for joint action by other interested committees. A form was submitted for the purpose of gathering service records of ties and other timber, in order to put it before the electric railway industry.

In view of the large amount of work necessary to prepare these specifications, the committee did not have time to take up a number of other important subjects assigned to it. In commenting upon this fact, as well as the work of past committees, it expressed itself as dissatisfied with the conditions under which committee work has been conducted, and suggested a careful review of the methods in order to bring about an arrangement whereby the work can be continued from year to year and the appointments of committee members made more promptly than in the past. Attention was also called to the growing importance of the subject of curved heads for girder rails and the fact that a number of member companies have installed test sections of track with rails of this type. In order to put this matter before the association, the way committee recommended that this subject receive prompt consideration by the ensuing committee acting jointly with the committee on equipment.

In the discussion on the above report A. E. Harvey, Kansas City Railways, pointed out how useful these specifications will be in loose-leaf form for sending out to bidders on materials. He explained how some of the paving specifications had been made up. For example, those on granite blocks were based on the "Chicago specifications," while the brick specifications followed those of the American Brick Manufacturers' Association.

At this point A. C. Simmons, a former president of the association and now Commissioner of Public Works, Milwaukee, Wis., was invited to say a few words. He said that during the past five years he had found himself in a position to understand both sides of the problem of the relation of railways to municipalities. In Milwaukee the situation is complicated by the fact that many technical questions are being settled in the courts. Referring to Mr. Simmons' remarks, G. W. Palmer, Bay State Street Railway, Boston, pointed out that in serving corporations engineers should remember that they are public servants as well as corporation servants.

E. M. Haas, ELECTRIC RAILWAY JOURNAL, devoted his remarks to wood preservation. He stated that the committee had in its work the co-operation of the United States Forest Products Laboratory and other expert assistance. The committee had not included in its report the zinc-chloride treatment of ties, because this appears

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not to be considered well adapted for electric railway tie preservation. Water-gas-tar specifications were not included, although such tar is used in connection with coal-tar creosote.

In response to an inquiry concerning the effect of preservatives on the electrical resistance of ties, Mr. Haas quoted from "Preservation of Structural Timber," by H. F. Weiss, director Forest Products Laboratory, the following statements:

"1. The resistance of timber varies directly with the length and inversely with the cross-section.

"2. The resistance of timber varies almost inversely with the amount of moisture present, between the limits of 15 and 50 per cent.

"3. The resistance of timber is lowest when measured along the grain and highest when measured tangentially to the growth rings.

"4. When treated with a soluble salt, such as zinc chloride, the resistance varies approximately inversely as the amount of the salt present.

"8. Treatment of timber by different creosote processes does not greatly change the natural resistance of the timber.

"A number of traction companies state that the zinc-treated ties corrode their spikes very rapidly, and for this reason they are opposed to using them. It is entirely possible that this will occur, especially if the ties are liable to hold much moisture and are situated a long distance from the power house. Ties which can be kept fairly dry and can be laid close to the power house so that the return current will be through them, rather than away from them, should give little trouble."

At this point E. M. T. Ryder, Third Avenue Railway, New York, called attention to the importance of service data on the use of the various types of pavement included in the specifications. L. A. Mitchell, Union Traction Company of Indiana, Anderson, Ind., asked for information concerning the use of water-gas-tar-creosote. He also called attention to the effect of zinc-chloride-treated ties on signal operation as experienced by steam railroads. He referred to the use of cinder ballast, and said that it was not always injurious to ties. He said that there was a section of track on his road where cinder ballast had been used exclusively for a number of years, and he had never been able to find a case in which a tie appeared to be affected by the cinders.

Martin Schreiber, Public Service Railway, Newark, N. J., stated that he was in full accord with the action of the standards committee in referring the subject of wood preservation back to the committee for further consideration. He believed that a specification should also be included to cover water-gas-tar creosote. Such a specification had been prepared by the National Electric Light Association, and he had been purchasing oil under it for a number of years. Up to the present time, he said, he had been unable to discover that the results being obtained were any different from those where coal-tar crosote had been employed. He was of the opinion that the subject was too important to pass over hastily, and he then told of the tremendous amount of work necessary in preparing wood-preservation specifications for the National Electric Light Association. The discussion also brought out the fact that cinder ballast was being generally used by the Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, without deleterious effect on the ties.

H. M. Steward, Boston Elevated Railway, Boston, Mass., said that his company had recently installed a wood-preserving plant and had found that he could make a saving over having the treatment done in commercial plants. A. B. Skelding, Tidewater Power Company, Wilmington, N. C., said that his company was also treating its own ties with Maintenance of Way specification creosote. Very satisfactory results were obtained by the open-tank process, in which a hot and cold bath is employed. Short-leaf pine ties, which only lasted a few years in his part of the country, were in a perfect state of preservation eight years after treatment.

George L. Wilson, Twin City Rapid Transit Company, Minneapolis, Minn., stated that his company had recently purchased 20,000 ties treated by the Card process. After three or four years the spikes were found to be badly corroded. These ties were used in track in paved streets and undoubtedly the presence of moisture and the ½ lb. of zinc chloride per cubic foot were responsible for the rapid rate of corrosion. He then referred to the paving specifications. and recommended that granite block be used exclusively for track in paved streets. While it was somewhat higher in first cost than other types, it gave a much longer life. Undoubtedly the objection of the public to this type of pavement was based on its experience with the old form of granite block used. Under the specifications included in this report granite block may be purchased and, if carefully laid, will produce a most satisfactory pavement.

Mr. Wilson also recommended that the blocks be inspected at the quarries rather than at the point of delivery. He had found that the quarrymen did not object to rigid specifications as long as the blocks were inspected when they were in the hands of the cutters. When the blocks are inspected at the point of delivery the quarrymen have no way of fixing the blame for imperfect workmanship. He said that granite-block pavement was purchased for Chicago in this manner, and the inspectors picked out the culls, placing those which could be recut in one pile and those which could not in another. Mr. Wilson also recommended a grout filler for granite-block pavements.

Mr. Steward then described a method he had recently adopted which made it possible to use old blocks or seconds in laying granite-block pavement. This process included extreme care in laying the blocks with open joints, filling the bottom of the joint with clean pea-gravel and filling them with 1:1 grout. Just before the grout has taken the initial set it is scraped from the surface of the blocks with a hoe, with the blade bent to 45 deg. with the handle. Following this operation, the pavement is swept with a push-broom, with the broom fixed at 45 deg. with the handle. After this had been done the surfaces of the blocks were thoroughly cleaned with a whitewash brush and water.

R. D. Hood, Massachusetts Northeast Street Railway, Haverhill, Mass., said that he had employed this method of laying granite-block pavement and obtained very satisfactory results. Although he had used many blocks which were seconds or culls, the finished pavement showed no depressions and it was dustless. If this process of grouting the pavement is employed, old blocks are just as satisfactory as new ones. He also called attention to the fact that the granite-block specifications in the report did not provide for the use of pea-gravel in the bottom of the joints. He was of the opinion that this was important, because it saved a certain amount of grout filler and the gravel increased the mechanical strength of the joint. As a matter of fact, in removing some pavement which had been grouted in this manner he found many instances where blocks broke instead of the grout filler.

E. A. West, Denver Tramway Company, Denver, Col., and D. P. Falconer, New York State Railways, Rochester, N. Y., described types of concrete pavement which they had employed with satisfactory results. Mr. West

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used a 1:4:8 mix below the ties, a 1:3:6 mix for the pavement foundation and a 1:2:3 mix for the pavement wearing surface. Mr. Falconer's experience with concrete pavement had been in making temporary repairs where he desired a pavement that would last as long as the old rail. He was of the opinion that concrete pavements would not last for periods longer than seven or eight years.

R. C. Cram, Brooklyn Rapid Transit Company, Brooklyn, N. Y., closed the discussion and asked for additional criticism of the report by letter for the benefit of the 1917 committee. He laid particular stress on the importance of service data for treated timber, and asked that the members fill in the information on the data sheets whenever they had occasion to rebuild track. He also questioned the value of treating yellow-pine ties when they were used in paved streets. He said that his company had removed untreated yellow-pine ties from track in paved streets which had been down from sixteen to twenty-two years. In rebuilding this track approximately 60 per cent of the ties were reused. In Brooklyn he had also found that Georgia-pine ties would last only three years in track laid in cinder ballast. At this point the report of the way committee was approved and President Lindall called for the report of the committee that had attended the American Good Roads Congress. This was presented by J. M. Larned, Pittsburgh Railways, Pittsburgh, Pa., and it was received as information. An abstract appears in the proceedings of the American Association. Before adjourning the meeting President Lindall announced that arrangements had been made for advancing the final session of the Engineering Association from 2 o'clock Friday afternoon to 9 o'clock Friday morning.

Thursday's Session

At the Thursday afternoon session of the Engineering Association the report of the committee on equipment only was presented as more time was consumed in its discussion than was anticipated.

EQUIPMENT

The report of the committee on equipment covered eleven subjects, therefore it was necessary to consider some of these in a rather preliminary way, while others were reported in detail. After a thorough investigation of the question of revising the steel wheel designs, the committee drew the following conclusions: Wheels of a diameter of 26 in. and under should have a rim thickness of 2 in., and wheels of 28 in. in diameter up to 36 in. in diameter should have a rim thickness of 2½ in. Wheels with diameters of 35 in. and 37 in. were eliminated from the designs because these sizes were not generally used. Although the equipment committee had prepared and recommended a revised contour of wheel tread and flange, it could not reach an agreement on these changes with the way committee, therefore the standards committee approved the new designs subject to an amended report being made at the convention. Agreement was reached, however, with the way committee that the present coning of the tread would be maintained at 1 in. in 25 in. The question of flange contour is still in controversy.

A revision of the standard design of brakeshoes, brakeshoe heads and keys was also undertaken by this committee to obviate the uneven wear of the shoes and the rapid wear of portions of the face of the brake head in contact with the shoes, resulting from insufficient wearing area. An investigation developed the fact that manufacturers were not following the association's standards for brakeshoes except in a general way, so that the revision was taken up with them. While the designs were changed, they in no way affect interchangeability with the present designs. A summary of the changes follows:

A plate type of brake head was proposed, *i.e.*, a head which covers the full bearing portion of the brakeshoe except for the indentations for end and center lugs and slight clearance recess; head design with square ends to fit end stops; a 3/16-in. clearance was provided between top of lug on shoe and brake head; the location of the center line of the key lug on narrow-tread shoes was corrected; the lip of the shoe flange was omitted at the center for a distance of 50 per cent of the total length of the shoe; the clearance was indicated around the flange of the wheel; standards were included for brake heads, brakeshoes and keys for wheels 26 in. in diameter and under, and unflanged brakeshoes were eliminated from the standards, investigation indicating that there were very rarely used for electric service, and where required to meet special conditions it was recommended that the members use M. C. B. standards. The new proposed designs were illustrated in appendix to the report and they were approved by the standards committee.

This committee also investigated the question of revising the standard design of axles to provide for the recent development in small-size motors. In its investigation of this subject the committee had the assistance and co-operation of representative motor and truck manufacturers, and the new proposed standards were illustrated in an appendix to the report. In connection with the design of these axles the report states that a very careful analysis of the stresses indicated that the former capacity ratings were somewhat high for ordinary annealed carbon steel and a reduction for the various sizes was made. The committee's investigation also developed the fact that while the present axle standards have been very desirable from the standpoint of standardizing the motor fit, excepting for heavy electric traction and interurban service, the standards indicated could not be used, because the lengths were too great for city service. To take care of this situation, two designs for 3¾-in. x 7-in. axle were added, with journal centers of 69¼ in. and 72 in. respectively. The former will meet the requirements of the driving axle for maximum traction trucks, and the latter for the heavy four-motor equipments operated in city service. To meet the requirements for small-size motors and light-weight cars, axle designs were added, one for 3½-in. and one for 4-in. motor fit, both having 3¼-in. x 6-in. journals spaced at 69¼-in. centers. These were recommended as standard designs and they were approved by the standards committee.

Car ventilation was also investigated and the committee reported that this subject revealed the fact that opinions differ as to the requirements for good ventilation and few if any of the theories or proposed requirements have been generally accepted. In some localities, state and municipal authorities have specified that cars must meet certain specifications, and a large number of electric cars have been equipped with various ventilating systems in an endeavor to meet these requirements.

In several cases authorities now admit that their methods of meeting these requirements are not practical from an operating standpoint. Due to this unsettled state of the art, the committee believed that definite recommendations could not be made, and, therefore, confined its report to a general review of the subject.

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Under the subject of lighting electric cars, the report calls attention to the fact that during the last two years special attention has been given to the question of scientific reflection and diffusion of light, and to the fact that investigations have demonstrated that the tungsten wire lamps are superior to the old carbon filament lamps both as regards efficiency and economy. Generally, however, the results of the scientific analysis were so dependent upon the construction of the car, the shape and color of the ceiling and other reflecting parts, as well as on the quantity and quality of adjacent light absorbent surfaces that the committee concluded it would be impractical to adopt any definite standards. It therefore recommended that all member companies be urged to give the matter of car lighting the careful and scientific study it deserved.

Since the manufacturers could not agree on what sizes of carbon brushes could be recommended as a standard for street railway motors, the committee deemed it inadvisable to take any action on this subject.

M. C. B. brasses for heavy electric traction were designed and submitted in this committee's report to obviate the difficulties encountered in the operation of M. C. B. journal bearings on heavy, high-speed equipments, particularly in connection with motor axles where the higher brake-shoe pressures become an important factor and result in abnormal wear due to comparatively heavy side thrusts. The committee found that a number of prominent member companies had developed a form of high-speed journal bearing which had proved satisfactory in overcoming these difficulties. In considering this subject, however, the committee deemed it highly desirable to have the high-speed bearings interchangeable with M. C. B. standards, not only insofar as the bearings themselves were concerned, but as regards the modifications in the journal boxes and supplementary end-thrust facilities. The details of these proposed high-speed journal bearings were illustrated in an appendix accompanying this report, and included those developed for 3¾-in. x 7-in., 4¼-in. x 8-in., 5-in. x 9-in., and 5½-in. x 10-in. sizes of journals. Journal thrust plates were also designed and submitted with the report, for applying on 3¾-in. x 7-in. and 4¼-in. x 8-in. sizes of journals, and one was designed for both the 5-in. x 9-in. and the 5½-in. x 10-in. sizes.

Limit-of-wear gages for the association's standard flange contours were also designed by the equipment committee for the 1-in. thickness of flange and the 1 3/16-in. thickness of flange. These designs were submitted in an appendix to the report, and they were approved by the standards committee.

A trolley catcher socket which is essentially the same as that known as the Keystone catcher, manufactured by the Electric Service Supplies Company, was adopted by the committee as standard and approved by the standards committee. Before its adoption, however, the sanction of the manufacturer was obtained, as well as permission for other manufacturers to make their style of trolley catchers fit this socket.

After analyzing the replies received from a number of representative electric railroads on the subject of car painting, such a wide variation in the methods employed was found that it was practically impossible to formulate any set of specifications which would be applicable to the various conditions or acceptable to the various member companies. Some companies spend considerable money to obtain a very smooth surface for the color and varnish coats, and others finish their cars with the principal object in view of obtaining protection from the action of the elements. The committee also found that some companies were forced to paint their cars quickly on account of limited shop space and the lack of extra equipment, while others were more favorably situated in these respects. The report also took up the various enameling processes, and the committee recommended that the accelerated drying of paints and varnishes receive more attention from member companies than they have in the past, because it believed that a closer study would develop greater advantages and result in extending its use.

In the investigation of rail corrugation in its relation to the use of rolled or forged-steel wheels versus the use of chilled iron wheels, the committee made observations on a number of large railway properties and discussed the subject with the engineers and the officials of these roads. It was found that some of the lines using rolled or forged-steel wheels exclusively were free from corrugations, while others showed corrugations in various stages of development. Likewise some of the roads using only chilled cast-iron wheels were free from corrugations, while others showed corrugations as pronounced as those found on any of the roads using steel wheels. It was the consensus of opinion of the engineers of some of these properties that one type of wheel was no more conducive to rail corrugation than the other. As a result of these investigations the committee reported that nothing could be found to indicate that one type of wheel more than another was responsible for rail corrugation.

PLAN OF COMMITTEE WORK AND APPOINTMENTS CRITICISED

At the close of this report the equipment committee placed itself upon record as opposed to the detailed consideration and recommendation of matters where it was evident from the start that no final determination could be made that would be conscientiously observed or advocated by individual members. In other words, it did not care to put forth the ideal as an ideal, and confine the consideration of the subject to historical sketches or reviews without adding definite recommendations. This committee also expressed itself of the necessity of some arrangement whereby its work could be continued from year to year, and with less interruption between the time of rendering reports and assignment of subjects for the ensuing year. It recommended that some more definite plan of continuing membership in committees be considered.

In connection with the report Mr. Gove said that next year a less number of subjects should be assigned and therefore more time would be available for consideration. The subjects of revision of wheel design and contour and tread and flange of wheel brought forth a lively discussion on flange dimensions and their relation to rails.

James Wilson, National Car Wheel Company, did not see the need for reducing the thickness of flange. There were many roads using flanges 1 3/16 in. thick and in Baltimore flanges 1¼ in. thick are used. H. H. Adams, Chicago Surface Lines, called attention to the growth in the use of steel wheels. Flanges on street car wheels were formerly thickened to introduce more grey iron and thus increase the strength in the flange. He thought that a compromise design to suit the requirements of both iron and steel wheels would eventually be reached. W. A. Bennett, Griffin Wheel Company, did not think that thicknesses of 1 3/16 in. and 1¼ in. were unusual. Wheels had been used in Peoria with a flange thickness of over 1¼ in.

N. B. Trist, W. A. Bennett and R. H. Dalgleish next discussed the wear on the back of flanges and the relation of flanges to guard rails. Mr. Dalgleish said that the radius of throat on ⅝-in. and ⅞-in. flanges could not be the same or there would be no tangent. He thought there would always be a demand for two sizes of flange and perhaps for three sizes.

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Mr. Adams said that in Chicago a taper on the tread of one to sixteen was used on steel wheels and that the average mileage of wheels from January to May, inclusive, had been 110,000. These were 34-in. wheels worn to 30-in. minimum diameter. He considered this a fairly good life for wheels in city service.

Mr. Dalgleish had conducted experiments with wheels of various tread tapers and found that an increase in taper had brought about an increase in the life of the wheels. He said, however, that if in conjunction with the way committee standards were adopted which assured a tread bearing over one-half the rail head in extent then taper would not be an element of importance. R. C. Cram, Brooklyn Rapid Transit System, said that the question of flange thickness was one to be determined largely from usage and experience.

Ralph D. Hood, Haverhill, Mass., held that in the association discussions and studies the aim should be to establish standards for the future to which all properties when reconstructing could work. L. A. Mitchell, Union Traction Company of Indiana, Anderson, Ind., argued for a larger flange and corresponding flangeway. Mr. Gove said that the one-wear wheel was increasing in popularity and consideration for that also must be made.

After further discussion the committee recommendation on this matter was approved.

Mr. Adams did not think that the committee had gone far enough in shortening axles. Every axle possible should be shortened because of the need for saving weight. A shorter axle meant that every crosspiece in the truck could be shortened. F. R. Phillips, Pittsburgh Railways, said that the committee should not overlook those several large companies which operated wide-gage track. The present standard axles can now be used with wide gage equipment, but if they were shortened it would mean new axle designs. The committee's recommendation on axles was then approved.

After an abstract had been presented by Mr. Gove, the association next approved the committee's recommendations regarding the standardization rules of the A. I. E. E.

As previously mentioned in regard to electric-car ventilation, the committee on this subject held that definite recommendations could not be made at this time, and therefore confined its report to a general review of the subject.

Mr. Adams recited his experience with ventilation intakes. Floor intakes brought about difficulty from street dust, but on studying the subject he had found a point at the side of the car where there was little dust. Therefore the intakes on later cars had been located on the sides of the cars, and this was found satisfactory.

That part of the report on lighting was read by W. E. Johnson. No discussion followed.

On the subject of carbon brushes, E. H. Martindale, National Carbon Company, Cleveland, Ohio, said that the Electric Power Club and the carbon brush manufacturers had been working toward common standards which had been submitted to the A. I. E. E., and which, after further consideration, would no doubt be submitted to the Engineering Association.

Mr. Gove then read an abstract of the committee's report on the M. C. B. brass for heavy electric traction. L. M. Clark, Indianapolis Traction & Terminal Company, pointed out that certain changes were necessary in design in order to facilitate the removal of the brass from the box. These could easily be made and, therefore, the association approved the committee's report and passed an amendment providing for the changes.

W. E. Johnson, Brooklyn Rapid Transit System, read the section of the report on the design of limit-of-wear gage for standard flange contours. F. J. Foote, Ohio Electric Railway, inquired why two general designs were shown. Mr. Johnson replied that the 1 13-16-in. gage followed the Central Electric Railway Association designs, but that the general shape of both gages could be made uniform. The association approved the designs recommended.

Mr. Johnson stated that on account of the patent situation, the committee wished to withdraw its recommendation on the subject of design of trolley-catcher socket. The sections of the report on painting of cars and consideration of a code of safety rules were read, as was also that on the investigation of rail corrugation in its relation to the use of rolled and forged steel wheels as opposed to the use of chilled cast-iron wheels.

Owing to the lateness of the hour, the report of the committee on buildings and structures was postponed to the Friday afternoon session.

Friday's Session

This session of the Engineering Association was opened with the report of the committee on buildings and structures, which had been carried over from the previous session.

BUILDINGS AND STRUCTURES

Of the topics assigned for its consideration this year the committee on buildings and structures found the following the most fruitful for study: Designs for fences; general specifications and form of contract for railway structures; provision for contraction and expansion in restrained concrete structures, and oil houses and their equipment.

Under the first head a number of dimensioned drawings of fences were given, together with brief statements of their characteristics. The general specification and form of contract which had been recommended for adoption in 1915 were submitted again in revised form. The revisions had been made after securing comments from many member companies, and the committee stated that it had now no hesitancy in submitting the form for adoption as a recommended specification and form of contract.

On the subject of providing for expansion and contraction in restrained concrete structures the committee recommended that its further consideration be suspended for the present on account of the exhaustive nature of the 1915 report. However, some drawings were submitted showing a few special problems that have occurred in actual practice and the methods of solution. One showed a method of waterproofing either a transverse or longitudinal expansion joint on a bridge structure. The success of these joints is believed to be due to placing rolls of plastic waterproof membrane in the copper "V" pieces which connect the end of the bridge and the abutment before filling the joints with plastic waterproof compound. The membrane gives the mass more body and allows the use of a softer mastic than otherwise.

Another drawing, reproduced herewith, showed a method of waterproofing a subway manhole where a sewer or water pipe of necessity passes through the structure and also several special cases of waterproofing expansion joints.

A third drawing showed a method of waterproofing the bases of iron or steel columns, the following explanation being given: It is well known that when

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concrete or other protection is built up around columns in streets or other exposed places, due to changes in grade or from other causes, in order to act as wheel guards or other protection, it is impossible to maintain a tight joint between the concrete and metal due to difference in the coefficient of expansion of the two materials, with the consequent rapid deterioration of the metal due inevitably to moisture collecting between the two. It so happens that the peculiar properties of some waterproofing compounds, especially that used in the case illustrated, is that the waterproofing material can be made to adhere equally well to both the metal and concrete, consequently positively sealing the opening, no matter how small. Of course, the compound is applied to the steel before pouring the concrete. This makes no difference as it has always been proved that the concrete, when set, has become firmly bonded to the waterproofing compound.

The fact that some materials bond to steel and iron has been found to eliminate the annoying troubles sometimes experienced in keeping steel work painted for appearance or for protection. Two examples illustrate this, one being the case of exposed bottom flanges of a bridge or floor structure and the other being an otherwise non-protected girder or beam. One treatment with waterproofing compound will outlast many coats of paint.

The last topic covered by the committee was oil houses and their equipment. A form of oil house was recommended to meet the requirements of municipalities and insurance companies. Two forms were suggested, one with tanks above, and the other with the tanks below the floor. It was stated that a list of manufacturers of oil pumps, metal tanks, waste bins and similar apparatus could be obtained from the secretary of the association or from the local board of underwriters having jurisdiction.

The report was signed by C. F. Bedwell, chairman; R. C. Bird, H. E. Fink, C. S. Kimball, James Link, F. F. Low, William Roberts, H. G. Salisbury and H. G. Throop.

G. W. Palmer, Jr., Bay State Street Railway, Boston, Mass., opened the discussion and told of his company's experience in preparing a contract form similar to this one. He said that they had gone to a great deal of trouble to develop a form of contract which was almost identical with the one submitted in the committee report. If the committee's form had been available at the time his company was endeavoring to develop one, it would have saved an immense amount of detail work.

H. H. Adams, Chicago Surface Lines, speaking as chairman of the standards committee, said that it had not acted on the recommendation of the buildings and structures committee because his committee did not deem it a good policy to include matter of this kind in the manual. The contract form submitted by the 1914 and 1915 committees had been sent back because the standards committee did not think it suitable for adoption as a recommended specification. However, as the general specification form of contract already appeared in the Manual under the heading "Miscellaneous Methods and Practices," Mr. Adams agreed that the form as revised by this committee should replace the one now in the Manual. Accordingly the recommendation of the committee was approved and the remainder of the report accepted.

HEAVY ELECTRIC TRACTION

The committee on heavy electric traction recommended further consideration of the standard diagram for clearance of overhead working conductors and stated that it approved the proposed standard clearance diagram for block signals submitted by the block signal committee. The committee indorsed the standardization rules of the American Institute of Electrical Engineers and gave an outline of its activities in connection with the proposed safety code of the United States Bureau of Standards. In addition there were submitted tabulated data regarding electric locomotives used on main line railroads in America and in Europe similar to those submitted in last year's report, these tables having been revised and corrected where necessary. A new table covering data regarding electric locomotives on the various interurban railways in America was presented. The report was signed by E. R. Hill, chairman; E. B. Katté, Hugh Hazleton, W. S. Murray and C. H. Quinn.

G. W. Palmer opened the discussion by calling attention to the fact that the power distribution committee had not accepted the standard rules of the A. I. E. E. and the heavy electric traction committee and had approved them without change. C. L. Cadle, chairman of the power distribution committee, explained that its action on the standardization rules had been governed by the fact that they did not conform to the standards already adopted by the association. Mr. Hill explained that his committee's action was only intended as a general indorsement of the rules. This conflict in the action of the two committees was therefore referred to the executive committee for reconciling the differences. This closed the discussion and the report was accepted.

C. W. Stocks next read the report of the committee on electrolysis, which was simply one of progress, and it was received as information. C. R. Harte, Connecticut Company, New Haven, Conn., presented the report of the committee on resolutions, and H. H. Adams that of the committee on nominations, which were unanimously approved.

President Lindall, before turning the gavel over to incoming President F. R. Phillips of the Pittsburgh Railways, thanked the members for the assistance they had given him during the past year and urged their co-operation for the new president. R. C. Cram, Brooklyn Rapid Transit Company, Brooklyn, N. Y., and Mr. Cadle escorted President-elect Phillips to the chair. In accepting the honor conferred on him Mr. Phillips said that since many of the committees believed that too many subjects had been assigned to them from year to year, it would be his policy to reduce the number so that more attention could be given to the details of the subjects considered.

NEW OFFICERS

The report of the nominating committee was then presented, and in accordance with its recommendations the following were elected: President, F. R. Phillips, superintendent of equipment Pittsburgh Railways, Pittsburgh, Pa.; first vice-president, G. W. Palmer, Jr., electrical engineer Bay State Street Railway, Boston, Mass.; second vice-president, W. G. Gove, superintendent of equipment Brooklyn (N. Y.) Rapid Transit System; third vice-president, E. R. Hill, consulting engineer Norfolk & Western Railway, New York City; secretary-treasurer, E. B. Burritt, 8 West Fortieth Street, New York City; members of the executive committee, the officers and C. S. Kimball, engineer maintenance of way Washington Railway & Electric Company, Washington, D. S.; C. L. Cadle, electrical engineer New York State Railways, Rochester, N. Y.; C. F. Bedwell, assistant engineer Public Service Railway, Newark, N. J.; J. W. Welsh, electrical engineer and traffic agent Pittsburgh Railways, Pittsburgh, Pa.

This report of the nominating committee was signed by Paul Winsor, chairman; E. O. Ackerman, William S. Twining, A. T. Clark and S. L. Foster.

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Transportation and Traffic Meetings

PRESIDENT H. A. NICHOLL

In Addition to the Committee Reports, the Association Had a Number of Contributed Papers, Which Added to the Interest of the Meetings. The Discussion Brought Out Many Valuable Ideas Regarding the Training of Men for Supervisory Positions, the Practical Aspects of Public Work, Etc.

THE annual meeting of the Transportation & Traffic Association was called to order by President H. A. Nicholl, who first read his annual address. An abstract of this follows:

PRESIDENT NICHOLL'S ADDRESS

At the opening meeting of the Transportation & Traffic Association held Monday afternoon, President Nicholl spoke first of the convention last year at San Francisco, which he said not only gave an opportunity to Eastern members to see a wonderful country under most favorable conditions, but the place at which it was held was particularly convenient for the members located west of the Rocky Mountains. The great hospitality of these members was greatly appreciated and will long be remembered. The large number of jitneys seen in the Western cities impressed those who participated in the trip and the Eastern members of the association sympathize with those companies which have to contend with this unfair competition.

President Nicholl then spoke about the change in the organization of the executive committee by which the first vice-president takes a more active part in the work of the association and will report to the president on June 1 of each year when he will recommend a list of appointments for the new committee on subjects. He will also report at the last meeting of the executive committee a tentative list of the recommended committee appointments for the ensuing year. In accordance with this change, the new subjects committee has already been appointed for the ensuing year and will undoubtedly be able to assign the work to the other committees earlier than heretofore. Other changes in the organization of the Association consist of the abolition of the board of accident control and the appointment in its stead of a joint committee designated as the joint claims-transportation committee, the appointment of a committee on the operation of motor vehicles, one on company publications, a joint committee with the Engineering Association to co-operate with the signal committee of the American Railway Association to secure a uniform code of rules for block signals and to coordinate the work of the two associations, and the committee on the cost of rush-hour service.

Mr. Nicholl then spoke briefly of the work of each committee to report this year and of the special papers which had been prepared for the program. He also urged during the year the co-operation of the different member companies with the committees and the attendance of members at meetings of committees.

PROGRAM

MONDAY

Annual Address of the President.
Annual Report of the Executive Committee.
Annual Report of the Secretary-Treasurer.
Reports of committees:
  Standards—L. H. Palmer, chairman.
  Construction of Schedules and Time-tables—Edward Dana, chairman.
Joint Session with Claims Association.
Reports of committees:
  Claims-Transportation—R. P. Stevens, chairman.

TUESDAY

Reports of committees:
  Passenger Traffic—J. K. Punderford, chairman.
  Uniform Definitions—J. V. Sullivan, chairman.
PAPER—"The Development of Schedule Makers," H. C. Donecker.
PAPER—"Training Men for Supervisory and Executive Positions." L. C. Bradley.
Joint Session with Engineering Association.
Reports of committees:
  Block Signals—J. M. Waldron and J. W. Brown, co-chairmen.
  Standards, Engineering—(On recommendations contained in above report).
  Transportation-Engineering—F. R. Phillips and W. A. Carson, co-chairmen.

WEDNESDAY

Joint Session with Accountants.
Reports of committees:
  Cost of Rush Hour Service—J. V. Sullivan, chairman.
  Fares and Transfers—C. S. Ching, chairman.
PREPAYMENT SYSTEMS—General discussion.
Reports of committees:
  Express and Freight Traffic—F. D. Norviel, chairman.
ADDRESS—"Some National Issues in Local Street Railway Franchises," Prof. Clyde L. King.

THURSDAY

Reports of committees:
  Rules—C. E. Morgan, chairman.
PAPERS—"Company Publications": "Their Use and Value," F. W. Hild, T. S. Wheelwright. "Their Preparation and Publication," Leake Carraway, James H. Braden.
General discussion.
General business.
Election of officers.
Installation of officers.

In conclusion he referred to the immense increase in the number of automobiles and consequently in accidents from them, and expressed his belief that an effort should be made by the association as well as by the parent association to see that proper legislation is enacted, making it a penal offense for an automobile to be operated across a steam or electric railway track without first coming to a stop to see that the way is clear and to be operated by anyone who is not a licensed chauffeur. Automobile accidents in cities from which reports were available showed that up to Sept. 1 of this year 1040 persons had been killed and more than 8000 injured, a larger number by far than those who had been killed and injured in the Zeppelin raids in England. This indicates that the automobile is much more dangerous than the Zeppelin.

In conclusion Mr. Nicholl expressed his appreciation for the co-operation of the officers, secretary of the association and the committeemen and members as well as for the honor conferred upon him at San Francisco.

Following the president's address, Secretary E. B. Burritt presented the report of the executive committee, which consisted of minutes of the two meetings held during the year. He also read his report as secretary-treasurer. From this it appeared that the committee had expended about $1,425 out of $2,750 appropriated. The membership on Sept. 30, 1916, was 201 individuals,

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a loss of 272 as compared with Nov. 1, 1915. Two hundred and forty-eight had been transferred to company section membership, of which company section members there were, on Sept. 30, 669.

TRANSPORTATION & TRAFFIC STANDARDS

L. H. Palmer, Eastern Pennsylvania Railways, Pottsville, Pa., then presented a report of the committee on standards.

The committee on standards stated in its report that, at the stated meeting held in August at New York City, formal action could not be taken by the committee because no quorum was present. However, the reports of six standing committees had been considered and had been forwarded to the executive committee of the association with the statement that, in the opinion of the members of the standards committee attending the stated meeting, the reports were in form to be submitted to the convention. The report stated also that a start had been made on the compilation of a syllabus covering the proceedings of the association since its inception, and it was hoped that this work would be completed during the ensuing year. The report was signed by L. H. Palmer, chairman; J. N. Shannahan, vice-chairman; A. H. Ford, C. H. Harvey, C. V. Wood, H. C. Donecker, J. K. Punderford, F. D. Norviel, N. W. Bolen, C. E. Morgan and Edward Dana.

The discussion of this report was opened by H. C. Donecker, Public Service Railway, Newark, N. J., who emphasized the point that the association is not getting the most possible from its committee work, although he did not criticise the work of the present committees. Operating men are busy and have difficulty in getting to committee meetings, so that even though committee members are carefully selected the results are not always satisfactory. Consistency is an important factor in committee work. It is evident that in the past the attempt has been made to do too much committee work, and in the future the committee work will be simpler. He expressed his belief that the member companies should consider the committee work of employees to be a part of their regular duties.

L. C. Bradley, Houston (Texas) Electric Company, referring to the work of the standards committee, said that this committee is in a position to understand the detail of committee work and its comments should be valuable. Men who accept committee appointments should realize their responsibilities. Committee work is an honor and a duty, and the success of the association work depends on faithfulness. C. Loomis Allen, Allen & Peck, Syracuse, N. Y., said that the association had done fine work but so far has merely scratched the surface. Referring to the suggestions of the committee, R. B. Stearns, Milwaukee Electric Railway & Light Company, said that executives do not lack interest in the work of the association. Although representatives are harassed with problems, managements are always willing to assist in solving problems, particularly those of this association. The trouble with the committee work has been that the shots are too scattered and the results indecisive. Some subjects should be closed out and a follow-up system of committee work should be inaugurated.

J. E. Gibson, Kansas City (Mo.) Railways, referred to the difficulty of getting full attendance of committee meetings. Companies should send men not only to convention but also to committee meetings. H. B. Potter, Boston (Mass.) Elevated Railway, suggested that members of the executive committee should be assigned to ex-officio position on committees, where they could give valuable assistance. Mr. Stearns stated that while this year's committee work was very satisfactory, most of the work was done by the chairmen. J. E. Duffy, New York State Railways, Syracuse, N. Y., thought that geographical restrictions prevent regular attendance at committee meetings. A. Swartz, Toledo & Western Railway, Toledo, Ohio, suggested that members might voluntarily express their preference for committee work. J. L. Adams, Philadelphia & Western Railway, Upper Darby, Pa., believed in small committees, but J. R. Harrigan, Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., opposed a reduction in the size of committees for fear of not having representative membership. Mr. Donecker explained that the committee recommended was intended to secure closer cooperation between the member companies and the committees. The report of the committee was then adopted.

CONSTRUCTION OF SCHEDULES AND TIME-TABLES

The committee on construction of schedules and time-tables, besides giving a summary of the work of previous committees on this subject, entered a plea for more permanence in the membership of committees. This committee has a membership of seven, but during the past seven years thirty-three different individuals have served on the committee. The longest period of service was three years, and two members served for this time. Nine members served for only two years, and twenty-two members served for only one year.

The first subject considered by the committee was the skip-stop development. Of sixty-eight companies replying, thirty-five companies as yet have made no move to reduce the number of stopping places on their lines, whereas thirty-three have made such an effort. Of the number that had tried the plan, fifteen indicate in a general way that a net saving has resulted, but eighteen had compiled no definite data. The committee believes that any method of operation such as this, which provides a more efficient service, must ultimately be successful even where there is a minority opposition, but, like rerouteing, it is often difficult to introduce, and where marked economies result, the companies could well allow a portion of the saving to revert to an increase in the service and show the public that this has been done. The committee also commends the ELECTRIC RAILWAY JOURNAL for reprinting in folder form several vital articles on this subject published in the issue of Jan. 1, 1916.

Four methods of skip stop are classified, namely: (1) The removal of every other stop inbound and outbound, placing the outbound stops at streets where the inbound stops have been eliminated. (2) The elimination of certain stops during rush hours by stenciling white bands on the poles with the statement that within certain hours the cars will omit that stop. (3) The designation by signs on the cars that at even or odd numbered streets, the car will not stop, as the case may be. (4) The operation of express cars with so-called locals.

The company urges the adoption of a standard interurban time-table and submitted a form which it recommended. Of the ten companies which replied to requests for criticism on the table, four were very much opposed to the practice of showing trains in one direction on one side of the table and those in the opposite direction on the reverse side. They preferred that the stations be placed in the center of the sheet, and the time of trains in one direction be shown to the left reading down and the time of trains in the opposite direction shown to the right reading up. The committee cannot agree that there is sufficient to be gained by this arrangement to warrant it, as it thinks the practice of reading up an unnatural one.

In its study of running time, wide variations were

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found. Some companies report that they check running time between specific points as often as three times a day, while others check once a year only. Various methods are used for checking. No change in running time throughout the day or year was reported by twenty-eight companies, whereas forty-four report variations during the rush hours or after 8 p. m., and one company varies its running time seven times a day. The importance of the subject to economical operation is emphasized, and the committee says that it could have found work enough to concentrate its entire energies upon this subject or upon any one of the subjects assigned to it.

Under the study of traffic regulations, a summary is given of various municipal traffic regulations that are in force. Attention is also called to the Standard Code of Traffic Regulations adopted by the Safety-First Federation of America. In the opinion of the committee the efforts of this organization in this direction should be approved.

The report was signed by Edward Dana, chairman; J. P. Kineon, Herman E. Hicks, H. F. Fritchs and Fred Cooper.

The discussion was opened by J. J. Dempsey, Brooklyn (N. Y.) Rapid Transit System, who brought out the importance of careful study of the skip stop and was followed by J. V. Sullivan, Chicago (Ill.) Surface Lines, on the same topic. Mr. Sullivan said that education on the skip stop is necessary. The skip stop is a move in the right direction, and a study of several cities where the number of stops have been diminished showed that the public would adapt themselves to the change. Insistent property owners sometimes oppose these skip stops and compromises should be used instead of arbitrarily locating stops. The public should be fully informed of the savings and explanations of the advantages to the public should be made. Experiments should be continued long enough to give the plan a fair trial, and stops should be eliminated with reference to the effects on business districts. Mr. Dana gave an example of the solution of the general problem where local and express two-car train schedules had been introduced.

R. T. Sullivan, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, pointed out that skip stops increase the inconvenience of service, which is important in view of the auto competition. On the same point J. F. Starkey, Lake Shore Electric Railway, Sandusky, Ohio, said that jitney competition in Sandusky, Ohio, had impressed on the management the importance of stopping as frequently as possible. Mr. Stearns indorsed the recommendations of the report, and stated that it represented an excellent piece of work. G. A. Richardson, Puget Sound Traction, Light & Power Company, Seattle, Wash., said that the skip stop was used some time ago in Seattle, and that the people in outlying districts liked it. He wanted to know, however, how the people in the inner part of the skip stop zone could be pleased. Alexander Jackson, Public Service Railway, Newark, N. J., said that the success of the skip-stop system will depend largely on the manner in which it is inaugurated, it should be done on one line at a time, and should begin on a line with short blocks. Suitable signs should be erected, and there should be considerable advertisement prior to the installation of the system. Express service could hardly be operated on lines where the headway is less than 5 minutes.

Regarding interurban time tables, Mr. Jackson took exception to a number of points in which he thought the form submitted by the committee was deficient. These referred to durability, the numbering of turnouts on interurban lines, and a number of typographical details. He objected to the printing of time tables in such a form as to show the trains in one direction on one side of the table and those in the opposite direction on the reverse side.

Before proceeding to the joint meeting with the Claims Association, President Nicholl announced the appointment of the following committees: On resolutions, J. N. Shannahan, E. C. Spring and P. N. Jones. On nominations, Dana Stevens, H. C. Page and S. W. Greenland.

CLAIMS-TRANSPORTATION

The joint committee on claims-transportation presented a progress report stating that it was investigating the cost of moving-picture reels and was developing a plan of operation for their use in electric railway safety work, since it had been found that seventy-three member companies desired to use such pictures, providing they could be displayed at a reasonable expense. As soon as full information on this subject has been obtained it will be put in the form of a further report and a recommendation by the committee. The committee had nothing to recommend at the present time in connection with co-ordination with the street traffic committee in the general safety-first movement. The report was signed by R. P. Stevens, chairman; E. F. Schneider, Edward A. Maher, Jr., W. F. Weh, S. B. Hare and J. J. Reynolds.

Mr. Stevens explained that the report was a progress report. The committee had conducted a great deal of correspondence with moving picture concerns, but these manufacturers were so busy that they had not given the matter as full attention as the committee hoped they would later. The committee had also corresponded with railway companies which had prepared such films, but with one exception these companies had refused to loan their films. Some 100 reels, however, were available at present. Seventy-three railway companies had written that they would be interested if films could be obtained at a reasonable expense.

E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa., said his company had had considerable experience with reels and had made one of its own at a cost of $2,300, although this reel was for advertising purposes and not an accident reel. His company had thought of preparing such a reel, but realized that it would be very expensive and after once shown it would be obsolete. It was found better to hire reels than to make them or have them made. There was also the question as to how these reels should be shown. At first the moving picture people raised some objection because the exhibits made of these reels were free. The company told them, however, that being a different class of picture, it would attract people who rarely or never went to moving picture shows and encourage the regular business, so that the company had no difficulty in hiring halls and operators. The speaker recommended hiring experienced operators as economical in the long run. He believed that the pictures did a great deal of good.

H. V. Drown, Public Service Railway, Newark, N. J., said that his company in 1911 had a reel made by the Edison Company and later this reel was released throughout the country. It was produced at no cost to the railway company except the loan to the picture company of its equipment, men, etc. This year the company had endeavored to repeat the contract with the Edison Company, but was unsuccessful and had arrangements with another concern to produce a reel. The experience of the company had been very satisfactory with these reels. It should be remembered, however,

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that they are perishable and wear out, and that may be one reason why companies do not care to loan them.

Alfred Sweeney, Portland, Me., asked if it was considered worth while to show accident reels unless an educational campaign was followed. Mr. Spring thought that it was much better to carry on such a campaign at the same time.

H. M. Braun, East St. Louis & Suburban Railway, suggested that it was most desirable to educate the trainmen first before starting in to educate the public.

H. C. Mallon, Chicago Elevated Railway, said that three years ago some stereopticon slides were prepared on his lines and that the moving picture manufacturers had offered to make some moving picture films, but could give no guarantees that they would be shown in the theaters. It is hard to get realistic views because the men realize that they are only acting, and to be attractive the picture must be realistic. He believed, however, that it was possible to get such views and referred to some very good views made of the work by the telephone company in Chicago to show the problems of telephone operation.

Tuesday Afternoon Session

The second session of the Transportation & Traffic Association meeting was held in accordance with the program, except that the paper of H. C. Donecker, Public Service Railway, Newark, N. J., scheduled for Monday was added.

PASSENGER TRAFFIC

The first report presented was that on passenger traffic, which was abstracted by J. K. Punderford, Connecticut Company, New Haven, Conn.

This committee presented a digest of work of previous committees on the subject, and in its own report discussed first the subject of interline passenger traffic arrangement between interurban and steam roads. Of 120 member companies submitting answers to the questions sent out, 17 per cent have traffic arrangements with steam roads, and of these nearly one-third, or 5 per cent, have reciprocal arrangements with all steam roads in their respective territories. Although it is generally said that steam roads do not interchange with electric railways, sixteen of the large steam railroads do interchange to a greater or lesser extent. Most of the interline arrangements were initiated more by the steam roads than by the electric roads, but they have been remunerative and satisfactory to both, as well as to the public. Rates have been usually constructed on the sums of local fares, although in some cases arbitrarily constructed basing rates have been used. Most of the lines using these basing rates have established them by prorating on rates, although some have prorated on mileage. Outside of Iowa there has been very little exchanging of mileage with steam railroads. The committee recommends that renewed efforts be made by electric railway officials to extend their traffic arrangements with steam roads.

Although most electric railways report that they carry baggage free up to 150 lb. and up to $100 value, the committee finds that some electric railways charge 25 cents for baggage of 150 lb., and believes that all should do so. It recommends, therefore, that a committee be appointed to meet with a like committee from the steam roads to establish a universal charge for the handling of baggage. It also recommends that through rates, when constructed on basing rates, should be prorated on mileage and that efforts be made to develop the interchange of mileage with steam roads.

The examination of the committee of the subject of open cars shows that the number of such cars in service is rapidly diminishing, and that practically all of the present users of such cars contemplate discontinuing their use, at least as rapidly as the equipment becomes unserviceable.

The committee also made an examination into rates charged for special car service, but finds an alarming lack of uniformity and one for which there is no justification.

The committee consisted of J. K. Punderford, chairman; B. E. Wilson, Charles Currie, E. M. Walker, J. S. Keys and P. P. Crafts.

In connection with the report, Mr. Punderford said that the committee had studied the subject of special car services, and found a great lack of uniformity as to rates charged by different roads for the same services. While the report contained no recommendations, he raised the question of the desirability of having a more rational basis for such services. C. R. Gowan, New York State Railways, Syracuse, N. Y., described the experience of his company in interline arrangements with the New York Central and the Ontario & Western. Some years ago his company had arrangements which placed it under the jurisdiction of the Interstate Commerce Commission. This proved quite a burden and was discontinued on March 1, 1913, since which date the arrangements have applied only to intrastate business. The results are very satisfactory, as a fairly good business is done, and the interchange arrangement is convenient to the public and hence promotes traffic. On the subject of advertising, Mr. Gowan thought each carrier should bear its own expense. The relations of his company with the steam roads have been pleasant. Regarding carrying of baggage he said that on one line baggage is charged for, while on another 150 lb. are carried free. Conditions determine this matter.

B. E. Wilson, New York State Railways, Rochester, N. Y., said that his company does some interchange business between Geneva and Rochester, this being intrastate only. He suggested that the subject of excess fare might profitably be studied to determine what companies can do to compel passengers to purchase tickets at stations. F. D. Norviel, Union Traction Company, of Indiana, Anderson, Ind., said that he was interested in the report because it covered conditions in the central states. He said that his company has interline arrangements with a number of steam roads. At first the local tariffs were combined, but now the tariffs are all practically the same as those prevalent among steam roads. He thought that the matter of special car rates must be controlled by local conditions.

The next speaker was J. F. Starkey, Lake Shore Electric Railway, Sandusky, Ohio, who said that his company gets a great deal of business from the Clover Leaf Line, and also has an arrangement with certain others. On the subject of advertising interline business, he thought that the initiating line should bear the expense. On his property, the special car rate is based on fifty passengers, a minimum rate of $15 being charged. This he considered too low. Above 50 passengers the fare is prorated. He wanted to know if roads which carried baggage on limited cars found that handling baggage at stations interfered with schedules.

J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., said that on his road fifty passengers is a basis for special car rates with a minimum of $25 total, and 50 cents per passenger. Baggage must be carried free by commission ruling.

Mr. Donecker put in a good word for the open car, objecting to the part of the report stating that the open

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car is out of date. The Public Service Railway some years ago had no fixed policy regarding open cars, but after a careful study of local conditions had lately decided that open-car operation should be continued on certain lines. The railways must develop new business in competition with automobiles, the jitneys and amusement attractions. The open car can be a factor in this, and the experience of the past summer has shown that the new cars of this type recently put into operation on the Public Service Railway has enabled the company to meet this competition. The study of the subject should be carried further.

W. J. Whiteside, International Railway, Buffalo, N. Y., told of the success of his company in developing interline business in connection with excursions to Niagara Falls. He thought that it was only necessary to go after this business. Mr. Norviel, referring to the Niagara Falls excursion business, in which his company is interested, said that he had found that through routing of cars over electric lines pleased the people better than combined electric and steam interline arrangements. He also believed the subject should be studied further.

UNIFORM DEFINITIONS

The subject of uniform definitions was brought up for the fourth time by the committee that had been assigned in 1912 to develop a code of terms used in electric railway work, and a request was made that some definite action be taken on the matter by the convention. The committee presented as an appendix to its report a list of definitions that had been recast from the list submitted to the 1914 convention, these being offered for the approval of the convention. If, however, the work of fixing a more complete list was to be undertaken to the various associations in accordance with the request of the committee, it was proposed that action on the list be deferred until some future convention, when a general report on terminology might be ready for discussion. The report was signed by J. V. Sullivan, chairman; W. C. Greenough and Frederick Nicholas.

In order to carry out the recommendation of the committee, L. H. Palmer, Eastern Pennsylvania Railways, Pottsville, Pa., moved that the report be referred to the executive committee for consideration, with the recommendation that a committee of representatives of the several associations be appointed to study the whole subject of uniform definitions. This motion was carried.

After the presentation of the above report, H. C. Donecker, Public Service Railway, Newark, N. J., read his paper on "The Development of Schedule Makers." This is abstracted elsewhere.

The discussion of Mr. Donecker's paper was opened by Edward Dana, Boston Elevated Railway, who emphasized the importance of this subject in view of the fact that men must be able to explain the matter of schedules to public bodies. There are many factors involved in making of schedules, at least six weeks being required to turn over the timetables of a property like the Boston Elevated Railway. The company should provide reasonable forces for this department, and should realize that days or even weeks may be necessary in making comparatively small changes in the schedules. Many railway officials do not realize this fact.

Alexander Jackson, Public Service Railway, Newark, N. J., reiterated Mr. Dana's statement regarding the difficulty of turning over the timetable of a railway. So many details are involved in this, on a large property, that the six weeks specified by Mr. Dana are none too much. Much money can be wasted through the use of improper timetables. They should be so made that the public is satisfied that the company is doing its best to give good service, that employees will be satisfied through reasonable wages and working conditions, and that due consideration may be paid to the income. There are evidently many problems involved in the making of schedules.

L. C. Bradley, Stone & Webster, Texas District, Houston, Tex., then read a paper on "Training Men for Supervisory and Executive Positions," which is abstracted elsewhere in this issue.

R. T. Sullivan, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, opened the discussion. He indorsed the qualifications set forth in the paper, but was of the opinion that hopeful-mindedness should be added. This quality was of vital importance in operating and supervisory officials in order to counteract the effect of ever-present public criticism. A cheerful and hopeful official makes a much better man for his company in its relations with the public, Mr. Sullivan said, while surprised at Mr. Bradley's statement of the failure of boyhood leaders to make good, was of the opinion that this was due to inordinate ambition. Selfish motives frequently governed their decisions rather than the general good of the company by which they were employed. Mr. Sullivan did not believe that limit should be placed on the class of employees to be trained for supervisory and executive positions, but that the road should be kept open to all who were ambitious. In closing he said that social gatherings were also very important in developing *esprit de corps.* This cannot be developed by facts and figures, but must come as a result of social intercourse. The day of the aloof, domineering executive officer is over, and he has been succeeded by one who looks upon his organization as a part of his family.

S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, complimented Mr. Bradley's paper very highly, and he was of the opinion that much of it should be preserved for subordinate employees. Continuing, he said that men are sometimes promoted from the ranks and their whole attitude of mind toward their subordinates changes. Frequently, this created ill feeling among the employees and trouble followed. Mr. Hutchins was of the opinion that the paper prescribed a method for training employees that would not produce that sort of an official.

At this point President Nicholl turned the meeting over to President Lindall of the Engineering Association, who in turn opened the joint session. The proceedings of this are covered in the Engineering Association report for Tuesday afternoon.

Wednesday's Session

The Transportation & Traffic Association met on Wednesday at 2.30 p. m. in a joint session with the Accountants' Association to consider committee reports on the cost of rush-hour service, fares and transfers, and express and freight traffic, and also to discuss prepayment systems and to listen to an address by Prof. Clyde L. King, Wharton School of Commerce, University of Pennsylvania, on "Some National Issues in Local Street Railway Franchises." The report of the committee on rush-hour service was read by J. V. Sullivan, Chicago Surface Lines, chairman; the one on fares and transfers by J. T. Moffett, Washington (D. C.) Railway & Electric Company, and the one on express and freight traffic by F. D. Norviel, Union Traction Company of Indiana, chairman.

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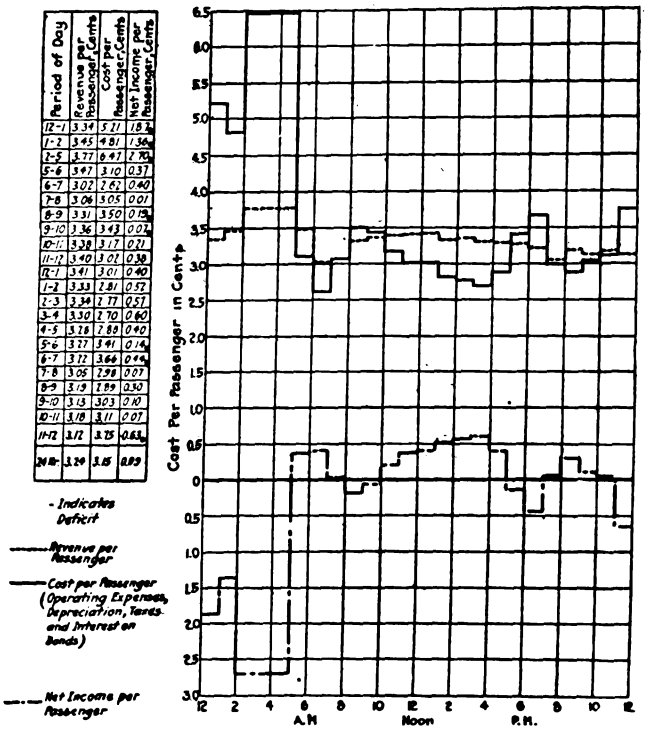
COST OF RUSH-HOUR SERVICE

The report of the committee on the cost of rush-hour service was more in the nature of a progress report, not aiming to give definite conclusions as to the best method of proving such cost. The committee suggested to member companies (except those having elevated or subway lines) a tentative method of computing rush-hour cost, but the three reporting companies whose data forms the greater part of the committee's report deviated more or less from the suggested method, and the result was a varying ratio between rush and non-rush-hour cost. The committee presented in detail the data submitted by each company, with description of the methods of computation used, and also distribution data regarding fixed and variable expenses from the publication of the Bureau of Fare Research on "The Cost of Urban Transportation Service." One of the most interesting exhibits presented by one company, the committee stated, was in the form of a diagram showing the revenue, cost and net income per passenger for a



Period of Day	Revenue per Passenger-Cents	Cost per Passenger-Cents	Net Income per Passenger-Cents
12-1	3.39	5.21	18%
1-2	3.45	4.81	136%
2-5	3.77	6.47	2 70%
5-6	3.47	3.10	0.37
6-7	3.02	2.62	0.40
7-8	3.06	3.05	0.01
8-9	3.31	3.50	0 15%
9-10	3.36	3.43	0.07%
10-11	3.38	3.17	0.21
11-12	3.40	3.01	0.39
12-1	3.41	3.01	0.40
1-2	3.33	2.81	0.52
2-3	3.34	2.77	0.57
3-4	3.30	2.70	0.60
4-5	3.28	2.88	0.40
5-6	3.27	3.41	0.14
6-7	3.12	3.66	0.54
7-8	3.06	2.98	0.07
8-9	3.19	2.89	0.30
9-10	3.13	3.03	0.10
10-11	3.18	3.11	0.07
11-12	3.12	3.75	0.63%
24 Hr.	3.24	3.15	0.89

CHART SHOWING REVENUE, COST AND NET INCOME PER PASSENGER ON TYPICAL WEEK-DAY FOR ONE COMPANY

typical week day. The accompanying reproduction of this shows a deficit in hours for the periods from 12-1, 1-2, 2-5, 8-9, 9-10, 5-6, 6-7 and 11-12.

In the opinion of the committee the general adoption of a plan of "day-light saving" probably would not assist materially in lowering the cost of rush-hour service, but its application in separate factories and stores here and there would doubtless be helpful. In conclusion, the committee stated that it is apparent to railroad men that any increase in business can decrease the cost of production only when the increase is distributed so as to make possible a more efficient use of existing equipment. Whenever that increase is concentrated so as to require more equipment, the cost of production per unit of service is increased, and consequently the cost of peak-load service is higher than that of normal service. A rate schedule, to be equitable to all consumers of a public utility, should make persons who need and create the peak-load service pay a price which will be commensurate with the extra cost of the service they are receiving. That principle is nearly always recognized in the making of electric lighting and power rates, but it has rarely been observed in rate making for electric railways. If it is not possible, however, for a street railway to charge a higher rate during rush hours, it does seem reasonable that the company be allowed to charge the same rate of fare as during the non-rush hours, rather than a decreased rate, as is done by workingmen's and other forms of tickets which are good only during rush hours. Similarly, the objection holds good that the return on investment should not be further impaired by requiring the use of more cars during the peak hours where service is already highly concentrated.

The committee recommended that the study be continued next year by a larger committee, having representatives from the Transportation & Traffic, the Engineering and the Accountants' Associations; that the member companies assist more actively in furnishing the information requested; that future studies of the problem include a separate investigation of rush-hour costs on subway and elevated lines, and that the American Association be urged to assist in promoting an appreciation by large industrial establishments of the acuteness of the rush-hour problem and the possibilities of improving rush-hour conditions by adjusting the opening and closing hours for work.

The report was signed by J. V. Sullivan, chairman; A. T. Warner and H. B. Potter.

DISCUSSION ON RUSH-HOUR COSTS

In opening the discussion of this report, Edward Dana, Boston Elevated Railway, stated that the committee had taken a long step forward in the analysis of the cost of rush-hour service. In his opinion, until the companies could explain the facts of this matter fully to public service commissions, they could not expect the commissions to view with as much seriousness as they themselves the question of adding service during the rush hours. A. T. Warner, Public Service Railway, Newark, N. J., mentioned the past studies made by his company along this line and said that if the work were to be done now, the railway would have to consider charging a large part of the cost of the new terminal to rush-hour service, for if it had not been for the rush-hour problem the terminal would not have been built for some years to come.

Prof. A. S. Richey, Worcester Polytechnic Institute, noted that public service commissions had generally recognized that electric lighting and power rates should be higher for rush-hour service than during the off-peak hours, but that in the case of street railways no recognition of a higher rush-hour cost was given except through telling the passengers not to expect non-rush-hour service in rush hours. In some localities, it is true, rates had been made lower during the rush hours either through workman's tickets or through a general fare reduction, but in a general fashion this was known to be a mistake, and the association was doing well to try to provide a method of proving the fact. Whatever variation there might be in the results secured by different methods of computing rush-hour costs, owing to the differences of individual judgments in their application, they would all show that service costs at least as much in rush hours as in non-rush hours, and that the companies ought to be relieved of lower fares in rush-hours.

According to Mr. Warner, he had found in his investigations that while the passenger traffic was much greater in rush hours the amount of service demanded was also much greater. In other words, the number of transfers and the average length of ride per passenger

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were greater in rush hours. In one case a ratio of 31 per cent for transfers to passengers in the middle of the day was changed to 40 per cent between 5 p. m. and 6 p. m., and the average length of ride per passenger was 14.8 per cent greater during this hour than in the middle of the day. Mr. Sullivan suggested the advisability of further study of rush-hour service being handled by a joint committee of the Engineering Association, the Transportation & Traffic Association and the Accountants' Association, and the report was accepted and this recommendation referred to the executive committees.

FARES AND TRANSFERS

The report of this committee contains a digest of the reports of previous committees on the same subject. A part of its report is devoted to statistics showing the percentage of transfers issued to revenue passengers carried on the 122 roads replying to the data sheet. The highest percentage shown is 74, and only nine lines report that they do not have free interchange of passengers at some point on their lines. Of 103 roads answering the question in regard to the delivery of transfers from the printers, twenty-seven have the transfers delivered to the general manager or superintendent, thirty-one to the accounting or auditing department, twenty-four to the storekeeper, ten to the general office, ten to the ticket or purchasing agent, and one road prints its own transfers. On sixty-three out of 113 roads the conductor punches the month, day, time and destination. On the other lines one or more of these designations is printed, punched by a clerk, designated by colors, or not shown at all. Transfers collected by conductors are turned in at the end of the day on seventy-seven roads, at the end of each trip on twenty-five roads, and at the end of each half trip on eleven roads. Other statistics of the use of transfers and the practice of the different companies are presented in the report.

While it is impossible to eliminate entirely the use of paper transfers, the committee recommends where possible the establishment of inclosed areas at large transfer points so as to obtain bodily transfer, because just as long as transfers are delivered to conductors for issue there will be some abuse of the privilege. For the collection of fares at such prepayment areas, the committee strongly recommends wherever possible the elimination of tickets and the collection of fares by means of a motor-driven fare box. While this device requires change makers, their number does not equal the number who would be required to sell tickets, and passengers are said quickly to acquire the habit of having the exact fare ready.

In conclusion, the committee recommends the appointment of a special committee to sit with a joint committee of the Accountants' Association on the whole question of transfers, that member companies give their support and encouragement to manufacturers in their effort to perfect a transfer-issuing machine, and that where transfers are issued they be printed where possible with day, date, month and year, and that the same color be not issued on consecutive days.

The report is signed by C. S. Ching, chairman; G. L. Radcliffe, Bruce Cameron, J. T. Moffett and B. C. Edgar.

OPINIONS ABOUT FARES AND TRANSFERS

Mr. Sullivan thought the transfer question was one which deserved thorough study. As a point in favor of a company printing its own transfers, he mentioned the possibility of a leak in the outside printing office. One company had to destroy 1,000,000 transfers because duplicate numbers had been run off by the printers and put in circulation. In another case it was found that transfers were swept up from the floor of the printing establishment and used. In regard to using transfers on which the month and day must be punched, instead of transfers printed for each day, Mr. Sullivan said that that use of the former transfers would reduce the cost of printing on account of no large excess being needed for each day, but that companies would probably admit the greater risk involved in using transfers valid for any day in the year, on account of the temptations for conductors to dispose of them. As to the registration of transfers, Mr. Sullivan stated that where the number in use was not so great as to prohibit the checking up of transfers to compare with the register statements, registration should be used. He said that it was advantageous to have the transfers placed in envelopes at least every round trip, boxes being placed at convenient terminals rather than on the cars. Furthermore, he felt that carelessness in regard to punching transfers was the principal cause of ill-feeling on the part of patrons, but it seemed that no amount of instruction would train every conductor to punch transfers as he should. It behooved a careful superintendent, however, to minimize this evil.

J. E. Duffy, New York State Railways, Syracuse, N. Y., believed that a check of transfers was worthy of consideration, inasmuch as it might show where rerouting might help riders. As for a transfer-issuing machine, if it could be made to occupy a small space, print legibly and reduce transfer costs to a minimum, there would be a good field for such a machine. He thought that the printing of the day, date, month and year on the transfers would be advisable for large companies, but that the waste might be prohibitive for small companies. He admitted, however, such transfers would probably give better satisfaction that no fraud was being committed. In regard to a joint committee with accountants for considering the questions of fares and transfers, Mr. Duffy thought that the executives of the companies should be the only ones to consider the question of transfer costs and the accountants should only follow orders and provide the transfer system desired.

W. F. Ham, Washington Railway & Electric Company, averred that it was just as proper for the accountants to make recommendations in regard to the proper spending of money along transfer and other lines as it was for the transportation officials to do so. The members of the accounting department would always follow instructions, but it would be wise to cooperate with them to find out whether any good was being accomplished by such instructions. To Mr. Ham's mind the question of the proper issuance of transfers was fundamental, and he asked whether it was reasonable, practicable or desirable to hold conductors strictly to a correct punching of transfers. Operating conditions, he said, made it difficult for conductors to punch transfers correctly at times, and unless the act was performed correctly there would be very little advantage in checking the transfers and trying to hold the conductors to rules.

J. F. Ohmer, Ohmer Fare Register Company, stated that the advantage of a transfer printed by a machine on the spot over one previously printed and punched was obvious, and that the saving to the conductor through the former transfers was also obvious. Manufacturers were trying to produce machines that would meet all requirements, but it was necessary that the requirements be brought to their notice. For this reason he asked that the transfer machines on exhibition at the convention be carefully examined and criticized.

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The report of the committee was thereupon accepted as rendered.

DISCUSSION ON PREPAYMENT SYSTEMS

The discussion on prepayment systems was opened by J. W. Brown, Public Service Railway, Newark, N. J., who, after describing the origin of the prepayment system, stated that the orderly movement of passengers and the business-like collection of fares under this system constituted a great improvement over the results of the old method. The prepayment principle on city lines was an undoubted success. Experience had indicated an increase in gross of from 5 to 12 per cent, and the public generally agreed that the plan was meritorious. Mr. Brown also spoke in favor of the use of fare boxes on prepayment cars. J. E. Gibson, Kansas City Railways, presented a historical review of the development of prepayment operation in Kansas City and stated that the plan was satisfactory to the public and the employees. He also described the success of front end collection in Kansas City as regards time saving in loading. He thought that the prepayment idea could be further developed along the line of perfecting a system of registration for all classes of fares.

A. Gaboury, Montreal Tramways, stated that the first modern pay-as-you-enter car was put in service in Montreal in 1904 on the St. Catherine Street route. In his opinion, if the company should to-day wish to return to the old system of the conductor going through the car, it would not be permitted to do so. After experimenting with long platforms, some as long as 9 ft., his company had found the ordinary platform quite suitable for all ordinary requirements, and had suffered delay through congestion only in exceptional cases, such as at ball games or at extraordinary places where large crowds had to be handled at once. It was interesting to note, however, that the large loading platform was again being brought forward in some cities, notably Cleveland, where the whole front half of the car was being used as a loading platform to speed up the car.

According to Mr. Gaboury, experience had shown that the benefits derived from pay-as-you-enter cars were far-reaching both to the companies and to the traveling public. They had done much toward eliminating missed fares, facilitated loading, helped to speed up the service, contributed to the comfort of patrons and created a revolution in the prevention of accidents. As to the elimination of lost fares, the increase in earnings when these cars were put on the road was marked and is on record, not to be disputed. Some improvements had been made since the first cars came out and others would doubtless be thought of, one of which would be to narrow the passage past the conductor, so that only one person could pass at a time, and rushing the conductor would be prevented. Mr. Gaboury had prepared sets of photographs, showing the evolution of pay-as-you-enter cars in Montreal.

N. H. Brown, International Railway, Buffalo, N. Y., firmly believed that the adoption of the prepayment idea ranked with the adoption of electrical energy for car operation. Revenue thereby had been increased 10 per cent through the elimination of fare dodgers, the avoidance of skipped fares in crowded cars and the control of dishonest employees. He believed that the system was the best one in use at present, although some time there would probably be developed a scheme for paying fares and receiving transfers before entrance to the cars in order to expedite traffic. In reply to a query as to the relative efficiency of center-entrance cars and rear-entrance cars, A. H. Woodward, International Register Company, stated that in Los Angeles seventy-five coin boxes had been placed in center-entrance cars, but that owing to the loss of fares through the arrangement of exit railings no gain was shown over end-entrance cars. The railings had been changed and the loss avoided, but there had been no time since to make a check as to the relative efficiency of the two types.

EXPRESS AND FREIGHT TRAFFIC

The committee on express and freight traffic subdivided its work between two sub-committees, to one of which was assigned the study of contracts with old-line express companies, the subject for the other being "Handling of Freight."

The first sub-committee was to endeavor to ascertain which style of contract is the most favorable from a revenue standpoint from old-line express companies: "A tonnage basis," "a mileage basis," or "a prorate of the rates," and to secure a form of contract which the committee may recommend for the use of traction lines in executing traffic agreements with the old-line express companies.

In reply to queries from the committee it was learned from twenty-six companies that of these all but one have contracts with one or more old-line express companies. Fifteen have contracts with Wells, Fargo & Company, six with the American Express Company, five with the Adams Express Company and one with the Dominion Express Company. One company has contracts with two old-line express companies and one company has contracts with three old-line express companies. Of these companies sixteen have entered into contracts on a rate prorate basis, eight on a tonnage basis and one company provides service, for which it receives a certain stipulated amount each month. Twenty of the companies have entered into exclusive contracts, that is, contracts which prevent doing business with any other express company than the one contracted with. Five have non-exclusive contracts. In addition to carrying old-line express, seventeen of the member companies handle local express on passenger trains, receiving for this service a higher compensation than that provided by the regular freight rates. The term local express here used refers to that class of service which provides for the carrying of certain commodities covered by classification on regular passenger cars. In other words, it is non-pickup or delivery express service. Nine companies do not render service of this class. In general, it is the practice of the electric railways to handle old-line express on regular passenger cars, which are provided with baggage compartments. A number of the member companies are obliged, on account of the large volume of business offered by the express companies, to furnish one or more trains a day for their exclusive use.

From data received and tabulated by the committee it was learned that in practically all cases the rate prorate basis of settlement produces the best financial returns to the contracting electric carrier. This is due to the fact that the minimum short-haul charge used in the basis of rate making is in favor of the short line. To illustrate this point, in one case the local rate for carrying 100 lb. 99 miles is 75 cents and for carrying 100 lb. 25 miles is 40 cents and 100 lb. 20 miles is 40 cents, and for carrying 100 lb. 150 miles is $1. This shows a variation from 2 cents per mile per 100 lb. to two-thirds of 1 cent per mile per 100 lb.

With respect to the compensation received by the carriers, there is a considerable range. Seven companies furnishing data receive 50 per cent, five companies receive 45 per cent, one company receives 40 per cent and one company 15 per cent of the gross revenue accruing to the express company from the carrying of express over the electric company's lines.

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There is no established practice as to the furnishing of terminal facilities by the electric companies for the express companies. In some of the contracts these facilities are provided for without extra compensation to the electric company and in other cases the electric company furnishes these facilities, receiving therefor stipulated rentals. The same is true with respect to furnishing of extra equipment for the exclusive use of the express company and with respect to furnishing the services of trainmen to look after the handling of express on the passenger trains, when same is not accompanied by express messengers.

It is the general practice of the express companies to employ as their agents, in small towns, the agents of the electric companies. Such services are usually paid for upon the basis of 10 per cent of the business originating at or delivered to the point at which the agent is so employed. It must be borne in mind that in order to ascertain which style of contract is most favorable to the electric railway companies, a thorough study of local conditions must be made. If the member company's mileage is sufficiently long so that it may expect, by reason of such mileage, to secure a proper proportion of the gross operating revenues, by reason of the handling of express over its line as either originating or intermediate carrier it might safely enter into a contract on mileage basis. It was the opinion of the committee that the average electric railway will fare better by rate prorate style of contract.

A recommended form of contract was included with the report.

On the subject of handling freight some valuable data were collected by the sub-committee. These show that about 95 per cent of the lines replying are handling freight locally and a majority of them also handle interline business. The use of trail cars is also becoming more general, supplementing the motor freight car, or being operated in trains with electric locomotives. Where the volume of tonnage will justify this mode of operation, it materially reduces the cost per ton. A large number of the lines have adopted the steam line scale of freight rates, while a few carry individual scales to meet local conditions. About half the lines interchange carload and less than carload business with their interurban and steam line connections on the basis of through rates with audit office settlements; a number interchange on the basis of sums of locals, or proportional rates, and a few have different methods with different connections.

Eleven lines report an increase and ten a decrease in tonnage for the year 1915. The report of gross revenue shows an increase for fourteen lines and a decrease for twenty-one, while twenty lines show an increase in freight revenue as compared with a decrease on seventeen. With the conditions existing in 1915, this showing would seem to demonstrate the fact that the freight business of interurban lines has not yet reached the fullest development, but may be still further expanded, furnishing another source of income without an excessive increase in operating expenses.

Nine lines report additional traffic arrangements with steam lines consummated during the year 1915, which shows a tendency toward the elimination of the barrier between steam and interurban railways.

A further investigation of the freight situation developed a new phase which threatens to be a very perplexing question in future freight rates. Prior to the Cummins amendment of the act to regulate commerce, railroads carried what has commonly become known as "released rates"; however, with the above amendment in lieu of "released rates" the act as it now stands permits the use of graded rates—to cover "different valuation" increased bulk with no increase in weight, and like conditions on like or analogous articles. This principle seems to be fully recognized in recent decisions. While a classification covering rates based on this plan would entail a vast amount of labor and expense, it is undoubtedly the only intelligent way of making rates on a parallel with valuation and liability. This plan, in the last official classification, has been recognized, especially in the handling of household goods and of livestock. And while it seems that the commission on one hand, and the railroads on the other, have a fair understanding as to the end to be arrived at, they have as yet apparently been unable to arrive at a common ground (except in a few instances, *i.e.*, baggage, household goods, and livestock) in the application of this principle.

The question has been before the courts, and in recent decisions the courts have been inclined to interpret the act favorable to and recognizing graded rates. In other words, if any freight, regardless of its liability of damage or its valuation, is accepted for transportation by a carrier, that carrier is liable for any loss or damage up to the full invoiced value of such article, its only relief being in some form of a graded rate adequate to cover increased or excessive carrier insurance.

The question of graded rates for handling baggage, covering weight value and bulk, has been established for about eighteen months, being in force by practically all steam carriers throughout the United States, and very largely used by electric lines, especially in the Central States.

There has been a vast amount of work investigating the question of livestock, which now seems to be fairly well settled by Case No. 6825 (40 I. C. C. 347-357), National Society of Record Associations et al. vs. Aberdeen & Rockfish Railroad et al., submitted May 24, 1915. Opinion No. 3816. This decision practically places equivaluation and carrying charges on such commodities in western, southern and official classification territories with the same graded increase for value in "rates on higher values to go up only 2 per cent on 50 per cent increase in value."

This report was signed by F. D. Norviel, chairman, H. J. Clark, W. S. Whitney, W. J. Whiteside, A. R. Piper and C. J. Munton.

DISCUSSION OF EXPRESS AND FREIGHT TRAFFIC

In discussing this report, J. H. Crall, Terre Haute, Indianapolis & Eastern Traction Company, was of the opinion that companies in the future would have to look to freight for an increase in revenues. He mentioned varying opinions as to whether electric railway freight rates should be higher than corresponding steam railroad rates, but said that there were indications in commission opinions and other sources that electric railways should meet the steam railroad rates. E. H. Hyman, Cleveland Railway, stated that it was a serious thing for any electric railway to enter into an agreement with an express company for the handling of purely local business, although a contract might be all right from points on the electric line to points beyond and vice versa. As regards the compensation to electric railways, he believed that a tonnage basis had an advantage over a pro-rata basis, inasmuch as under it all the money earned by the electric line could be secured within thirty days and the traffic could be checked. The report was accepted and ordered filed.

The last item on the program was the paper by Professor King, which is abstracted elsewhere in this issue. After its submission a rising vote of thanks was voted to him and the joint session was declared ended.

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Thursday's Session

The session of the Transportation & Traffic Association, held on Thursday afternoon, was opened by the presentation of the report of the committee on rules. Owing to the absence of the chairman of this committee, C. E. Morgan, Michigan Railway, Jackson, Mich., the report was presented by J. E. Duffy, New York State Railways, Syracuse, N. Y., a member of the committee. The report was adopted by the association without discussion.

COMMITTEE ON RULES

The committee on rules presented a progress report in which it was recommended that the subject of signal rules be given further consideration by the incoming committee. The committee expressed the opinion that the existing standard rules are sufficient to cover the operation of trains of two or more cars, since it has been found that practically all member companies are using standard signals, although they are employing different mechanical methods for communicating such signals to the motormen.

The report stated that two questions involving interpretation of rules had been submitted to the committee during the year, and that action had been taken upon these prior to references to the executive committee for its approval. The report was signed by C. E. Morgan, chairman; Samuel Riddle, J. E. Duffy, M. S. Sloan, U. W. Berry, F. M. Hill and S. W. Greenland.

COMPANY PUBLICATIONS

Following the presentation of this report there was a symposium on company publications in the form of written papers by F. W. Hild, general manager Denver Tramway Company; T. S. Wheelwright, president Virginia Railway & Power Company, Richmond, Va.; Leake Carraway, director of publicity Southern Public Utilities Company, Charlotte, N. C., and James H. Braden, general agent Northern Ohio Traction & Light Company, Akron, Ohio. In addition Mr. Hild read a suggestion on standardization of company publications prepared by Mr. Davis, editor of the *Tramway Bulletin*, which is published by the Denver Tramway Company.

An abstract of these papers appears elsewhere in this issue.

The discussion on company publications was opened by A. D. B. Van Zandt, Detroit United Railway, who said that the publicity man is not one to suppress news and that publicity is not to be started in days of war. Preparedness is necessary in this field and the department of publicity should be as well organized as other departments, so that it can anticipate the pulse of the public. The association should assist in the organization of publicity departments as in other branches of the electric railway field. The man responsible for publicity work should not lay down rules which are too rigid as to material and size of publications and publicity work should have a wide range. He should be a trained newspaper man who has learned electric railway work or vice versa. In Detroit, the public seems to look upon the company publication, *Electric Railway Service*, as if it were independently published. Mr. Van Zandt thought that no company should refrain from the publication of periodicals on account of the cost, and that the company would be justified in carrying appropriate advertising if necessary.

H. A. Bullock, Brooklyn Rapid Transit System, said that in approaching this subject it was important to have in mind the principles outlined by Mr. Lee in his American Association paper. The principles must be sound, as no amount of attractiveness in appearance of material will take the place of such soundness. Publicity material should be divided into two parts, that which is suitable for publication in a company organ and that which should be published elsewhere. Newspaper advertisements, car cards, etc., have their place. When dry facts have to be presented lucidly, display type in newspapers is valuable.

Regarding company publications Mr. Bullock said that there are two radical divisions of these, those for distribution on cars and those for employees. It has been questioned whether the periodical is the best medium, or whether irregular although possibly frequently issued circulars on special topics are best. Conditions differ in different communities, and each situation demands a careful analysis to determine the most effective ways. Irregular publication might be best for a metropolitan district where ground is raked carefully by the newspapers.

Mr. Bullock did not agree with Mr. Wheelwright in believing that controversial questions should be avoided in these publications. Ambitious politicians are apt to pre-empt newspapers and it is difficult for a corporation to get facts before the public through ordinary channels. Special bulletins afford an opportunity to tell the facts. When a bulletin is not needed for special questions it can discuss safety, welfare, insurance, suggestions regarding co-operation, etc. The *Brooklyn Rapid Transit Monthly* is made up of several parts. The covers carry an attractive design and bulletins, there is an editorial by the president and feature articles or write-ups. The balance is filled with news of departments, safety, benefit fund data, etc. Twenty-five thousand copies are printed.

G. T. Seely, Metropolitan West Side Elevated Railroad, Chicago, stated that his company has two publications, one for employees and one for the public. These are used partly for publishing commendatory letters and the effects upon the employees are excellent. A newspaper man is engaged to prepare material for these papers which are each of about eight pages.

Mr. Carraway moved that the executive committee consider the matter of company publications with a view to encouraging a co-operative spirit, and the motion was passed. After votes of thanks for these papers and resolutions of appreciation for the efforts which had been made to render the convention a success, the following were elected on nomination by the nominating committee:

President, L. C. Bradley, assistant district manager Stone & Webster Companies, Houston, Tex.

First vice-president, W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Second vice-president, R. P. Stebens, president Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

Third vice-president, L. H. Palmer, acting general manager Eastern Pennsylvania Railways, Pottsville, Pa.

Executive committee: R. B. Stearns, vice-president Milwaukee Electric Railway & Light Company; H. C. Donecker, assistant general manager Public Service Railway, Newark, N. J.; J. J. Dempsey, superintendent elevated transportation Brooklyn Rapid Transit System, and H. B. Potter, assistant to vice-president Boston Elevated Railway.

After the president-elect had been escorted to the chair by L. H. Palmer and R. P. Stevens, he accepted the responsibilities of his office, stated the closing convention was the best in the history of the association and declared the meeting adjourned.

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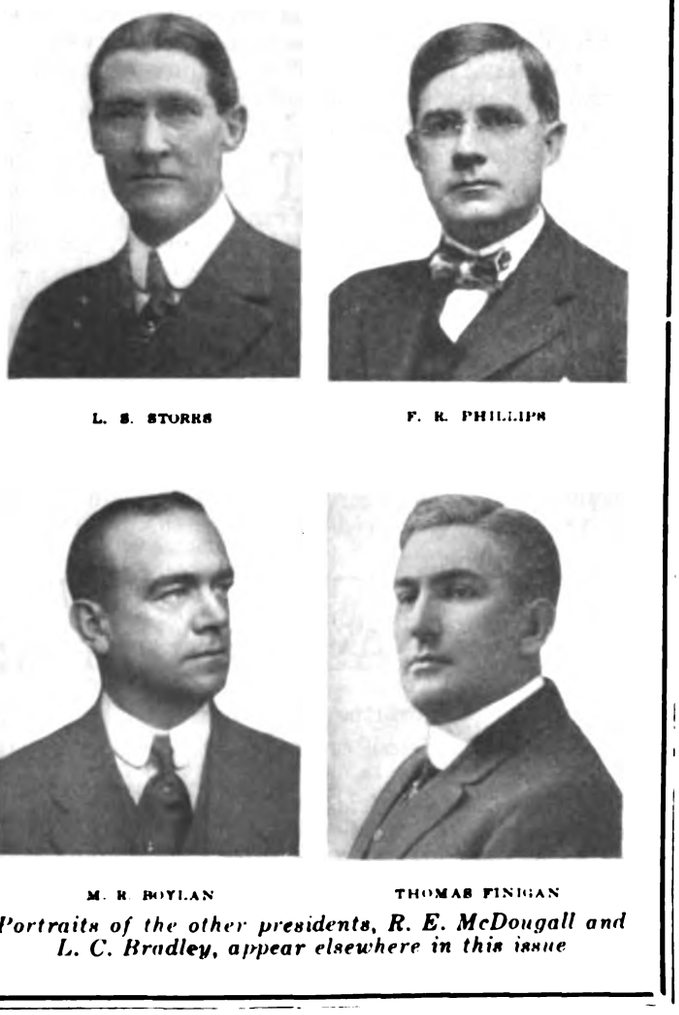
The 1916-1917 Association Presidents

LUCIUS S. STORRS, last year first vice-president of the American Association, was elected its president at the Atlantic City meeting. He was similarly promoted from the vice-presidency of the Connecticut Company, New Haven, Conn., to the presidency of that company in December, 1913, the position which he now holds.

Mr. Storrs takes up the presidency of the Association at the age of forty-seven years, after long experience in the work of the Association and of the industry which it represents. He is an alumnus of the University of Nebraska, class of 1890, and while in college followed a scientific course. He is entitled to append the letters "A.M." to his name should he care to do so. For about seven years after graduation he was on the staff of the Colorado Fuel & Iron Company with the title of geologist, leaving this company for a position with the Northern Pacific Railroad.

Mr. Storr's occupancy of his present position is the direct and logical outcome of the step which he took in 1906, in entering the organization of the New York, New Haven & Hartford Railroad, as he was made vice-president of the New England Investment & Security Company, a New Haven subsidiary, with headquarters in Boston, the following year. Soon thereafter he became president of the company. In 1908 he established headquarters in Springfield, Mass., having charge of the administration of a number of electric railway properties, with particular interest in the development in the central Massachusetts territory of both passenger and express service and the coordination of several systems into an organization of improved earning power and efficiency. In June, 1911, he was elected vice-president of the Connecticut Company and of the New York, New Haven & Hartford Railroad the following year. In December, 1913, he became president of the Connecticut Company.

Mr. Storrs is a member of numerous scientific and professional organizations, including the Sigma Xi Society and the American Institute of Mining Engineers.



L. S. STORRS F. R. PHILLIPS

M. R. BOYLAN THOMAS FINIGAN

Portraits of the other presidents, R. E. McDougall and L. C. Bradley, appear elsewhere in this issue

MATHEW R. BOYLAN, the newly-elected president of the Accountants' Association, has served on many important committees of the Association. He was its first vice-president in 1910, and since 1912 has been its secretary-treasurer. His promotion to the presidency is in accordance with the plan suggested by President Kilfoyle, of putting into the responsible positions those whose work has most thoroughly familiarized them with the details of the Association's problems.

Mr. Boylan is at present general auditor Public Service Railway, Newark, N. J. For twenty-four years he has been continuously connected with the New Jersey railways. He began his work as stenographer and clerk in the office of C. B. Thurston, president Jersey City & Bergen Railroad when it was a horse-car line. After the road was electrified he served in the transportation department, the shops and the power generating stations of the company. In 1899 Mr. Boylan entered the general auditors' department of the Consolidated Traction Company, which had absorbed the Jersey City & Bergen Company and was leased to the North Jersey Street Railway. He served as voucher clerk, bookkeeper, chief clerk and assistant auditor in this department. The North Jersey Street Railway was acquired by the Public Service Railway in 1903, and since 1904 Mr. Boylan has been the general auditor of the latter company, with headquarters at Newark, N. J.

FRANK R. PHILLIPS, the new president of the Engineering Association, is one of the pioneers in the design of light-weight cars and equipment, and has developed numerous labor-saving devices in repair-shop equipment. He is superintendent of equipment of the Pittsburgh Railways, having taken this position on Jan. 1, 1910.

Mr. Philips was born in Cleveland, Ohio, Oct. 29, 1876, and obtained his early railway experience in that city. He was first employed by the Cleveland City Railway in 1894 as clerk in the transportation department, and later served successively as rodman in the way department, switchboard operator, boiler fireman, shop electrician, mechanical draftsman and inspector, and general foreman of shops. While engaged in this work he took up the study of mechanical engineering by private instruction, attending lectures at night. In addition to the general apprenticeship mentioned, Mr. Phillips has held the positions of master mechanic of the South Covington & Cincinnati Street Railway, chief engineer of the Michigan United Railways and engineer in charge of railway work for the Ohio Brass Company.

In connection with his work Mr. Phillips is an advocate of the co-operative system of training for engineering students as promulgated by Dean Herman Schneider of the University of Cincinnati. He believes with Dean Schneider that the application of theory to practical

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uses during college training tends better to fit the student for life work at the time of graduation. His particular hobbies are production efficiency and the development of uses for waste materials. He has served as member of a number of association committees and as chairman of the committee on equipment for several years. He is most particularly interested in the work of the committee on standards.

R. E. McDOUGALL, the newly-elected president of the Claims Association, has been its acting president since the mid-year meeting of the Association held in Chicago, Ill., on Feb. 4, 1916. At that time the executive committee elected him to fill the position left vacant by George C. Carson, claim agent Puget Sound Traction, Light & Power Company who, having severed his connections with the company, was no longer eligible.

Mr. MacDougall has been prominently connected with the association for several years and has been on important committees. He served as vice-president from 1913 until he was made acting president last winter. Prior to his work in the railway industry, Mr. MacDougall was a lawyer with Kernan & Kernan, attorneys, Utica, N. Y. He severed his connection with this law firm to become claim agent for the Utica & Mohawk Railroad and the Oneida Railway. After several years' service with these lines, he went to Rochester to take the position of claim agent of the New York State Railways, Rochester Lines, with which he has been associated for about four years. He is a member of the Rochester Club, the Oak Hill Country Club, the Rotary Club of Rochester and the Rochester Chamber of Commerce. A portrait of Mr. MacDougall will be found elsewhere in this issue.

LUKE C. BRADLEY, the new president of the Transportation & Traffic Association, is an engineer of wide experience secured on properties scattered widely throughout the United States. This has come about through his association with Stone & Webster and J. G. White & Company particularly. In the several cities where he has resided he has taken an active part in civic affairs.

The important positions which Mr. Bradley has occupied before his present one are: General superintendent Puget Sound Electric Railway, Seattle, Wash.; general manager Key West Mining & Railway Company, Salt Lake City, Utah; general superintendent Tennessee Northern Railway, Knoxville, Tenn.; general manager Scioto Valley Traction Company, Columbus, Ohio; general manager of the J. G. White railway, lighting and gas properties at Pottsville, Pa.; manager Galveston (Tex.) Electric Company, and vice-president Houston (Tex.) Electric Company and Galveston-Houston Electric Railway. Since 1913 he has been assistant district manager Stone & Webster Companies, Texas District, with headquarters at Dallas. In this position he has control over the street railways and other corporations in Galveston, Dallas, Fort Worth, Beaumont, Port Arthur, Houston and El Paso, and several interurban railways.

THOMAS FINIGAN, manager sales department American Brakeshoe & Foundry Company, San Francisco, Cal., who was re-elected president of the Manufacturers' Association, was formerly in railway operating work, having entered the employ of the Consolidated Traction Company, Newark, N. J., in 1898. He soon became assistant master mechanic, and in 1903 entered the mechanical department of the United Railroads of San Francisco. He became purchasing agent for the same company in 1907 but resigned in 1913 to enter commercial work.

A biographical sketch of Mr. Finigan was published in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 9, 1915, page 786.

Manufacturers' Association Activities

After an Analysis of the Situation by a Committee and Discussion by the Manufacturers' Association at Atlantic City, It Was Decided to Continue This Association for the Present

MORE than 100 members of the American Electric Railway Manufacturers' Association attended the annual meeting held on Oct. 11 in the Park Avenue Hall of the Marlborough-Blenheim Hotel at Atlantic City. At this meeting a committee report of great interest was favorably considered and adopted, routine business was transacted, new officers were elected, and the manufacturers listened to a talk by Charles L. Henry, president of the American Electric Railway Association. Thomas Finigan, president of the Manufacturers' Association, presided.

After routine business had been transacted, President Finigan spoke of the events that had transpired since the San Francisco convention. At the San Francisco convention C. Loomis Allen, the then retiring president of the American Electric Railway Association, in his annual address had stated that the conlition of the industry made it necessary to have the closest co-operation of all in order to obtain the best results. He further stated that the status of the Manufacturers' Association precluded the possibility of obtaining the necessary co-operation, and he recommended that manufacturers be admitted as members of the parent association on the same basis as railway company members.

Mr. Allen's successor, President Henry, in accord with this suggestion, Mr. Finigan said, appointed a committee to formulate plans for obtaining the desired results. This committee was unable to formulate any definite plans, but at the mid-winter meeting in Chicago the constitution and by-laws of the American Electric Railway Association were so modified that manufacturers, as companies and individuals, could become members of the parent association. At that time Mr. Henry agreed with members of the executive committee of the Manufacturers' Association on a plan for jointly carrying on the work of the 1916 convention. Later, the parent association stated that it would undertake this work itself.

Mr. Finigan further stated that as this took out of the jurisdiction of the Manufacturers' Association the functions ordinarily performed by that association, the Manufacturers' Association for the first time in its history was deprived of the privilege of participating in the activities of the 1916 convention as an association, and the question then arose as to whether or not there was any necessity for continuing the Manufacturers' Association in its present form. After a full and free discussion of this subject at a meeting of the manufacturers' executive committee in New York on March 8, it was the sense of the members present, Mr. Finigan

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said, that perhaps there was a work, aside from looking after the exhibits and entertainments at the convention, which this association could perform to promote the welfare of the electric railway industry, and that President Finigan, by resolution, had been authorized to appoint a committee of four to consider this phase of the situation and to report at the Atlantic City meeting. This committee accordingly had been appointed. It consisted of Messrs. B. A. Hegeman, Jr., chairman; James H. McGraw, M. B. Lambert and W. F. Cutler.

President Finigan told the manufacturers that Mr. Hegeman's committee had reported to the Manufacturers' Association executive committee and that it was the sense of the executive committee that the report be submitted to the annual meeting of the association with the recommendation that it be adopted. President Finigan then called upon Mr. Hegeman to present the report of the committee.

REPORT ON CONTINUING MANUFACTURERS' ASSOCIATION

Before reading the report Mr. Hegeman stated that at the meetings of the committee when the report was being formulated the committee members had industriously studied the question of just what the manufacturers could do to render service of greatest value to the American Electric Railway Association and likewise to the manufacturing companies. The subject had been approached with the spirit of good feeling, and, in accordance with the original resolution, Mr. Hegeman had consulted with the president of the Railway Business Association to learn whether its functions as performed for the steam railroads might similarly be performed by the Manufacturers' Association for the electric railways. It was thought, however, that because of the differences in the character of the steam and electric railways, one being interstate and the other largely local, that it would be impossible and impracticable to carry on similar work.

Mr. Hegeman then read the committee's report, an abstract of which follows:

"Your committee, appointed by our president at the meeting of the committee held at the Waldorf-Astoria, New York, March 8, 1916, for the purpose of considering the advisability of continuing the association, and, further, to formulate plans, if possible, looking to the use of our association to promote the interests of the electric railway industry, begs to report as follows:

"At a meeting of the committee held at the Shelburne Hotel Oct. 8, 1916, at which our president and all members of the committee were present excepting Mr. Cutler, and after a full and free discussion of the subject under consideration it was decided as the sense of the committee that the association should continue its existence for another year at least, as it is found the balance now in the association's treasury is sufficient to meet our expenses.

"The reasons that led your committee to recommend the action above outlined were:

"First—This is the first time that manufacturers and sellers of electric railway supplies have not participated as an organization in the activities of the electric railway convention. This is due to the action of the American Electric Railway Association at the meeting in Chicago, February last (1916), when they altered the constitution and by-laws so as to admit to full membership manufacturers as company members with all the rights and standing of railway companies.

"Second—That although manufacturing concerns are now members of the railway association their exact status has not yet been determined and its seems therefore desirable to preserve the organization at least one year."

After the reading of the report the president called upon Messrs. McGraw and Lambert for discussion. Mr. McGraw said that he believed in the principle that was adopted by the American Association at Chicago and that it was proper and fitting for manufacturers to become members of the American Association as they saw fit. He was, however, not in entire accord with the hastiness of the Chicago action. There were problems connected with the plan of the amalgamation in membership that still had to be solved. The manufacturers should be willing to work at these problems until the light appeared. He knew that they would work in the interest of the industry as a whole and in the right spirit. Already 208 manufacturers had joined the American Association.

It seemed desirable to retain the organization of the Manufacturers' Association, however, so that it could continue to voice the sentiment of the manufacturers to the parent association, and so that it could do any other work that might arise. There was reason for congratulation that every manufacturer could be a member of the American Electric Railway Association.

Mr. Lambert said that someone had raised the question as to the need for an independent Manufacturers' Association; why should there be two organizations? This question he answered by stating that there were frequently subjects of common manufacturing interest that were presented for discussion only from the manufacturers' standpoint. The plan of organization of the American Association did not provide the machinery for meetings on subjects purely of manufacturing interest. The report of the committee had been formulated only after discussions with many railway officials, practically all of whom thought it best to continue the Manufacturers' Association.

After short remarks by the president, the Association unanimously adopted the report of Mr. Hegeman's committee, thus determining to continue the American Electric Railway Manufacturers' Association on its present basis.

REPORT ON FINANCES

The chair then called upon L. E. Gould, vice-president in charge of finance for a report. Mr. Gould stated that because of the reduced association operating expenses in 1915, since there was no exhibit at San Francisco Convention, the annual dues had been reduced from $30 a year to $10 a year, and in 1915, no dues had been collected since the railway association had handled the exhibit and entertainment features. Mr. Gould abstracted the audit of the association books made as of Oct. 1, 1916. This showed that all bills had been paid, and that the Manufacturers' Association had a balance of $1,679.72.

ELECTION

President Finigan announced that the following members automatically retired from the executive committee at that meeting: Messrs. L. J. Drake, F. A. Elmquist, Thomas Farmer, Jr., Bertram Berry and Thomas Finigan. The following nominating committee was then appointed: Messrs. McGraw, Lambert, Wickwire, Estep and Archbold. This committee after deliberation nominated and the association unanimously elected the following new members to the executive committee: Thomas Finigan, American Brake Shoe & Foundry Co., and L. J. Drake, Galena Signal Oil Co., to succeed themselves, and B. A. Hegeman, Jr., U. S. Metal & Mfg. Co., Dwight B. Dean, G. C. Kuhlman Car Co., and Edwin B. Meissner, St. Louis Car Co.

The new executive committee members were installed later in the day and they re-elected Thomas Finigan president and the following vice-presidents: Charles C.

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Peirce, Daniel W. Smith, L. E. Gould and E. F. Wickwire. Fred C. Dell was elected secretary and L. E. Gould treasurer.

MR. HENRY ADDRESSES MANUFACTURERS

The Manufacturers' Association unanimously voted to request President Henry to address them on subjects of mutual interest. Mr. Henry spoke with much emphasis on the subject of the union of interests between manufacturers and railway men. These interests were now united, he said, in the work for the common good. Mr. Henry thanked the representatives of the manufacturers for the work that they had done for him as president in planning and executing the convention and entertainment details. He spoke of the reasons underlying the Chicago amendments and said that when he retired as president he could carry with him the highest regard for the manufacturers.

When considering how the new manufacturing members of the American Association could best assist in the work Mr. Henry had first thought that some plan might be suggested to the manufacturers as a group, but after continued study he had come to the conclusion that the manufacturers were the ones to decide what to do to complete the amalgamation. He announced, however, that the parent association would at once increase its executive committee membership by the addition of two or three representative manufacturers who would work with the president of the American Association, the four vice-presidents and the presidents of the four affiliated associations towards a final plan for amalgamation. Mr. Henry also said that if the manufacturers thought it desirable to organize an affiliated manufacturers' association, the president of that association, ex-officio, would be a member of the parent association of the executive committee.

Other Features of the Convention

ANNUAL RECEPTION A GAY AFFAIR

The annual reception which from a social standpoint formally opened the convention was held Monday night on the convention pier and was largely attended.

In the receiving line were the officers of the several associations, namely Messrs. Henry, Storrs, Stanley, Kilfoyle, Lindell, Palmer, Nicholl and Burritt, with their ladies.

After the reception, an informal dance was given which lasted until a late hour. The music for the dancing, which was rendered by Caravana's Viennese orchestra under the guidance of Conductor Amorisi, and the tropical Marimba band, was delightful.

RED SPECIAL DINNER

Sixty-four of the party which traveled to the San Francisco convention last year on the famous Red Special train, sat down to dinner Thursday evening at the Shelburne grill room. The menu was printed in red; Red Special acquaintances were renewed and Red Special songs were sung. Speeches recalling different experiences of the trip were made by C. L. Henry, C. C. Peirce and C. Loomis Allen. The dinner lasted until about 9 o'clock, when the party adjourned to go to the ball.

MARDI GRAS BALL

One of the most enjoyable events in the social calendar was a Mardi Gras ball, given Wednesday night on the convention pier. As the delegates entered, they were presented with paper hats, and they found the hall decorated with innumerable paper flags and lanterns, characteristic of the carnival spirit. The evening began with dancing, which was continued for half an hour, when an extraordinarily exciting game of polo was put on, the crowd being kept in order by four comedy cops. At the conclusion of the game, which was won by the Reds or Blues, no one knows which, there was a general dance. This was followed by a brief but very amusing skit on the presidential election, the actors being obviously home talent, but hardly distinguishable. After this came an especially graceful and interesting professional act, and then more general dancing, serpentine streamers being thrown from the balconies to make, with the shafts of colored lights thrown upon the floor, a remarkable picture for the onlookers. While the dance was going on, three Italian singers came on the floor and rendered a number of characteristic songs. Subsequently, dancing was continued until after midnight, concluding a most entertaining evening.

ANNUAL PROMENADE CONCERT AND BALL

The annual promenade concert and ball, which was the formal event of the week, was well attended and the program, which contained many delightful features which had been arranged by the entertainment committee, was carried out successfully. The festivities began with a grand march led by President Henry and other association officers. There were eighteen dances and numerous encores. The music was furnished by Caravana's Viennese orchestra and Tropical Marimba band. At this affair, as at other affairs earlier in the week, the enjoyment was heightened by specialties introduced between the dances. These specialties were high-class society circus attractions. The first one was a comedy act on the bounding mat. Later there was a special prize dance, in which Mr. and Mrs. Scott Crane figured. And last but not least came roller skating bears.

MILITARY BRIDGE PARTY A SUCCESS

The Solarium of the Marlborough-Blenheim presented a festive appearance Tuesday afternoon on the occasion of the military bridge tournament for the ladies, which was scheduled for 2.30 p. m. Altogether there were twenty-two tables and eighty-eight participants, all of whom hoped to win the prizes which had been offered by the entertainment committee. During the game refreshments were provided by the Marlborough-Blenheim. At the close of the contest eight bottles of La Bohème perfume were awarded as prizes to the same number of winners.

RESULTS AT THE TRAPS

Henry Lee, vice-president of the Railway Electrical Engineer, won the championship trap shooting contest at the end of the pier Wednesday, by scoring forty-six out of the fifty clay pigeons. Mr. Lee's exhibition was a most excellent one in this contest of one-barrel shooting, and it needed to be, since he was closely followed by L. M. Cargo, district manager of the Westinghouse Electric & Manufacturing Company, who finished second prize winner with forty-five to his credit.

INDOOR GOLF FESTIVITIES

During each morning of the week the indoor golf links at the Garden Pier were used by the ladies. These links have nine holes with hazards, tees and all of the other accompaniments of regular links, but are under cover. The course was greatly enjoyed, not only by those who played, but by those who acted as a gallery.

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NEWS OF ELECTRIC RAILWAYS

SEVEN-CENT FARE UNIT AUTHORIZED

New Hampshire Commission Hands Down Decision in Manchester & Nashua Street Railway Case

In a finding dated Oct. 9 the Public Service Commission of New Hampshire authorized the establishment of a 7-cent fare unit by the Manchester & Nashua Street Railway in place of the existing 5-cent unit. The commission suggested the retention of the present fares for school children, together with a commutation ticket on a 5-cent basis in order that workingmen might not suffer hardship by the general increase, although the board pointed out that it did not order the establishment of these reduced rates. The new 7-cent unit took effect on Oct. 16.

The line is divided into three fare limits of about 4 miles each, the middle zone being about 0.5 mile longer than the others and covering the principal residential district of the town of Litchfield. The capitalization of the Manchester & Nashua Company is $240,000 in common stock and $200,000 in 5 per cent bonds, the entire proceeds from the sale of the securities being expended in construction. To March 31, 1916, in nine years and three months' operation, the company had paid no dividends on its stock and had made no specific reserve for depreciation, but had accumulated a surplus of $24,508. In the fiscal year 1915 the operating revenues were $49,087; operating expenses, $29,399; net revenue, $19,688, and bond interest, $10,000, leaving the net income of the company $9,688.

As in the Manchester & Derry case recently decided, it was claimed by the company that operating expenses should be increased by much larger expenditures for maintenance, which it was testified should amount to $500 annually per mile of track. In 1915 this standard would have involved the expenditure of $6,187 additional on this item, reducing to $3,501 the net income available for depreciation and dividends. This standard of maintenance is not considered unreasonably high, and the commission points out that if the standard were maintained, the depreciation requirements would be correspondingly reduced. Even with so high a maintenance rate, 1 per cent would not be a large depreciation allowance, and the net income remaining is insufficient to provide even 1 per cent on the investment, wholly apart from making provision for accrued depreciation.

The company has never paid taxes, but next year will come in for taxation, which the commission estimates at not less than $6,000. It is also entitled to a fair return on its investment, if that can be earned at rates not unreasonable in themselves. A 6 per cent return has been used as the minimum to which the company should be restricted. On the principle laid down in the Manchester Street Railway rate case, this return is to be calculated on the whole investment, whether represented by stock or bonds, the company having been unable through deficiency of income to make adequate provision for depreciation. On a 6 per cent basis the company is entitled to receive $16,400 in addition to the present return upon its investment, or $22,400 above present revenue to meet all expenses including taxes, and to pay a 6 per cent return, with a small sum also added though not named, for depreciation reserve.

In addition to all this, the commission points out that the company "is constitutionally entitled to a fair return from the beginning of operation," and that this deficiency of nearly 60 per cent on $240,000 must be taken into account, either by treating it as a cost of developing the business, and so increasing the amount of the investment upon which the return is to be computed, or by permitting a higher rate of return until the deficiency has been made good. The increase of fares from 5 to 7 cents, on the 1915 traffic, would produce an increase in revenue of $18,583, which the commission states is inadequate to provide for depreciation, taxes and a return of 6 per cent on the original investment, taking no account of the deficiency in return from operations hitherto. The commission says: "It is clear that we cannot justly, legally or constitutionally forbid the proposed increase unless the new rates are such as to be clearly unreasonable in themselves, as being more than the service is worth."

The road is occupied almost entirely with interurban service. Its local business is small and it is operating in active competition with the Boston & Maine, rendering a service which in point of speed is hardly inferior and in frequency is greatly superior. The commission states that the track and equipment are good and the service excellent and entirely satisfactory to the patrons of the company.

There is hourly service each way between Manchester and Nashua, increased to half-hourly in July and August afternoons. The trip of about 18 miles from Manchester City Hall to Main Street, Nashua, is made in 55 minutes. The trip between the same points by the Boston & Maine, involving two changes, from electric car to train and from train to trolley, can hardly be made in less time and often requires more. The cost of operation is less on the electric road and the accommodations not so commodious, but the board states that the difference is not such as to warrant any great disparity in rates. For the casual traveler, unless he walks about 0.5 mile in Manchester and nearly a mile in Nashua, the trip by train would cost 52 cents between the same points, or 48 cents by using a mileage book, against 31 cents by the electric road. The board states that "with these comparisons in mind it is impossible to say that the proposed new rates are unreasonable in themselves."

It is held that if school fares were increased, other means of transportation, less expensive and less satisfactory, probably would be provided, putting the townspeople to inconvenience and causing the company to lose such revenue. There is evidence that the running of a jitney bus for the accommodation of workingmen is contemplated, and the cutting off of school and workingmen's patronage would be clear loss to the company, as it would result in no reduction of service or diminution of operating expenses.

The finding states that there is at least grave doubt of the authority of the commission under any circumstances to order the giving of special rates to any special class of patrons where the cost of service is no less than for others, and it is certain that no such power exists where the proposed fares cannot at best produce the revenue to which the company normally would be entitled. It is, however, recommended that the company make no increase in school fares and that it sell commutation tickets, good for one ride in each direction, on every week day, on a 5-cent fare basis.

PREPARATIONS BEING MADE FOR CONSTRUCTING NEW 130-MILE LINE

The Oklahoma & Northern Traction Company has been incorporated to build an electric railway from Bartlesville east to Miami and thence to Joplin, with a branch from Miami to Columbus, Kan., and another to Baxter Springs, where connection will be made to the lines of the Southwest Missouri Railroad into Joplin. The line will be from 130 to 135 miles in length, and the final locations and surveys are now going on and specifications are being prepared. Mason & Overlees, Bartlesville, Okla., have charge of the local work. W. K. Palmer & Company, consulting engineers, Kansas City, Mo., are in charge of the engineering and business matters connected with the enterprise and are the ones to be addressed on matters connected with the undertaking.

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MAYOR ADDRESSES PHILADELPHIA COUNCIL ON RAPID TRANSIT

Mayor Smith of Philadelphia, Pa., addressed a special session of Councils on Oct. 10, on the transit question in that city. The Mayor, in his address, said in part:

"I sought all the light available to have presented to you a complete and tangible working agreement, which, in turn, could be submitted to the Philadelphia Rapid Transit Company for the equipment and operation of the new lines. with the massive maps and data submitted to me was the draft of the agreement prepared some time in 1914 by the Director of Transit, the parties to which were the city of Philadelphia, the Philadelphia Rapid Transit Company and the Market Street Elevated & Passenger Company.

"I resolved that if the 1914 draft had, in that year, been formulated as a basis of negotiation for the equipment and operation of city-built lines, there was no apparent reason why it should not act in a similar capacity in 1916. I therefore instructed my director to bring the 1914 draft down to date, so as to include the new lines authorized by the 1916 ordinance and omit therefrom all reference to the Camden tube. This the director has done and the revised draft is incorporated in the proposed ordinance hereto attached. I would respectfully urge upon you that public opportunity be given for a full and free discussion of the terms so that the greatest problem facing the citizens and officials of the city may be honestly and equitably solved."

The ordinance introduced at the request of the Mayor provided for the construction by the city of the complete Taylor plan, and for the equipment and operation of this system by the Philadelphia Rapid Transit Company. The ordinance incorporated all the terms of the Taylor plan, including the straight 5-cent fare from any section of the city to any other section in a forward direction and for the abolition of exchange tickets in the various sections of the city on a graduated scale of time. The number of years, however, was left blank in the ordinance.

The conclusion of the ordinance read: "The Mayor is hereby authorized to submit said contract to the Philadelphia Rapid Transit Company, the Union Traction Company and the Market Street Elevated Passenger Railway, and upon their acceptance to execute, acknowledge and deliver the said contract on behalf of the city."

Fewer than one-half the members of Common Council were in their seats when the special session to hear the Mayor's transit message was called, but the clerk declared a quorum present. William M. Lewis, of the Thirty-second Ward, moved to adjourn because the chamber had waited two hours after the time set for the meeting, but his motion was lost. Under the rules, one-half of the membership constitutes a quorum. Thirty-five Councilmen out of eighty-seven were present.

HUDSON & MANHATTAN RAILROAD ADJUSTS DIFFERENCES WITH EMPLOYES

The differences that existed between the Hudson & Manhattan Railroads, operating under the Hudson River between New York and New Jersey, and its employees were adjusted on the night of Oct. 4 at a four-hour conference attended by G. W. W. Hanger, commissioner of the United States Board of Mediation & Conciliation; Wilbur C. Fisk, president of the Hudson & Manhattan Railroad Company; G. H. Sims, vice-president of the Brotherhood of Railway Trainmen; L. G. Griffing, third assistant chief of the Brotherhood of Locomotive Engineers; William Clark, of the Order of Railroad Conductors, and representatives of the local unions affiliated with the national brotherhoods. The conference was held in the office of Mr. Fisk in the Hudson Terminal Building. Mr. Fisk issued this statement:

"A most satisfactory conference was had with the representatives of the union. A compromise was reached which seems to appeal to all. The thirty-two discharged employes will be at once reinstated and the Brotherhood of Railroad Trainmen will be recognized by the company. All differences have been amicably settled to the satisfaction of both sides."

BOSTON ELEVATED APPEAL FOR FINANCIAL RELIEF WELL RECEIVED

The statement of the Boston (Mass.) Elevated Railway, submitted to the special legislative commission on Sept. 25 at Boston in connection with the latter's inquiry into the company's financial condition, has been exceedingly well received by the local dailies. The soundness of the company's case has received editorial recognition. Some of the more significant comments are quoted below in part:

Boston *Herald:* "Judging from the comment in the newspapers, some of which we have reproduced, press and public are convinced that the Boston Elevated Railway must be allowed to charge a little more for its services, either directly to its patrons or indirectly through its relation to public taxation. There never was a time when the public had become so accustomed to increased charges. This was a good time for the company to appeal. When the railroads, not many months ago, changed their mileage books from the 2-cent rate at which they had stood for decades to 2¼ cents, there was hardly a ripple of complaint, and yet this was an increase of 12½ per cent in passenger transportation, a change which individual fares also reflected.

"Everybody seems to acknowledge that the Elevated is economically and effectively run—too economically if anything. The public would like less crowding in the cars, but this obviously means a larger scale of expenditures. The wages of operatives are already the result of arbitration in which public authority—and so the voice of the people—has ultimate control. The supposedly high salaries paid to officials, even if unnecessary to retain their services, are but the merest drop in the bucket; and yet the Elevated can get no new money, under the terms which the statute prescribes, for additions and extensions. It is up to the commission now sitting to find a way out. And from the evidence which public discussion affords, the commission will find public sentiment behind them, in some liberalization of existing conditions."

Boston *Advertiser:* "Even if it were honest for the public to expect public service at less than actual cost, it is not to the public's best interests to have it: for in the long run that means poor public service, unsatisfactory facilities. Unless a sufficient margin of profit is allowed, to permit keeping the whole plant in satisfactory shape, the public must suffer with the corporation. . . . The release of the $500,000 guarantee fund, deposited with the State nearly twenty years ago, is one of these (feasible) suggestions. . . . Then, too, the road is fully justified in asking that the abuse of the transfer privileges be stopped. . . . The purchase of the Cambridge subway by the State and a rental to the company, also, is worth considering. In time the enterprise will be profitable, although it is not so to-day."

Boston *Transcript:* "The company's difficulties were at least clearly and ably stated. It was shown to be up against the stone wall of a great increase in operating costs due to the price of labor and of materials, street railway rentals, subway rentals, taxation, the requirement of additional facilities, and what not. . . . The company is able to make it appear quite clearly that it must be helped out of a situation where it is giving more than it gets. . . . The Boston public, and particularly the Boston suburban public, has rather more privileges of extended travel on a single fare than any other large city."

Boston *Post:* "The Boston Elevated Railway's case, as regards its need of greater revenues in order to make a fair return on investment, is excellently made out. . . . It requires little argument to show that the company needs more revenue than it can get at present under its limitations, some of which have been fixed by law and some of which have been voluntarily assumed. Its expenses—and legitimate ones—have increased much faster than its receipts. . . . It is a well-run road, so that little criticism can come in respect to extravagance. It needs more money and it ought to have it. No other street railway in the country gives so much for a nickel as it does. . . . It is not unreasonable to suppose that out of these suggestions and others that will doubtless be made by men not of the company some measure of relief will be found with justice to all concerned."

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RAILWAY MAIL ON SPACE BASIS

On Nov. 1 the Post-office Department will place practically all the railways in the country on a space basis of pay instead of weight as at present. The only exception will be in the case of the closed pouch business, which will go by weight.

The new method of shipment will include 90 per cent of the postal service. It is understood that the arrangement is experimental and that the Interstate Commerce Commission, whose consent has been obtained for the experiment, will decide after the trial whether the new method should be permanent. Second Assistant Postmaster General Praeger said on Sept. 28:

"The authority which the Interstate Commerce Commission has given to the Postmaster General to place practically the entire railroad mail service on a space basis experimentally will enable the Post-office Department to demonstrate to the commission the fairness of the contention in its long fight before Congress that the space basis is the only practicable, definite, and equitable measure of service in the complex mail transportation problem. Canadian officials have assured us that, after three years' trial, Canada will never change from the space back to the weight basis, and I believe it will be entirely possible to administer the railway mail transportation service of the United States in a manner so just and so practicable from a transportation standpoint that the space basis now authorized experimentally will in the end prove acceptable to the Interstate Commerce Commission and to the railroads."

ARBITRATION OF CLEVELAND POWER CONTROVERSY DEMANDED

The street railway committee of the City Council of Cleveland, Ohio, having indicated that it will not approve an eighteen-year power contract between the Cleveland Railway and the Cleveland Electric Illuminating Company, the railway has demanded arbitration of the question. At its meeting on Oct. 9 the Council was advised that it would doubtless be necessary to submit the matter to arbitration.

A few days previously, Secretary of War Newton D. Baker, former Mayor of Cleveland, met with the committee and advised that it refuse to approve any contract. J. J. Stanley, president of the Cleveland Railway, said that it would be preposterous for the Illuminating Company to spend $1,000,000 in preparation for furnishing power without a contract.

Secretary Baker said he would return to Cleveland to aid in the campaign for the approval of the proposed $1,750,000 bond issue for the municipal light plant by the voters at the November election.

While the proposed contract provides an opportunity for submitting new bids at the end of five years, it requires that if the bid of any competitor be 10 per cent lower than the present proposed figures, the Illuminating Company shall have the option of submitting a new contract, and if its new proposal is as favorable as that submitted by the competitor, the railway shall make a new contract with the power company. Opponents of the plan claim that this will force any other competitor to make a reduction of 10 per cent and virtually result in the retention of the contract by the Illuminating Company for eighteen years.

FULL SERVICE IN ATLANTA

On the night of Oct. 7, exactly one week after the general riots in downtown Atlanta were fomented by agitators in behalf of the Amalgamated Association against the loyal car crews of the Georgia Railway & Power Company, the company resumed normal schedules on all lines in its system except two. These two, however, were operated normally in daylight.

No open rioting occurred after the morning of Oct. 1, the indignation meeting of citizens with the city police board on the afternoon of that day apparently having impressed the police with the law abiding majority's determination to tolerate no more such disorder. The sole case of disorder reported on Oct. 9 was that of two strikers who manhandled and threatened a conductor. The agitators were arrested.

The fact that normal night schedules were resumed on Sept. 7 was accepted generally as indicating that the attempt to stampede the men had degenerated into a campaign of malicious mischief. Oct. 8 passed almost without incident. Oct. 9, the first of two circus days, with a parade in the forenoon, passed without incident of any kind, save for the one referred to previously.

The citizens' committee, which started meeting at noon each day in the Chamber of Commerce, was visited and addressed on Oct. 4 by representatives of organized labor. The labor men were informed that the sole interest of the committee was the preservation of law and order in the community and that it would not discuss any other question. On Oct. 5 a second attempt was made by local representatives of organized labor to secure interference by the committee between the company and those of its employees who had been disloyal. The general committee intrusted further developments to the executive committee, which conferred on Oct. 6 with representatives of organized labor and adopted on Oct. 7 a resolution not only declaring for the preservation of order, but also recommending a conference between the company and a committee of nine, three of the latter to be striking employees. Without directly answering this, the company addressed a bulletin to its employees, warning them that suggestions of conferences would come from many sources, but assuring them that no matter whence these suggestions emanated the company would not alter its refusal to discuss the agitation with anyone who was responsible for it. Simultaneously the organized labor representatives declared the committee as suggested was not acceptable. They asked to be permitted to name not only three but six members. Thereupon the Superior Court Judge, who had been suggested by the citizen's committee as the proper person to name the committee of nine, declared his purpose to have nothing at all to do with the matter.

Ontario Hydro Radial Railway Vote.—On Sept. 28 the Ontario Government passed an order-in-council, at the request of the Ontario Hydroelectric Power Commission, authorizing twenty-five Ontario municipalities to submit by-laws on Jan. 1, 1917, to the ratepayers for the purpose of securing their sanction to the proposed construction of the portion of the Ontario hydro-radial railway system from Port Credit (near Toronto) to Niagara Falls. The road as projected will consist of 100 miles of line. The cost is estimated at approximately $40,000 per mile.

Experience Ordinance Eliminated from New City Code.—The City Council of Indianapolis, Ind., sitting as a committee of the whole to consider an ordinance providing for the revision and codification of city ordinances, struck out a measure which was passed at the time of the threatened strike in Indianapolis about two years ago, providing that motormen and conductors must have thirty days' experience before they may be employed by the Indianapolis Traction & Terminal Company to operate cars. The ordinance has been held unconstitutional by a Marion County court.

Action on Removal of Kansas City Tracks.—The City Council of Kansas City, Mo., has killed an ordinance providing for the removal of tracks of the Kansas City Railway from part of McGee Street. The particular significance of the action is that it seems to add to the probability that the interurban passenger station may be located near Tenth and McGee Streets. The City Council is considering measures for the establishment of a traffic way on Oak Street, one block east of McGee. The actions heretofore in behalf of a trafficway have designated McGee Street.

Contract Awarded for New York Storage Yard. — The Public Service Commission for the First District of New York has awarded to the Thomas J. Buckley Construction ompany, the low bidder, at $372,893, the contract for the construction of a railroad yard for the storage of subway cars in connection with the White Plains Road extension of the first subway. The yard is officially designated as the 239th Street yard, although it will cover an area approximating several city blocks, beginning a short distance east of White Plains Road and north of 239th Street. Another yard is also under construction by the same contractor at 180th Street and Bronx Park. The 239th Street Yard will provide accommodations for approximately 580 subway cars. Adjoining it on a part of the same plot the Interborough Rapid Transit Company will later construct a yard having a capacity for about 350 elevated cars.

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Financial and Corporate

ANNUAL REPORT

Albany Southern Railroad

The comparative income statement of the Albany (N. Y.) Southern Railroad for the years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Gross operating revenue:				
Railroad department	$323,737	62.1	$325,445	65.6
Electric department	152,253	29.2	129,729	25.9
Gas department	45,326	8.7	44,491	9.0
Total	$521,316	100.0	$499,665	100.0
Operating expenses, including taxes	376,667	72.2	366,083	73.3
Net operating revenue	$144.649	27.8	$133,582	26.7
Other income	2,347	0.4	3,110	0.6
Total corporate income	$146,996	28.2	$136,692	27.3
Deductions from income	95,217	18.3	91,719	18.3
Net corporate income	$51,779	9.9	$44,973	9.0

The gross operating revenue of all departments for the last fiscal year showed an increase of 4.3 per cent, while the operating expenses, including taxes and sinking fund charges, increased 2.8 per cent, thereby causing an increase of 8.3 per cent in the net operating revenue. The total corporate income showed an increase of 7.5 per cent, and the net corporate income an increase of 15.1 per cent. The operating ratio for the last fiscal year was 62.8 per cent, as compared to 64.5 per cent in 1915 and 67 per cent in 1914. Retirements and replacements and other surplus adjustments during the year amounted to $32,430.

In the railway department the improved revenue for the latter half of the year almost made up for the decrease during the first half, the gross operating revenue being $323,737 in 1916 and $325,444 in 1915. The operating expenses of this department showed an increase of $4,851, owing almost entirely to the sinking fund accrual. The following statistics will give an idea of the improvement in operating conditions in the railway department:

	1916	1915
Revenue passengers carried	1,475,423	1,452,739
Revenue passenger car miles	662,155	706,781
Revenue passenger car hours	50,946	50,227
Passenger revenue per passenger car mile	$0.268	$0.260
Tons of freight carried	64,809	60,962
Power used, kilowatt hours	4,221,886	4,566,818
Maintenance of way and structures per mile of road operated	$980	$746
Maintenance of equipment per mile of road operated	$600	$507
Crew expense per passenger car mile	$0.049	$0.044

The annual report of the company states that it had suffered so much from accidents that most unusual care was taken to prevent them. Owing to the relatively large number of grade crossings and the greatly increased use of automobiles and the carelessness of their drivers, the company considered it expedient to put into effect a number of slow orders which necessarily lengthened the running time of the trains, but this action was met with general approval by the patrons, who appreciated the efforts of the management in eliminating hazards.

The report also notes that the electric express business is showing a most gratifying increase, it having been necessary to purchase two additional express cars. Under the new three-year agreement made with the employees on Feb. 28, 1916, the aggregate amount of increase in wages for each year will be about $4,000. The amount spent on construction and new work in the railway department amounted to $36,386, of which the largest item was $16,283 for increasing the capacity of the Albany bridge floor.

The gross operating revenue of the electric department showed an increase of $22,524 or 17.4 per cent, while the operating expenses increased only $976. The gross operating revenue of the gas department increased $834 or 1.9 per cent, and the operating expenses increased $856.

The amount set aside for depreciation at the present time is 2.6 per cent of the value of the railway property, 1.3 per cent of the value of the electric property and 2 per cent of the value of the gas property. Based on the physical values as of June 30, 1916, the total amount now being set aside to cover all provisions for maintenance and depreciation charges is $97,365.

BENEFITS OF CUSTOMER OWNERSHIP

Mutualization of Public Utilities Will Help Public Relations —Broad Local Distribution Possible in from Three to Five Years

Inducing the consumers of a public utility to become financial partners of the enterprise is a movement which has made considerable progress during the last year and one-third at the properties under the general direction of H. M. Byllesby & Company, Chicago, Ill. The general practices of this organization in offering securities of utilities to citizens of the communities served was described in an article in the ELECTRIC RAILWAY JOURNAL of Aug. 12. In a paper presented on Sept. 22 before the Colorado Electric Light, Power & Railway Association, William H. Hodge, manager, publicity department of H. M. Byllesby & Company, described the work of his company along this line and summarized the situation in the following words, which will undoubtedly be of interest in connection with the article previously published in these pages:

"It has been demonstrated to our satisfaction that a broad distribution of the securities of a utility may be secured among the company's own customers by serious, careful and persistent effort over a reasonable time, say a period of from three to five years. It is not sensible to expect a new movement involving the constant savings of the people to accomplish fastest headway.

"The benefits to the utility and the public which assuredly will follow a wide distribution of a company's securities among its patrons warrant the effort and initial expense. The objects falling within range include the most vital things in the relations between the utility and the people. Achievement will go a long way toward solving controversial difficulties which have marred these relations in the past.

"Customer ownership will not mean a license for excessive profits or indifferent service. It will not permit a corporation to obtain undue favors from the legislative bodies of State and city. It will not give a company political security unless it keeps itself modern and efficient. Customer ownership, however, will establish friendly connections with a large number of citizens and voters, will share with them the earnings of the business and will so modify destructive criticism as to approach within reasonable distance of the equation which means peace, prosperity and recognition of useful service well performed. It is in line with the broadening trend of economics as understood today. It provides a simple and workable means to preserve the needful equilibrium between the producer and consumer—the natural and economical monopoly and the people. Customer ownership will humanize the utility corporation and give the people a true understanding of corporate affairs. It will do the corporation just as much good as it does the public, and no more."

Alton, Jerseyville & Peoria Interurban Railroad, Alton, Ill.—The County Court at Jerseyville, Ill., was to hear testimony on Oct. 7 in the suit asking for the appointment of a receiver for the Alton, Jerseyville & Peoria Interurban Railroad. The petition for a receiver is signed by the St. Paul Fire & Marine Insurance Company, the Hearne Timber Company, Jacob Kohlmiller, G. J. Gromme and others.

California Railway & Power Company, San Francisco, Cal.—The current dividend payment of 1 per cent on the prior preference stock of the California Railway & Power Company payable on Oct. 2 to stockholders of record on Sept. 20, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 7, constituted a reduction from the last regular quarterly dividend of 1¾ per cent paid on July 1. An official statement issued by the company says that while the United Railroads of San Francisco has heretofore punctually paid the interest upon its notes held by the California Railway & Power Company, it is apparent, in view of the prospective reorganization of this subsidiary company, that it is not likely to be able to make remittances during the period of such reorganization

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As the parent company had the money on hand to pay the above dividend now, however, the board of directors decided to make the payment, calling attention to the fact that the dividends are cumulative.

Cape May, Delaware Bay & Sewell's Point Railroad, Cape May, N. J.—Vice-Chancellor Beaming in the New Jersey Court at Camden recently appointed Alfred M. Cooper of Cape May as receiver for the Cape May, Delaware Bay & Sewell's Point Railroad.

Cities Service Company, New York.—Montgomery, Clothier & Tyler; J. & W. Seligman & Company; Kissel, Kinnicutt & Company and Henry L. Doherty & Company have purchased the $8,000,000 of 6 per cent cumulative preferred stock of the Cities Service Company, the authorization of which by the board of directors was noted in the ELECTRIC RAILWAY JOURNAL of Oct. 7. This stock is being offered by the above-named banking houses at $93 a share. It is preferred as to both assets and dividends, is not redeemable and makes monthly dividend payments.

Northern Ohio Traction & Light Company, Akron, Ohio.—The stockholders of the Northern Ohio Traction & Light Company voted on Oct. 2 to increase the authorized amount of 6 per cent cumulative preferred stock from $5,000,000, of which $4,600 000 is outstanding, to $10,000,000. The National City Company, New York, is offering $4,000,000 of first lien and refunding mortgage 5 per cent gold bonds of this company at 94 and interest to yield 5.36 per cent. Reference to the new financing of this company in connection with the change of control to Hodenpyl, Hardy & Company, New York, N. Y., and E. W. Clark & Company, Philadelphia, Pa., had previously been made in these pages.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—A. B. Conant & Company, Boston, Mass, is offering privately, if, when and as issued, $826,000 of first and refunding mortgage 5 per cent sinking-fund gold bonds of the St. Joseph Railway, Light, Heat & Power Company. The price is 94.5 and interest. The bonds are dated July 1, 1916, and mature on July 1, 1964. They are redeemable on any interest date at 102.5 and interest. A reference to the execution of a mortgage covering these bonds was made in the ELECTRIC RAILWAY JOURNAL of Oct. 7.

Sheboygan (Wis.) Electric Company.—Paine, Webber & Company, Chicago, Ill., having sold the greater part of the issue, are offering the unsold portion of the outstanding $350,000 of 7 per cent cumulative preferred stock of the Sheboygan Electric Company at par and dividends. The stock is preferred as to assets and dividends. This company was formerly the Sheboygan Railway & Electric Company.

Union Traction Company, Philadelphia.—James G. Balfour and John C. Gilpin have been elected directors of the Union Traction Company to succeed George W. Elkins, resigned, and Jacob S. Disston, deceased.

DIVIDENDS DECLARED

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

California Railway & Power Company, San Francisco, Cal., quarterly, 1 per cent, preferred.

Cleveland & Eastern Traction Company, Cleveland, Ohio, quarterly, one-half of 1 per cent, preferred.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly 1 per cent, common.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred and common.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1 per cent, common.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

Ottawa (Ont.) Traction Company, Ltd., quarterly, 1 per cent.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 75 cents, preferred.

Rome Railway & Light Company, Rome, Ga., quarterly, 1 per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Aug.,	'16	$74,805	*$42,000	$32,805	$17,884	$14,921
1 "	"	'15	73,221	*36,822	36,399	17,610	18,789
12 "	"	'16	806,971	*438,398	368,573	211,851	156,722
12 "	"	'15	781,405	*380,869	400,536	211,843	188,693

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m.,	Aug.,	'16	$100,238	*$67,335	$32,903	$29,962	$2,941
1 "	"	'15	91,213	*63,039	28,174	30,289	†2,115
12 "	"	'16	1,204,145	*754,506	449,639	356,744	92,895
12 "	"	'15	1,039,701	*713,423	326,278	353,565	†27,287

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m.,	Aug.,	'16	$46,303	*$24,925	$21,378	$11,467	$9,910
1 "	"	'15	45,047	*21,002	24,045	10,974	13,071
8 "	"	'16	307,896	*171,642	136,254	91,098	45,156
8 "	"	'15	281,139	*155,787	125,352	87,785	37,567

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m.,	Aug.,	'16	$290,082	*$176,785	$113,297	$42,863	$70,434
1 "	"	'15	242,299	*153,572	88,727	40,232	48,495
12 "	"	'16	3,402,472	*1,984,418	1,418,054	506,995	911,059
12 "	"	'15	3,056,293	*1,813,726	1,242,567	470,899	771,668

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m.,	Aug.,	'16	$1,358,867	*$765,087	$593,780	$419,647	$174,133
1 "	"	'15	1,181,948	*649.007	532,941	372,679	160,262
12 "	"	'16	16,152,529	*8,629,990	7,522,539	4,926,315	2,596.224
12 "	"	'15	14,088,122	*7,552,322	6,535,800	4,346,834	2,188,966

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m.,	Aug.,	'16	$251,981	*$150,445	$101,536	$62,886	$38,650
1 "	"	'15	205.259	*121,539	83,720	62,421	21,299
12 "	"	'16	2,807,253	*1,671,118	1,136,135	752,407	383,728
12 "	"	'15	2,434,872	*1,449,601	985,271	761,017	224,254

GRAND RAPIDS (MICH.) RAILWAY

1m.,	Aug.,	'16	$106,497	*$73,977	$32,520	$16,838	$15,682
1 "	"	'15	101,207	*73,136	28,071	13,966	14,105
12 "	"	'16	1,269,110	*835,957	433,153	174,780	258,373
12 "	"	'15	1,202,935	*831,178	371,757	163,970	207,787

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m.,	July,	'16	$31,808	*$15,966	$15,842	$5,241	$10,601
1 "	"	'15	26,177	*13,297	12,880	5,523	7,357
12 "	"	'16	310,051	*172,408	137,643	65,324	72,319
12 "	"	'15	263,166	*164,693	98,473	66,965	31,508

JACKSONVILLE (FLA.) TRACTION COMPANY

1m.,	July,	'16	$50,981	*$35,285	$15,696	$15,408	$288
1 "	"	'15	50,097	*34,890	15,207	14,597	610
12 "	"	'16	616.065	*420,410	195,655	179.084	15,571
12 "	"	'15	637,938	*445,116	192,822	168,165	24,657

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m.,	Aug.,	'16	$167,567	*$89,799	$77,768	$36,455	$41,313
1 "	"	'15	144,479	*81,032	63,447	36,209	27,238
8 "	"	'16	1,054,483	*663,977	390.506	290,972	99,534
8 "	"	'15	906,050	*594,433	311,617	288,706	22,911

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m.,	Aug.,	'16	$87,115	*$53,180	$33,935	$15,075	$18,860
1 "	"	'15	79,359	*43,415	35,944	15,962	19,982
12 "	"	'16	779,888	*518,633	261,255	190,633	70,622
12 "	"	'15	709,775	*465,555	244,220	188,455	55,765

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m.,	Aug.,	'16	$199,574	*$122,736	$76,838	$42,236	$34,602
1 "	"	'15	166,467	*108,536	57,931	43,140	14,791
12 "	"	'16	2,316,748	*1,423,419	893,329	513,685	379,644
12 "	"	'15	2,149,747	*1,281,951	867,796	494,828	372,968

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m.,	Aug.,	'16	$473,434	*$291,304	$182,130	$47,995	$134,135
1 "	"	'15	360,054	*214,559	145,495	53,318	92.177
8 "	"	'16	3,334,077	*2,011,571	1,322,506	403,001	919,505
8 "	"	'15	2,488,442	*1,535,909	952,533	413,588	538,945

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m.,	July,	'16	$26.379	*$18,087	$8,292	$7,161	$1,131
1 "	"	'15	23,196	*14,400	8,796	7,538	1,258
12 "	"	'16	304,669	*194,841	109,828	88,063	21,765
12 "	"	'15	291,458	*184,201	107,257	91,807	15,450

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	Aug.,	'16	$447,502	*$255,342	$192,160	$181,701	$10,459
1 "	"	'15	460,861	*257,583	203,278	186.507	16.771
12 "	"	'16	5,423,882	*3,067,277	2,356,605	2,185,086	171.519
12 "	"	'15	5,668,404	*3,084,826	2,583,578	2,210,856	372,722

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m.,	July,	'16	$663,746	*$418,230	$245,516	$184,645	$60,871
1 "	"	'15	664,564	*402.137	262,427	181,542	80,885
12 "	"	'16	7,709,641	*4,954,027	2,755,614	2,202,477	553,137
12 "	"	'15	7,846,587	*4,804,798	3,041,789	2,155,431	886,358

*Includes taxes. †Deficit.

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Traffic and Transportation

SUMMARY OF FINDING IN "OWL" FARE CASE

Pennsylvania Commission Decides That Increase in "Owl" Fare in Pittsburgh Was Not Properly Advertised

As noted briefly in the ELECTRIC RAILWAY JOURNAL of Sept. 30, page 699, the Public Service Commission of Pennsylvania in an opinion rendered on Sept. 28 held that the Pittsburgh Railways acted in violation of both the spirit and the letter of the Public Service Company Law of that State in the way in which it proceeded to give notice of the doubling of its "owl" or night fares, and in an order supplementary to the opinion directed the company to cease from collecting any rates or enforcing any rules or regulations except those contained in its original tariff filed on July 17, 1914, and further ordered the company to make reparation to its patrons for excess fares upon presentation of certificates of excess payment issued under order of the commission since June 23.

The opinion was based on the complaints of William Jacoby and the city of Pittsburgh against the Pittsburgh Railways, alleging that the proposed increase of rate of fare for night car service in Pittsburgh was unjust, unreasonable and excessive. A complete review of the case is contained in the opinion, which was written by Commissioner Michael J. Ryan and acted upon by the entire body in executive session. In reviewing the filing of the proposed change in rates the commissioner's report says:

"The company contends that this folder (two typewritten pages containing rates which it claims to be a change in the original tariff) is a supplement to the original schedule and the sending of it to the Public Service Commission and the placing of a copy thereof in the general offices of the company at Pittsburgh and its dispatchers' offices in various carhouses of the company constitute ample notice to the public and is sufficient and adequate compliance with the Public Service Company Law to warrant its doubling its charges for night service upon the cars operated by it in and about Pittsburgh."

The displaying of the notice of the increase in the company's cars on June 21, the night of the day preceding the date on which the increased fares were to become effective is then mentioned, together with the insertion of full page advertisements calling attention to the proposed change in all the daily papers of Pittsburgh. Next is reviewed the filing of the complaints by W. M. Jacoby and the city of Pittsburgh, the preliminary public hearing held at the Capitol on June 23, and the issuing of the order directing the company to issue certificates in excess of the former rates pending the determination of the matters alleged. Next is reviewed the public hearing held June 30, when testimony anent the notice to the public was heard. Commissioner Ryan continues:

"The Public Service Company Law distinctly requires that no change in the rates of fare shall be effective 'except after thirty days' notice to the commission and to the public.' It is required that a public service company shall plainly state the exact changes proposed in the tariffs or schedules then in force and whether an increase or decrease and the time when the proposed changes will go into effect. Although the paper filed with the commission has the sub-division 'night fares' on page two in darker ink than the rest of the page, it is admitted that all copies filed by the company at any place in Pittsburgh or adjacent territory are merely photographic copies and that there is no difference whatever in the coloring and that there is no 'black type' on those to put any inquirer upon notice. The only place (other than with the commission at Harrisburg) where the alleged supplement was filed were the general offices of the company in Pittsburgh and various dispatchers' offices and carhouses of the company.

"When the Pittsburgh Railways determined that a change in its rates of fare was desirable it could have done either of two things in accordance with law: First, filed, posted and published new tariffs or schedules; this admittedly it has not done; or secondly, it could have indicated the proposed changes plainly upon the tariffs or schedules now in force and kept open to public inspection. It seems to the commission that the methods followed by the respondent company do not comply with the law. There is nothing whatsoever in the supplement filed which plainly states the exact changes proposed to be made. There is nothing in the supplement filed that indicates whether or not there is to be an increase or decrease in fare. That the company itself did not believe the folder and inclosure and the placing of it in its office and carhouses would impart knowledge of the proposed increase in fare to the public, is shown by its own conduct on the day the proposed changes in the rates were to take place when it caused to be posted the large lettered announcement of the increase, and by advertising in the daily papers in the city the full page notice of the change in rates.

"The posters put up in the cars carried information in letters 2 in. in height so that all could know, but up until then there was not the plain statement of the exact changes proposed to be made, nor was notice properly given. We are of the opinion that the action of the company is in violation of both the spirit and the letter of the law.

"Public service companies are public servants—subject to the control of and regulation by the Commonwealth. They may increase their rates and charges when sanctioned by the authority which gives them life and in accordance with the law and that there can be no doubt that openness, fairness of dealing with and confidence in that public which they serve are the best methods to be employed to more certainly obtain that justice to which not only public service companies but the people are alike entitled."

Commissioner Ryan then states that no opinion is expressed with regard to the authorization of an increase in rates. In this connection he says: "When that matter comes before us in the regular way and after full hearing shall be had, this commission will decide." He concludes by saying: "The commission finds that the supplement is not a legally filed, posted and published tariff of the Pittsburgh Railways and that the only tariff or schedules of said company in effect on June 21 or at any time subsequent is the original tariff of June 17, 1914.

The order to cease collecting the excess fare and to make restitution of the excess fares paid by patrons is then affixed.

"AN AUTOIST APPLIES THE GOLDEN RULE"

Under the caption "An Autoist Applies the Golden Rule" the Hot Springs (Ark.) Street Railway published in the local papers in that city recently the following fable in the form of a full page advertisement addressed "Fellow Automobile Owners":

"I live at the extreme end of one of the street car lines and make the morning, noon and night trips between my home and place of business in my automobile.

"Shortly after purchasing the auto, and feeling confident of my ability to operate it safely, I acquired the habit of picking up acquaintances whom I found at street corners intending to board street cars. The first morning I stopped to pick up my friend Jones. I had plenty of room and hated like the mischief to pass him up. I thought he would vote me selfish and stuck-up since I purchased my auto. On the way down town Jones said to me, 'Now let me off any place; don't go out of your way for me.' But it did not seem the right thing to put Jones off at any place except his exact destination. So I insisted that he tell me where he was going and the result was that I went four blocks out of my way to be nice to him.

"The next morning it was my luck to find Jones on the corner waiting for his street car. He had two friends with him. I had plenty of room. I sounded my auto horn to indicate I was coming and I called out, 'Going down? Jump in!' So they did. I wanted to be just as big and broad as the day before and took Jones to his destination, four blocks out of my way. His two friends seemed anxious to cause me as little trouble as possible and wanted to jump out with Jones, but I would have none of that, and the discussion finally ended by my taking both to their destination.

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They felt ill at ease but I owned an automobile, and they did not, and I was bound to be a good fellow.

"So things went on until I found myself operating a free service line to and from town. Jones and his friends would frequently look the other way when they saw me coming down the street. Often they would plead they wanted to walk for the exercise but I would go to the expense of stopping my car for them and was so insistent they finally would give in. At times I would have my wife and children along and did not care to have company in the car, but if I saw Jones and his friends I did not have the courage to pass them by.

"Recently I met an official of the street railway. In our talk about business he gave me an insight to the street railway conditions of to-day that opened my eyes. I will repeat to you the statements he made to me: 'He stated there were more than 375 privately owned automobiles in the city, and by reason of the practice of the owners picking up friends along the streets it was conservatively estimated the street car company was losing an average of 50 cents an automobile a day. This in addition to the loss of patronage of the owners and families which the street car company enjoyed before the purchase of the automobile. He called attention to the fact that the owners of the street car company were the heaviest investors of outside capital in this city; that they were the heaviest taxpayers; that one-third of all the paving in this city was at the street railway company's expense; that many thousands of dollars were paid to men in the company's employ who had homes in this city and families to support; that additional thousands of dollars were expended with our merchants annually in the purchase of supplies and material, preference being given to home merchants even though the goods could be purchased at a less cost outside the city; that the company was among the heaviest contributors to advertising, State Fair and other funds necessary to create business for the welfare of our citizens; that it took part in all movements for the upbuilding of the city; that it contributes and pays taxes toward good roads which you and I enjoy in our automobiles; that it maintains training grounds at a loss and furnishes free transportation for the baseball teams visiting this city for their spring practice; that car tickets can be purchased in book form twenty-five for $1 or 4 cents each, and that school tickets are sold in book form at 2½ cents each; that it operates its cars about twenty hours a day under a schedule which for frequency of trips is seldom enjoyed by other cities.

"Fellow Autoists, when I take Jones and his friends in my automobile in the future, it will be on a pleasure trip, not competitive to our own street railway.

"Note—It will be the aim and pleasure of this company to continue to be a factor in the upbuilding of Hot Springs, and we hope our friends will be lenient should we fail at times to do all that we should desire. Bear in mind that our only revenue is secured from passengers picked up along our lines. This little fable is printed to acquaint you with new conditions that are confronting street railways in all small cities, due to the advent of the automobile, which we believe has come among us to stay."

SEATTLE BUS BILL DEFEATED

The City Council of Seattle, Wash., by a vote of five to four defeated the passage of the Dale ordinance for the regulation of jitney buses in Seattle, and went on record as opposing the submission of the question of regulation to the voters at the general election on Nov. 7. Councilman Dale, in Council, asked that some action be taken upon the measure to regulate the jitneys, saying the city's inaction on the subject had caused the State Legislature to act, and that he feared the certificate of public necessity act, which will be voted upon in November, if not defeated would empower the Public Service Commission to eliminate jitney competition altogether. Rejection of the Dale bill means that the regulation of the motor buses will be undertaken by the Council itself, and will not be submitted to the voters. The special committee appointed more than a month ago composed of Councilmen Moore, Hanna and Hesketh, to report upon the question will prepare a bill for passage by the Council.

JITNEYS AS STEAM RAILWAY COMPETITORS

A further examination of the reduced passenger service on the Spokane, Portland & Seattle Railway, which was announced in the ELECTRIC RAILWAY JOURNAL for Sept. 16, page 515, brings out some interesting side lights on the case. It develops that the railroad, as the largest taxpayer, has been the largest contributor toward the finely paved highway, which has been finished and opened to jitney travel gratis, and without which the jitney service would never have sprung up there.

There are five road districts in Clatsop County, and the railroad pays taxes in each, amounting to a total of 5.5 cents on each dollar of assessed value of its properties. Thus, under the county laws the railroad has been paying $10.55 a day in taxes toward the construction of the new highway and when the interest on the bonds for the paving begins to accrue, the company may expect an increase in the rate of the taxes used for this purpose.

Several other western steam lines have reduced train service, and the effect of jitney competition has been severe wherever the highway parallels the tracks. On the occasion of a recent convention in western Washington for which steam line excursion rates were offered, 2700 people came into town from points distant 18 miles or more, and of this number only 350 traveled by train. To attend this same convention, ninety delegates had to travel 275 miles, and fifty others 250 miles across the mountains.

Relief for Traffic Congestion in Kansas City. — After several months' study of traffic conditions, the legal department of Kansas City, Mo., has prepared an ordinance for relieving traffic congestion in the business district. The ordinance eliminates parking of motor cars on the streets of the downtown district, where many streets are narrow and the parking of cars requires vehicular traffic to follow the street cars in the busy hours.

Newspaper Train from Chicago Loop to Waukegan.— The first through service to the North Shore district via the Chicago Elevated Railways and the Chicago, North Shore & Milwaukee Electric Railway was begun on Oct. 1. This service consists at the present time of an express car carrying Chicago newspapers. This train leaves the Metropolitan terminal station on Fifth Avenue, between Jackson Boulevard and Van Buren Street, and runs to Waukegan, Ill. Britton I. Budd, president of both companies, inaugurated this service for the benefit of the Chicago newspapers in distributing to the North Shore district.

Railway Participates in Fire and Accident Prevention Celebration.—The Kansas City (Mo.) Railways took an active part in the celebration of fire and accident prevention day on Oct. 9. J. H. Harvey, superintendent of efficiency, of the company, is president of the Local Safety Council, which assisted in the work, and is chairman of the committee on distribution of literature. The committee on celebration provided the literature, largely prepared by Mr. Harvey, and the railway company distributes it, 40,000 pieces going to the schools on Friday, Oct. 6. The company also had one of the eighteen floats in the parrade. In addition to the floats there were trucks or cars by the various city departments, and seventeen pieces of apparatus by the fire department. Many local organizations were represented by cars carrying the members of their fire or accident prevention committees.

Vehicle Drivers Reported for Indifference.—A recent incident in Kansas City, Mo., indicates the ease with which a general movement for improving traffic conditions can be stimulated. The Kansas City Railways has been having its trainmen note the drivers for retail and other establishments who most often interfere with the prompt moving of traffic. The trainmen were already largely familiar with the offending drivers, and reports came quickly. The officers of the railway company reported the drivers to the merchants. In most cases the latter expressed gratitude at the suggestion, and many asked the railway for further assistance in this manner. In some cases the merchants established new rules, and issued special instructions as to watchfulness of the interests of others by their drivers, taking the position that with everybody trying to keep all the traffic moving, the general good results would be shared by all.

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Personal Mention

H. O. Swoboda, Pittsburgh, Pa., has been appointed in a consulting capacity by the Pittsburgh & Butler Railway, Butler, Pa., to take care of its interests in connection with the agreements which it made with the West Penn Power Company.

Alston Green has been elected vice-president of the Alabama City, Gadsden & Attalla Railway, Gadsden, Ala. Mr. Green will have charge of the office of the company and of the sale of current. He has lived in Gadsden all his life and has a wide acquaintance in the city and county.

James G. Wray, chief engineer of the central group, Bell Telephone Companies, has resigned to become associated with the firm of Hagenah & Erickson, public utility engineers, First National Bank Building, Chicago, specializing in appraisals, cost analyses and rate investigations.

H. L. Brown, who succeeds E. M. Haas as Western editorial representative of this paper, was graduated from the electrical engineering department of the University of Michigan in 1912, and during his senior year there was assistant to Professor de Muralt, then head of the department. After two years spent in technical journalism, Mr. Brown became connected with the Chicago Telephone Company's engineering department and remained with this company for about a year, when he joined the editorial staff of the *Electrical World*.

Exum M. Haas, who for the last five years has been Western editorial representative of the ELECTRIC RAILWAY JOURNAL, has resigned from this paper to accept the office of manager of sales of the International Steel Tie Company. He will be succeeded by H. L. Brown, who for the last year has been assistant editor of the *Electrical World* in Chicago. Mr. Haas, after graduation from the civil engineering course of Purdue University in 1905, was resident engineer for the Chicago & Eastern Illinois Railway in the construction of a 6000-car capacity freight yard in Dalton, Ill. In 1906 he was appointed assistant engineer of maintenance of way for the Illinois Traction System, where he helped to organize the maintenance of way department and served as locating and constructing engineer for the company in charge of building extensions for the system. In 1909, when work on the track extensions had practically ceased, his title was changed to superintendent of bridges and buildings, and while he served in this capacity most of this company's standard way stations and substations and the terminal stations in St. Louis, Mo., were built. He has been a member of the 1915 and 1916 way committee of the American Electric Railway Engineering Association.

Dean Treat, assistant general manager of the Wisconsin Public Service Company at Green Bay, has been promoted to the position of general manager of the Wisconsin Railway, Light & Power Company at LaCrosse, Wis., one of the Clement C. Smith properties. Mr. Treat began his railway career as timekeeper for Westinghouse, Church, Kerr & Company during the construction of the Grand Rapids, Grand Haven & Muskegon Interurban Railway, and remained with that company until 1907, when he was promoted to the position of assistant trainmaster. He resigned from the last-mentioned company to become assistant superintendent of construction of the Milwaukee & Northern Railway and remained with that company until 1910 as superintendent of transportation. He then became superintendent of the Sterling, Dixon & Eastern Electric Railway, and in 1912 was made manager of the Lee County Light Company. On the sale of that property to the Samuel Insull interests Mr. Treat was made district superintendent of District "D," where he remained until January, 1913, when he resigned to become superintendent of railways of the Wisconsin Public Service Company at Green Bay, Wis. He was subsequently promoted at Green Bay to assistant general superintendent, then to assistant general manager and from that position he was finally promoted to LaCrosse as general manager at that place.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

FRANCHISES

Harvard, Ill.—The Chicago, Harvard & Geneva Lake Railway has asked the Council for permission to abandon its trackage on North Division, West Diggins and North Eastman Streets entering the city over its freight line through the Logue and Brainard farms, thence to the city limits and along West Front Street to Eastman and thence to the Chicago & Northwestern Railway depot.

Bowling Green, Ohio.—The City Council of Bowling Green has adopted a resolution granting the Toledo, Fostoria & Findlay Railroad a fifteen-year franchise if it will buy the property of the Lake Erie, Bowling Green & Napoleon Electric Railroad, which the owners have decided to sell for junk.

San Angelo, Tex.—The City Commission of San Angelo has refused the petition of J. E. Willis of Abilene for a franchise for a street railway system in San Angelo. The reason for this refusal, as given by the commission, was that they had under consideration a proposition submitted by the Interstate Electric Corporation of New York, which they will probably accept.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—It is reported that the Calgary Municipal Railway will construct a mile of track over the West Center Street bridge, now under construction.

Capital Traction Company, Washington, D. D.—With the dual purpose of affording transportation facilities to Potomac Park and relieving street car congestion at Fifteenth Street and New York Avenue, the Capital Traction Company has applied to the Public Utilities Commission for permission to extend its lines south on Eighteenth Street to C Street, where it is proposed to construct a terminal loop around the triangle between Eighteenth Street, C Street and Virginia Avenue. The improvement calls for an expenditure of about $100,000. If authorized by the commission, work on the project will start early next year, and effort will be made to complete it by July. Under the plans submitted the company would place additional special work at the intersection of Fifteenth Street and New York Avenue, providing a double-track connection between the present tracks of the Fourteenth Street line on New York Avenue and the present tracks on Pennsylvania Avenue west of Fifteenth Street. It is proposed to operate Fourteenth Street cars in the new Eighteenth Street service. The company also applied for permission to build a connecting track between the proposed southbound track on Eighteenth Street and the existing track on F Street. With this connection installed, cars from the Fourteenth Street service proceeding down Eighteenth Street would be able to return either by way of the suggested loop terminal at Eighteenth Street, C Street and Virginia Avenue, or by making a loop via F and Seventeenth Streets.

Chicago, North Shore & Milwaukee Electric Railway, Highwood, Ill.—B. J. Fallon, chief engineer of the Chicago, North Shore & Milwaukee Electric Railway, has announced that the company will lay 350 tons of new rails this fall; also it will double track some single track sections and will replace a 100-ft. pile-bent trestle by a large concrete box and fill. The company has recently purchased fifteen sets of crossing gates, and also twelve Bryant Zinc Company highway crossing signals. Inquiries are out for a considerable number of additional highway crossing signals to be installed at crossings between Evanston and Milwaukee.

Mason City & Clear Lake Railroad, Mason City, Iowa.—This company reports that it expects to build 1½ miles of new city track in Mason City.

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St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—This company has authorized a $15,000,000 refunding bond issue for the retirement of its present outstanding bonded indebtedness of $5,000,000 and for improvements and extensions. The extension will be in the direction of Atchison or northeast of Maryville, Mo.

***Ardmore, Okla.**—Plans are being made at Ardmore for the organization of a company with local capital which will build an electric interurban railway from Ardmore to the newly discovered Fox oil field. It is stated that the Ardmore Railway Company is interested in the project. Surveyors will take the field at once for the purpose of making preliminary surveys. The plans in contemplation include an extension to the Washita River and the development of water power from that stream.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont.—About 1 mile of track has been practically completed by the Hamilton Street Railway, a subsidiary of the Dominion Power & Transmission Company, on Wentworth Avenue between Barton and Burlington Streets.

Williamsport (Pa.) Passenger Railway.—Plans are being considered by the Williamsport Passenger Railway for the construction of an extension into Newberry.

Dallas (Tex.) Consolidated Street Railway.—The City Commission has revoked its order to the Dallas Consolidated Street Railway Company requiring the company to lay 103-lb. girder rails on Tremont Street from Beacon to the City Limits. The new order requires the company to lay 80-lb. T rails. The change in order of the commission was made on petition of the company, which claimed that to carry out the commission's original order would mean bankruptcy for the company.

SHOPS AND BUILDINGS

Boston (Mass.) Elevated Railway.—Plans for extensive changes at the Forest Hills station of the Boston Elevated Railway, for the purpose of relieving congestion on the street surface platforms during rush hours, have been submitted to the Public Service Commission by L. S. Cowles, engineer. Mr. Cowles explained that it is purposed to lay another track on the westerly side of the southbound platform, thus creating an island but increasing the loading facilities to an extent that would care for the heavy traffic during the morning and evening rushes. The portion of the station it is designed to use for the new tracks is now devoted to vehicular traffic, but there is plenty of room outside for street-widening purposes.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—It is reported that this company will construct a combined passenger and freight depot, together with sufficient switching facilities, at the corner of North Court and Friendship Streets, Medina.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio.—The Ohio Valley Traction Company, a subsidiary of the Portsmouth Street Railroad & Light Company, will construct a carhouse at the corner of Third and Lawrence Streets, Ironton.

Three Rivers (Que.) Traction Company.—This company has completed an 85-ft. extension of its carhouse and shop building, doubling the car capacity.

POWER HOUSES AND SUBSTATIONS

Louisville & Northern Railway & Lighting Company, New Albany, Ind.—Preparations are being made by the Louisville & Northern Railway & Lighting Company for the installation of a new street lighting system in Charlestown.

Columbus Railway, Power & Light Company, Columbus, Ohio.—A 1300-volt transmission line is being erected by this company to the plant of the Brunt Tile & Porcelain Company, which formerly operated an isolated power plant. New motors and equipment will be installed when the transmission line is completed.

Republic Railway & Light Company, Youngstown, Ohio.—Plans have been made by the Republic Railway & Light Company for the addition of a third 20,000-hp. generating unit to its Lowellville power station, but it is stated that, owing to present conditions in the electrical industry, it will not be installed for some time.

Manufactures and Supplies

CAR PAINTING MATERIALS ARE HIGH

Enameling Process Gains in Favor—Deliveries Normal, Except for Reds

Trade conditions in the paint, oil and varnish field have been moderately active during the summer. The comparatively large number of cars ordered during the first six months of the year stimulated buying to a point considerably above the average of 1915. Prices now are high. Linseed oil has been as high as 82 cents a gallon. Zinc oxide has touched 35 cents a pound, and the imported brilliant reds have been exceptionally high with prices very unstable. White enamel, such as is most commonly used, and which was formerly priced at $2.50 to $2.75 a gallon, is now $4 a gallon, and reds that were $3 a gallon are now $4.50 a gallon and higher. With zinc oxide at 35 cents a pound, and 5 lb. required in the composition of a gallon of white enamel, it is easily seen why the price for the mixed product is now especially high.

Master painters used to hold to the opinion that white lead as such must be "pure" white lead, but now a substantial number of painters in car construction and maintenance fields think that for some purposes it is desirable to add zinc to a white lead mixture.

There is a growing tendency among the electric railway lines to change the outside painting of cars from paint and oil coats with varnishes to enamel. The idea of producing a piano finish is giving way to more practical plans of reducing the number of coats by applying enamel. Back of this movement is the idea that there will be a reduction, not only in the first cost but in the renewal cost. This is particularly true with steel cars. If a wooden car becomes badly marked it is necessary to scrape off the paint down to the wood and build up the several coats with especial care in order to match the colors and then to finish with the varnish coat. With enamel, the injured parts can be quickly filled in at less cost and with better results than when oil coats and varnish are used.

One reason for the increasing use of car enamel is the availability of improved products, resulting from greater attention having been given to enamels by manufacturers. As now ground in the paint factories, the enamels give much better finish than when the painters themselves used to grind their own color into varnish. It is pointed out by the manufacturers that a larger use of enamel for car exteriors will reduce the demand for varnish. On some roads, however, it is the practice to varnish over the enamel.

With regard to the orders placed during the last few months, none of these have been especially large. In the North Central States Kansas City has probably bought as much painting material in proportion to the size of the property as any road. That property has been changing its standard color from dark green to a light yellow with white trim and so has been doing an especially large amount of painting.

On most of the medium-sized roads that have formerly maintained revarnishing and repainting schedules, it is noted that during the past two years these schedules have not been followed, but rather it has been the practice to delay two or three months on the renewal work.

Except for the venetian reds, deliveries on paints, varnishes and enamels are practically normal.

PACKING MATERIALS HOLD UP DELIVERIES

Lumber, Cardboard, Fiber and Other Materials Are Difficult to Obtain and Prices Are Greatly Advanced

In addition to a scarcity of raw materials for their products manufacturers are face to face with a serious shipping problem in the matter of packing materials. These materials are scarce and in some instances are holding up deliveries. Lumber, fluted cardboard, fiber and other packing materials are difficult to obtain, and prices have advanced materially.

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The amount of lumber used each year in crating machinery and for packing boxes in the industry is enormous. In many electrical lines it has been superseded by fluted cardboard, but events of the last year or so, it is understood, have disturbed this supply also.

NEW LUMBER ASSOCIATION STANDS FOR UNIFORM GRADES

A new national association has been formed, under the name of the National Retail Lumber Dealers' Association, whose object it is to establish uniform grades of lumber in all parts of the country. The purpose intended is that a customer may know what he will receive when he places an order for a specific grade. The association indorses the extensive branding of lumber as a means of guarantee to the consumer that he will get the quality of lumber he desires as well as the use of trademarks and of extensive advertising of lumber.

ROLLING STOCK

Jackson Light & Traction Company, Jackson, Miss., has ordered two cars from the Southern Car Company.

Chicago (Ill.) Surface Lines are in the market for thirty cars similar to those purchased in 1914. These are for replacement of equipment destroyed by fire and damaged in the service.

TRADE NOTES

Consolidated Car-Heating Company, Albany, N. Y., has received an order from the Bay State Street Railway for 436 car equipments of Consolidated buzzers.

Roller-Smith Company, New York, has appointed as its representative in Birmingham, Ala., Jonathan Haralson, Brown-Marx Building, who will handle Roller-Smith instruments, circuit breakers and Columbia meters.

Hess-Bright Manufacturing Company, Philadelphia, Pa., at a meeting of the board of directors on Oct. 6 elected B. D. Gray president to succeed F. E. Bright, who remains identified with the company as chairman of the board.

H. W. Johns-Manville Company, New York, N. Y., has just opened a new branch office at Great Falls, Montana, in the Ford Building, Room 418, in charge of J. H. Roe. With the opening of the Great Falls office the Johns-Manville Company increases its number of branches to fifty-five.

H. W. Finnell was recently elected vice-president of Templeton-Kenly & Company, Ltd., Chicago, manufacturer of Simplex jacks for industrial and railroad purposes, and also for automobile use. He assumed his duties with that company on Oct. 1. Just prior to his present affiliation, Mr. Finnell was general manager of the Henry Giessel Company, in which concern he still retains his interests. He has been intimately connected with the railway supply industry for more than ten years.

Cooper Heater Company, Carlisle, Pa., has recently shipped the following orders for hot air heaters: Cincinnati Traction Company, 100 No. B-2; Johnstown Traction Company, forty-seven No. B-2; Northern Ohio Traction & Light Company, thirty-six; Pittsburgh Railways, 112; Beaver Valley Traction Company, twelve; Omaha & Council Bluffs Street Railway, twenty-five; Evanston Railway, twenty-seven; Steubenville & East Liverpool Railway, five; Muskegon Traction & Light Company, four; Cumberland & Westernport Railway, seven; South Covington & Cincinnati Traction Company, twenty-five; of the No. B-4 type: Lehigh Valley Transit Company, twelve; Stark Electric Railroad, seven; London & Port Stanley Railway, three; of the No. B-5 type. Also the following orders for No. 15 hot water heaters: Easton Transit Company, six; General Electric Company, four; Milwaukee Northern Railway, ten; Shamokin & Mount Carmel Railway, two; Missouri & Kansas Interurban Railway, two.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, is distributing an illustrated circular describing the O-B emergency fire hose bridge.

American Catalogs to Be Distributed at Lyons Fair.—The Annual Fair at Lyons, France, will be held from March 1 to 15, 1917, inclusive. Buyers from all parts of the world will be present, and it is desired to have as large a representation of American manufactures as possible. The State Department has placed $500 at the disposal of the American Consul, which will enable him to distribute the catalogs and other literature of American manufacturers who are interested. The catalogs of those interested should be forwarded direct to the consul at Lyons.

Holden & White, Chicago, Ill., have issued a new catalog on Perry-Hartmann side and center bearings, which are manufactured by the Joliet Railway Supply Company. This catalog describes and illustrates the Perry double-roller, roller-bearing side bearings and the Hartmann self-centering ball center plate. It includes a chart showing the wheel flange pressure of a friction center plate compared with that of the Hartmann centering center plate. It illustrates in cross section the means for obtaining a surface contact on the centering plate balls to carry the load and, at the same time, operate in inclined pockets. Dimension drawings of the bearings are shown and also six full-page drawings of various applications of these side and center bearings to car trucks. The reading matter includes chapters on the necessity for roller side bearings and the advantages to be obtained by centering center plates.

NEW PUBLICATIONS

European Economic Alliances. National Foreign Trade Council, New York, N. Y. 117 pages. Paper, 25 cents.

This pamphlet is a compilation of information on international commercial policies after the European war and their effect upon the foreign trade of the United States, as well as an analysis of European and United States commercial interdependence and treaty relations. Expository rather than argumentative, the book is simply part of the work done by the National Foreign Trade Council in investigating the problems arising in foreign trade, and it offers in convenient form essential information on this subject of such present importance.

Manual of American Railway Engineering Association.—Edition of 1915 published by the American Railway Engineering Association, Chicago, Ill.

This is a volume containing the standards and recommendations of the various committees of the American Railway Engineering Association. With the various subjects reference is given to the volume of the proceedings for the full context of the committee reports and discussions. The 1915 edition is the fourth revision of this association's manual, which was first published in 1905. The subject matter includes the recommended standards on roadway, ballast, ties, rail, track, buildings, wooden bridges and trestles, masonry, signs, fences and crossings, signals and interlocking, records and accounts, rules and organizations, water service, yards and terminals, iron and steel structures, economics of railway location, wood preservation, electricity and conservation of natural resources. Standards recommended by special committees on the classification of railways, grading of lumber and uniform general contract forms have also been included in this manual. In order to make this volume as useful as possible for reference purposes, a complete index of the various subjects treated by the American Railway Engineering Association's standing committees has been prepared. The manual contains 680 pages and is intended for distribution among the members of this association.

The Earnings Power of Railroads. 1916 edition. James H. Oliphant & Company, 61 Broadway, New York, N. Y. 514 pages. Leather.

This is the latest edition of the valuable financial reference book presented to investors by the above-named banking houses. There are the usual introductory chapters explaining the fundamental principles to be used in the analysis of stock and bond values; tables giving vital statistics regarding earnings, mileage, capitalization, tonnage, etc., and notes presenting information as to dividends and other points of direct interest to investors. Those interested in steam railroad securities find this book both handy and valuable.

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Electric Railway Journal

Published by the McGraw Publishing Company, Inc.
Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLVIII NEW YORK, SATURDAY, OCTOBER 21, 1916 No. 17

INVESTIGATE SNOW-FIGHTING EQUIPMENT

Among the subjects which will be assigned for consideration this year by the Engineering Association, it has been suggested that it might be well to include an investigation of the subject of snow-fighting equipment. So far as we know, this matter has not been treated within recent years certainly by any committee, yet it is of very live interest to all companies in the northern sections of the country. A great variety of equipment is now in use on these properties, and almost an equally large number of theories exist as to the proper methods of combatting snow. All of these cannot be best for all conditions. One reason for a variety of practices in snow-fighting equipment is undoubtedly the fact that much of this equipment is home-made because it is used for only part of the year. Of course, home-made equipment may be just as efficient as any other for this purpose, but this fact is another reason why the subject could well be reviewed by a committee to compare the practices that are now used by different companies and to outline the requirements that are demanded of equipment for effectively removing snow.

A FINE REPORT OF PROGRESS

We have already referred to the high character of the Atlantic City report of the sub-committee on social relations, abstracted elsewhere in this issue. Although called a progress report, it is actually one of the most important ever presented to the American Electric Railway Association. It is not only a dispassionate exposition of the advances made by electric railways in solving employee problems through social insurance, but also a far-sighted discussion of the future application of social economics along insurance lines. The committee strongly suggests, as a necessary and probable development of the near future, compulsory life and health as well as accident insurance for all American wage earners, most of which insurance, it states, could well be managed by joint boards of employers and employees in the various industries under regulations made by law. In the electric railway industry the best progress in procuring social insurance has already been made through mutual benefit associations thus jointly supported and managed, but if the industry is to secure the maximum benefits for employees as social insurance spreads, it must continue its good work along this line and so efficiently perform its social function as to keep itself free from the loads of other industries or overhead government costs. It is essential, therefore, that the electric railways thoroughly understand the social insurance theory of assisting individual progress through the co-operative handling of hazards—a sane compromise between extreme paternalism and extreme individualism—and that they know the relative efficiency of methods under this theory. The sub-committee has furnished in elaborate form the material for such knowledge, and it should be used to the fullest possible extent by all electric railway officials.

AXLE-MOUNTED MOTORS ON THE MILWAUKEE

On the giant locomotives for the Chicago, Milwaukee & St. Paul Railway, which are described in considerable detail on another page, there is one feature that seems to us to stand out in importance before all others, with the possible exception of the ingenious scheme whereby regenerative braking is accomplished with direct-current motors. This dominating feature is the successful application of the so-called trolley-car drive, or the direct-axle-mounted arrangement for the motors, and the fact that it has passed satisfactorily through practically a full year of service on these heavy engines cannot fail to have far-reaching influence on electric locomotive design of the future. To the axle-mounted motor may be ascribed the very great advantages of simplicity and accessibility, but for heavy, high-speed locomotives the low-hung non-spring-borne weight has frequently been regarded with suspicion. On the Milwaukee's electrified divisions the rail is of 85-lb. and 90-lb. weight with four-bolt and six-bolt joints, the rail being double spiked and equipped with tie plates at all curves. Manifestly, this construction is of a high grade, but it does not by any means go beyond the practice that is customary for the better class of steam railroad. As a matter of fact, there is no difference between the track construction on the Milwaukee's electric zone and that found throughout the remainder of the road. If, then, the Milwaukee's high-speed and ultra-heavy electric locomotives can be operated for a year without troubles on this score, it seems to be safe to say that the old bogey of track damage from electric locomotives with direct axle-mounted motors may well be laid away permanently. Whether the simplicity of this arrangement can overbalance the advantages of wider clearances and concentration of power that are possessed by the frame-mounted motor is, of course, still to be determined, but from the evidence at hand the issue between the two types of design can no longer be complicated by the highly nebulous question of the relative influence that is exerted by each one upon the track.

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ELECTRIC RAILWAYS IN MOBILIZATION

We are very glad to see the military authorities taking up seriously the work long ago advocated in these columns, of organizing the electric roads of the country for maximum efficiency in case they should be needed for military purposes. The addresses of Colonel Baker and Captain King at the Atlantic City convention last week pointed the direction in which electric railway companies and their officials can be of assistance to the War Department, and we feel sure from the indications already plain that electric railway men will co-operate in the heartiest and most patriotic manner to the furtherance of so good an end. Not only can this great network of subsidiary lines be made immensely useful for mobilization, but it can be turned to admirable account in the organizing of a proper supply system.

The time has gone by when an army can cut loose from its base, as did Sherman's, and live on the country while carrying its supplies of ammunition with it. These last must now be so prodigious as to demand in themselves transportation facilities to an amount hitherto unimagined. The work of military transportation requires a close co-ordination of facilities which cannot be attained by any suddenly extemporized means. Everything must work intelligently together on a well-devised plan in order that the steady stream of material can be kept up. It is notable during the progress of the European war on the western front that more than one promising drive has been checked, not for lack of men, but for lack of shells.

There are hundreds of active and patriotic young men in the electric railway service, not immediately available for the organized army, who would esteem it both a duty and a privilege to fit themselves to deal efficiently with the work of the quartermaster's department along their own familiar lines of operation. They could do this without interfering with their ordinary duties or giving time which they could ill spare to temporary service, if only the military authorities would arrange a proper scheme of instruction. If our country unhappily should get into war it would need an immense host of officers trained at least in the rudiments of their duties, and how can it better further efficient preparatory work than by taking advantage of men who are professionally trained already in part of what would be their military duties. Many a man who is extraordinarily competent to devise and carry out an emergency supply system may be from age, physical disability or temperament unfitted for active service. This indeed is one of the great problems in England at the present time, to make each man fit into a co-ordinated scheme of defense in the most efficient fashion.

The working out of a great scheme of transportation service, utilizing the personnel made available by its experience, is of particular importance in a country of great distances like our own, and we earnestly hope that the good work now inaugurated will go on with the co-operation of the War Department. Such a movement is part of the general scheme of preparedness which is so clearly shown to be necessary at the present time.

MAKING SALARIES PUBLIC

At a recent commission hearing in which the cost of service was being analyzed with great care, counsel for the city requested that the names of all employees in the company's engineering department, with the salary received by each man, be read into the record or filed as a public exhibit. Representatives of the company immediately offered objection on the ground that the publication of names and compensations corresponding had never been the policy of the utility in question, and that such a course would be likely to impair discipline. As the city did not press for a ruling at the time, the issue was not forced, but the point raised was of much interest, and its discussion occupied the hearing for about half an hour.

The point was made that since salaries of employees in the public service are fixed and open to all inquirers, those of employees in quasi-public duty should be equally exposed. An important distinction, however, was overlooked in this connection. In the particular company before the board, salaries are paid to men as individuals of proved value to the utility rather than to the occupants of certain well-defined positions. In the public service, a stated position generally carries with it a stated salary, and so long as the incumbent can fill the office, his personal abilities expressed as variants above the normal have comparatively little effect upon his compensation. This, in fact, is one of the most depressing features of public service and is one of the chief arguments against governmental ownership and operation. The stimulus of financial reward is lacking in comparison with that in private or semi-private business.

It may be conceded that the city was entitled to know the details of the so-called special payroll of the company, so far as relates to the number of men receiving salaries of each grade, but it is hard to see that it is of the slightest consequence to the public interest to make public the facts that Mr. A receives $150 per month, that Messrs. B and C receive $125 per month each, and so on. We believe that fairness to the individuals whose compensation is often unknown to each other, and whose pay is settled by the management after careful consideration of their individual and personal qualifications, justifies a company in refusing to give out this information in any other form than the number of men receiving $150 per month, the number receiving $125, and so forth. In fact, it ought to serve the ends of justice in many cases to present a total of salaries for a department with the total number of men employed, enabling the average salary to be determined by simple division, and if demanded by the tribunal sitting in the case, the maximum and the minimum compensation accorded. Some consideration for the personal aspects of employment is still essential, and needless publicity of the earnings of specific individuals adds nothing to the value of evidence in a rate case, but tends to create dissatisfaction and possibly internal friction in an otherwise harmonious organization.

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The Newspapers—Your Friends or Your Enemies?

The Public Utility Corporation Is Full of News—LET IT OUT!

WHAT would become of the department store that used, misused or didn't use at all the newspapers the way most utility companies use, misuse or don't use the press?

A public utility is even MORE DEPENDENT than a department store upon the good-will of the press and public.

But you say you have no lingerie bargains to advertise.

Perhaps not; but you have even more important things to gain than 49-cent customers.

You have a public service to sell.

To sell it in peace and profit you must have public UNDERSTANDING and GOOD-WILL.

You can get both by proper use of the newspapers.

The public utility corporation is full of news; LET IT OUT.

If you have anything to announce that is not news, pay for its publication in the form of advertising.

But your day-by-day affairs; what you are doing; how you are doing it; how that accident happened and how you purpose to prevent another like it; how your income is spent; why you don't do some of the things that the public wants you to do—

All this is information that any newspaper is glad to print.

And the printing of it, coupled with the established conviction that your door is open to newspaper men, to anyone, in fact, who has a question to ask or a criticism to offer, will make the newspapers your AIDES instead of your enemies.

Do you cultivate newspaper men—owners, editors, reporters—as you cultivate bankers and politicians?

IF NOT, WHY NOT?

These days the newspapers make and break bankers and politicians—and railways.

If the press and the general public—which largely derives its opinions and impressions from the newspapers—

If these are your friends you won't need any others.

The best man to do the every-day cultivation of newspapers is a newspaper man—a PUBLICITY MAN.

What's that? you ask.

See Talk No. 4, next week.

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Illinois Traction System's One-Man Car

A 32-ft. Two-Compartment, Single-End Design Has Been in Satisfactory Service for the Past Three Years on City Lines with Light Traffic Operated by This Company, the Equipment Including a Number of Novel Features

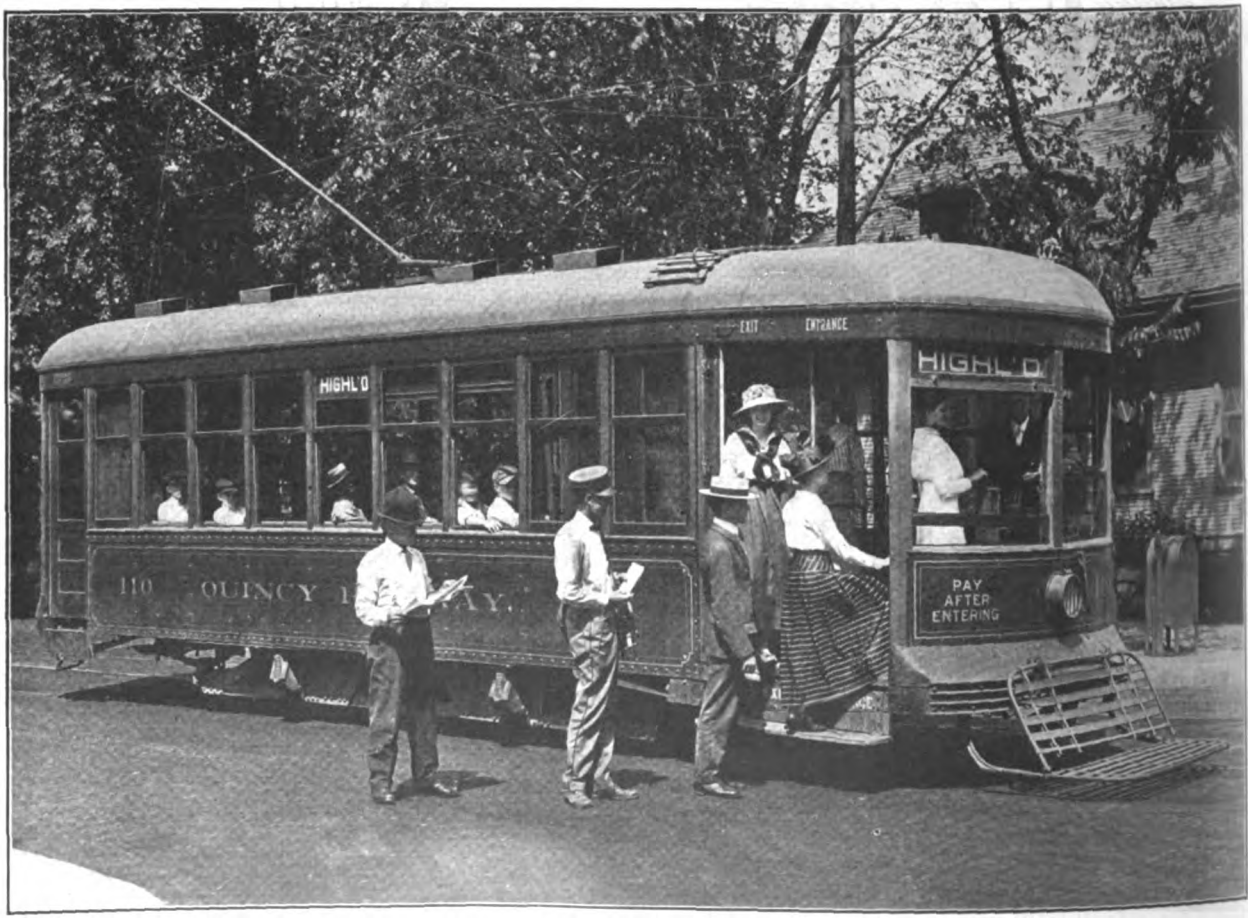
JITNEY bus competition on several of the Illinois Traction System's street railway properties, together with a desire on the part of the management to furnish a more frequent service at a lower operating cost resulted in the construction of a number of one-man cars by this company some three years ago. These equipments seat thirty-seven people and weigh 23,500 lb., so that they not only reduce platform cost but furnish a seating capacity equivalent even to some double-truck cars. Moreover, the reduction in weight decreases energy consumption, overhead and track maintenance. Aside from these features, there were incorporated in the car equipment safety appliances consisting of a dead man's control, air-operated doors and steps and an emergency rear door, all so arranged that the car cannot be started when the doors and steps are open and the doors and steps cannot be opened when the car is in motion. As a result the cars have proved to be as safe as any type operated by two men, and the past three years' experience with them has been thoroughly satisfactory from an operating standpoint.

CAR BODY ARRANGEMENT AND CONSTRUCTION

The general design, being of the one-man type, is arranged for single-end operation with exit and entrance doors at the front and an emergency exit door at the rear. The car floor is continuous through the car body and vestibules. The body is arranged in two compartments, namely, the main passenger compartment at the front end of the car, where space is provided for the entrance and exit of passengers as well as for the motorman, and a smoking compartment occupying the rear vestibule, the latter being separated from the main passenger compartment by a bulkhead fitted with a sliding door. Longitudinal seats are provided in the main passenger compartment, and there are seats along the sides and around the end of the rear vestibule, except for an aisle to the emergency door. The general dimensions are as follows:

Length overall, 32 ft. 4 in.
Height from top of rail to top of trolley, 10 ft. 9⅜ in.
Height from rail to car body floor, 28 in.
Height from rail to top of first step, 14 in.
Height from first step to car body floor, 14 in.
Distance between side posts, 2 ft. 3½ in.
Width of car over side plates, 8 ft. 2 in.
Gage of track, 5 ft.

The underframing of the car, which was greatly simplified by the omission of drop platforms, includes side sills that consist of ⅜ in. x 2½ in. x 3 in. angles running



ILLINOIS TRACTION'S ONE-MAN CAR—VIEW OF CAR IN SERVICE

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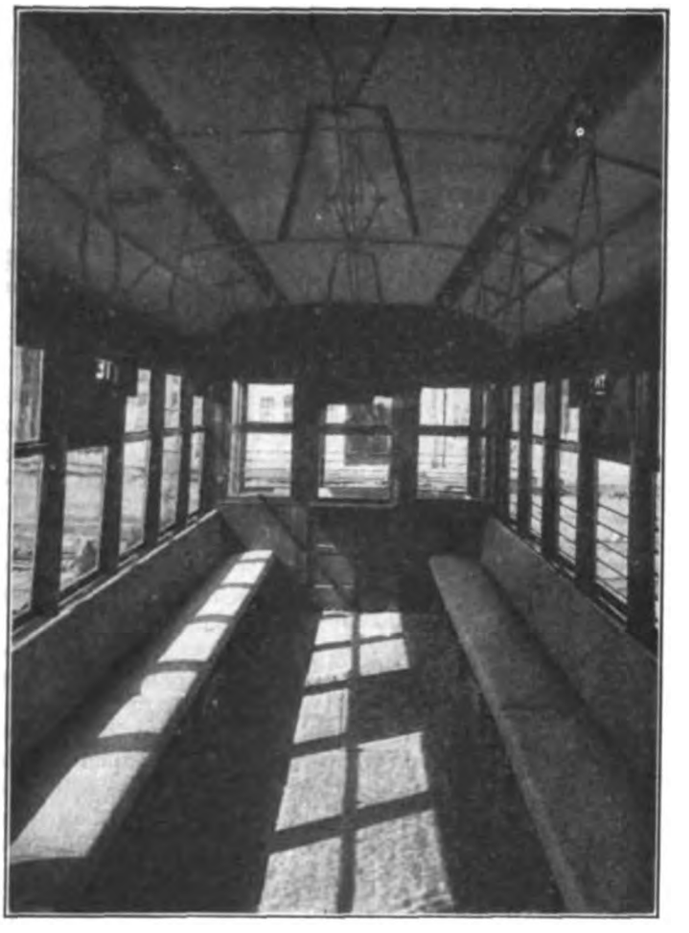
in one continuous length from buffer to buffer and offset at one side for the exit and entrance doors in the front vestibule and for the rear emergency door. The two cross-bearers in the center of the underframe and those at the vestibule corner posts are formed of 3-in., 5.5-lb. I-beams. The next set of cross-bearers to those in the center of the underframe are 3-in., 7½-lb. I-beams, and those at the body corner posts are 4-in., 7½-lb. I-beams. Diagonal bracing in the two vestibule panels of the underframe is provided by two ⅛ in. x 3 in. x 3 in. angles. The underframe is of the side girder type, and the girders are formed of ⅛ in. x 32 in. plates reinforced at the top by ⅜ in. x 3 in. belt-rails which extend the full length of the girder.

The posts are of ash mortised into long-leaf yellow pine sills which are bolted to the steel underframe. Each post is securely bolted to the girders by four ⅜-in. turned-head carriage bolts. Plates are installed and these also are of long-leaf yellow pine and they are mortised for top-post tenons. The letterboard is made of poplar dapped over the side posts to which it is securely glued and screwed. The arm rails are made of ash dapped over the side posts, and the outside of the vestibules below the windows is covered with No. 14 gage steel. The roof is of the plain-arch type and of wooden construction, except over each side post where it is reinforced with a ⅜ in. x 1¾ in. steel carline.

Mahogany of a plain design is used for an interior finish. The ceilings are formed of three-ply poplar veneer, the sashes are of mahogany and the hardware is highly polished bronze. The seats are of the longitudinal type and they are upholstered in rattan. Other specialties include the Consolidated Car Heating Company's buzzer system, Empire Safety treads and Pantasote curtains on Edwards spring rollers, fitted with Curtain Supply Company's ring-type fixtures.

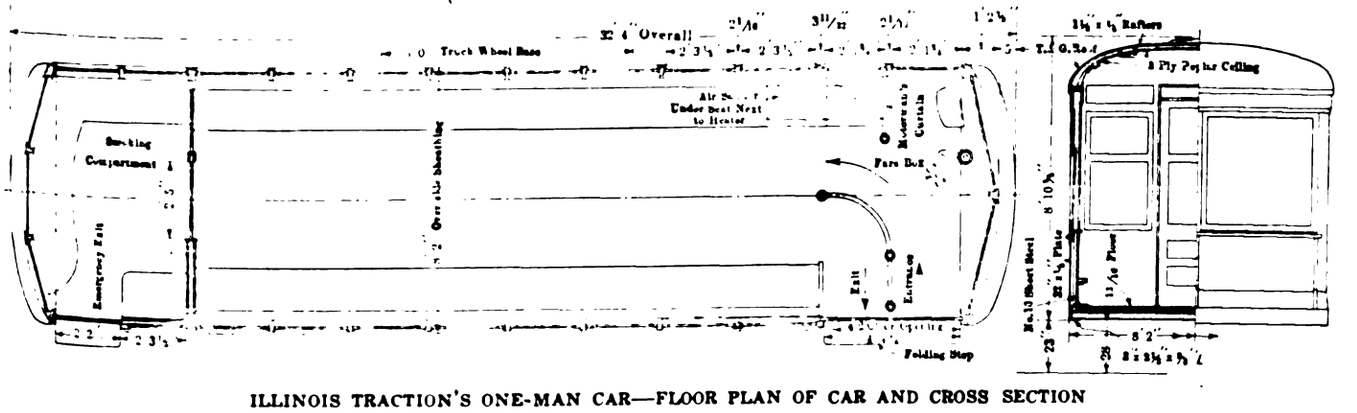


ILLINOIS TRACTION'S ONE-MAN CAR—INTERIOR VIEW OF CAR

Trucks and Safety Appliances

A single truck of special design has been provided for the car, the bottom member of the truck frame being formed of ½ in. x 3 in. x 3 in. angles, and the top member of ½ in. x 4 in. x 4 in. angle. Four elliptic springs are mounted on the four outside corners of the truck frame and these carry the body. The journal-box yokes are arranged to permit the wheels to be removed in an ordinary drop pit, and longitudinal motion of the car body is limited by providing a dampener between the truck frame and one of the body-underframe cross-bearers. Similarly, coil springs are provided in conjunction with the elliptic springs to obviate unnecessary vertical movement. The truck is fitted with 28-in. wheels, and has an 8-ft. wheelbase. The motors are Westinghouse Type 328, similar to those used on the original low-floor Pittsburgh car.

Undoubtedly the most interesting features of the car are included in the provisions to make its operation by one man safe under all conditions. As mentioned earlier in this article, these features include air-operated doors and steps so arranged that the car cannot be started when the doors and steps are open, and they in turn cannot be opened when the car is in motion. In order to combine these functions in as simple an apparatus as possible for one-man operation it was necessary to purchase special equipment. Since doors and steps were to be air-operated and interlocked with the brake system the Westinghouse Traction Brake Company was requested to develop a brake apparatus which would not only perform its function, but would also operate the doors and steps and sand the rail in one operation. The resulting new type of equipment was described in the ELECTRIC RAILWAY JOURNAL for Sept. 2, 1916. Some features of the scheme of operation, however, were not mentioned in that description and may well be outlined at this time. Obviously, the object of the combined air-brake and door-operating apparatus is to reduce the number of handles to be actuated by the motor man. The brake valve, as described, has been arranged not only to supply air pressure to the air-brake apparatus



ILLINOIS TRACTION'S ONE-MAN CAR—FLOOR PLAN OF CAR AND CROSS SECTION

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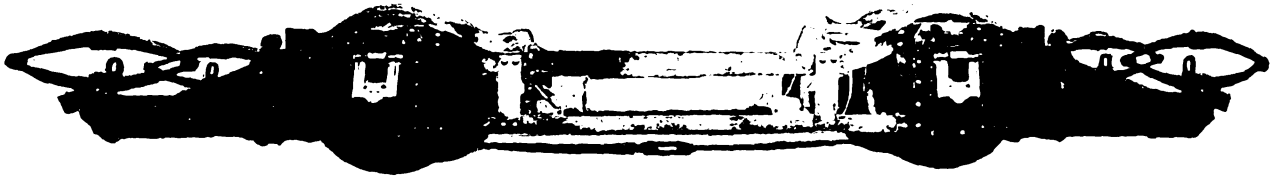
in the usual way, but to supply air pressure to the front-door operating cylinder, and also includes a feature which enables the motorman to sand the rails, merely by depressing the brake-valve handle.

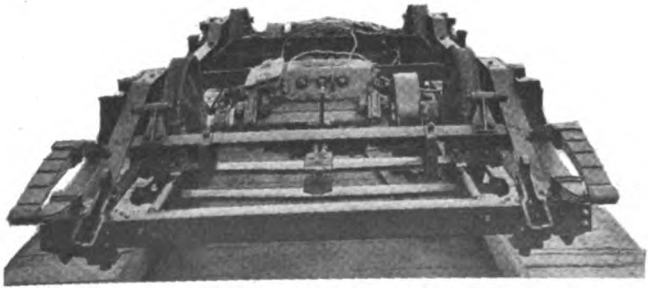


ILLINOIS TRACTION'S ONE-MAN CAR—SIDE VIEW OF SPECIALLY DESIGNED SINGLE TRUCK

In normal operation the plan is to control only the front door and step in addition to the air brakes by means of the brake valve. The rear door is intended for an emergency exit, and its operation is controlled by an emergency valve and not directly by the brake valve. On any occasion which produces an emergency action of this valve, an emergency application of the air brake is made, and the front and rear doors and steps open. After such an application of the emergency valve a pause of approximately twenty seconds is required before release of the brake and doors can be effected. In order to avoid holding the front and rear doors open for that period of time in disagreeable weather, a cut-out cock with a side vent has been installed in the motorman's cab adjacent to the brake valve, which, if operated, will serve to release and close the doors and steps, but this in no way affects the air brakes. Emergency operation may be caused in four different ways—by placing the brake-valve handle in the emergency position; by removing the hand from the controller handle while in a feeding position; by opening the conductor's valve, or by a rupture in the air-brake piping system.

Safety under all operating conditions was the motive which also governed the design of the door-operating mechanism. When the front door is opened the step drops quickly and it is in the lowered position by the time the door is opened 12 in. or 14 in. Any additional travel of the door toward its open position does not affect the step, and consequently when it is being closed the door will travel to within 12 in. or 14 in. of its closed position before the step is raised. The general operation of the rear-door mechanism and step is similar to that of the front door step, except that the rear door is automatically fastened shut so that it cannot easily be opened by hand.

Reference has already been made to the fact that these especially-designed one-man cars were put in operation in August, 1913. The complete description,



ILLINOIS TRACTION'S ONE MAN CAR—END VIEW OF SPECIALLY DESIGNED SINGLE TRUCK

however, has been withheld until experience has proved the equipment satisfactory from every standpoint. Since their construction the cars have thoroughly established their reliability and economy and the knowledge gained in their operation has led to the development of a still lighter car designed on the same principles, and equipped with the same safety appliances, which have shown themselves to be an important operating feature of this type of car. The cars were designed by J. M. Bosenbury, superintendent of motive power and equipment, under the direction of H. E. Chubbuck, vice-president executive of the Illinois Traction System, and they were built in the shops of the St. Louis Car Company, St. Louis, Mo.

Doherty Railway Managers Meet

Discuss Operating Topics—F. R. Coates Suggests Ten Commandments for Improving Public Relations

THE first separate convention of traction managers of the Doherty Organization was held at Toledo on Oct. 5, 6 and 7. What bids fair to be a permanent result of the convention was the appointing of a committee consisting of J. H. Van Brunt, St. Joseph, chairman; Albert Swartz, Toledo; B. Waller Duncan, Cumberland; C. D. Flanigen, Athens, and R. L. Lindsey, Durham, to draw up recommendations for the handling of Doherty railway problems, and which will be submitted to the firm. This committee at the conclusion of the convention announced that on account of the many meritorious features of the discussion, it was decided to hold a conference before drawing up the final recommendations. This meeting will be held at St. Joseph, Mo., very shortly.

The two-day session was attended by about forty Doherty men, many of whom were cadets at the Toledo school. All the traction managers were present with the exception of Guy W. Faller, Amarillo; W. H. Merritt, Bartlesville, and A. B. Paterson, Meridian. These managers were prevented from attending by pressure of business. Meridian was represented by T. F. McArthur.

The convention was opened by Chief Engineer Bump and the visitors were welcomed by Frank R. Coates, president Toledo Railways & Light Company, and also by Mayor Milroy of Toledo, whose address showed the standing of the Rail-Light Company and Mr. Coates personally in that city and with its chief executive. This tribute was considered an excellent example to the other managers of the value of a friendly public policy.

A letter written by Henry L. Doherty to Harry Abel some fourteen years ago, when the latter was managing the San Antonio property for the American Light & Traction Company, was read by Mr. Scott as a standard example of what a managerial report and analysis should be. R. F. Carbutt, traction and district engineer, then explained the purpose of the gathering.

Mr. Coates spoke on "Public Relations" and told of his Toledo experience and recommended courteous reception of all complaints and also a careful investigation. "Welfare Work and Public Policy" were the topics treated by Mr. Bump. "Transportation" was the subject treated by Mr. Van Brunt, and one of his important points was the consideration of schedules.

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R. L. Baker, electric and district engineer, read a paper on "New Business Methods for Railways," and advocated the adoption of a numerical system to indicate routes to the traveling public, this system having been in successful operation in Chicago and Philadelphia for several years. E. R. Kelsey, advertising manager Toledo Railways & Light Company, in an address on advertising advocated a central bureau to handle all Doherty advertising and particularly that in the street cars. This was along the lines suggested by S. B. Severson, general manager of the Manhattan & Queens Traction Company, who spoke on "Discipline" and believed in the merit and demerit system, as he has used this on the M. & Q. with good success.

Dewey C. Bailey, of the legal department of the Toledo Railways & Light Company, spoke on "Claims," and believed that the trained man is the best preventer of accidents. Harry L. White, assistant commissioner of safety, reviewed the work done in the last year. J. M. Enright read a paper on "Handling Crowds."

At the conclusion of the first day's session the delegates visited the Water Street plant and the Overland works and at night were the dinner guests of Mr. Coates at the Toledo Club.

On Friday W. W. Lowe, in charge of the Toledo Cadet School, spoke on possible economies in electric railway operation and advised rapid braking and starting. C. E. Murray, secretary Toledo Railways & Light Company, led the discussion on accounting and referred to several short-cut methods in use in Toledo, such as the counting of transfers. The paper on "Track" read by Albert Swartz, track specialist of the Doherty organization, uncovered a great difference of opinion on what should constitute standard construction and maintenance. It was generally agreed that uniform practice was not yet practicable because of the many differences in traction properties. Improvement in design of overhead work both as regards money expended and maintenance was treated by W. E. Richards of Toledo. H. F. Wheeler, general manager of the Hattiesburg (Miss.) Traction Company, spoke on the problem of the small company because of the serious competition with privately-owned automobiles. He stated that his company had partially met this obstacle by one-man car operation. Mr. Lindsey, general manager of the Durham (N. C.) Traction Company, in discussing one-man operation reviewed operations in Durham and discussed types of cars and methods of fare collection. This latter topic also showed great diversity of opinion.

At the conclusion of the Friday session the visitors were the guests of E. H. Close, who took them on his private yacht to Put-in-Bay. On Saturday the delegates went to Cleveland on a special interurban car and visited the Cleveland Railway shops. The sixty new cars for the Toledo system being built at the Kuhlman shops of the Brill Company were also inspected.

TEN COMMANDMENTS FOR IMPROVING PUBLIC RELATIONS

One of the features of the convention was the suggestion of ten commandments to be observed by corporation men in their dealings with the public. This suggestion was made by Frank R. Coates and the commandments were as follows:

"A kind word quietly spoken will make friends.

"Take the public into your confidence. Lay all cards face up on the table.

"Give service that is everything that the word implies.

"Treat your employees and the public as you would be treated. Apply the Golden Rule in business.

"Remember we are all human and likely to err. Be patient.

"Keep your property maintained as nearly as possible to the 100 per cent standard.

"Officials should become connected with civic uplift bodies. Be an active member. Do your share of the work. Don't hesitate to let the public know you. Be one of them.

"Corporation offices should be devoid of red tape, and the doors should be open to the public.

"Don't keep callers waiting too long.

"Keep promises. Don't make any that you can't keep."

According to Waller B. Duncan, general manager of the Cumberland & Westernport Electric Railway, the good conductor is a mindreader. Mr. Duncan, who rose from conductor to general manager, was of the opinion that this was a necessary mental attainment. Some of his ideas were as follows:

When a passenger gets on, the conductor sometimes has to be a mindreader to sell tickets and prepare a transfer.

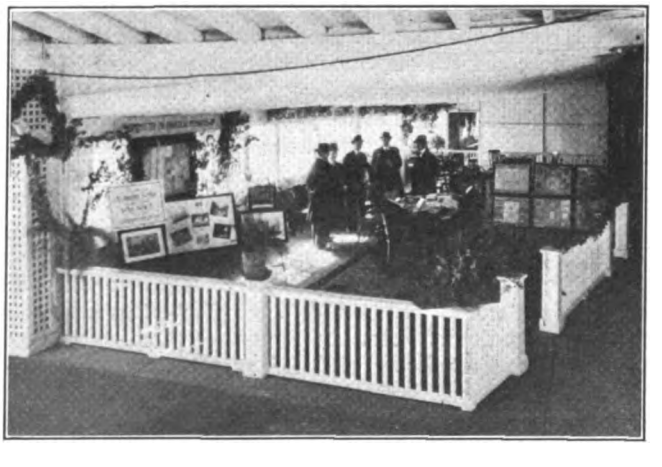
If he is acquainted with the men and women on the routes, he must know at which department store the women want to shop first and whether the men want to get breakfast or go to the barber for a shave before going to the office.

The mindreading conductor tells the hurried man he has forgotten his umbrella or the forgetful woman that her pocketbook is open. He must be a directory, timetable and show guide.

He should know where Mary Pickford is playing on that particular day and the chance for seeing the first inning at the ball park. Sometimes he holds the baby while mother gets out the tickets. He must be a fount of information. But mindreading is the most important part of his work.

Company Section Exhibit at the Convention

The committee on company sections of the American Electric Railway Association made a very attractive exhibit near the Greek Temple on the pier at the recent convention, showing the lines of work and social activity followed by several of the sections. Framed groups of



BOOTH OF THE COMMITTEE ON COMPANY SECTIONS ON THE PIER AT ATLANTIC CITY

photographs, volumes of circulars and data sheets, etc., were attractively displayed. The booth, which was arranged to serve as the headquarters of company section members, proved to be a popular rendezvous, as is shown in the accompanying illustration.

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R. C. GREEN

J. J. REYNOLDS

S. B. HARE

H. G. WINSOR

Accident Prevention and Adjustment

Papers and Written Discussions Before Claims Association in Atlantic City, Oct. 9-12, Covered the Four General Topics of Compensation Laws, the Near-Side Stop, Automobile Accidents and Traffic Regulations, and Fundamentals in Claim Work

THE ELECTRIC RAILWAY JOURNAL of Oct. 14, page 820, contained a report of the president's address and the proceedings of the Claims Association at the convention in Atlantic City on Oct. 9-12. According to the usual custom of this journal, the various papers read at the several meetings, together with the scheduled written discussions thereon, are presented in abstract this week on the following pages:

A. D. BROWN

E. P. WALSH

C. G. RICE

Ohio's Compensation Act

BY R. C. GREEN
Accident Department, Cleveland (Ohio) Railway

OHIO passed its first compensation act May 31, 1911. The constitutionality of the act was attacked by a suit filed in the Supreme Court, the chief grounds being the taking of private property without due process of law and interference with freedom of contract. The court, however, decided the act to be constitutional.

Most innovations in their inception are crude, and in this respect Ohio's compensation act was no exception to the rule. This was an elective measure making it optional with the employer as to whether or not he would join the state fund, and his failure to make such an election denied him, in an action for personal injuries by an employee, the defenses of the fellow-servant rule, assumption of risk and contributory negligence. It provided for the payment of premiums by both employers and employees. Employers, however, were not to be stampeded, and out of a total of about 18,000 employers only 4000 became members of the fund. This attitude, of necessity, resulted in lack of funds, and it was apparent that before the act could become successful an amendment would be necessary, embracing the feature of compulsory membership.

This, however, could not be done until there was an amendment to the state constitution. Accordingly, in 1912 the constitution was amended, providing for compulsory contribution by employers to a state fund to be administered by the state. This was adopted by the people at a special election Sept. 3, 1912. In February, 1913, the General Assembly amended the act of 1911. The act of 1913 did not differ materially in principle from the act of 1911, except that it was compulsory and applied as well to public as to private employers of five or more workmen. An employer under the amendment who failed to contribute his quota to the state fund or, in other words, failed to become a member thereof, was denied the common law defenses of fellow-servant rule, assumption of risk and contributory negligence. Furthermore, an employee might, in lieu of an action for damages, file application for compensation with the board, and if the claim was honored and not paid by the employer a penalty was added. This forced employers to join the fund.

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In view of a decision by the United States Supreme Court (Noble State Bank *vs.* Haskell), an Oklahoma case which provided that it was constitutional to levy an assessment against banks and thereby create a fund from which depositors might be reimbursed in cases of insufficient funds of insolvent banks, all doubt seemed to be removed.

DEFINING "WILLFUL ACT"

Under the act as it now stood, the employer was not protected if the injury was caused by the "willful act" of the employer or his agent, and up to this time there had been no legal interpretation of the words "willful act." The ambiguity of this phrase afforded a loophole for the damage lawyer, inasmuch as it became a question for the determination of the jury under the instructions of the court.

It fell to the lot of the Standard Boiler & Plate Company, a corporation doing business in Ohio, to be the martyr. A suit was filed in the federal court by an employee who had been injured. The cause of action was predicated upon the alleged "willful act," and the defendant set up by way of answer that it had paid its premium into the state fund and was therefore protected by the terms and defenses of the compensation act. The court charged the jury that willful negligence must amount to wanton negligence, or to use the language of the court, "the act complained of must have been such an act as to evince an utter disregard of consequences so as to inflict the injuries complained of." The jury returned a verdict of $14,000, which was affirmed by the Court of Appeals of Cincinnati and paid.

At the reconvening of the Legislature, however, another amendment was passed defining "willful act" to be an act done knowingly and purposedly with the direct object of injuring another. This stopped that sort of litigation, but did not restore to the Standard Boiler & Plate Company its $14,000. Legal ingenuity aided by legislative ignorance had exacted its tribute and had been paid in full.

PAYMENTS UNDER OHIO LAW

In the event of an injury to an employee of an employer who has elected to operate under the act and paid his premium into the state insurance fund, it is the duty of the Industrial Commission to award to the injured employee, upon application and proof of his claim, an allowance for medical, nurse and hospital services and medicines, not exceeding in any instance the sum of $200 and 66 2/3 per cent of the impairment of his earning capacity during the continuance of his disability, not to exceed a maximum of $12 and not less than a minimum of $5 per week, and if the employee's wages are less than $5 per week, his full wages for a period of time not exceeding six years from the date of the injury, the aggregate amount of such payments not to exceed $3,750. If the disability is permanent and total, the award is 66 2/3 per cent of the average weekly wage, to continue during the disability of the injured employee, with a maximum payment of $12 per week. When the injury causes death within the period of two years after the injury and the decedent leaves no dependents, funeral expenses only are paid. If there are wholly dependent persons at the time of the death, the payment is 66 2/3 per cent of the average weekly wage, and continues for the remainder of the period between the date of the death and six years after the date of the injury, with a maximum and minimum of $3,750 and $1,500 respectively. If there are partly dependent persons at the time of the death, payments are made for all, or such portions of, the period of six years after the date of the injury as the board in each case may determine, with a maximum of $3,750.

DEALING DIRECTLY WITH EMPLOYEES

Under Section 22 of the act, employers of sufficient financial ability or credit to render certain the payment of compensation to injured employees, or to the dependents of killed employees, may deal directly with the employees or their dependents. Employers so electing are compelled to pay into a fund, provided for by the act, a sum equal to 10 per cent of their premium. This 10 per cent rate was to prevail until the fund totaled $100,000, when it was to be reduced to 5 per cent. It has long since been reduced, as the fund is now approximately $500,000.

At the time of the preparation of this paper, a suit was pending in the Supreme Court attacking the constitutionality of Section 22. It is contended that Section 22 is in contravention of the state constitution, which provides that all laws of a general nature shall have uniform operation throughout the state. It is further asserted that it conflicts with the fourteenth amendment of the federal constitution, which provides: "No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States, nor deny to any person within the jurisdiction the equal protection of the laws."

About 1200 of the large employers of labor throughout the state are paying the 5 per cent into the fund and compensating their employees direct. Out of a total of thirty-four street railways within the state, eleven being urban and twenty-three interurban, all of the urban lines are operating under Section 22 and twelve of the interurban are so operating.

In 1914 the premium of the Cleveland Railway, the largest street railway of the state, was $49,519. A total of 5 per cent of this amount, $2,476, was paid to the state, and to its employees in compensation it paid $12,968, making a total cost of $15,444. In 1915 5 per cent of the premium amounted to $2,292, and to its employees the company paid $6,700, making a total of $8,992. This decrease was due to the fact that the number of accidents to employees was reduced 50 per cent in 1915 as compared to 1914. The estimated premium for the first six months of 1916 is about $24,000, making the 5 per cent premium $1,200. About $3,500 was expended in compensation.

OHIO COMPENSATION IS SATISFACTORY

Because of the growth of the properties, it would be difficult to make any very satisfactory comparison with former years, but it is safe to say that state compensation is satisfactory to the street railways of Ohio and to their men. Compensation has resulted in a benefit not only to employers and employees, but to the commonwealth generally. Employees have been benefited in that they have received the compensation due them without having been compelled to divide it with some damage lawyer. Moreover, the ordinary juror of to-day regards himself as a sort of avenging hero whose duty it is to see how quickly and how thoroughly he can separate a defendant in a damage suit from his bank roll, never for one moment thinking that ultimately the consumer, "Mr. General Public," must foot the bill. He goes upon the theory that the defendant has some mysterious source of revenue. The saving, therefore, to the community also is generally of no small consequence.

LEGISLATION FOR INJURIES TO PUBLIC

Everyone will agree that this fixed statutory method of compensation is a step forward. It is a progressive

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enactment, promoting prosperity and personal happiness. Am I stepping beyond the realm of reason, therefore, if I suggest that a legislative enactment, providing a fixed method for compensating those injured by public service corporations, would be beneficial? Is it any more fanciful or chimerical than the idea of state compensation twenty years ago?

The time may not be propitious for an innovation so radically divergent from the methods employed at present, but inasmuch as such a change can only be accomplished through the creation of a favorable public sentiment, it seems to me that it should be the sense of this organization, both individually and collectively, that it bend every effort toward the conversion of this idea into a reality, the undoubted result of which would tend to bring about a better feeling between this class of corporations and their patrons.

Written Discussion

BY LEONARD J. TYNAN
Attorney Public Service Railway, Newark, N. J.

Personally, I like compensation law. I have always felt, and still feel, that it is logically unsound, but it is a wise provision for the state, for the courts, for the master and for the servant. And it has come to stay. The drift of legislation, however, will be to make the burdens of the law excessive. This inclination of our law-makers will have to be constantly watched. I know of no better safeguard in this direction than to fight to keep all classes of employers within the provisions of the law. Some of the states attempt to draw a distinction between hazardous employments and non-hazardous employments. This is an absurdity. The man who loses a leg does not much care whether he lost it making cheese or making dynamite. His remedy should be the same in either case. Whether an industry be non-hazardous or not, it should be kept within the law. If the hazard is low, the insurance against hazard also will be low.

COMPENSATION LAWS LEVEL GOOD AND BAD CASES

In states in which compensation laws are new, and while they remain new and untested in the courts, it is wise to have express written agreements between master and servant, if the compensation plan is adopted, providing that settlements made under the new law shall remain conclusive whether or not the law be upheld by the courts. This is a safeguard against possible confusion, for otherwise the nullifying of a statute, after many cases have been settled under it, would open up all the supposedly settled cases. Such a result would perhaps compel the employer to pay further damages in cases in which he had been negligent, without any hope of recovering back money paid in cases where he had not been negligent. It must always be borne in mind that the theory of compensation laws is the levelling up of all cases, good and bad, so that compensation is paid whether the employer be to blame or be absolutely innocent. In New Jersey, the only exceptions are those very rare cases in which the employee willfully and intentionally injures himself or commits suicide, and where the accident is caused by the intoxication of the injured person. And to meet the additional cases that must thus be paid for, there is a levelling down of the amount to be paid.

The man who loses a leg, for instance, cannot get a verdict for $5,000 or so as he once might. In New Jersey, the compensation for loss of a leg is 50 per cent of daily wages during 175 weeks, with a minimum of $5 a week and a maximum of $10 a week. So $1,750 distributed over a period of 175 weeks, or approximately three and one-half years, is the highest compensation that such a man can receive for the loss of his leg. There is, of course, something additional in that he will get 50 per cent of his daily wages while the wound is healing, and his medical expense for the first two weeks. Thus the reduced damages payable enable companies without undue strain to pay for the greater number of cases, although in the case of my company compensation as a whole is somewhat in excess of the charges for litigation and damages under the old system. Perhaps the difference is made up in the better relations that exist between company and employees. The bad blood and rancor of the old days have practically disappeared. Cases are almost always settled without friction, and men who would formerly leave our employ and hire a lawyer to sue us, now get better and go back to work.

POINTS ARISING UNDER NEW JERSEY LAW

In New Jersey, we have to be careful to get our rate of compensation properly adjusted, for the courts have held that over-payments will not, on adjustment, be credited to the payments due in the future, but that they will be considered as gratuities. In the early days of the law, we did some things which we would not dare to do now. I recall one case in which we loaned a poor fellow $200 to get a cork leg, and then went into court and got a commutation to a lump sum of sufficient of his payments to enable him to repay to us the loan. In the present state of our law, we would not dare to do that, for the courts would hold that the injured man's weekly payments could not be commuted in order to pay a debt.

Occasionally a case arises in which commutation is an advantage to the injured party. Some times weekly payments over a considerable period will be commuted to a lump sum in order to enable him to buy a store or start in some small business. It is quite common to commute future payments to a lump sum for a widow who, with her children, is about to return to Europe. Such commutations are calculated upon a 5 per cent simple interest rebate basis. One of the odd features of our New Jersey statute is that in death cases, if a dependent dies, or if a widow re-marries, the right of such dependent or widow to compensation shall cease. Nevertheless, our courts, following the language of the statute, will commute future payments in death cases to a lump sum, and allow the widow and children to take that lump sum abroad, regardless of the fact that such commutation must be on a 5 per cent simple interest basis, and that no allowance is made to the employer for the chance of the widow marrying again, or for the possibility of the death of the widow and other dependents.

An interesting feature of our statute is the situation that arises when one of our workmen, while about our work, is injured by a third party. For instance, one of our conductors might be knocked off the running board of a trolley car by a recklessly driven automobile. In such a case, our New Jersey statute provides that we must pay compensation to the conductor for his injuries, but that any money recovered by him from the owner of the automobile shall be credited upon such compensation, and if we file a notice with the owner of the automobile, setting forth our position, such automobile owner could not settle with our conductor until he had first paid us, out of the money payable by him to the conductor, the amount which we up to that time had advanced to the conductor as compensation, or such part of said amount as the payment by the automobile owner to the conductor amounted to.

Our statute contains a great deal about agreements

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between the parties. For instance, it contains a statute of limitations, that unless an agreement be made, or a petition for compensation filed, within a year, the injured party will be too late. Now, as a matter of fact, agreements are seldom made in injury cases. They are in death cases, because there the amount can readily be fixed, but injury cases depend upon the length of time required to heal the injury. Our usual practice in such cases is to begin payments at the end of the first two weeks, during which time we pay only the medical expenses, and to continue the payments until the injured man goes back to work, of course having due regard for the statutory limitations as to the time that payments shall continue. The limitation for temporary disability is three hundred weeks. The limitation for disability total in character, and permanent in quality, is four hundred weeks. The limitation in death cases is three hundred weeks.

In New Jersey there is no obligation to the employer to insure for the benefit of injured workmen. I am inclined to think that such insurance should be required from all employers, except those who are able to prove their solvency to the satisfaction of the state authorities. Where insurance is required, a momentous question is whether to insure in a private company or in a state fund, which the states requiring insurance are providing, or to carry one's own insurance, depositing insurance with the state as a guarantee. The state fund is usually safer insurance than that of a private stock company, because in some states, at least, insurance in a private stock company only relieves the employer if such private stock company makes good, while insurance in the state fund is an absolute and final relief to the employer. It must be remembered that, under the laws of some of the states, these weekly compensation payments have, in some cases, to be continued over a period of many years. An insurance company which is at present perfectly solvent, may, ten or fifteen years from now, get into financial difficulties, and the burden that it had undertaken, and could not carry out, would be returned to the shoulders of the employer that had trusted it.

ADMINISTERING THE LAW

In New Jersey, we consider ourselves fortunate in being able to administer the law ourselves. This would be more difficult where insurance was required. The advantage of an employer dealing directly with his workmen is that it gives a chance for good feeling and sympathy to develop between the master and the servant. Our settlements are all reported to a State commission, and the settlement is not considered conclusive until this commission has approved of it. The commission also undertakes to bring parties together where misunderstandings exist, without the intervention of lawyers and with as little expense and delay as possible. Where the parties fail to agree, the commission can order the matter into court for a hearing. A very small percentage of our cases reach the court. Occasionally we are compelled to go there because of unreasonable demands by the injured party, or because some legal question concerning the case may arise, which can only be settled by a court decision.

Under our New Jersey statute, we are supposed to supply medical aid to the injured man for the first two weeks. Of course it is sometimes an advantage to ourselves to supply such aid for a longer period, as it pays to get the man well and back to work as soon as possible. The injured party must accept the medical aid which we tender. If he insists on getting his own physician, we do not consider ourselves responsible for such physician's bill unless, of course, we approve of his being hired in the first instance, which, as a matter of fact, we sometimes do.

We have some difficult problems to decide in the administration of the statute. A watchman is set to guard a trench which we have dug in order to locate a leaking gas pipe. At four o'clock in the night, he tells a policeman that it is cold; he wishes he had his overcoat. Two hours later he is found dead, sitting at the bottom of the trench. He died from gas asphyxiation. There is no evidence that the guards about the trench have been disturbed. There is nothing to show that he fell into the trench. Did he die while performing his duty, or did he die while neglecting his duty to take a nap? The welfare of three or four little orphan children depends upon our decision in this matter.

A conductor on our trolley car is hit in the eye by a stone which a boy threw. The stone first hit the wire gate, and then bounced off against the conductor's eye. If the stone was not thrown intentionally at the conductor or the car, then getting in range of the stone was merely one of the incidents of travel in the street, and was not one of the hazards peculiar to the conductor's employment. If the stone was thrown at the conductor, it was merely one of the ordinary hazards of the street. If the stone was thrown at the car, or at the conductor because he was in charge of the car, then it was an extraordinary hazard due to the conductor's employment. As we could not find the boy who threw the stone, it was difficult to ascertain whether we should, or should not, recognize the claim of the conductor for the loss of the eye.

SETTLING WITH DEPENDENTS

It is important in death cases to get signed statements from the decedent's relatives as early as possible. Our New Jersey statute provides for a varying percentage of compensation in death cases, the percentage depending upon the number of dependents left by the decedent. If the relatives of a decedent are carefully approached before they are acquainted with the intricacies of the law, they are likely to tell the truth. After they learn from some lawyer what the requirements of a dependent are, they cannot so well be relied upon. Sometimes the desired information can best be obtained by back-handed action. If we say to the father of a man who has been killed—"Why, your son supported you, didn't he?"—he will become indignant, and will say: "No, indeed, I am quite able to support myself; he never did anything for me." Then is the time when you want him to put the statement in writing and sign it.

We recently had a case of a conductor who came from North Carolina and was killed at his work. We located his people, had the body shipped to his home, paid $100 toward the funeral expenses and had an interview with the father, who came North to our office to talk over the matter. The father signed a statement to the effect that the boy was single and had no dependents, and that while he occasionally sent money home to his sister, the father did not know how much. Later on, this father hired a lawyer, and the case got into court. We lost it. Despite the father's statement that the son had no dependents, he testified that the son sent him money every few weeks, $15 or $20 at a time, and that he, his wife and daughter had great trouble in getting along without this money. When questioned about the signed statement that he had made, he was prepared to argue about the meaning of the word "dependent," and said: "I meant by that to say that we did not entirely depend on the boy, that I earned something." We lost the case, but we learned a lesson. We seldom use the word "dependent" any more.

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Just now we have the case of a colored man who was killed. He was single and childless. His father was in our office recently and made a statement about his boy. We did not ask him whether the boy had anybody dependent on him. Instead of that, the father made, signed and swore to a statement before a witness, that since the boy left home last Christmas, he had not sent any money home except a present of $15 to his mother. That colored man will have hard work to argue aside the expression, "had not sent any money home."

This question of dependency in death cases gives us considerable trouble. Sometimes, in case of the death of a single and childless man, his entire family circle, father, mother and sisters and brothers, whether adults or not, are held to be dependent upon the decedent, on the theory that the family fund has been depleted by his death. For instance, in a recent case, a single man aged thirty was killed in an accident. His earnings were approximately $12 per week. He left a father whose weekly earnings were $22, a sister whose weekly earnings were $7, and a mother who was janitress of the house in which the family had its home and got some allowance from the family rent because of her service. All moneys were paid to the mother. She spent it all for living expenses, except some small amount for life insurance.

Here a very pertinent question was as to whether the decedent in his contribution to the family fund contributed more than he consumed. Calculations were made on different theories, and they all were very close; but the court held that the decedent's contribution to the fund was in excess of what he consumed from the fund, and so held that the father, mother and sister were all dependent upon the decedent and were all entitled to compensation for his death.

One of the distinctions made in that and another case recently decided in New Jersey, is between decedents who are more than twenty-one years of age, and decedents who are under that age. In both of these cases it was decided that, in regard to those under twenty-one and single, the father is entitled to all their earnings, and therefore is the only person dependent upon them. When the decedent is more than twenty-one, his contribution to the family fund is assumed to be voluntary on his part, and all beneficiaries of that contribution, within the prescribed limits of relationship, are held to be among his dependents.

DEALING WITH MINORS

A doubt has arisen in our courts as to the applicability of our statute to persons under twenty-one years of age who have parents. The theory is that the parent is entitled to the service of the minor, that a contract of hire made by a minor is really made by him as the agent of his parent, and that when the law attempts to force into such contract a compensation provision that may under some circumstances greatly reduce the minor's recovery of damages for injuries, the minor, being the injured party, should not be bound by the provisions of a contract which was not really made by him or in his interest, but was, in law, made by the parent and in the parent's interest.

This matter has not as yet been thoroughly threshed out in the courts. In New Jersey, where the compensation provision is an implied feature of the contract of employment, I feel that the parent should not be able to bind the minor so that the minor could not sue for his injuries, when the contract is not that of the minor but rather that of the parent. In New York, where the compensation provision is not contractual but automatically follows the fact of employment, the same subject may arise on a different theory, to wit, that the minor is not employed. It is really his parent who is employed and who is using the minor as an instrument to perform the work. It may, therefore, in the end be held that the minor is in the same position as a bondman or slave, and it may possibly follow that the courts will hold that he is not subject to the provisions of the compensation law.

In New Jersey, in a recent decision, a child under fourteen years of age was put to work. He claimed to be injured through the negligence of his employer, and brought an action at law for damages. When the employer set up as a defense the workmen's compensation statute, the court held that, as our factory law forbade the employment of children under fourteen, and as our legislature in enacting the compensation statute clearly intended it to apply only to lawful employees, it could not be held to apply to the case of a child under fourteen. Of course, this decision has enabled the child, through its proper representative, to proceed with its suit for negligence, but what will the court do when a similar case arises in which there is no negligence, and a child of tender years asks for compensation under the workmen's compensation act? It happens that the decision, as recently promulgated, will probably work out for the benefit of the child. The same logic, in a case where no negligence of the master existed, would work to the detriment of the child.

The Near-Side Stop

BY JOHN J. REYNOLDS

Claims Attorney Boston (Mass.) Elevated Railway

TOPOGRAPHY probably stands first among the obstacles which have retarded the fullest development of the near-side stop. Where irregularity of street intersections exist, the near-side stop is impracticable. A very large percentage of railway men, however, favor the near-side stop. Indeed, so completely has this stop satisfied them that they would not willingly return to the old method of the far-side stop. It seems reasonable, therefore, to believe that if all those companies which are not prevented by the condition of the layout of streets, or by municipal ordinance, were to adopt the policy of extending the near-side stop as much as possible, and above all of advocating it, not only on the strict safety-first ground but also upon those other and very substantial economic grounds indicated by those who have made a careful study of the subject, we would, despite all skepticism, begin a new era in the development of accident prevention.

There are four principal influences which encourage belief that the near-side stop will ultimately be adopted, as far as possible, on all railway systems of any size: (1) Safety of operation; (2) lower maintenance cost; (3) greater regularity of schedules, and (4) a saving in power. Economic reasons will one day place this stop in the operating policy of efficiently managed railways, just as economic reasons brought about the adoption of those types of car which are to-day recognized as instrumentalities of safe, efficient and economic operation.

REDUCES OPPORTUNITIES FOR ACCIDENTS

The near-side stop does not leave open the same opportunity for accidents that the far-side stop does. For instance, it is obviously less difficult to control the speed of a car when it is accelerating after a service stop on the near side of the street than it is to do so while it is being braked for a service stop on the far side of the street. Many passengers are thrown in cars which make the far-side stop on account of very abrupt or short stops due to the motorman being sud-

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denly surprised by a pedestrian, team or other vehicle unexpectedly coming out of intersecting streets. Not only does this cause accidents to passengers, but its effect on the brakes, shoes, wheels and general car equipment is very damaging.

Accidents of this character would be prevented, or very greatly reduced, by the near-side stop, because the motorman would have a chance to observe fully the movement of street traffic before crossing and to avoid that "hitching along" due to vehicular interference and other traffic. This practice of "hitching along" is peculiar to the far-side stop, and is responsible for the partially set or "dragging" brake habit, so common with present-day motormen, as the brakeshoe and power cost items of maintenance will show. Maximum acceleration and braking to the limit of adhesion on the rail, practices causing discomfort as well as accidents to passengers and increased maintenance cost, may also be fairly charged to the far-side stop. Moreover, with the near-side stop passengers generally alight from the front end of the car, thus eliminating that class of accident where passengers step from behind the car and in front of a car traveling in an opposite direction on the other track.

Various reports of association committees have shown how the near-side stop has been increasingly adopted by member companies and what its advantages are, while these facts have also been discussed in the proceedings and reports of safety organizations and the technical press. * * * In order to get for this paper some statistics that would be conclusive in favor of the near-side stop, approximately 100 letters were sent by the writer to the claim departments of as many railway companies. Answers were received from more than 60 per cent, but, unfortunately, comparatively few companies furnished any statistics. Apart from the absence of statistics, however, there was a practically unanimous opinion by thirty-five companies that the near-side stop tends to prevent accidents. * * * In other words, those companies know from actual experience that the near-side stop does prevent accidents, although most of them are without figures to demonstrate it. It is submitted, therefore, that the nonexistence of statistics is of no consequence as an argument against the near-side stop. Moreover, it is believed that no sufficient evidence of opposition to this stop has been disclosed by the inquiry to warrant its recital in this paper. It is significant that several companies have requested a return to the near-side stop, where it had been done away with.

Somewhere beyond the ocean of impossibility and the shifting sands of the improbable, is a shore upon which claim men may safely land in their quest for information to establish facts so generally believed to exist and yet apparently so incapable of mathematical demonstration. A statistical classification will one day, I hope, give us such a shore, from which we may be able to procure incontrovertible figures to back up or disprove the efficacy of just such institutions as the near-side stop.

Oral Discussion

BY SAMUEL B. HARE

Claim Agent Altoona & Logan Valley Electric Railway, Altoona, Pa.

The testimonials from companies operating under this system, the gradual increase of the percentage of the companies adopting the near-side stop and the unanimous opinion that it is the better mode of operation and that there will be no return to the old system, are self-evident facts that the near-side stop has come to stay. In our opinion it is the greatest safety device that has been adopted for the protection of passengers, pedestrians and vehicular traffic.

1. *Passengers in Cars:*

A great majority of the people on a street car arise and go to the front end of the car at the street where they desire to get off as the car is gradually coming to a stop, with the result that at most every corner many persons will be standing immediately before the car stops. Should, therefore, the car be brought to a smooth stop, as is most frequently done with the near-side stop, there is no confusion and the standing passengers are discharged without trouble. When the far-side stop is used the car is passing the intersecting street; if a vehicle or pedestrian suddenly approaches the car, it is necessary for the motorman to make a quick stop, with the result that the passengers standing in the aisle are often thrown or struck.

2. *Boarding Accidents:*

When a car has stopped at the near side, the passengers board the car some distance from the corner of the intersecting streets and on the right side, this in reference to prepayment cars. Almost every municipality has an ordinance requiring vehicles following a car to stop and not pass the street car while it is taking on or discharging passengers, and the very fact that the car is being brought to a stop is a signal to following traffic, making it possible for the passenger to occupy the street and board the car with greater safety to himself.

When the far-side stop is used, vehicles going at right angles turn to the right at an intersecting street and traverse the spot where a person must necessarily stand to board a car. In the case of reckless drivers of vehicles, the position that the person must be in to board the car makes an accident quite possible. No vehicle turns directly left at an intersecting street, it being a universal custom to cross over to the right side, and the position of the car at the near side is a guard and protection to all the individuals who are about to board it.

3. *Alighting Accidents:*

When a car stops at the near side and a passenger alights from the front to the right, the opportunity is afforded to look for an approaching vehicle or obstruction. There need be no apprehension of accidents from any direction but the rear, and in that direction the passenger is protected as stated. Should the passenger, after alighting, desire to cross to the left side of the street, there is the opportunity of seeing the traffic on the highway before starting across. It has become the custom in such cases for the passengers, after alighting, to wait until the car has started before going across the street.

4. *Pedestrians:*

Inhabitants of a municipality soon learn the method of operating of cars and when it is known that cars will stop at the near side, the street can be crossed by a pedestrian with greater safety. As he comes to the edge of the property line he sees the car approaching and its speed indicates that it is about to stop; or, if the car has stopped and is taking on or discharging passengers, he knows it will remain still until all have been taken on or discharged. He knows that all vehicular traffic, moving in the same direction with the car, has stopped at the rear of the car. Nothing can obstruct his view and he sees that traffic coming in the opposite direction has also stopped, and he has a right

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to believe that the ordinance pertaining to the passing of street cars will be observed by the drivers of vehicles. On the other hand, should the car proceed to the far side and the pedestrian, as it starts, cross the street, the position of the car will obstruct his view and there is a possibility of being struck by a vehicle coming in the opposite direction.

5. *Vehicular Accidents:*

When a car comes to a near-side stop at intersecting streets, the line of vision of the motorman extends to the right and left a distance of at least 120 ft., and he is able to see in both directions any approaching vehicle, and the car can be seen by the drivers of these vehicles for a like distance. In the more congested districts the signal of the traffic officer controls the starting and stopping of traffic and few vehicular accidents occur at these places. Yet, in other districts, in the absence of the officers, the motorman of the car and the driver of the vehicle are the ones to control the operation. If, therefore, the car stops at the near side it would seem impossible that an accident could occur, unless through the gross negligence of one of the parties. There is no prevention or safety device or hope for the absolutely careless and reckless driver. Where the far-side stop is used the operator of the car must have his car in motion to cross the street, and that motion carries him sometimes quickly beyond the street line and into a collision.

6. *Traffic Squads:*

Inquiries from traffic squad officers, patrolmen and cornermen have brought forth the opinion that the movement of traffic is facilitated by the use of the near-side stop. These officers have stated that vehicles and pedestrians are protected, that there is a greater co-operation between the operators of the street cars and the traffic squad by the use of the near-side stop than otherwise, and that officers thereby have less trouble in regard to handling the traveling public to cross the streets.

7. *Accommodation to Public:*

Every accident or collision means the stopping of the car, the examination of the damage done, the procuring of the names of witnesses, the clearing of the track, etc. Aside from the possible fright and injury to passengers, they are inconvenienced in the meeting of important engagements. It needs must follow that anything that leads to accident prevention means the removal of that which is inconvenient to the traveling public.

8. *Character of Accidents:*

While all forms of accidents have not been eliminated by the near-side stop, there has been a marked decrease. With a decrease in number, we also have a corresponding decrease of the accidents of a more serious nature. This result is, no doubt, obtained by reason of the fact that at intersecting streets the car is stopped in front of the impending collision, and all parties concerned have but to use their eyes intelligently to avoid that which under the circumstances of the far-side stop could not have been avoided. It is a significant fact that every motorman is in favor of the near-side stop, and we have been unable to discover any railway line that has once adopted this stop to have returned to the old method. It, therefore, can be safely stated that the installing of the prepayment cars and the adopting of the near-side stop are the two most important and beneficial safety devices known to street railway operation.

Motor Vehicle Accidents and Traffic Regulation

BY H. G. WINSOR
Superintendent of Investigation and Adjustments Puget Sound Electric Railway, Tacoma, Wash.

IN the consideration of the first part of the subject, "Motor Vehicle Accidents," let us observe first what the development of motor vehicle traffic has been during the last few years and what effect this development has had upon the electric railway claim business. As an indication of the progress which has developed in the motor vehicle industry during a period of ten years, it may be said that the number of automobile registrations in 1905 totaled 24,051 for nine states, while in 1910 they amounted to 414,678 for twenty-six states and in 1915 to 2,297,843 for forty-two states. For the nine states having records back to 1905, the percentage of increase in the 1905-1910 period was 340 per cent and in the 1910-1915 period 471 per cent. The twenty-six states whose record of registrations in 1910 showed 414,678, in 1915 registered 1,886,116 motors, an increase of 355 per cent. At the same rate of increase during the five years ending in 1920, these twenty-six states will have registered at that time 6,695,711 motors, and in the forty-eight states nearly 10,000,000 of motor vehicles will be in use. It is probable, however, that the rate of increase recorded during the last five years will not be maintained, as the automobile industry will have more nearly reached a point of saturation. A very conservative estimate would place the number at 5,000,000, which with a population of 110,000,000 would allow a motor vehicle in operation by one person in every twenty-two, one adult person in every six being licensed to operate a high power motor in the public streets.

How Collisions Have Increased

In order that we may have a comprehensive idea of the effect this phenomenal increase in motor vehicle traffic has had on the problem of vehicle accidents, let us now consider the increase in collisions in which street and interurban cars were involved. The record on page 875 for twenty-five cities shows the number of cars in service, the number of car-miles operated, the total number of vehicle collisions and the number per 10,000 car-miles operated, during the years 1911 and 1915, with the percentage of increase or decrease in each case. In the arrangement of this record, cities are divided into classes, as follows: Class A—cities where 800 or more cars are operated; Class B—cities where 400 to 800 cars are operated; Class C—cities where 200 to 400 cars are operated; Class D—cities where less than 200 cars are operated, and Class E—interurban lines.

A careful analysis of these figures shows that while the increase in traffic has been phenomenal, electric railways have up to this time succeeded in keeping the percentage of increase in collisions between cars and motor vehicles within reasonable bounds. The record is certainly creditable and worthy of commendation, but can this record be maintained? What of the much greater number of street accidents in which the cars are not concerned? Single-handed, we have but little influence over the control of traffic conditions.

Traffic Conditions Leading to Accidents

In the thickly populated portion of one of the largest cities, a check was made recently for the purpose of observing the people who during the period of one hour entered upon the traveled portion of the streets under observation in such a manner as to place themselves in a position of danger. The three persons who made the

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experiment traveled in an automobile 12 miles in the hour and the following interesting table resulted:

Children passed who were roller skating	237
Children passed who rode bicycles	116
Children passed who were playing ball	98
Children passed who were playing other games	74
Nursemaids who wheeled baby carriages	53
Men who looked in our direction before crossing streets	91
Men who did not look in our direction until aroused by loud sounding of horn	152
Total	1,163

One of the party conducting this investigation said: "All of these 1163 men, women and children had placed themselves within easy striking distance of our car, and each demanded from every driver near him a certain amount of care and consideration. There were times when a score or more of those just listed were counted within 100 ft. of our car, which was going ahead at a speed well within its legal rate." Such a condition as this is not confined to any particular city or locality, but is only an example of what exists wherever traffic conditions are congested.

The public does not exhibit reasonable care while traveling over the highways. Moreover, it is an undisputed fact that immunity from the operation of the present admittedly inadequate laws is extended in many cases and serves to encourage the motoring public in their disregard of the rights of others. The indiscriminate licensing of automobile drivers as at present in many states is also without doubt an extremely dangerous practice. This is, of course, not apparent in some states, Massachusetts, Connecticut, New Jersey and Minnesota being among those that have very good laws intended to protect the public by licensing only those who are physically and mentally capable. I am not prepared to say whether or not these laws are enforced, but protection in this regard should be given the public in every state.

Credit should be given experienced chauffeurs for the part which they play in the game of chance which is going on continually on the streets and highways. They, in nearly all cases, handle their motors efficiently and carefully, with due regard for the rights of others, and are seldom concerned in accidents. The proper description of a chauffeur, as given in a recent publication, is "One employed to prevent pedestrians and children from committing suicide."

TABLE SHOWING INCREASE IN COLLISIONS WITH VEHICLES

	Year	Number of Cars	Car-Miles	Vehicle Collisions	Collisions per 10,000 Miles
Class A:					
Public Service Railway	1911	1,300	44,561,141	5,013	1.12
	1915	1,375	51,194,087	5,295	1.03
Cleveland Railway	1911	967	27,851,112	4,249	1.52
	1915	1,375	34,138,776	7,047	2.06
Boston Elevated Railway	1911	.....	46,123,852	3,933	0.85
	1915	1,250	45,711,578	3,135	0.69
United Railways of St. Louis	1911	1,015	540,01,181	5,440	1.34
	1915	1,086	42,305,802	4,893	1.15
Detroit United Railway	1911	850	27,059,465	4,672	1.73
	1915	1,000	33,500,941	8,325	2.48
Five companies—average collisions per 10,000 car miles			1911	1.31	
			1915	1.48	
			Increase	13 per cent	
Class B:					
Los Angeles Railway	1911	566	24,159,824	4,278	1.77
	1915	704	29,542,701	5,437	1.84
Minneapolis Street Railway	1911	444	15,028,319	1,347	0.90
	1915	606	18,031,328	2,379	1.32
International Railway	1911	599	22,228,176	1,597	0.72
	1915	561	22,119,054	1,631	0.74
United Railroads of San Francisco	1911	539	22,077,429	2,821	1.28
	1915	597	24,632,749	4,766	1.94
New York State Railways	1911	462	11,881,054	1,496	1.26
	1915	559	11,531,730	1,701	1.48
Milwaukee Electric Railway & Light Company	1911	442	17,244,497	1,307	0.76
	1915	540	17,437,171	2,149	1.23
Capitol Traction Company, Washington Railway & Electric Company	1911	510	18,463,790	1,737	0.94
	1915	536	18,514,483	1,411	0.76
Seven companies—average collisions per 10,000 car nmiles			1911	1.09	
			1915	1.33	
			Increase	22 per cent	
Class C:					
Portland Railway, Light & Power Company	1911	404	12,264,618	964	0.79
	1915	365	14,969,001	1,724	1.15
Puget Sound Traction, Light & Power Company	1911	361	12,730,740	1,012	0.80
	1915	358	12,662,487	1,789	1.41
San Francisco-Oakland Terminal Railways	*1913	338	16,399,409	933	0.57
	1915	333	16,447,519	1,161	0.71
Rhode Island Company	*1913	220	13,606,092	1,089	0.80
	1915	215	16,382,610	1,949	1.19
Indianapolis Traction & Terminal Company	1911	228	9,655,103	1,095	1.03
	1915	239	10,370,785	1,253	1.21
Five companies—average collisions per 10,000 car miles			1911	0.82	
			1915	1.14	
			Increase	39 per cent	
Class D:					
Omaha & Council Bluffs Street Railway	1911	153	9,537,552	**212	0.22
	1915	171	10,431,444	**270	0.26
Denver City Tramway	1911	170	10,888,780	869	0.80
	1915	150	9,778,055	851	0.87
Columbus Railway, Power & Light Company	1911	150	8,459,395	714	0.84
	1915	134	8,204,525	872	1.06
Memphis Street Railway	1911	131	7,277,396	1,830	2.51
	1915	125	7,690,462	666	0.87
Bay State Street Railway (Fall River Division)	1911	.....	2,696,829	188	0.70
	1915	.....	2,981,834	271	0.91
Tacoma Railway & Power Company	1911	96	4,028,994	163	0.40
	1915	97	4,111,893	269	0.65
Grand Rapids Railway	1911	67	4,016,462	290	0.72
	1915	72	4,305,987	2,045	4.75
Washington Water-Power Company	1911	59	3,634,400	128	0.35
	1915	59	3,293,540	68	0.21
Eight companies—average collisions per 10,000 miles			1911	0.82	
			1915	1.19	
			Increase	45 per cent	
Class E:					
Pacific Electric Railway	1911	560	16,964,784	828	0.48
	1915	675	31,864,470	1,448	0.46
Terre Haute, Indianapolis & Eastern Traction Company	1911	53	4,660,339	97	0.21
	1915	61	5,233,532	184	0.35
Puget Sound Electric Railway	1911	11	1,364,509	35	0.26
	1915	11	988,701	51	0.52
Indianapolis & Cincinnati Traction Company	1911	11	1,559,081	34	0.22
	1915	11	1,443,807	37	0.26

*No previous record.
**Collisions resulting in claims.

REGULATING TRAFFIC

Frank Upham Adams in the April issue of the *American Magazine* has an article which describes street problems which are arising and suggests: (1) The restriction of the operation of automobiles to those mentally and physically equipped for this responsibility. (2) The strict enforcement of state-wide laws fixing speed limits. (3) The legal restriction of pedestrians to the proper use of streets. (4) The absolute prohibition of streets as playgrounds for children and others. While the enactment and a strict enforcement of such laws would admittedly bring about the desired condition, there is a serious question as to whether legislative bodies could be prevailed upon to enact such laws, and if successful in securing their enactment, whether it would be reasonable under present conditions to expect a rigid enforcement.

1. *Restricting Automobile Operation:*

With reference to the first suggestion, that of restricting the operation of automobiles, there is no question concerning the urgent need of immediate action in every state where indiscriminate licensing is allowed. In a recent discussion on this subject at the Pacific Claim Agents' Association convention, a comparison was drawn between the requirements of a locomotive engineer who must serve a number of years before being intrusted with the operation of an engine, and the automobile driver who only requires a few hours instruction from a salesman, whose sole desire is to make a sale. On the one hand, the railway superintendent has the interest of both the public and his employees at heart; and on the other, the salesman has a purely selfish motive and no thought or responsibility concerning what may happen as a result of his purchaser's inexperience or temperament.

2. *Enforcing Speed Laws:*

The second suggestion could probably be worked out in a satisfactory way as far as the framing and passage

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of suitable laws are concerned. The difficulty, however, is in the enforcement. While the traffic officer has been successful in bringing about order and compliance with regulations at street intersections, his useful influence, unfortunately, does not extend beyond the limit of his vision. The motorcycle officer soon becomes known to those who care little for speed laws, and while arrests are frequent, it is getting to be quite the fashion to be arrested for speeding and have your case placed on file with the admonition, "Don't do it again." Lack of sufficient funds is another obstacle which seriously interferes with the enforcement of speed laws, and is usually pleaded by the authorities when their actions are criticized.

A rather novel experiment has been proposed in California which is intended to aid in the observance of the "Stop, Look, Listen" regulation. Authority has been asked of the Public Service Commission to install so-called "Thank you, ma'ams" or depressions in the highway at a certain distance from steam and interurban railroad crossings for the purpose of forcing automobiles to reduce their speed. I am told that such a plan is or has been used in the State of Ohio. The attorney-general of Oregon has rendered an opinion that such action would be illegal, and that any damage occasioned as a result could be recovered from the county in which the accident occurred. A reasonable requirement in my estimation would be for automobiles to stop before approaching within, say, 50 ft. of a crossing and to reduce their speed to not more than 10 m.p.h. at a distance of 100 ft.

3. *Restricting Pedestrian Travel:*

Mr. Adams, in his third suggestion, has covered a wide field. If plans or laws could be devised and successfully prosecuted which would influence pedestrians to the proper use of streets, an immense amount of suffering would be avoided and many lives saved. It is a condition well worth striving for, but it seems to me that only a small part of this accomplishment could be brought about by legal measures. You might by law or ordinance require a person to cross the street in a certain way and only at street intersections, but there are so many possibilities during the act of crossing that it would be impossible to remove the individual responsibility or the danger involved in the act. To my mind, simple but well defined laws are all which we could expect to enforce with regard to control of pedestrians. We should bend our energies to the education of the public in safe practices and the matter of caution in the use of the streets.

4. *Prohibiting Street Play:*

Not the least important is the fourth suggestion—the absolute prohibition of streets as playgrounds for children and others. With the advent of extensive asphalt streets and the natural desire of children to use them for roller skating, wagon coasting, ball playing and other sports, an especially dangerous traffic condition has been brought about. Many children are so poorly housed that they practically live in the streets. To refuse them the privilege of playing in the traveled portion would indeed be a hardship. Yet, with the startling record of serious and fatal accidents to little ones engaged in street play—a record which is multiplied year by year—some action must be taken to protect them from the results of their own carelessness and the negligence of their parents. Just how stringent the required legislation should be depends in a measure upon local conditions. The principle involved, however, should be considered in all cases, and such laws as are enacted should be enforced.

While giving consideration to such legal regulations as seem necessary, we should not forget our duties or opportunities along educational lines. In this phase of our work, no better field can be found than in the public school. In our city the plan of lecturing to pupils during the school year has been elaborated upon, and we now have a working safety organization in each school building, assisting in the enforcement of safety rules and practices and working out well defined plans to conserve the lives and health of not only themselves but also their relatives and friends and the public generally. One of the results of this effort on our part has reduced street playing 50 per cent, and within the next two years we expect practically to eliminate the habit. These children of school age, who are known to us as "Safety Scouts," have taken up the work with an enthusiasm which is surprising, and their keen conception of what benefits can be derived from their efforts, acts as an inspiration to every one who observes it. As our traffic problems of the future must be solved by these same boys and girls, our energies in teaching them the principles of care and caution will serve effectively to build up a sentiment for the conservation of mankind.

OTHER POINTS NOT TO BE OVERLOOKED

As to the enactment of other laws which are of importance, there are a number which should not be overlooked. On pages 57 and 58 of the Proceedings of our 1915 convention, you will find a proposed statute submitted by Russell A. Sears, Boston, Mass., which it was intended should be introduced at this year's session of the Massachusetts legislative bodies. This has a great deal of merit and should become effective in every state. This proposed statute defines the meaning of and establishes so-called thoroughfares and regulates the operation of vehicles upon and entering such.

Uniform laws governing the positions of slow and rapidly moving vehicles, passing and overtaking other vehicles, lights and dimmers, turning at street intersections and the parking of idle cars should be considered with a view of securing such changes in existing laws and the passage of such laws as are needed in addition to enable operators of automobiles to understand clearly just what is required of them, not only in the state where they reside, but in any other state which they might enter. There is fully as much violation of traffic laws through ignorance of their requirements as through wilful acts.

Written Discussion

BY A. D. BROWN
Claim Agent New York State Railways, Syracuse, N. Y.

Laws should be enacted prescribing regulations and restrictions that will prevent the indiscriminate licensing of drivers of high-power motor vehicles. There should be certain qualifications necessary, such as age, physical fitness, habits, etc., before a person, owner or otherwise, is allowed to drive a motor vehicle upon the public streets and highways. Such laws should be rigidly enforced, and the public should co-operate with the state, county and municipal authorities in enforcing them.

There should be a standardization of road signs and signs and signals at grade crossings, and in order to perfect such a standardization, the municipal, county and state authorities, railways and automobile associations must co-operate. With standard signs and signals at grade crossings to warn the motorist of danger, then some regulations should be imposed by law that he either stop before crossing the track or else limit the speed of his car so that he could stop in case it became necessary to avoid a collision.

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There should be a like co-operation to enforce existing laws and ordinances and to secure uniform state laws to govern the rate of speed in rural districts and in incorporated villages and cities. Municipal ordinances governing speed, line of travel, safety zones, passing standing cars, etc., are not uniform. This state of affairs cannot be other than confusing to the most careful tourist as he passes from one municipality to another.

Many motor vehicle accidents are not the fault of the drivers of such vehicles, but are rather due to the carelessness of the public in general, and many of these accidents may be prevented by the education of the public as to safety first. Railroads have been pioneers in this movement, but it must be carried on further and railways, automobile associations and other organizations interested in the problem of prevention of accidents, should endeavor to bring about the actual introduction into our public schools of a system whereby the youth of to-day will receive, as a part of his or her education, a thorough course of instruction by lectures or otherwise on accident prevention.

Claim Work Fundamentals

BY E. P. WALSH
Attorney United Railways, St. Louis, Mo.

THE claim agent of other days found his tasks comparatively simple. In the days when cars and all other vehicles using the streets were drawn by animals, accidents were few and usually of a not very serious character, but because some accident did occur the claim agent was tolerated as a necessary evil and was generally considered by his employer as a constant source of expense from which no compensatory returns were received.

That condition is now materially changed, however, and to-day the claim agent is considered as a respectable part of the company organization. His task, however, is none the less difficult, and I see no prospect of his being able to recline upon a bed of roses in the immediate future. The hazard of accident is greater to-day than it ever was. Horse-drawn vehicles are diminishing in number, while those driven by motor power are greatly increasing. The claim agent of the future must be the man who will not only speedily and efficiently take care of and minimize, as far as possible, the ill-effects of accidents that happen, but will be most far-seeing in his ability to devise ways and means whereby accidents may be avoided.

Policies and Principles

Street railways are confronted with a twofold task, the education of the employees upon the one side, and the education of the public upon the other. Every mechanical appliance that would seem to tend toward the avoidance of accidents has been employed, and yet our experience has convinced us that the most perfect mechanical appliances are almost nil in their effect unless they are handled by men who are educated and trained to be careful. The healthy, happy, comfortable, satisfied employee does the best work and is the safest custodian of the company's equipment. In order that these conditions may prevail among employees, our various companies have established for them welfare associations, building and loan associations and employees' mutual benefit associations, and have provided times and places of enjoyment that demonstrate more forcibly than mere words could tell the mutual interest and co-operation between employer and employee. These conditions in large measure assist the claim agent in his work of education with a view to preventing accidents. The claim agent, however, finds that his school of education must continue constantly. Spasmodic efforts now and then have their effect, but unless persisted in cannot obtain the necessary result.

In attempting to educate the public the claim agent finds an even greater task. As a result of the work begun by the public service companies, inspiration has been afforded to many thousands of citizens in every commercial pursuit to interest themselves in safety-first work, and their efforts have been valuable in that they have caused the people to think along the lines of accident prevention. Yet those of us engaged in this work know that no matter how often the public is told to be careful many of them will not heed. We can put up signs at crossings and we can tell them to stop and look and listen, but we know that the only sure way to avoid accidents at such places is absolutely to do away with grade crossings. This particular instance will serve as an illustration that must guide us throughout the entirety of our efforts in this class of work.

The successful claim agent to-day is the man who will quickly perceive liability and adjust it when it can be reasonably adjusted before there is the added element of the lawyer and the provocation that comes from the feeling on the part of the claimant of undue delay. When the claim agent is convinced that liability exists the claim should be settled without loss of time or energy. More of us every day are coming to a realization of this fact. With these matters that must be settled out of our way, we have left more time and energy to expend in the defense of those claims which we feel to be without merit.

Psychology and Claim Work

Mental states and processes have much to do with successful handling of claim work. They are important not only with reference to the mind of the claim agent himself but with reference also to the minds of his subordinates and other officials of his company. The development of proper mental states and processes with reference to the subordinates comes as the result of training and developing each in his special line according to his fitness and adaptability. The mental attitude of other department heads with reference to claim work is also much affected by the attitude of the claim agent. In recent years there has been a passing out of disconnected efforts by different department heads, each selfishly striving to advance the interests and credits of his own particular department regardless of what may happen to some other department, and a coming in of a spirit of co-operative effort for the all-around development of the interests of the organization. By this means the claim agent has enlisted with him in his services the very best that every organization affords.

The claim agent's task does not end, however, with his associates. He must go further and inculcate in the minds of the members of the community at large certain attitudes of thought that will cause the public to understand the workings of the claim department in a way that will rid it of the prevailing notion that wherever and whenever anyone is injured some one must pay for it. The mind of the public at large should be impressed with the fact that all cannot receive damages, but that those entitled to them will receive reasonable compensation for their loss. In determining what shall be a fair compensation, however, the injured one must co-operate in a businesslike way with the claim agent, submitting to all reasonable investigation and furnishing whatever evidence is necessary to establish the truth of his contention. Care should be taken in the handling of a claim that no false impression is conveyed that will cause expectation of more than a claim is worth, and

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then when a settlement is made there will remain a satisfied claimant and a friend.

Such a course of action with reference to legitimate claims will enable the company to pursue with more vigor a policy of absolutely no quarter with frauds and impostors and no compromise with unjust or improper claims. The feelings of the public must be regarded, and the company which gets the reputation of dealing fairly with legitimate claims will find the task easier when compelled to defend itself against improper demands, because the feeling that the company is willing to do all that is fair and right will be reflected in the verdicts of the jurors and in the judgments of the courts. The claim agent who can best induce conditions of this sort is the man who will best serve his company's interests.

Oral Discussion

BY CECIL G. RICE
Assistant to President Pittsburgh (Pa.) Railways

I have nothing to say against the claim agents of the past. I believe that, under the conditions which they had to face, their work was equally as good as the work of the claim agent of to-day. The years, however, have brought changes and it is my opinion, based upon my experience, that there has been a complete reversal of the methods of handling claims. Formerly, a claim agent dared not go to a person who had been injured, or who was involved in an accident, for fear of suggesting a claim. To-day, however, there is not one out of five people in any large community but knows that there are such things as claims. By reason of the publication of large verdicts, and the almost universal publicity in connection with the workmen's compensation laws, the idea has got into the minds of a great many people that no matter how they are injured, the state makes companies pay them something. Every compensation case that is settled, every case that is settled by the courts, adds one to those made by the claim departments of a member company. So that to-day, instead of being fearful to give to a person information, it is necessary to see him in order to convince him that he has no claim. It was just the opposite in the days of old. Years ago the matter of adjusting claims was a battle of wits. To-day it is a purely business proposition; and when it is not so regarded, something is wrong either higher than the claim man or with him or below him.

PSYCHOLOGY NOT DIFFICULT

The matter of psychology sounds rather fearful, but it does not mean a great deal. It is merely the science of the mind. The science of psychology is merely the orderly arrangement of relative facts. The thing to keep in mind in considering this subject is that the claim agent does not settle the claim, but does settle with the claimant. John Jones may have a broken leg, and it will cost so much. Tom Brown has exactly the same injury, but it may cost ten times as much or only one-tenth as much. The individuality of the person involved has really more to do with any settlement than does the actual occurrence itself.

Let me illustrate how psychology may be useful in settling claims. Recently, a man who was a cheat claimant acting throughout the country, came into our office. His general practice was to report to the claim agent within two or three hours after the occurrence of the alleged accident. He would say that some attorney had happened along and invited him to call, but that he had refused to have anything to do with attorneys and would rather settle with the company. In ten or fifteen cases around Milwaukee he had used the name of a particular attorney, and he made the mistake of telling the same story when he came in to us.

We all knew that he had been tried for perjury in Milwaukee. I said to him: "Do you suppose, Mr. So-and-so, that this man who invited you to come to see him was attorney —— of Milwaukee?" Immediately he was confused, because the name I used happened to be the name of the lawyer with whom he had worked.

I said: "Did you make the statement that you had never had any accidents before this one, and did you swear to that statement? Now, we don't want to take advantage of you, but in this State it is a felony to swear to something that is not true. We might put you in the penitentiary for that." By that time he was sweating quite a little, and said he spoke German mostly but knew how to count money. So I said to him: "Suppose you go home to the American House, where you stayed last night, and write out the accidents you have been involved in, and bring them to me to-morrow morning." The first train went out at eleven o'clock the next day, and he was there about an hour before train time, but he did not leave with any of our money in his pocket.

As far as the claim was concerned, he was easy to handle. There was no fear of paying him anything at any stage of the game, but I want to make the point of the value of the use of suggestion, which is psychology, rather than the strong arm method, saying, "You are a thief and a crook." The mere suggestion to him that this man, who he said was on the car near him and gave him his name, was the attorney out in Milwaukee, had let him know at once that we knew something about his work in Milwaukee, and he would reasonably suppose that if we knew something about him there we would know something about him somewhere else. The suggestion about the danger of committing crime put fear into his heart, and that was all that was necessary.

HOW TO OVERCOME PREJUDICE

Just what are claim agents going to do to offset the prejudices that exist against all traction claims departments regardless of how fair and square they may have been? The point is, do the people know that claim agents are fair and square, and how are they going to show this fact? The solution of this by the Pittsburgh Railways is to publish what we term a "Code of Ethics and Policies." It is not a theory. It is merely a collation of facts and a description of principles and policies by which we are attempting to handle all business relating to the adjustments for accidental occurrences in and around Pittsburgh. This was described and favorably commented upon in the ELECTRIC RAILWAY JOURNAL of Oct. 7, pages 706 and 712-713.

In conversation with a judge of one of our courts recently, I mentioned this "Code of Ethics and Policies" to him. He brought up the subject of claims himself, and I opened up and told him some few things he had not heard before. He was very much interested, and he asked me to send him a copy. While it is copyrighted, if anyone cares to make use of it and will send me a postcard, I shall be glad to have a copy forwarded to him.

My particular interest in this Claims Association is the development of a higher standard of work and added dignity, in the hope that the ultimate result may be that the claim agent will take his place in the official counsels of his company as a man, as an officer, as some one who has a right to consider, suggest and advise—instead of being thought of as a nuisance because everything seems to be going out and nothing coming in.

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Social Relations of Electric Railways

Comprehensive Progress Report to American Electric Railway Association on Important Problems Arising Out of Co-operative Activities of Management and Employees—Main Subject Covered in Present Report Is Protection of Employees Through Life, Health and Accident Insurance

By JAMES D. MORTIMER, Chairman
HENRY C. BRADLEE EDWIN W. RICE, Jr.
Composing the Subcommittee on Social Relations of the Committee on Public Relations

THE problems considered under the heading of "Social Relations" naturally group themselves into two parts: (1) The protection of the employee, including the subjects of industrial injury compensation, life insurance, health insurance and old age pensions. (2) The betterment of the status of the individual employee, including such subjects as the best form of wage payments, the minimum wage, education, practices of efficiency, standards of living, thrift and profit-sharing plans with the employer. The committee has not approached the problems of protection or insurance from the standpoint of policy but solely from the standpoint of economic and efficient administration. It has not concerned itself with philosophical aspects or with the desirability or expediency, in individual cases, of providing such insurance.

There is perhaps no single industry in the country which has accomplished more in the betterment of social relations than the electric railway industry. Yet, although reports have been many in regard to other phases of its work, not much information regarding the progress made in solving problems between companies and their employees has heretofore been available in printed form. For this reason the report of the subcommittee on social relations of the public relations committee of the American Electric Railway Association, presented at the Atlantic City convention on Oct. 11, is a record work. The accompanying abstract gives in detail the survey of the industry contained in the report, but, owing to limitations of space, only the general points of the elaborately prepared chapters on life, health and accident insurance are here presented.

AGENCIES FOR SOCIAL INSURANCE

In conceding the need for such forms of social insurance as compensation for industrial accidents, life insurance, health insurance and old age pensions, the question arises as to the agency best suited to provide this protection. Shall it be the state, an organization of employees, the employer, co-operative action of employee and employer, or an underwriting agency such as the insurance company? These agencies may be compared thus:

1. *State Insurance:*

It seems generally conceded that the provisions for sickness, accident, life and old age in Germany have been well administered. The scheme has comprised central government supervision supplemented by local administration by employees' benevolent organizations. The same cannot be said of the English insurance act administration. The German success appears to be due to strong bureaucratic control and racial characteristics of thrift and obedience to authority lacking in more populistic forms of government. A number of our states, notably Washington and Ohio, provide for state administered funds to care for industrial accidents, and one state, Wisconsin, provides for life insurance upon the voluntary plan. On the basis of charges which have been made concerning the conduct of business of those states, this form of administration does not seem to have been a conspicuous success. A number of governmental divisions, including our federal government, have provided staff pension plans for public employees. The failure to make adequate provision for the accruing laibilities under these pension plans has been the universal shortcoming of such administration.

Lack of a broad and far-sighted financial policy and the usual inefficiency under political management are recognized shortcomings which will probably postpone the day when state insurance will become the ultimate method in the solution of the problem of social insurance. The obvious advantage of administration by state agency is its widespread effectiveness. Under such a plan the individual would be free to change his employment or affiliation without being deprived of like protection in some other pursuit. The very comprehensive character of any plan of state insurance, however, comprising as it would every diversified vocation and trade, constitutes its greatest weakness from the standpoint of efficient administration. If such a plan were supported by contributions from various industries it would be a long task, if not a hopeless one, to determine equitable premium rates to be charged for each occupation and each industry.

2. *Employees' Organizations:*

There have been no comprehensive plans of social insurance, health, accident, life and pension, inaugurated by trade unions. In fact, insurance benefits have not been considered germane to trade union activities. Where such benefits are provided the funds for such purpose have not been organized.

According to statistics given in the *Quarterly Journal of Economics* (May, 1916), out of 154,684 persons engaged in electric and street railway occupations, only 33,773 or 21.8 per cent were members of trade unions in 1910. These figures evidently include only platform labor, as the total number of persons employed in 1912, according to the 1912 census report on street and electric railways, exclusive of six companies which failed to make report, was 282,461. The Amalgamated Association of Street & Electric Railway Employees of America instituted a system of death and permanent disability in 1895. Death benefits of from $100 to $800 are paid, dependent upon the length of term members have been in good standing. Disability benefits are limited to total disability "through sudden accident while in service." Old age benefits accrue only "after twenty years of continuous membership and reaching the age of sixty-five." During the six months' period ended June 30, 1916, the association reports having

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expended $144,789 for 320 death benefit claims and $2,200 upon three disability claims. No old age benefits were paid. The benefits are supported by an assessment of 25 cents per member per month. There are no liability funds established for accruing obligations due to increased age and period of membership. At the fourteenth convention a report of the general executive board—reading "Disbursements (from the benefit fund) were 79 per cent of receipts the previous year and 84 per cent this term. This is not an alarming increase, but should serve as a caution against adding to the present liability"—was concurred in with the recommendation that no further burdens be added to the benefit fund.

In addition the association reports that thirty-three of its locals pay death benefits in one form or another. These range from definite payments of $50 to $200 per member to the amount available from per capita assessments or the proceeds of "passing the hat." While the benefits of the parent association do not include sick benefits or accident disability benefits, eighty-nine divisions pay limited benefits reported to range from $2 to $9 per week usually for a period of thirteen weeks. That these benefits are much restricted is evident from the fact that for the eighty-nine divisions these benefits during 1915 aggregated $55,725 or $626 per local.

Whatever advantages there may exist in theory to the employees' organizations as administrators of the protection provided by the various forms of social insurance, the fact remains that these have not developed in practice. The benefit liabilities assumed have not been handled in a business-like manner. The effectiveness of the organization is limited to the trade in which it operates rather than the entire industry.

3. *Employers:*

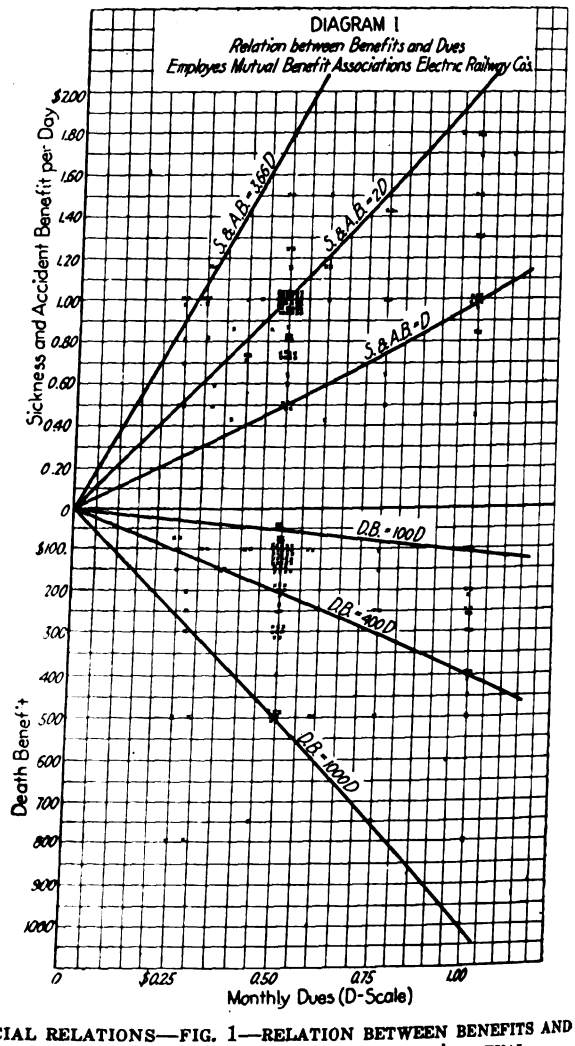
Few electric railway companies exclusively administer and support benefit funds, aside from pension systems. Twenty-six electric railway companies reporting pension systems sustain these funds. Only three out of ninety-four companies reporting sickness and accident relief funds report exclusive administration of these by the employing company. Nine out of fourteen companies operating under the "group insurance plan" pay full premium for the amount of such policies. The objection to this form of administration lies in the lack of interest and consequent lack of economic administration which exists where the employee does not co-operate in the maintenance and distribution of such funds.

4. *Co-operative Associations:*

One hundred and eighteen electric railway companies report benefit associations maintained in co-operation with employees and providing sickness and accident disability benefits, medical supervision and death benefits. Although membership in these associations is voluntary, the percentage of total employees cared for is substantial. Out of thirty-nine associations which reported the number of employees and the number of members in the relief associations, fourteen have a percentage of membership between 85 per cent and 100 per cent, fourteen a percentage of membership between 65 per cent and 85 per cent, and only eleven a percentage of membership under 65 per cent.

Twenty-five associations reported whether or not medical examination is required for admission to membership, and only one does not require such medical examination. Twenty-three associations reported limitations of age below which the association will not admit members; five of these will not admit to membership employees under sixteen years, six will not admit employees under eighteen years, six will not admit employees under twenty-one years, and two make no such limitation. As regards the upper age limit of twenty-three associations reporting, thirteen will not admit to membership employees over forty-five years of age, four will not admit employees over fifty and the age limits of the remainder vary from thirty-five to sixty-five years. Of the forty-three associations reporting on the length of service necessary before admitting to membership, twenty-four, or 65 per cent, make no such requirement; nine, or 21 per cent, require a probation period of three months; six require a probation period of thirty days, and the rest range from sixty days to three years.

The majority of associations are administered by boards of trustees or directors consisting of a number of employees elected by members and a number elected by the company, although in some few instances the administration rests entirely with the employees. Of ninety-four companies reporting as to the sources of financial support of the association, the great majority report contributions from the employing company in excess of 50 per cent of the entire cost of conducting



SOCIAL RELATIONS—FIG. 1—RELATION BETWEEN BENEFITS AND DUES IN ELECTRIC RAILWAY EMPLOYEES' MUTUAL BENEFIT ASSOCIATIONS

the association. In almost all instances the administrative overhead expenses, including cost of keeping records, medical inspection, etc., are carried by the employing company. Of 107 companies reporting membership dues, 60 per cent require monthly dues of 50 cents, 10 per cent require monthly dues of $1, and the remainder, dues ranging from 25 cents to $4. Of forty-seven companies reporting initiation fees, 67 per cent require a fee amounting to $1, 15 per cent a fee of 50 cents, and the remainder, fees ranging from 25 cents to $2.

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For such membership fees and company contributions eighteen associations report maintaining a medical staff and five report maintaining hospitals and infirmaries in addition to benefits. The disability benefits range from $5 to $12 per week, although one association reports, under its additional insurance plans, benefits for members at cost of as high as $120 per month. Out of sixty companies reporting disability benefits, 35 per cent of the cases limit the payment of the benefit to thirteen weeks in one single case and 22 per cent limit the payments to 100 days.

Death benefits vary over a considerable range among the different associations from $50 to $1,000. Out of sixty-eight associations, fourteen report paying death benefits upon the death of the wife and eight upon the death of the child of the employee. The usual benefit paid by these associations upon the death of the wife is $50 and upon the death of the child $25. A number of associations also bear part of the funeral expenses.

The relations between benefits and employees' dues is shown in Fig. 1 on page 880. For the majority of associations a sickness and accident benefit of $7 per week and death benefit of $100 is provided for monthly dues of 50 cents and the employing company's additional contribution. That the benefits as compared with the dues vary over a wide range is apparent from the figure.

The reports indicate that in most instances the benevolent associations are working well. In addition to medical supervision and free medical care in cases of sickness by the association physician, visiting committees appointed by the members supplement such care and comfort in case of disability, and no doubt exercise a deterring influence upon malingering. A number of associations are now increasing their benefits. In one instance as high as 80 per cent of the weekly wages is paid in the case of sickness and accident disability, $2,000 in the case of death from natural causes and $5,000 in the case of death from accident.

5. *Underwriting Agencies:*

At the present time there is no single insurance company which is attempting to write a policy covering life, accident, sickness and old age pensions or annuities in a form sufficiently attractive to be considered as an acceptable agency for the carrying out of insurance plans. The forms of life policies are not attractive for employees with moderate incomes except for nominal amounts. Some few companies write so-called industrial insurance at 5 and 10 cents a week, but these are unusually heavily burdened with collection overhead expenses. The only form of insurance adapted to social insurance plans is the group insurance policies recently offered for employees of a single industry. These are confined to the payment of only life insurance benefits.

A number of the old-line life insurance companies originally writing sickness insurance, have abandoned the business. Disability for sickness and accident are now underwritten almost exclusively by the casualty companies and at rates not designed to be attractive to any but select risks. Few companies are pushing the sale of annuities, and none of these has made any effort to underwrite pension plans or annuities deferred until the usual age of retirement. The State of Massachusetts has, since 1907, permitted savings banks to issue policies for life insurance and annuities limited respectively to $500 and $200. These consist of straight-life policies with premiums to cease at the age of seventy-five, endowment policies maturing in twenty years and at the age of sixty-five, and insurance endowment policies under which insurance continues to the age of sixty-five, at which time premiums cease and the payment of the annuity begins.

The reason for this lack of development does not lie in the sparse demand for such forms of underwriting, but in the unlimited field for regular policies and the unattractiveness of policies carrying small reserves and possibly increasing risks due to inadequate supervision.

6. *Relative Advantages:*

Of the various types of administration enumerated, co-operative association of employee and employer is best suited to the future development of a comprehensive plan of social insurance. It is the most readily available means. It comprises the entire industry rather than the separate trades. It is assured of economical management and close supervision. Should state administration ever occur, it may, in all likelihood, take the form of supplementing rather than superseding existing agencies. In trade unionism, the social insurance is and will continue to be a matter of secondary importance. Present tendencies do not suggest the marketing of underwriting suitable in scope and form for the electric industry.

INSURABILITY OF ELECTRIC RAILWAY EMPLOYEES

It is well to make a general survey of the characteristics of the electric railway business affecting the insurability of employees, which must be kept in mind in providing permanent plans of insurance. These characteristics may be commented upon under suitable headings:

1. *General Characteristics:*

There are few industries which require in their scheme of organization so many diversified kinds of employment as the electric railway. In addition to motormen and conductors operating in outdoor environment, the list of employees includes power plant operators, firemen, engineers, electricians, linemen, troublemen, all employees with widely different duties, but necessary solely to provide the motive force which propels the electric car. The maintenance of roadway, track, and buildings and structures requires another group of employees embracing every type of employment from surveyor to painter. The maintenance of rolling stock also requires every type of employment from founder and machinist to car cleaner. In one typical company the occupations represented in the electric railway business number 124. Of these the largest group naturally is the trainmen intrusted with the operation of cars. Employees connected with maintenance and furnishing of power, however, constitute more than 50 per cent of the number of employees.

Electric railway employees vary in degree of skill from the common day laborer to the highest skilled electrical, civil and mechanical engineers. Many of the employees in specialized occupations require years of preparation. Such employees have chosen their life vocation. If they were to leave one electric railway, it would be only to pursue their calling in some other electric railway or allied industry. On the other hand, those engaged in other occupations, among them trainmen, are constantly changing. Trainmen are usually recruited from the untrained additions to the city's industrial population from the country. The vocation requires intelligence and skill, but it is easy to learn. The compensation usually exceeds that of other trades requiring a like degree of education and skill. The work is congenial and out-of-doors. The average hours of employment are not excessive, nor is the calling hazardous. Such work is likely to attract young men of more than ordinary intelligence and ambition, and

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serves as a stepping-stone to the more skilled industries. There are naturally variations in the length of employment and in the compensation paid therefor, because of these differences.

Finally, the complexity of the industry requires employment under the most extreme variations of hazard, ranging from office employees and others usually classed in the "select group," to employments classed as "extra hazardous" and "non-insurable" in the standard accident insurance classification of casualty companies. This latter class includes operators of electrical machinery, linemen, structural steel workers, wiremen, and operators of special machines.

2. *Classification by Age:*

A factor of great importance in life and sickness insurance and pension plan cost computations and of some importance in accident insurance computations is the age of the insured group. The figures given in Table I are derived from analysis of the records of a single company. The change in average age in this case has been due to higher standards of labor and the operation of social insurance plans.

3. *Classification by Years in Service:*

This is a factor of importance in determining the cost of a pension plan where, as is usual, the amount of pension liability is dependent upon the years of service prior to retirement. The data given in Table II cover the same company and periods for which classification of employees by age is made in Table I.

4. *Recession Rate:*

Factors of importance in determining the cost of life insurance and pension plans are the resignations and dismissals. The usual insurance computations assume that with the exception of those removed from participation by death, all surviving members will be entitled to death benefits or pension annuities. Needless to say, this factor is of varying importance in different companies. Tables III to V, giving data for a single company, indicate the tendency of the recession rate by age and years of service and occupation.

5. *Classification of Compensation:*

A factor of importance in all insurance is the extent of the possible burden for premiums as compared with the compensation paid. The question is, in short: "How much insurance can the average employee afford to carry?" The federal census throws some light on the average wages paid electric railway employees, variously classified in its reports. Table VI shows the average wage during 1907 and 1912 for each group and the proportion represented in each. The average wage of $711 for the entire country is somewhat less than that obtaining in the larger companies.

The distribution of average wage by ages and years of service is also of importance. Such an analysis has been made for years past by one of the member companies, and the results, for a typical year, are given in Fig. 2 and Fig. 3 on page 883. These illustrate a maximum earning capacity at about forty years of age and fifteen years of service.

6. *Conditions for Improvements of Risk:*

The success of any plan of insurance is dependent upon the elimination or reduction of risks. The cost of life and sickness insurance depends upon careful initial selection and periodic supervision of health and mode of living. Accident liability depends principally upon education and safety-first measures; age and health are important. The extent of preventive efforts in each of these fields has a marked effect upon cost.

TABLE I—DISTRIBUTION OF EMPLOYEES BY AGE IN PER CENT OF TOTAL

Age Group	1912	1913	1914	1915
16-19 years	7.9	6.3	4.3	4.3
20-24 years	22.7	23.8	20.0	17.8
25-29 years	21.3	22.4	24.5	22.9
30-34 years	14.7	15.2	17.2	18.4
35-39 years	10.9	11.2	13.3	13.6
40-44 years	9.0	9.0	8.7	9.4
45-49 years	6.4	5.4	5.5	6.1
50-54 years	3.9	3.4	3.3	4.5
55-59 years	2.1	2.2	2.2	3.4
60 years and over	1.1	1.1	1.0	1.7
	100.0	100.0	100.0	100.0
Average age	31.6	31.4	32.0	33.1

TABLE II—DISTRIBUTION OF EMPLOYEES BY YEARS OF SERVICE IN PER CENT OF TOTAL

Years in service group	1912	1913	1914	1915
Less than 1 year	42.2	37.3	21.5	17.3
1 year	11.1	20.6	13.6	6.2
2 years	9.6	7.1	16.8	13.9
3 years	4.7	6.4	10.9	13.9
4-5 years	6.7	5.2	10.4	16.3
6-10 years	13.0	11.3	12.9	14.9
11-15 years	7.2	6.9	7.5	9.1
16-20 years	4.5	4.1	5.2	4.7
Over 20 years	1.0	1.1	1.2	3.7
	100.0	100.0	100.0	100.0
Average years of service	4.12	3.98	4.97	5.97

TABLE III—RECESSION RATE OF EMPLOYEES OF A SINGLE COMPANY, BY AGE

Age Group	Ratio Withdrawals During Year to Number of Employees at End of Year	Ratio Withdrawals During Year to Number Employed During Year
15-19 years	86.6 per cent	46.4 per cent
20-24 years	56.4 per cent	36.1 per cent
25-29 years	39.4 per cent	28.3 per cent
30-34 years	26.5 per cent	20.9 per cent
35-39 years	23.9 per cent	19.3 per cent
40-44 years	24.7 per cent	19.8 per cent
45-49 years	17.9 per cent	15.2 per cent
50-54 years	20.1 per cent	16.8 per cent
55-59 years	9.7 per cent	8.9 per cent
60 years and over	30.3 per cent	23.3 per cent
Total	36.7 per cent	26.9 per cent

TABLE IV—RECESSION RATE OF EMPLOYEES OF A SINGLE COMPANY, BY YEARS OF SERVICE

Years of Service	Ratio Withdrawals During Year to Number of Employees at End of Year	Ratio Withdrawals During Year to Number Employed During Year
Less than 1 year	95.4 per cent	48.8 per cent
One year	63.4 per cent	38.8 per cent
2 years	23.1 per cent	18.7 per cent
3 years	11.8 per cent	10.6 per cent
4-5 years	8.8 per cent	8.1 per cent
6-10 years	6.6 per cent	6.2 per cent
11-15 years	4.5 per cent	4.3 per cent
16-20 years	4.1 per cent	3.9 per cent
Over 20 years	5.3 per cent	5.0 per cent
Total	36.7 per cent	26.9 per cent

TABLE V—RECESSION RATE OF EMPLOYEES OF A SINGLE COMPANY, BY REPRESENTATIVE OCCUPATIONS

	Ratio Withdrawals During Year to Number of Employees at End of Year
Accounting clerks	19.2 per cent
Record clerks	68.4 per cent
Track repairmen	117.0 per cent
Yardmen	95.0 per cent
Trainmen	23.6 per cent
Car house repair crew	30.6 per cent
Car cleaners	132.0 per cent
Carpenters and helpers	116.0 per cent
Painters and helpers	77.8 per cent
Blacksmiths and helpers	25.0 per cent
Machinists and helpers	79.3 per cent
Firemen	88.2 per cent
Oilers	44.5 per cent
Coal passers	150.0 per cent
Boiler washers	38.4 per cent
Pumpmen	50.0 per cent
Switchboard operators	35.0 per cent
Wiremen	60.5 per cent
Polemen	202.0 per cent
Groundmen	105.0 per cent
Electrical repairmen	54.2 per cent
Steamfitters and helpers	36.4 per cent

TABLE VI—ANNUAL COMPENSATION OF ELECTRIC RAILWAY EMPLOYEES (From Census Report)

	1912		1907	
	Per Cent of Total Number of Employees	Average Wage	Per Cent of Total Number of Employees	Average Wage
Salaried officers of corporations	2.8	$2,962.40	2.5	$2,257.73
Managers and superintendents	2.7	1,865.55	2.4	1,709.82
Clerks, stenographers and other salaried employees	7.5	814.85	3.6	677.16
Conductors	23.4	716.64	25.3	636.90
Motormen	24.1	737.10	24.8	675.36
All other employees	39.5	620.28	41.4	662.09
Total	100.0	$711.22	100.0	$681.89

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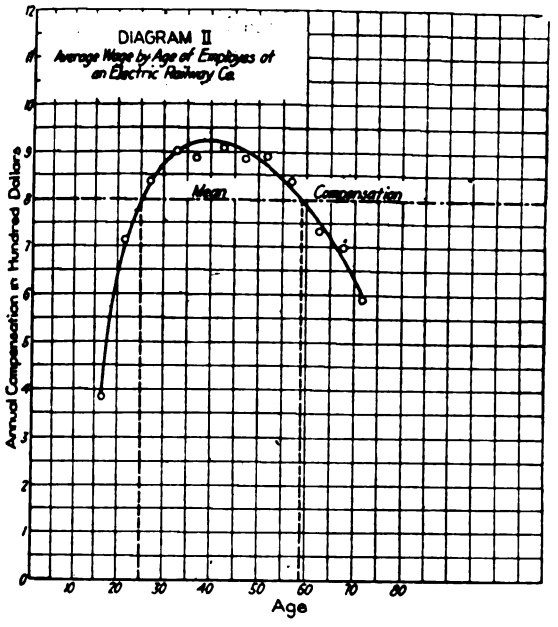
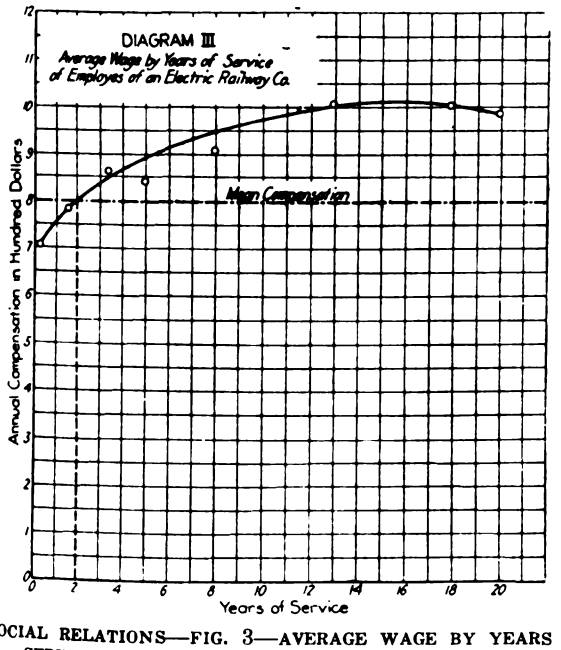
Fig. 4 and Fig. 5 show the reduction in accidents per employee with increased years in the service. These figures refer to the experience of one company only, in connection with employees in the power plant and transportation departments respectively. This reduction in



SOCIAL RELATIONS—FIG. 2—AVERAGE WAGE BY AGE OF EMPLOYEES ON ONE ELECTRIC RAILWAY

accident hazard is due presumably to a number of causes. The company which reports the figures has had a safety campaign under way for several years, and the older men naturally give the matter more attention than the younger men. The men longest in service usually do work in which there is less liability to minor injury, although, insofar as major accidents are concerned, this does not appear to hold. A number of other causes are doubtless operative, but the conclusion is cer-



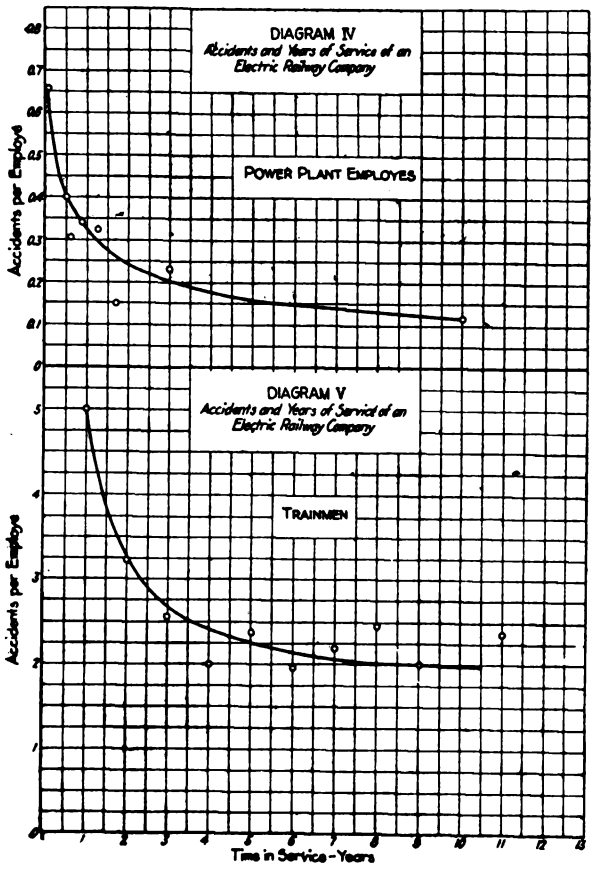
SOCIAL RELATIONS—FIG. 3—AVERAGE WAGE BY YEARS OF SERVICE OF EMPLOYEES ON ONE ELECTRIC RAILWAY

tainly warranted that if the hazard decreases with experience, education will accelerate the process and that some form of safety-first measures is a condition of a successful system of accident insurance.

The factors outlined in the above preliminary survey of the industry will, of course, vary in importance with the conditions found in each particular locality and company. They are essentials, however, of the successful administration of social insurance.

LIFE INSURANCE

According to the sub-committee, the necessity of life insurance in some form or other is well recognized by all students of sociology. Its influence in reducing poverty in old age and charitable and poor home relief is quite generally appreciated. Life insurance in some form will sooner or later become universal. If the determination of the method is left to the sociologists, it will likely take the form of compulsory insurance, in whole or in part, supported by taxation, as in the case of many European countries. American industry will soon have to decide whether it wishes to be forced into



SOCIAL RELATIONS—FIGS. 4 AND 5—ACCIDENTS AND YEARS OF SERVICE FOR POWER PLANT EMPLOYEES AND TRAINMEN ON ONE ELECTRIC RAILWAY

this kind of life insurance, or whether it wishes to anticipate such legislation by voluntarily providing life insurance for its workingmen and other wage earners, or utilizing existing machinery for placing life insurance at their disposal in a way to cause it to be used.

A large number of electric railways of the United States provide some life insurance for their employees either through the medium of benefit associations or through life insurance companies. Out of ninety-five companies reported as having benefit associations and providing death benefits, twenty-three pay death benefits of $100. The benefits vary from $50 to $1,000. Fourteen associations report paying death benefits upon the death of the wife, and eight upon the death of the children of the employee. One association writes endowment as well as life policies for as high as $2,000. The cost of such benefits, including insurance against sickness and accident as well as death, is borne in the

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majority of instances jointly by the employee and the company. A medical examination is usually required by these associations prior to admission to membership. Out of fourteen companies reported as insuring their employees in insurance companies, the greater number provide insurance of $1,000. In a number of these companies the insurance provided is equal to the yearly wages of the deceased employee. In a majority of these instances the cost is shared by the company and the employee, although a number of companies foot the entire bill. Such insurance usually requires no medical examination. The protection thus provided electric railway employees is supplemented in many cases by industrial insurance, assessment society benefits and regular old line insurance policies.

1. *Cost Factors:*

The most important factor in the cost of insurance is the chance of death at various ages. Under the American experience table, at the age of thirty a contribution of $8.43 by all the 85,441 living at that age would pay a death benefit of $1,000 for each of the 720 deaths during that year. At the age of sixty the necessary contribution would be $26.69, due to the higher death rate, while at the age of twenty the necessary contribution would amount to only $7.80. These amounts are, for these varying ages, the net cost per premium of an insurance of $1,000. The very substantial increase in the net cost with increased age demonstrates clearly the fallacy of uniform contribution to life insurance funds irrespective of age. Where the life insurance benefits are small, as is now the case with the large number of electric railway benefit associations, the ill effects of uniform contributions are not so apparent, but it is certain that if an increase in death benefits is contemplated, the scheme of monthly dues of associations must be made to conform with the ages of members or the contributions changed yearly if the fund is to continue to remain solvent.

2. *Determination of Self or Purchased Insurance:*

There is, of course, at the outset considerable force to the argument that an industrial concern cannot afford to go into a business which is foreign to its particular field, concerning which it knows little and which it is not equipped to handle. The argument is not, however, strictly applicable to the electric railway business. Many street railways are carrying their own public medical and claim departments, which are capable of taking on a small additional amount of business in making examinations and investigating claims, with little added cost. The problem of investment of reserves presents no difficulties as electric railway securities and real estate mortgages, legal investments for insurance funds, are familiar investments. These are important advantages. At least, as is the case with other supplies and services which the electric railway company buys or produces, the possibility of self-insurance offers a competitive advantage which should permit it to negotiate for insurance with the underwriting agency, if it chooses to do so, at the most economical figure.

The advantages and disadvantages of self-insurance may be summarized as follows:

(a) Unless the group is sufficiently large the mortality experience will only apply in part, so that net premium or annual cost may exceed that of an underwriting agency. Actuaries consider a group of 500 sufficient to come within the usual mortality experience. There is nothing to indicate that electric railway employees are subnormal or extra hazardous risks. Should this occur, insurance rates would be expected to conform to the added risk. Where the group is sufficiently large, the company or association representing it would, by carrying its own insurance, immediately secure the benefit of selection arising out of the more careful preservation of the health and safety of its employees.

(b) Reserves can be more profitably invested than the reserves of insurance companies, and where necessary the company can guarantee the earning.

(c) More liberal terms and conditions as to the cash and surrender values can be given the employee under the self-insurance plan.

(d) By making insurance compulsory, the cost of solicitation can be reduced to a minimum, and a large part of the overhead cost eliminated.

There is a final consideration which must not be overlooked, namely, that of increasing the *esprit de corps* of the employee organization. The benefits of mutual co-operation are only appreciated where such activities are self-administered. The solicitation committees and visiting committees are important factors in increasing the educational value of co-operative activities. A live association which provides the benefits as well as conducts the funeral is of greater importance to the employee than a mere nominal organization which turns the work over to some impersonal underwriting agency. This last advantage is intangible, it is true. Its importance will be more readily appreciated by those who have had experience in the promotion and administration of benefit associations.

3. *Group Insurance:*

Insurance written upon the lives of a large number of employees of an industry, on one contract, has come to be known as group insurance. This plan is based upon the one year term, and where the group is sufficiently large, the risk is accepted without medical examination. There is, of course, a selective influence due to the fact that the members insured are regularly employed, and hence not likely to be impaired lives.

Replies from fourteen companies that have contracted for group insurance for their employees indicate that 12,190 employees are so insured, the average age being about thirty-six years, and the average premium $11.10 per $1,000 of insurance. Four companies provide $500 benefits; seven companies, $1,000 benefits. Two companies provide insurance equal to a year's salary, and two companies vary the benefit with the length of service. Eight companies contribute all the premium; two contribute $4 per policy; one contributes $1 per $1,000 policy; one the full premium on a $1,000 policy, while in two companies the entire cost is borne by the employees.

Owing to the newness of the group insurance form of contract, many features might, in the sub-committee's opinion, be suggested which have not as yet been incorporated in the policies. The cost on the one year term plan is certain to increase with the increase in the average age of employees. This is likely to be a serious objection, as the entire tendency of employment in the street railway industry, with the operation of pension systems and other co-operative activities, is certain to be more permanent. Nothing has as yet been done to give preferred rates where the conditions of medical attention are such as to entitle the insuring company to such a reduction. The term plan, moreover, does not permit of automatic provision for a continuation of insurance should the employee leave the service of the company. Because both protection and employment are terminated simultaneously, the one year term system is not likely to be enthusiastically endorsed by the employee. These objections would be obviated by an ordinary life rather than one year term system of insurance.

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4. *Form of Insurance Desirable:*

The general specification of the type of insurance protection, which it seems should be furnished either through employees' associations or some underwriting agency, is as follows: (*a*) Protection should be offered to all employees and participation for a minimum amount made compulsory during employment. Individual contracts with individual employees should be provided. (*b*) A sufficient number of kinds of protection should be provided to suit the variety of conditions of income, age, dependency, etc., which will be found among the various employees. The term insurance plan with its increasing cost is not desirable. One form of policy should be provided on the ordinary life plan, providing for level premiums as long as a protection is afforded. A second form of policy should be provided which will permit the payment of full protection in twenty installments. A third form of policy which has much to commend it, is a limited term endowment policy. *c*) The policy should make liberal provisions for automatic extension where through sickness or misfortune premiums are not paid and should provide for the payment of the face of the policy where the total disability makes it impossible to continue employment. (*d*) The policy should automatically give the employee the right to continue the insurance should he leave the employment of the company; accept the cash surrender value reserved to his credit, or apply such reserves without further payment to the purchase of paid up or extended insurance. (*e*) With the accumulation of reserves, liberal provisions can be included in the policy for the extension of protection, even where for some reason premiums are not paid. The policy should contain the usual provision for grace in payment and reinstatement. (*f*) A change in beneficiary should be provided at the option of the insured, at any time during the continuation of the policy, but the matter of assignment of policy should be carefully safeguarded, provision being made in the interest of the employee that the association assumes no liability as to the validity of any assignment and that satisfactory proof of the assignee's interest must be produced on making claim. (*g*) Payment of premium should preferably be provided in monthly installments and the employee's share collected by payroll deductions or deducted from the dividends of profit-sharing plans. (*h*) It is the usual experience that single payment life benefits are dissipated in a short time by unwise investments and extravagances. Many policies now provide for the payment of an income to the beneficiary for a specified period of time desired by the insured. The so-called Gilder weekly income policy plan, designed for moderate sums, features an immediate payment of $75, at death, to defray funeral expenses, and the payment of $10 per week for fifty-two weeks to the beneficiary. This benefit is the equivalent of an insurance of $587 if paid in one sum. A policy of $1,000 would provide a monthly income of $40 for two years in addition to a funeral benefit. These are a desirable form of payment. Larger policies should permit of the payment of an annuity for the life of the beneficiary.

5. *Administrative Problems:*

Various administrative problems present themselves in placing in operation some plan of insurance as outlined, but the subsequent operation of the plan is more or less automatic. Insurance accounting does not require a separate account for each policy, the costs, reserves, paid up insurance and extended insurance values being readily determined at any time from the tables, and a copy of the table covering the history of the policy being contained in each individual contract. A check up or valuation of reserves is necessary each year. The annual reports usually required present no unusual difficulties for the accounting departments of electric railways. Many companies now require a more exacting medical examination upon employment than is required by insurance companies. If, as is now the case in the administration of many of the benefit associations, the employing company supplies office space and contributes supervisory and accounting work, the complication of loading can be directly obviated.

If the surrender values are made equal to the reserve, there will be no accruing surplus other than that arising out of more favorable mortality. It is not necessary, therefore, to complicate the policies by making them participate and providing payment of dividends. Savings from a better selection of mortality will serve to enhance the reserve and create a surplus. When these surplus reserves reach a substantial point, the premium rates may be reduced. The rates, reserves, surrender values, paid-up insurance and extended insurance options may be definitely stated in the policy and no question or dissatisfaction can arise as to the participation of the employee, should he leave the service of the company.

6. *Social Problems:*

The regular routine work of examination, selection of premiums, payment of death benefits and surrender values must, of course, be supplemented by the work of employee members of the association in benefit promotion, visiting and funeral committees. The largest social service to be rendered lies in the education of the employee as to his duties toward those dependent upon him and the business-like way of meeting such responsibilities.

The extent of the protection which is necessarily provided if any plan of life insurance is to be effective, will depend upon the living necessities of the employee's wife and his children until they attain the age of self-support. The protection should be at least $1,000, permitting an income of $40 per month for two years and funeral expenses. Adequate protection requires an insurance of at least $5,000 if a small annuity is to be provided during the remaining life of the wife. The premiums for this latter benefit fall well within 10 per cent of the annual income of any regular electric railway employee.

HEALTH INSURANCE

Because of their immediate and recurring nature, health benefits are probably the most popular form of insurance. For this reason also they are the least available form of insurance on the market and the most desirable form from the employing company's own standpoint.

Of the one hundred and eighteen companies having employees' mutual benefit associations, ninety-nine give data on sickness and accident benefits; 48.5 per cent of these provide a benefit of $1 a day during sickness, and 12 per cent from 50 cents to $1 a day, dependent upon the dues paid. In a large majority of cases this disability benefit together with the death benefit is supported by dues of $1 per month, half of which sum is contributed by the employee. Sickness and accident disability insurance plans usually provide that a certain stipulated duration of disability elapse before the member becomes entitled to the benefit. This is required to safeguard the association against claims for imaginary sickness or trifling indispositions. Thirty-nine associations report a length of time ranging from four days to twelve days, 27 or 69 per cent of these fixing the duration at seven days.

It is usual also to limit the period during which benefits will be paid for a single continued disability. This

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period is usually sufficient to cover the period of sickness, including convalescence, but excludes permanent disability. From information reported by sixty associations, it is noted that in twenty-one or 35 per cent of the associations the benefits are limited to ninety days. In thirteen or 22 per cent of the associations the limit is placed at one hundred days. The associations usually maintain a medical staff entrusted with the care of disability cases. A number of associations furnish medical supplies and surgical treatment free of charge. One association reports giving free medical and surgical aid to the families of employees. A few associations have reduced rates for family service.

The plan of insurance best suited to mutual benefit associations appears to be the renewable term plan with increase in rates at ten year intervals, full benefits limited to three months or one hundred days, half benefits for an additional three months for a single case; no benefits paid for disability of less than one week and no benefits paid for disabilities covered by workmen's industrial injury compensation acts. Under this plan rates based on Manchester unity experience place the cost of disability at about $3.60 per annum for a $1 a day benefit at the age of thirty and somewhat exceed the present costs of some mutual benefit associations. To this rate there must be added the component of medical attention, hospital care, sickness supplies, etc.

There are two selective factors which can serve materially to increase or reduce the disability cost. The first of these is medical attention. Prompt investigation is necessary in all cases of illness. Supplementing this a health propaganda as intensive as a safety program is well worth while. One of the member companies publishes monthly a series of health talks written in non-technical manner for employees. Herein lies the largest field of activity for preventive medicine. The second factor is the moral hazard. It is believed that its influence in employees' mutual benefit associations has been exaggerated. Fellow employees, the doctor and the visiting committee of the association are strong inhibiting forces to any tendency to "play hooky" on sick leave.

There is no question but that the employees' mutual benefit association has a field to itself in the most efficient and economical development of health insurance. In so doing it is performing a much needed social service which other industries can do well to emulate. There is a widespread need for cheap insurance. Underwriting agencies are not keen for sickness insurance business. Largely because of these conditions there is an active propaganda for health insurance in the United States modeled upon the German and English systems. Such legislation has been recommended by the Industrial Relations Commission and embodied in the platforms of the old Progressive party. At present the American Association for Labor Legislation is sponsor for a health insurance bill which, it is said, will be introduced in twenty-five states of the Union. It is desirable that American employers examine these proposals and their European counterparts with some care.

The benefits of health insurance can only be made widespread by making the insurance compulsory. Compulsory insurance can be best introduced by the employer making a substantial contribution toward the cost of insurance, considering such contribution as a part of the wage payment and an element in the cost of production. Whatever system of compulsory health insurance is provided in this country will, following the historical development in European countries, recognize the employees' mutual benefit association. It may regulate and prescribe its activities so as to make it less effective. Herein lies the greatest danger of present tendencies. The interest of the electric railway industry lies in the maximum benefits for its employees. It should not be burdened with caring for the load of other industries or governmental overhead costs. It can most effectively preserve its identity by leading the way and so efficiently performing its social function that state interference cannot hamper it.

WORKMEN'S INDUSTRIAL INJURY COMPENSATION

Every good workmen's compensation act gives and should give expression to these four fundamental objects, viz.: (*a*) To promote the prevention of work accidents: (*b*) To provide for adequate medical and surgical care for injured employees in order to forestall or at least to reduce resultant disability for work. (*c*) To establish definite compensation schedules which will assure to injured employees certain financial relief in proportion to their industrial impairment and which will limit the employer's liability as a practical insurance proposition; and (*d*) To create a simple but authoritative mechanism of administration to avoid costly and time-absorbing litigation and in its place introduce a large measure of the personal element in the settlement of disputes arising out of personal injuries.

The employer can be materially stimulated to practise effective accident prevention by requiring him under the law to report to the supervising state authority every accident in employment causing injury. The employer's attention is thus focussed upon every accident in his plant, which is the first important step toward arousing him to measures of prevention. The majority of all accidents, however, have their chief source in carelessness, and this in turn points to persistent and consistent efforts to make employees reasonably careful by conscious effort at first and eventually by habit, as the most effective method of accident prevention.

If the claim is justified that the enactment of a workmen's compensation law is for the best interests of employees, it stands to reason that the protection of this law should extend to all employees regardless of their specific occupation, unless their employment is only of such casual nature as to make it impracticable or even impossible to set the compensation machinery in motion before the casual employment ceases.

There is no justification for an insurance monopoly under the law. Every legitimate and properly safeguarded method should be allowed to enter the field of compensation liability insurance, and that form of insurance should be most encouraged which in itself carries the greatest incentive for accident prevention. Stock insurance companies have recognized the importance of this feature by providing differentials in the premium rates of employers, according to the condition of safety of their premises; quite often also they stimulate safety in employment among their clients by advising and assisting the latter in regard thereto. Mutual insurance companies, in which employers in similar industries form a group and each pays in addition to the proportionate cost of administration a proportionate share of the total compensation liability of the group, make it decidedly more interesting and important for the employer to reduce accidental injuries in his own plant and to work toward their elimination in the plants of all group members. Yet even under this arrangement the employer must still contribute his proportionate share of the cost of management and participate financially in the creation of a general reserve fund. To eliminate also this economic waste and to give greatest expression to efforts for accident prevention, employers should be permitted to carry their own insurance under such safeguards as the state au-

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thorities may deem necessary for the benefit of injured employees. Since the claim has been advanced that state insurance is the best form of social insurance, it should be made one of the elective forms of insurance in order to experiment with this new and practically untried phase of governmental activity. To most thoughtful people state insurance commends itself least as an effective agency for preventing accidents, ferreting out fraudulent compensation claims, or for economical administration. Whichever form of insurance, however, the employer selects as a condition *sine qua non* for his acceptance of the workmen's compensation law, such action on his part should at once relieve him of all other liability for damages for personal injuries to his employees, and conversely, compensation claims should constitute the only remedy of an injured employee against his employer, if both operate under the compensation law.

It stands to reason that the compensation schedule should be predicated on a part of the wages. All early compensation laws provided that the compensation due an injured employee should be equal to 50 per cent of his average wage during the time for which compensation is payable. Compensation laws more recently enacted, however have adopted a more liberal schedule by recognizing 55 per cent to 66 2/3 per cent of average wages as a basis of compensation, and some of the older laws have undergone amendments to the same effect. The resistance of employers to such liberalizing of the compensation schedule does not merely arise out of the justified desire to keep the cost of compensation insurance at a reasonable level, but more from the conviction and experience that the higher the compensation schedule, the more frequent malingering and fraudulent claims by some injured employees. To the degree to which effective safeguards against these unjustified claims are developed and put into practice, the opposition to a liberal compensation schedule will lose much of its present potent force. Stringent enforcement of the injured employee's duty to give prompt notice and to accept willingly adequate medical care by the employer's physician even during the whole period of disability, if the latter so chooses, is perhaps the most effective of these safeguards.

The tendency to malinger has also a direct relationship to what is commonly called the waiting period under a compensation law. Two weeks is the common provision in the law; some laws, however, have a waiting period of only one week and the general tendency toward a shorter waiting period is seen in the recent amendments to compensation laws, reducing that period from two weeks to ten days and in some instances to even one week. This situation warrants very careful, unbiased consideration. When disability continues beyond two weeks, then, with few exceptions, physicians are able to determine quite definitely whether or not continued unfitness for work exists. Many more might try to simulate disability if the waiting period were of one week's duration only. Some states have compromised the situation by providing that compensation payment shall be due from the beginning of disability, if the latter should continue beyond two weeks. Such a provision offers great inducement to prolong the disability period. A retroactive proposition obviously seems unwise.

Data supplied by a member company show the extent to which disability varies in different departments. Employment on work cars appears to be the most hazardous, on roadway and buildings next in order, and the work of linemen third in order of hazard, showing 4.47 per cent, 1.34 per cent and 0.74 per cent days disability to days worked respectively. The class of motormen and conductors shows 0.19 per cent disability.

In those states where compensation laws have been in effect the longest and where comparative data have been compiled, costs under the usual scales of compensation have at first been proportionately higher under the law than under the conditions obtaining prior thereto. Safety campaigns, better selection of employees, the application of safeguards to machinery and the more continuous use of safety appliances, however, have tended to bring down the cost of industrial injury compensation. It is quite improbable that any member company now operating under such laws would be willing to return to the old conditions.

National Safety Congress This Week

THE fifth annual congress of the National Safety Council, which was held in Detroit, Mich., from Oct. 17 to 20 inclusive, was attended by about 1200 delegates, including a number of electric railway men. Sectional meetings devoted to public utilities, electric railways and public safety were held on Tuesday, Wednesday and Thursday, respectively. Abstracts of some of the papers will be printed in a later issue of the ELECTRIC RAILWAY JOURNAL.

A list of the electric railway section papers was printed in the issue for Sept. 30. In addition to the papers delivered before the section itself there were other papers of value to railway men, notably one on "Station Safeguarding," by Charles Penrose, Philadelphia Electric Company, and others on public safety.

R. W. Campbell of the Illinois Steel Company presided over the public safety meeting in the place of Edward C. Spring, Lehigh Valley Transit Company, who was detained by business. Perhaps the most interesting single feature of the electric railway section was the records given of the rapidly increasing number of collisions with automobiles.

At the meeting on Oct. 20, H. A. Bullock, Brooklyn Rapid Transit Company, was elected chairman and Edward C. Spring, Lehigh Valley Transit Company, vice-chairman of the electric railway section. L. R. Palmer of the Department of Labor and Industry of Pennsylvania, was elected president for the ensuing year of the National Safety Council.

The papers and discussion brought out clearly the influence which safety considerations are having upon all lines of industrial and public utility work. The earnest interest in the proceedings shown by the delegates indicated that the safety movement is taken seriously from both the economic and humanitarian standpoints.

As an adjunct to the congress a safety exhibit was held in the armory located at Larned and Brush Streets. While no electric railways exhibited, there were steam railroad exhibits, and many safety appliances applicable to electric railways were shown. The meetings were held on the second floor of the Hotel Statler.

Attendance at the Atlantic City Convention

The registration figures at the Atlantic City convention last week, as compared with those at the 1914 convention, are given below. Comparison is made with the 1914 convention as that is the last one that was held at Atlantic City.

	1916	1914
Officials of the different associations	66	31
American Association	248	196
Accountants' Association	125	101
Claims Association	81	75
Engineering Association	547	360
Transportation & Traffic Association	300	158
Individual Members	44	73
Ladies	725	416
Guests	231	144
Manufacturers	904	900
	3,271	2,454

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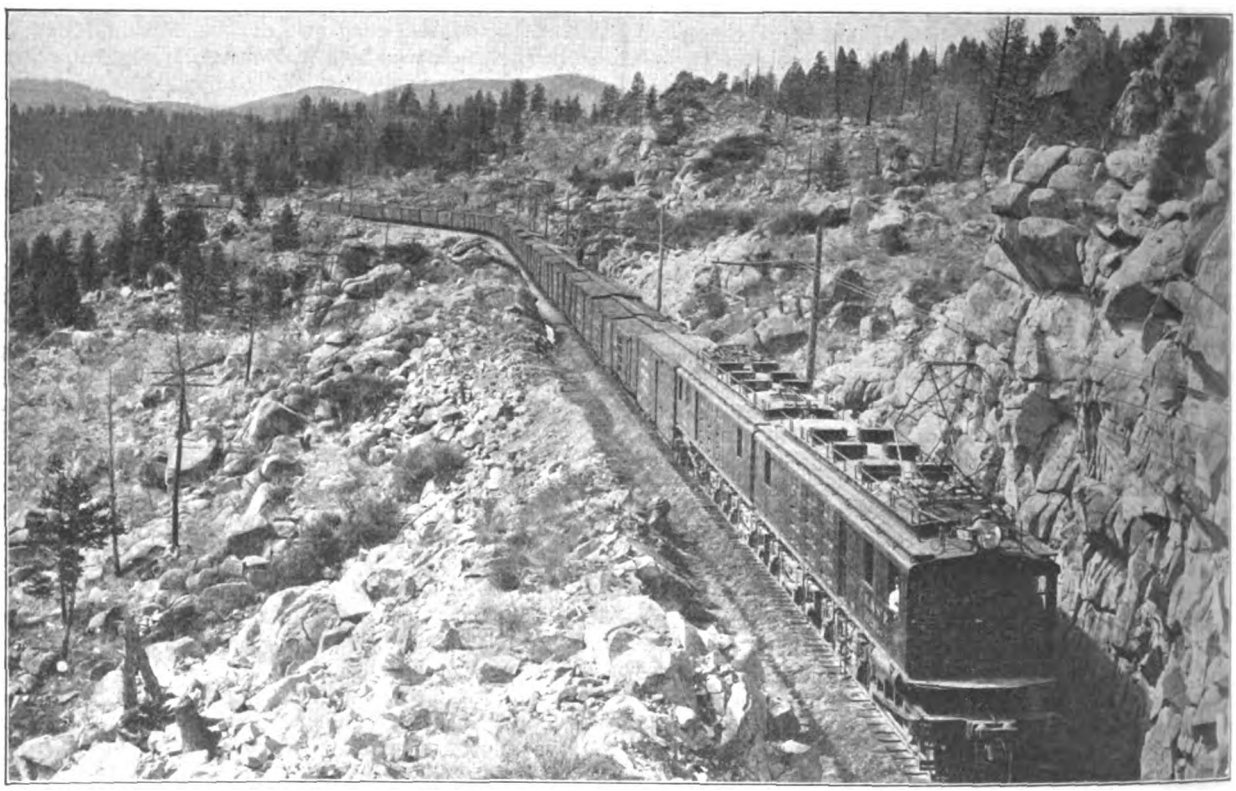
Mechanical and Electrical Features of the C., M. & St. P. Locomotives

Details Are Published for the First Time Regarding the Method of Regenerative Braking with D.C. Motors, Also Regarding the Mechanical Construction of the 288-Ton Locomotives Which Have 450-Hp. Axle-Mounted Motors and Operate Satisfactorily at 65 m. p. h. in Passenger Service



C., M. & ST. P. LOCOMOTIVES—FREIGHT TRAIN DESCENDING 2 PER CENT GRADE ON EASTERN SLOPE OF ROCKY MOUNTAINS

THE locomotives for the Chicago, Milwaukee & St. Paul Railway's electrification, which has been discussed in various past issues of the ELECTRIC RAILWAY JOURNAL,* possess more than ordinary interest through their many novel features, the most notable among these being the use of 3000-volt direct-current and the adoption of direct-current regenerative braking. These locomotives were first placed in regular service in December, 1915, so that some of them have had practically one year's service. During this period the engines have been operating most successfully, permitting an increase in train load on maximum grades from 1700 tons to 2500 tons, and an increase of speed from 8 m.p.h. to 15 m.p.h. At the same time there has been a reduction in the number of helper engines on the grades, and half of the dispatchers originally employed are now able to handle trains on the 226 miles of route that are electrically operated at the present time. Indeed, according to C. A. Goodnow, assistant to the president Chicago, Milwaukee & St. Paul Railway, who is in charge of the electrification, the installation has been such a tremendous success that the fact of the existence of the Continental Divide has been altogether forgotten.

*Among the previous articles on this installation in the ELECTRIC RAILWAY JOURNAL are the following: Nov. 21, 1914, Construction Plans; Dec. 19, 1914, Operating Plans; June 5, 1915, Locomotive Design; Oct. 16, 1915, Substations and Overhead; Dec. 18, 1915, Operating Tests; March 4, 1916, Switching Locomotives; April 1, 1916, Features of Operation; June 17, 1916, Operating Notes.

MECHANICAL DETAILS OF THE LOCOMOTIVE

The decision to use 3000-volt direct current for the Milwaukee locomotives followed a careful study of the relative cost and other features of split-phase and alternating-current systems and of the other practical direct-current voltages. This review showed figures and operating characteristics favorable to direct current with but little difference in the investment between 3000 volts and 5000 volts. However, the investment in copper for the former case was transferred to investment in locomotives for the latter case, and copper was obviously subject to less depreciation and maintenance than in the case of rolling stock. Further, as the investment for substations and copper was sufficient for a material increase in traffic, such locomotives as might be subsequently purchased, if built for 5000 volts, would continually add the burden of a higher cost. As installed, the initial investment for the 440 route-miles of the electrification will be something less than $30,000 per mile, according to figures published by the railway company.

The first of the four engine divisions to be electrified by the Milwaukee extends through a most difficult sec-

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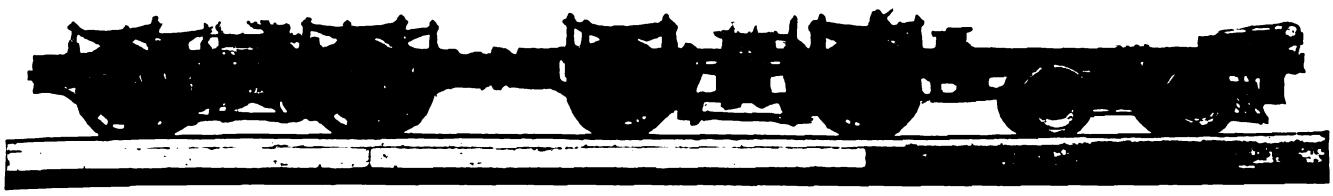


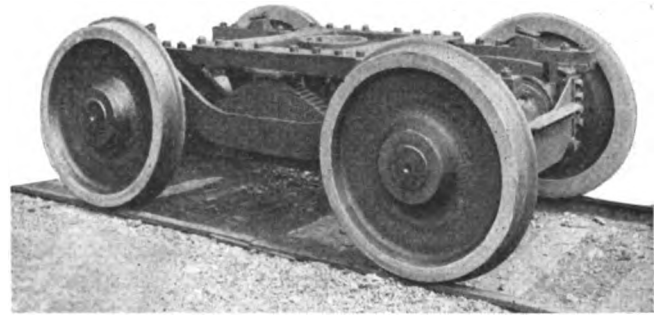
C., M. & ST. P. LOCOMOTIVES—RUNNING GEAR FOR ONE HALF-UNIT

tion of the Rocky Mountains. During the past year, however, this division has been operated by the electric equipment without any apparent difficulty, not only keeping the road clear of congestion, but almost universally making up time that had been lost on adjoining steam-operated portions of the road. From the mechanical standpoint, the electric locomotives that have been making this remarkable record are of unusually large size, the principal dimensions being as follows:

Maximum tractive effort	132,500 lb.
Continuous tractive effort	71,000 lb.
Length overall	112 ft. 0 in.
Total wheel base	102 ft. 8 in.
Width overall	10 ft. 0 in.
Height, pantograph lowered	16 ft. 8 in.
Rigid driving wheel base	10 ft. 6 in.
Rigid guiding wheel base	6 ft. 0 in.
Diameter driving wheel	52 in.
Diameter guiding wheel	36 in.
Size main driving journals	8 in. x 14 in.
Size guiding journals	6½ in. x 12 in.
Total weight	576,000 lb.
Weight on drivers	450,000 lb.
Weight per driving axle	56,250 lb.
Spring borne weight per driving axle	40,000 lb.
Dead weight per driving axle	16,250 lb.
Weight on guiding wheels	126,000 lb.
Weight per guiding axle	31,500 lb.
Spring borne weight per guiding axle	27,274 lb.
Dead weight per guiding axle	4,226 lb.
Maximum tractive effort in per cent of weight on drivers	30 per cent
Continuous tractive effort in per cent of weight on drivers	16 per cent
Normal braking power in per cent of weight on drivers	89 per cent
Normal braking power in per cent of total weight	69 per cent

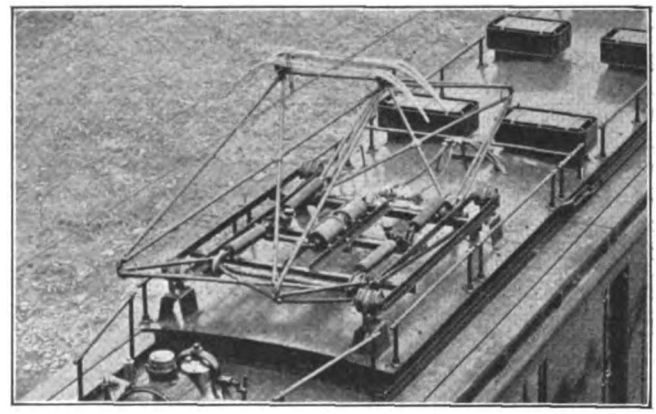
The locomotives, which were built by the General Electric Company, are each made up of two duplicate sections, each section having a cab mounted on two driving trucks, of which one is unsymmetrical in that it has an extended frame to carry the draft rigging and the center pin for the guiding truck. The guiding truck is of the well-known equalized type common to steam locomotives, and it carries the load on a center bearing through a bolster which provides 4 in. of lateral movement each way from the center against a constant pressure. The riding characteristics have been most satisfactory, speeds of 65 m.p.h. being attained in passenger service. There is absolutely no nosing on tangent track.

In the driving trucks the side frame, transoms and other parts taking longitudinal stresses are designed to withstand a 500,000-lb. static pressure with liberal factors of safety. The side frames are of cast steel 4½ in.



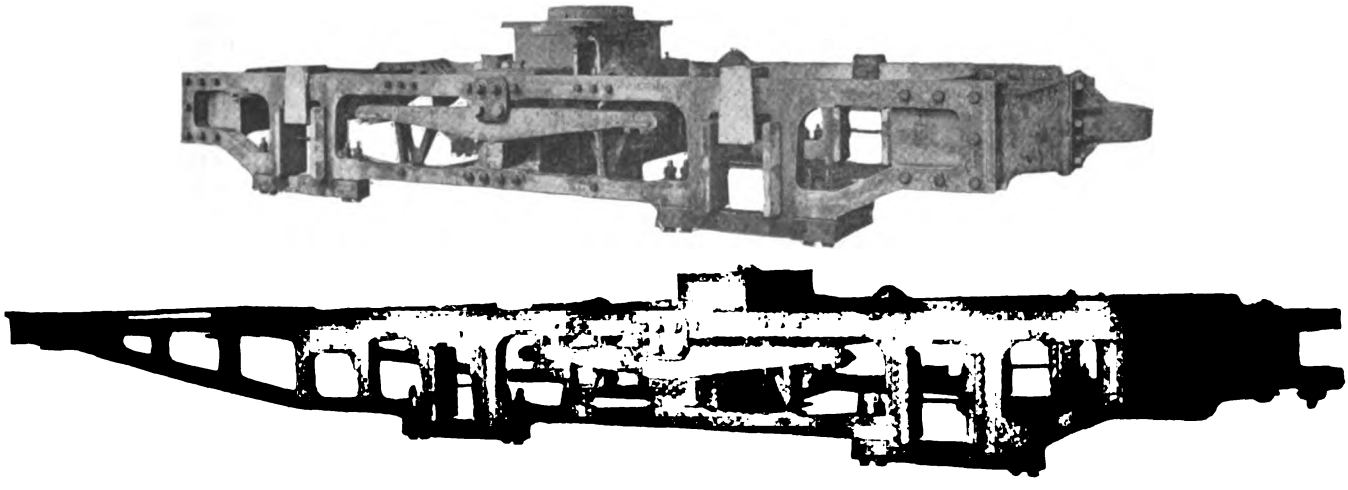
C., M. & ST. P. LOCOMOTIVES—GUIDING TRUCK

thick placed on 80-in. centers. Midway between the wheels on each of the trucks is a hollow cast-steel transom with supporting lugs for the nose of the traction motors, and ventilation from the blower in the cab is



C., M. & ST. P. LOCOMOTIVES—DOUBLE SHOE PANTOGRAPH AND VENTILATORS ON CAB ROOF

transmitted through this direct into the motors. The equalizing arrangement for each driving truck is similar to that used upon steam locomotives. No vertical



C., M. & ST. P. LOCOMOTIVES—FRAMES OF SYMMETRICAL AND UNSYMMETRICAL TRUCKS

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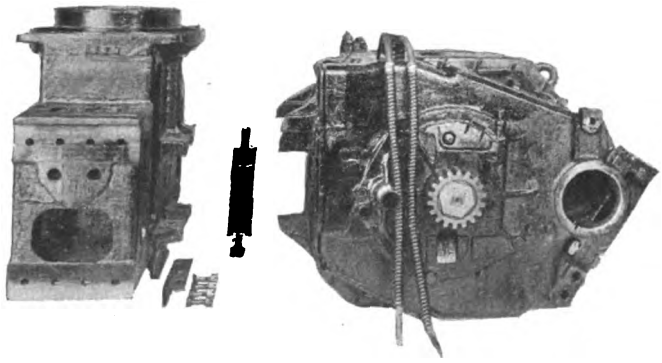
play is allowed in the hinge between the trucks for each half unit, but it is provided in the hinge joint between the two half-locomotives.

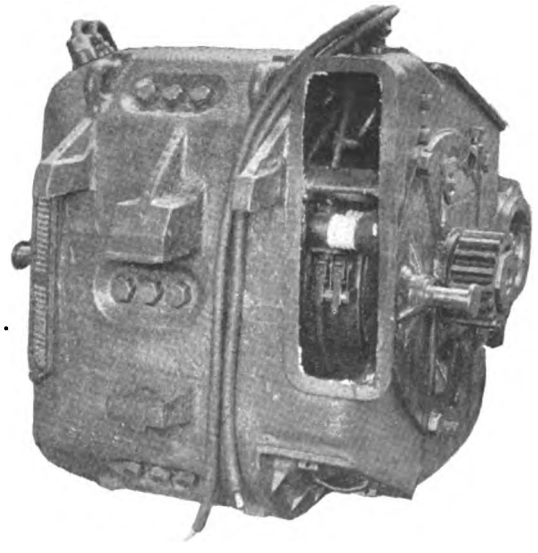
The frames are provided with pedestal shoes at the journals so that when the shoes are dropped the journal boxes can be removed from place without lifting the frame. This makes it convenient to renew the thrust



C., M. & ST. P. LOCOMOTIVES—DISSEMBLED VIEW OF NOSE-SUSPENSION OF MOTOR ON TRANSOM

plates which are provided at the back of each box. The motors are supported in the usual way directly on the axle at one side, and by a nose bracket through double-acting springs to the bolster in the other side. The motors drive through flexible gears that are mounted directly on the axle, one at each end of the motor.

The superstructure of each section of the locomotive is made up with two 12-in. longitudinal center sills placed 31 in. apart, this forming a box girder and providing for an air duct to conduct the ventilating air from the blower to the motors. A secondary floor of 6-in. channels forms ducts for the wiring conduit and serves as a floor for the cab. The cabs are built in the usual way, with ventilating louvres in the sides. Each is divided into two compartments, consisting of the main apparatus cab, 47 ft. long, and the motorman's cab, 5 ft. long. The apparatus cab is arranged with an aisle



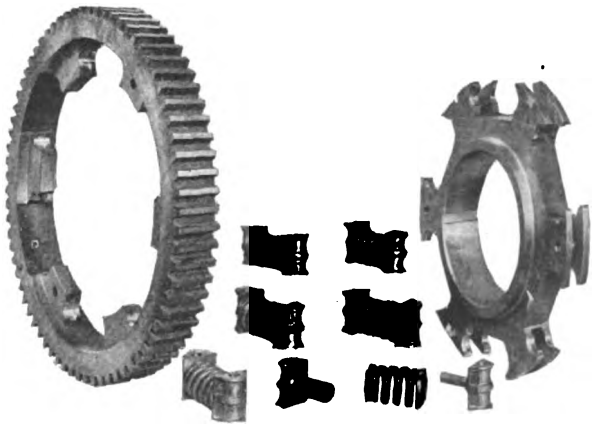
C., M. & ST. P. LOCOMOTIVES—VIEW OF 450-HP. MOTOR SHOWING VENTILATING AIR INTAKE

23 in. wide that extends for the entire length on each side, with compartments for the control and other apparatus arranged in the middle, hatches being provided in the roof for handling all apparatus with overhead cranes. The motor-generator set, the blower and the compressor are carried directly on the box girder forming the main air duct.

In the compartment for rheostats and switches the rheostats are supported near the floor, and above them are mounted the contactors. Ventilating flues leading from the rheostat compartment through the roof provide natural ventilation, air being taken through openings in the floor. The front of the contactors and switches is accessible from a center aisle into which all contactors face, thus providing liberal arcing space. This arrangement of rheostat and contactor compartment has been found particularly desirable on account of the ease of inspection and removal of parts that need replacement. By this means also all of the high-tension apparatus that might be a source of danger is safely inclosed.

MOTORS

The motors used with these locomotives are the largest of the axle-mounted type that have been used in the electrification of steam railways. They are known as the General Electric type 253. Based on the A.I.E.E. standard method of rating, their one-hour rating is 452 hp., and the continuous rating, based on a temperature rise of 100 deg. C. in the armature and 120 deg. C. in the fields, is 396 hp. These ratings are for a poten-



C., M. & ST. P. LOCOMOTIVES—DISSEMBLED PARTS FOR FLEXIBLE GEAR

tial of 1500 volts, two motors being coupled permanently in series for operation on 3000 volts from the line. The motor is designed for operation with an external blower and the volume of air at the continuous rating approximates 2500 cu. ft. per minute. The air is blown into the motor through a large opening on the front of the magnet frame at the commutator end, then passes in parallel streams through the armature and over the field coils, and is exhausted through openings in the magnet frame and bearing head at the opposite end.

Each motor complete, including spring gears, pinions, gear case and axle lining, weighs 14,860 lb. It has four main poles and four commutating poles, and is designed for field control, the field being shunted 50 per cent in motoring at full speed. The armature has forty-nine slots with seven coils per slot, and the commutator 343 segments. The armature has a single-turn winding, and the diameter of the armature core is 29½ in., the coils being insulated with mica and asbestos. At the one-hour rating the speed of the armature is 446 r.p.m. There are four brush holders per motor, each having two brushes 11/16 in. x 1¾ in.

The main field coils are wound with strip copper in two sections with asbestos between turns. They are insulated with mica and asbestos, and have a final wrapping of strong cotton tape. The commutating coils are made of edgewise-wound strip copper, and are insulated in a similar manner to the main field coils. The main exciting field coils are not subjected to full volt-

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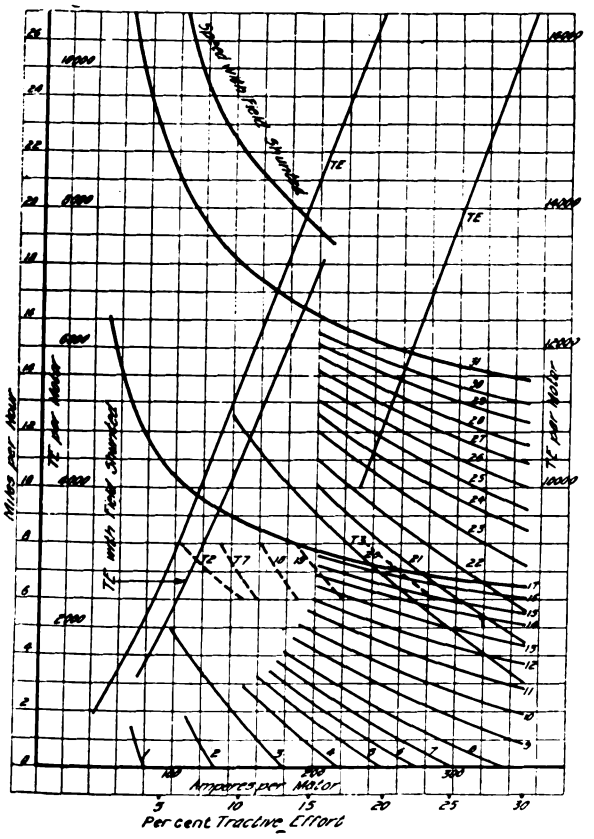
age, since the armatures of two motors are connected in series with the fields of both motors on the ground side. The clips connecting the top and bottom bars at the back end of the armature are electrically brazed to the bars, thus insuring a reliable connection at any abnormally high temperature which might occur at excessive overload. The magnet frame is made of cast steel, and except in size differs but little in general appearance from standard box frame railway motors.

The commutating characteristics of the motor are excellent, and it has been found possible to raise the voltage on a stand test 50 per cent above normal without injurious sparking. When the motors are regenerating at voltages materially higher than 3000, the fields can be shunted to a surprising extent without appreciable sparking.

The motor has twin gears with a 4-in. face and two-pitch. For the freight locomotive the gear ratio is 18:82, and for the passenger locomotive 29:71. Both gears and pinions are made of high-carbon, oil-treated stock, having an elastic limit of 85,000 lb. per square



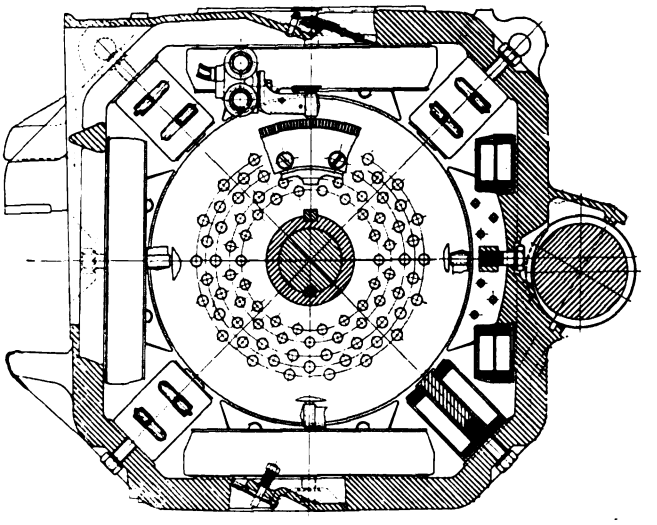
C., M. & ST. P. LOCOMOTIVES—CHARACTERISTIC CURVES FOR VARIOUS CONTROL POINTS, AND SERIES-PARALLEL TRANSFER STEPS FOR 1500-VOLT FREIGHT-SERVICE MOTOR WITH GEAR RATIO OF 18 : 82 AND 52-IN. WHEELS

inch. In service the motors have operated with excellent results, and there is no noticeable gear noise or vibration while the locomotives are in motion. At present the motors run at a comparatively low temperature because their capacity is sufficient to handle heavier trains than originally contemplated.

CURRENT COLLECTION AND CONTROL

As mentioned in previous articles the locomotive has two pantographs, one mounted on each half unit of the locomotive. Each pantograph has two sliding contacts or shoes, which are provided with copper wearing strips, and further provision for increased contact area is obtained by the use of double-contact wires of copper for the overhead catenary system. With the four points of contact at the pantograph it becomes easy to collect the heavy currents that obtain in the service. Sparking is entirely eliminated, although the current required for a single locomotive at continuous rating is 840 amp., and in passenger service speeds up to 60 m.p.h. are attained.

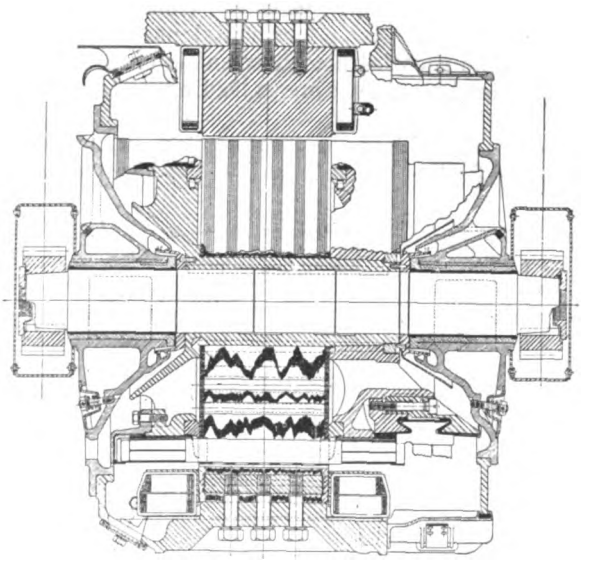
The motorman controls the operation of his pantograph by means of an air valve, which admits air to a pair of cylinders energizing powerful springs, the latter in turn raising the pantograph and at the same time



C., M. & ST. P. LOCOMOTIVES—TRANSVERSE CROSS-SECTION OF MOTOR

regulating the pressure against the trolley wire. The range of action of the shoe is between 17 ft. and 25 ft. above the rail. An auxiliary trolley pole with a swivel base is supplied to collect current for the air compressor when the locomotive is first put into service. The two pantographs on each complete locomotive are connected by a bus line so that the duplex electrical equipment can be supplied from either one.

Great importance has been accorded to the design of the main emergency switches and fuses, and accordingly



C., M. & ST. P. LOCOMOTIVES—LONGITUDINAL CROSS-SECTION OF MOTOR

these devices are mounted in a separate high-tension compartment. The trolley lead, starting from the pantograph, first enters this high-tension compartment and is divided into main and auxiliary circuits therein. From the main switch and fuse the main power lead goes directly to the controlling apparatus of the trac-

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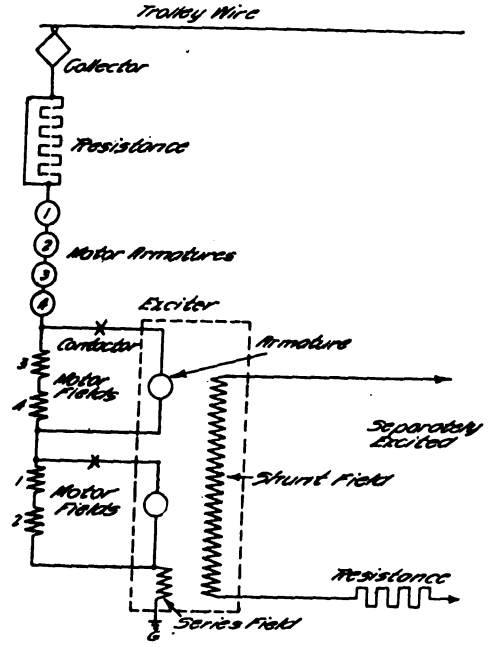
tion motors. The auxiliary lead passes to three disconnecting switches from which separate circuits run to the motor-generator set, the air compressor and the cab heater. For each lead the switch and fuse are mounted on a cradle that disconnects the fuse when the switch is open. A 3000-volt aluminum-cell lightning

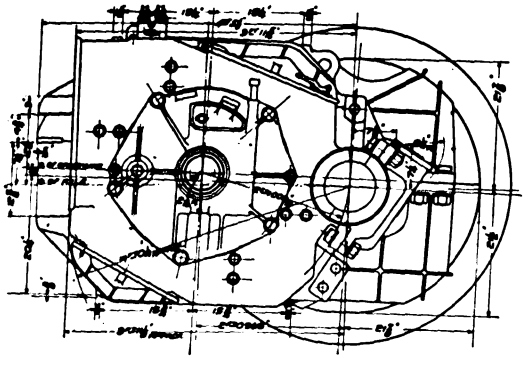


C., M. & ST. P. LOCOMOTIVES—SIMPLIFIED ARRANGEMENT OF CONNECTIONS FOR ELECTRIC BRAKING

arrestor is tapped into the main lead and is mounted on the back of the high tension compartment.

The controlling apparatus which, in general, is of the well-known Sprague-General Electric type "M," is grouped in a sheet-iron compartment located near the center of the cab. At the bottom of this compartment are assembled the starting rheostats, which are of the cast-iron grid type and mounted upon 3000-volt insulators. The rheostats are separated from the equipment groups above them by a horizontal partition, and the bottom of the rheostat compartment is open, ventilation being obtained by six chimneys leading up to ventilators in the cab.

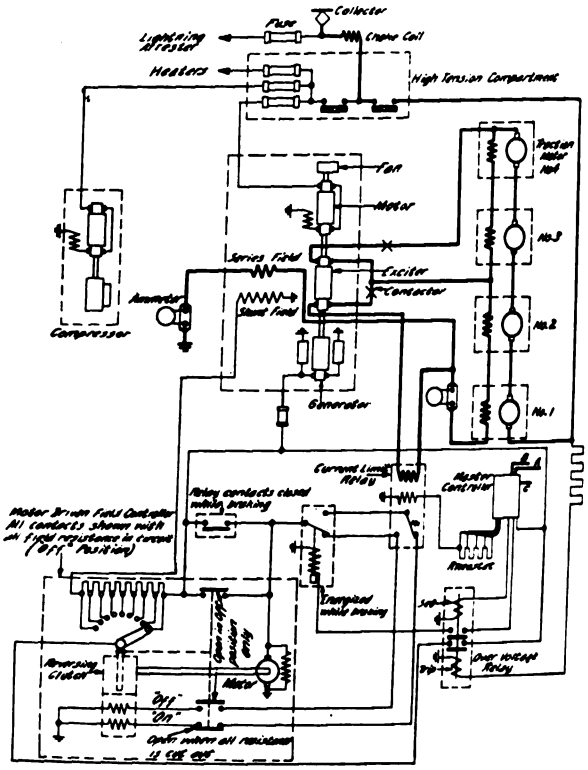
Between the chimneys four control groups are installed, the first of these including the high-voltage dis-



C., M. & ST. P. LOCOMOTIVES—ELEVATION OF MOTOR

connecting switches and starting sets for the motor generator set and compressor, as well as the heater disconnecting switch, a portion of the rheostat and tap field contactors and the translating relays between the motor connections for running and regenerative braking. The second group contains the rheostat contactors, and the third group contains the overload relay and a set of line contactors governed by it. The latter apparatus protects automatically against careless operation on the part of the engineer, the fuse in the high-tension compartment serving as a final protection against short circuit. In the fourth group are contactors that are assembled along and actuated by a compressed-air-driven camshaft, their functions being to series-parallel the traction motors in order to obtain two efficient continuous running speeds. Two handles at the end of this group provide for cutting out either of the two series pairs of motors on each half locomotive, permitting the other pair to be controlled either direct or in multiple unit locomotive operation.

The master controller provides for operating the permanently connected pairs of traction motors in series through sixteen rheostat points, with a seventeenth full series running point, then through eleven rheostat points in parallel and a twelfth full-parallel point. An additional parallel point with the field of the traction



C., M. & ST. P. LOCOMOTIVES—SCHEMATIC DIAGRAM FOR ELECTRIC BRAKING CONNECTIONS

motors shunted is provided on both the freight and passenger locomotives for efficient running at higher speed.

The circuits related to the master control are designed for voltages of 125 or less. This applies also to the circuits for the reverser, since the motor fields are always on the grounded side of the armature, the reverser being operated by an air motor similarly to the series-parallel switch. The shunts and similar apparatus associated with the motor fields are also designed for low voltage. This current at reduced voltage is obtained from a motor-generator set directly connected to the 3000-volt trolley supply. The set consists of a 3000-volt driving motor, a direct-connected fan for ventilating the traction motors, an exciter and a small 125-volt generator. The exciter is used during electric braking to super-excite the traction motor fields, and while not thus employed to recharge storage batteries for lighting in passenger service. The 125-volt generator supplies

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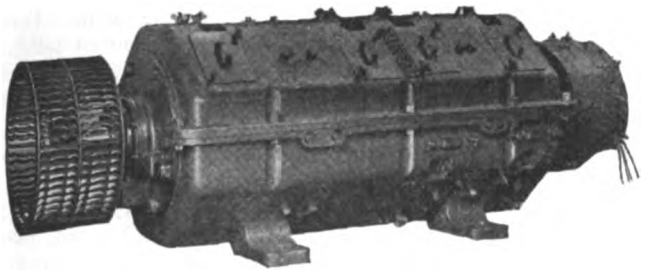
power for the master control circuits, cab lights, headlight and other low-voltage auxiliary circuits.

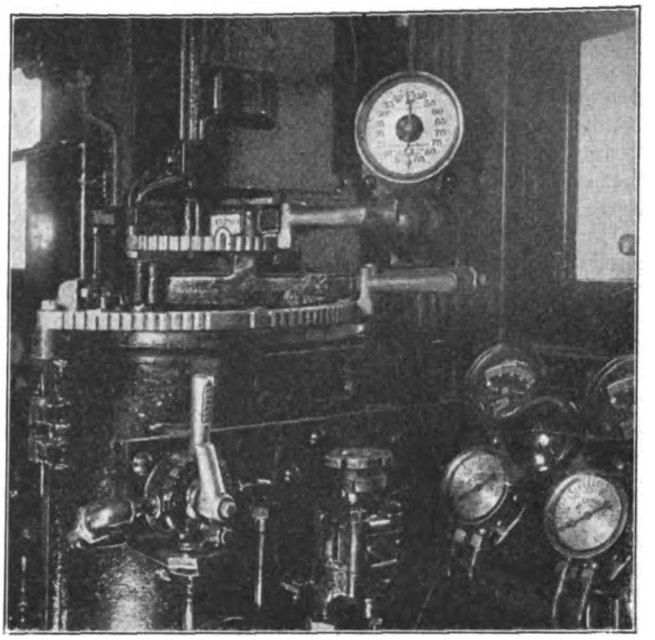
REGENERATIVE ELECTRIC BRAKING

Regenerative electric braking is, doubtless, the most interesting feature of the control equipment. With the simple direct-current motor adopted for the Milwaukee



C., M. & ST. P. LOCOMOTIVES—MOTOR-GENERATOR SET WITH FAN HOUSING REMOVED

locomotives, operation as a motor or a generator depends upon whether the trolley voltage at the locomotive is above or below the voltage at the motor terminals. Hence, when the locomotive descends a grade and is to brake regeneratively, it is necessary only to effect an increase in the voltage across the motor terminals so that power is pumped from the locomotive into the transmission system. The means for thus raising the voltage level of the motor rests in the use of the before-mentioned exciter, which is so connected as to super-excite the traction motor fields. By properly proportioning the design of the exciter for its service, the stable characteristic of the series motor is inherent in the braking connection as in the motor connection. Since the generative function is a reversal of the motor function, the traction motors provide in regeneration that, with an increase in speed, there is an automatic increase in braking effort, and with a decrease in speed there is an automatic decrease in braking effort, a definite torque corresponding always to each particular speed and voltage. The fact that this stable characteristic is closely maintained during regenerative braking is one of the greatest contributing elements to the success of electric braking in this service, because it permits operation down grades at constant speed with but little regulation by the motorman, except as changes in grade or curves produce large variations in the intensity of braking power required.

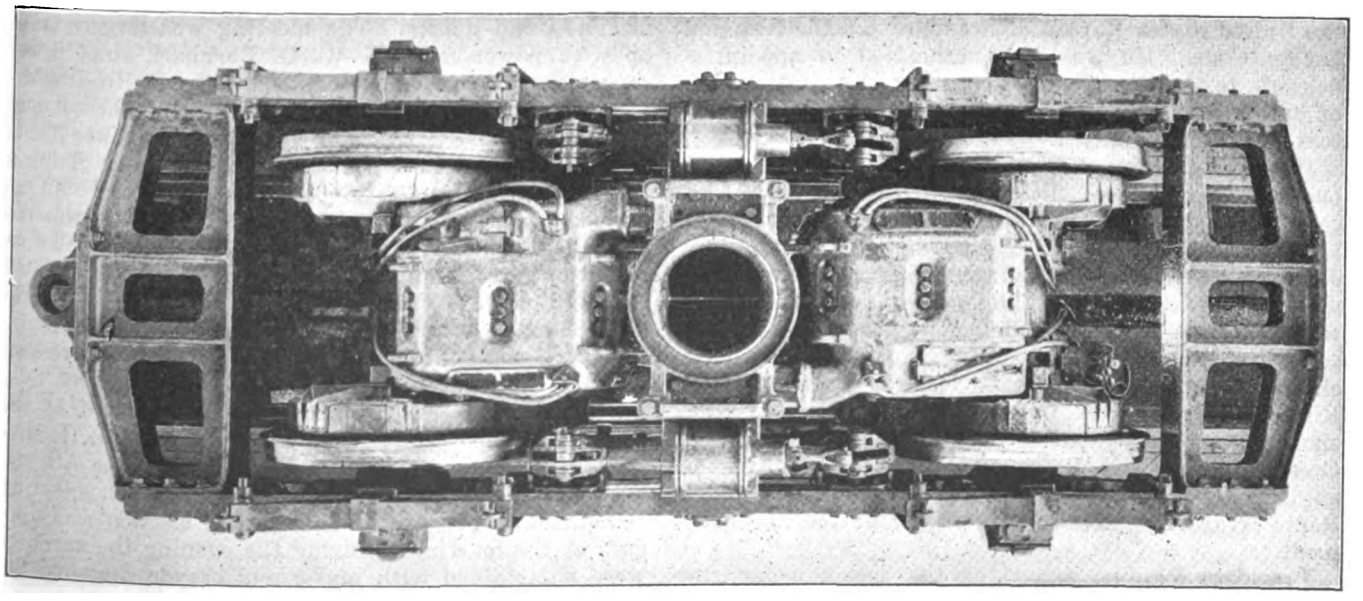


C., M. & ST. P. LOCOMOTIVES—INTERIOR VIEW OF MOTORMAN'S CAB SHOWING CONTROLLER AND ELECTRIC-BRAKING HANDLES AND OPERATING GAGE BOARD

So far as the motorman is concerned the operation is simple. When motoring he varies his tractive effort by changing the resistance in series with his traction motors, thereby limiting the amount of power to be expended in the motors. When braking he merely changes the resistance in the shunt field of his exciter, thereby regulating the increment of voltage above the line, the returned power reacting as a braking effort.

The equipment used in producing this result includes a small controller inverted upon the large master controller, the handle for the former being used for varying the intensity of the retarding torque, which may be accomplished when the motors are running either in full series or full parallel. An illuminated ammeter and gage panel is located directly in front of the motorman. This is provided with a center-zero ammeter for the line, and a field ammeter, which measures the current in the traction motor fields when they are being super-excited during regeneration. Red marks are located on the ammeter scales to show when the continuous capacity of the motor is being exceeded.

The exciter current for strengthening the main motor



C., M. & ST. P. LOCOMOTIVES—TOP VIEW OF DRIVING TRUCK SHOWING VENTILATING AIR INLET IN CENTER PLATE

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fields is controlled by a specially-designed motor-driven controller which is regulated by the braking handle on the master controller. To assist in multiple-unit operation so that the different sets of motors will properly divide the load, a current-limit relay is used in the system of connections between the master controller and the exciter field controller to fix the setting of the latter.

Emphasis may well be laid upon the ease and simplicity of operation of the regenerative system by noting the fact that, during the past year of operation, steam locomotive engineers have been intrusted with the electric locomotives after having but a few days of instruction. In the first days of operation the electric locomotives were even pooled with the steam machines, and an engineer would not know until he was called whether he was to take out an electric locomotive or a steam machine.

Under regeneration the regular operation of the locomotives is not interfered with in any way, electric braking being immediately available at any time. If the speed of the train on any grade reaches a higher point than desired before braking is applied, the electric brake can be put on very slightly and gradually brought up to the point required to slow down the train and hold it at the desired speed. The regenerative control is entirely automatic, and the braking effort is held constant for any definite setting of the braking controller, being entirely independent of changes in trolley voltage, distance from substations or from the nearest locomotive, changing grades, etc. In effect, the locomotive under regeneration acts exactly the same as a portable substation that is moving between the permanent substations but is electrically and physically connected to the substation busbars. The substation generators fix the voltage and the locomotive must generate this voltage plus the voltage drop due to current returning to the substation busbars. If power is fed into another locomotive, the generated voltage is dependent upon the drop in voltage due to the load taken from the substation by the locomotive that is not regenerating. It is possible for one train descending a grade to take a lighter train up the other side of the mountain with all power passing through the substation busbars, but without the delivery of any power from the substation, the generating apparatus merely floating on the line and determining the trolley voltage.

In past years it has always been considered necessary to figure on a larger motor for electric braking than would ordinarily be used, because in this case the motor would be operated continuously, but the internal ventilated type of motor that is installed on the Milwaukee locomotives has such a high continuous capacity that it can be operated continuously at the normal locomotive rating without being overheated. In brief, the advent of the commutating-pole motor, with its greatly increased commutating capacity and its rugged construction, has contributed most largely to the establishment of direct-current regeneration, because the standard commutating-pole motor automatically becomes an excellent generator, when driven by the weight of the locomotive and train on down grades without necessity for adding to the weight of the motor or changing its fields or connections.

American Association News

President Phillips of the Engineering Association Announces the Appointment of Committee Chairmen—Scale of Dues for Manufacturing Members—Meetings of Company Sections in Chicago, New Haven and Milwaukee Were Addressed by Prominent Speakers and Showed Good Attendance

Engineering Association Appoints Committee Chairman

Immediately following the last session of the Engineering Association meeting at Atlantic City, President Phillips called a meeting of the executive committee. Among other items of business the president was authorized to appoint a special committee to confer with the United States Bureau of Standards on the National Safety Code. He was also authorized to appoint a delegate to the Good Roads Congress. A tentative plan of subjects for the consideration of the new committees was also submitted.

President Phillips then announced the appointment of officers of committees as follows: H. H. Adams, Chicago Surface Lines, secretary standards committee; C. H. Clark, Cleveland Railway, chairman way committee; J. W. Welsh, Pittsburgh Railways, chairman power generation committee; C. L. Cadle, New York State Railways, Rochester, N. Y., chairman power distribution committee; E. R. Hill, consulting engineer, New York, chairman committee on heavy electric traction; C. S. Kimball, Washington Railway & Electric Company, chairman committee on buildings and structures; L. P. Crecelius, Cleveland Railway, chairman committee on engineering-accounting, and W. G. Gove, Brooklyn Rapid Transit System, chairman committee on equipment.

President Phillips named as the special committee to confer with the Bureau of Standards: C. L. Cadle, chairman; J. W. Welsh, co-chairman; W. G. Gove, C. S. Kimball and E. R. Hill.

Chicago Elevated Section Inaugurates Educational Talks

The meeting of the Chicago Elevated Railroad Company Section, held recently, was attended by 150 members and guests. The meeting was largely taken up with power matters, W. O. Barnhart, chief power supervisor, being the principal speaker. He first described visits made by the section during the summer to the great Fisk Street and Quarry Street power plants of the Commonwealth Edison Company, later giving a talk on "An Explanation of Electrical Terms." As explained by President H. A. Johnson, the latter was the first of a series of fifteen-minute educational talks on subjects pertaining to the operation of the elevated railroads. These talks are to be followed by general discussions. It was expected that John W. Bunn, Galena Signal Oil Company, would deliver an address on "Signal Oil," but he was obliged to postpone his talk.

Several items of business were disposed of at the meeting, among which were the election of J. H. Mallon, safety engineer, as section delegate to the Atlantic City convention, and the appointment of a nominating committee to prepare a slate for the election which occurs at the meeting. During the evening the members were entertained with music and crayon drawing, the latter to piano accompaniment.

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Scale of Dues for Manufacturing Members

In the report published last week of the new scale of dues for manufacturing members of the association, as adopted at the Atlantic City Convention, the scale quoted by error was that for foreign members of the association. The action taken at Atlantic City was to make dues for manufacturing members uniform with those of railway companies. These dues in both cases are based on gross earnings from electric railway operation or from the business of manufacturing or selling material for electric railways, or from other electric railway operation in the preceding fiscal years of the respective members, and are as follows:

Gross Receipts				Dues Annual
Under	$50,000			$25
Between	50,000	and	$100,000	50
Between	100,000	and	250,000	75
Between	250,000	and	500,000	125
Between	500,000	and	1,000,000	175
Between	1,000,000	and	2,000,000	225
Between	2,000,000	and	3,000,000	275
Between	3,000,000	and	4,000,000	325
Between	4,000,000	and	5,000,000	375
Between	5,000,000	and	6,000,000	425
Between	6,000,000	and	7,000,000	475
Between	7,000,000	and	8,000,000	525
Between	8,000,000	and	9,000,000	575
Between	9,000,000	and	10,000,000	650
Between	10,000,000	and	over	750

Meeting of Connecticut Company Section

At a meeting of the Connecticut Company Section in New Haven, Sept. 19, A. L. Donnelly, assistant engineer of the Connecticut Company, read a paper on the maintenance of way department and its relations with the operating department.

After saying that the work of this department includes the maintenance and construction of track, pavement and bridges, Mr. Donnelly explained that for maintenance of way purposes the 746 miles of the system is divided into three sections, assistant engineers being in charge of each section. There are six engineers in the field and office corps, with two additional men during the summer. The track work is in charge of four roadmasters. The department holds a "roadmaster's meeting" once a month from October to May or June, during which the work done during the past summer and that proposed during the next season is discussed. Pavement repairs are made by the track department, but pavement construction, including reconstruction of old pavement, is let out on contract. Last year $1,149,561 was spent for track and roadway maintenance and construction. The department keeps in close touch with the operating department on all matters of mutual interest. The reading of the paper was accompanied with lantern slides.

After the conclusion of this paper, J. F. Berry of the legal department read a paper on "Some Trial Experiences and Other Observations," after which Col. N. G. Osborn of the *Journal-Courier* gave a talk on "The Obligations Between Electric Railways and the Public."

In the general business meetings P. Ney Wilson, chairman of the committee appointed to investigate snow fighting methods and equipment, said that the report on that subject would be presented at the next meeting of the section.

Standard Schedule for Milwaukee Meetings

The Milwaukee Company Section (Section No. 1) held its first meeting of the season on Sept. 21. This was also the first meeting to be held under the new schedule adopted at the previous council meeting, according to which the plan for future meetings is as follows:

1. The chairman of the program committee will consult with the various heads of departments in regard to the appointment of a man to present a paper on current events in his department. As there are nine departments represented in the company section, this will give material for nine meetings. It was suggested that the first paper be presented from the transportation department.

2. At each meeting there will be an outside speaker when one can be procured to present a subject appropriate for the occasion.

3. At each meeting there will also be an entertainment feature, such as a musical number or short act, between the reading of the two papers.

4. The president will appoint a booster committee with a member from each department to boost the attendance at the meetings.

5. Individual notices will be sent in advance to each member of the regular meetings giving the features to be presented.

At the meeting on Sept. 21, R. H. Pinkley, engineer of way and structures, gave an account of a trip which he had taken through the Far West and told of the points of electric railway interest which he had seen. Slides were used to illustrate the talk. Following this address was a musical number. Harry Wunderlich, supervisor of the transportation department, then gave a talk on the current events in his department, including an account of the methods used to handle the transportation of large masses of people at parks, picnics, places of amusement, etc. When such extra transportation is required, orders are issued in advance to each station as to the number of cars it shall supply and to each supervisor as to just what is expected of him.

The usual review of the technical press, dated Sept. 21, 1916, was also distributed at the meeting.

COMMUNICATIONS

A Few Letters on the Convention Issue

LOS ANGELES RAILWAY
LOS ANGELES, CAL., Oct. 8, 1916.

To the Editors:

I am in receipt of the Convention Section of your journal for Sept. 30. When a person does an extra good thing, I think it due him that he should be told of it. I have been a constant reader of your publication for many years, and I feel that the fraternity will vote your latest effort in convention numbers as being the best and most useful you have brought forth.

E. L. LEWIS, Superintendent.

DALLAS, TEX., Oct. 10, 1916.

To the Editors:

On my return from a "visiting trip" among some of our members in the western part of the state, I found your issue of Sept. 30 on my desk and have spent most of my leisure time since then in reading it. I am not yet through with it and I have put it on my desk among my books of reference where it will be used quite constantly within the next few months, as the jitney has made the "car" the most important question of the moment.

I am, as you know, somewhat of a crank on the subject of the usefulness of the trade and technical journal, and if there is an electric railway official anywhere who cannot obtain at the least a year's subscription value from the perusal of this single number of the JOURNAL, then he is either impermeable to new ideas or his property is so perfect that he ought to tell us all about it.

H. S. COOPER.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Combination Car for City and Interurban Traffic—Recent Tests on Steel Conductors—Labeling Fuses Prevents Accidents—Recent Induction-type Time-limit Relay—Pit Lighting in New Car Shops—Combination Outdoor Metering Set—Other Articles of Practical Interest

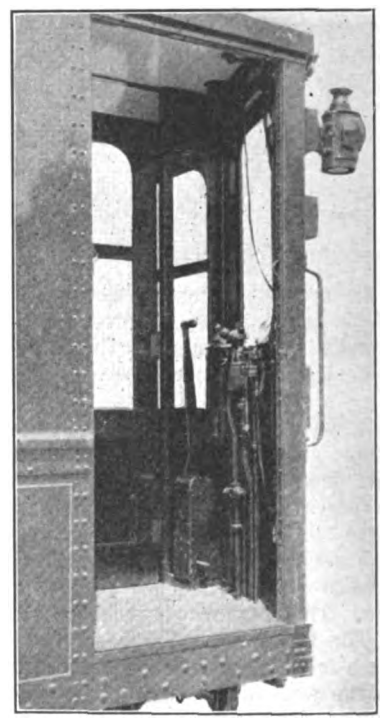
All-Steel Center-Entrance Cars for Interurban Service

This Car Has Been Developed for Service on All Lines, Combining the Virtues of Recent City and Interurban Types

BY H. R. FEHR
President and General Manager Lehigh Valley Transit Company, Allentown, Pa.

The Lehigh Valley Transit Company operates 215 miles of electric railway in eastern Pennsylvania, located mainly in the counties of Lehigh and Northampton, and serving Allentown, Slatington, Easton, Bethlehem and South Bethlehem, together with numerous other towns and boroughs. Connections are made on the north with the Delaware Water Gap, and on the south cars are operated directly into Philadelphia. The cement and slate industries of this section are far-famed, and the great works of the Bethlehem Steel Company at South Bethlehem stand foremost among the large and varied manufacturing plants located on its lines.

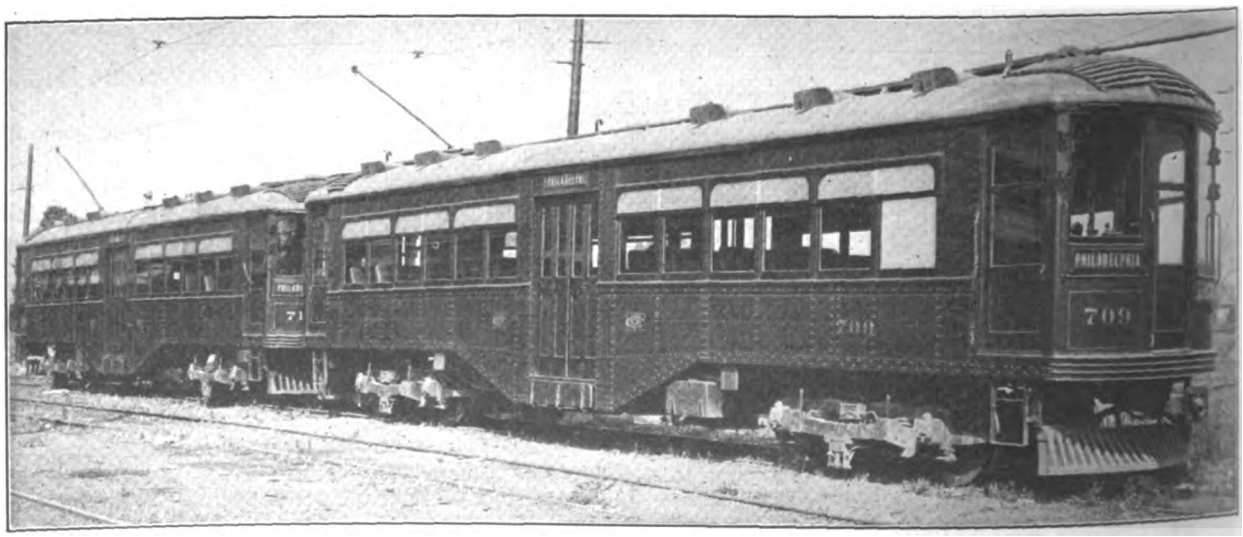
At the beginning of the year it was decided to purchase additional passenger equipment to meet the rapidly increasing business, and it appeared advisable to design a car which could be used equally well either in local or interurban service. Heretofore the interurban cars used between Allentown and Philadelphia, a distance of 55½ miles, weighed 41 tons, whereas the city cars weighed 26 tons, so that each type was limited to its own special service. Therefore, a detailed study was made of all existing conditions, such as clearances, grades, schedules, etc., and future needs were estimated as far as possible, with the result that plans and specifications were drawn up by superintendent of equipment Harry Branson and the writer for a universal car of the double-end, all-steel, center-entrance type, adapted for operation on all lines equally well, and weighing complete 34½ tons. From Norristown to Sixty-ninth Street Terminal, Philadelphia, a distance of 13½ miles, the Lehigh Valley Transit cars operate over the tracks of the Philadelphia & Western Railway, so have to be equipped for third rail operation. For current collection over the remainder of the line they are equipped with Miller trolley shoes and the usual trolley poles.



MOTORMAN'S CAB SHOWING BRAKE AND CONTROL APPARATUS

Twelve cars were ordered from the Southern Car Company and these were received and placed in operation early in September. They met with the instant approval of the public and the trainmen, and have more than justified the original expectations of the management.

The cars are mounted on Brill M.C.B.-2X trucks, with 36-in. rolled steel wheels, with a 3½-in. tread, and equipped with Westinghouse 547-A motors, with ALM control, and Westinghouse straight and automatic air brakes, Schedule A. M. M. Safety and comfort were not sacrificed in



A TWO-CAR LIMITED TRAIN ON THE LIBERTY-BELL ROUTE OF THE LEHIGH VALLEY RAPID TRANSIT COMPANY

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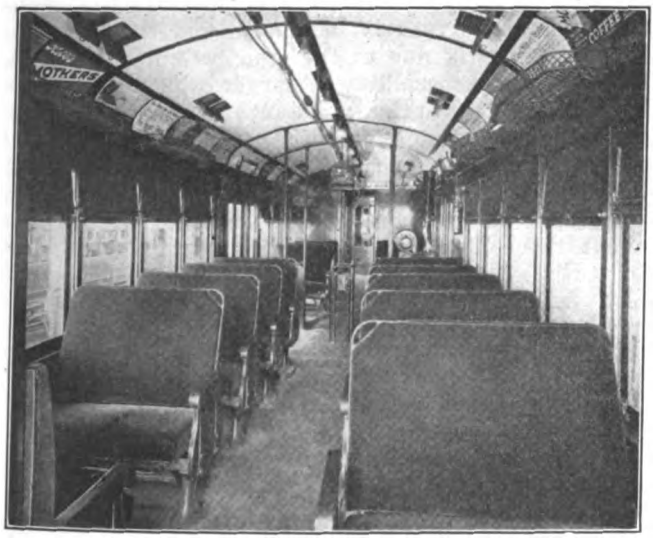
favor of weight in the design of these cars, as is so often the case, and the easy riding qualities of these cars are worthy of mention.

The general dimensions of these cars are as follows:

Length over bumpers	50 ft.
Width over all	8 ft. 10½ in.
Width of aisle	23¾ in.
Height from rail to top trolley base	12 ft. 6 in.
Truck centers	29 ft. 6 in.
Diameter of wheels	36 in.
Wheelbase of trucks	6 ft. 6 in.
Step heights:	
Rail to top of first step	15½ in.
First step to second step	13½ in.
Second step to floor	11⅞ in.
Entrance width in the clear	4 ft.
Ramp of floor from bolster to center	5 in.
Seating capacity	60
Weight	69,200 lb
Weight per seated passenger	1,153 lb

The miscellaneous equipment includes Tomlinson couplers, Rico anti-climbers, Edwards sash fixtures, Curtain Supply Company's curtains, Automatic ventilators, Horne double acting hand brakes, Western Electric push buttons and buzzer system, Ohmer registers, National Pneumatic Company's manual door devices, and Keystone illuminated signs.

The car body is all steel, with arch roof, steel tee posts, and with pan floor construction, of No. 18 gage sheet steel, divided to meet cross and longitudinal members. On the steel floor are laid ⅞-in. maple, 1-in. cork and 5/16-in. linoleum, the only other wood besides the floor reinforcements, being in the sash, doors and in-



VIEW SHOWING INTERIOR ARRANGEMENT ON CARS OF LEHIGH VALLEY TRANSIT COMPANY

side ceiling trim. The use of cork, linoleum and agasote will insure warmth in winter and coolness in summer.

The interior of the car is constructed on the most sanitary lines, and with the elimination of all dust collecting pockets. The side windows raise 52 in. above the floor line, so as not to obstruct the view and at the same time giving ample ventilation in warm weather. The lighting system is of the center type. Heat is furnished by a Cooper B-5 forced ventilation hot air heater in conjunction with Consolidated electric heaters. On each end the motorman's compartment is placed at the right of the car, thereby giving an extended view through the observation windows to the passengers, who have not hesitated to express their approval of this feature. In one end of the car is a large smoking compartment seating thirteen, with Hale & Kilburn latest type "Walkover" seats with embossed pressed steel arm rests and Chase leather finish. The cross seats in the balance of the car are of the "Walkover" type, finished in green plush. In the center of the car are four longitudinal seats, and there are three folding seats and one stationary seat at each end.

In the opposite end of the car, from the smoking section and just behind the motorman's compartment, is located a toilet room, finished in white enamel and completely equipped according to the most modern practice. Drinking water and paper cups are also provided.

In laying out the various pieces of apparatus underneath the car floor special attention was paid to its location in order to obtain an equal distribution of weight according to center pin and side loads, thereby eliminating all vibration and the hammer blows due to unequalization. Particular care was devoted also to the inspection and renewal of all parts.

Although there is considerable difference of opinion regarding the merits of the center-entrance car as compared with the end-entrance type, the Lehigh Valley Transit Company believes it is a question to be solved by the public and the local conditions of operation. The attitude of its patrons, therefore, toward this new type of car will be noted carefully by the management, and will be of considerable influence in determining the design of future equipment.

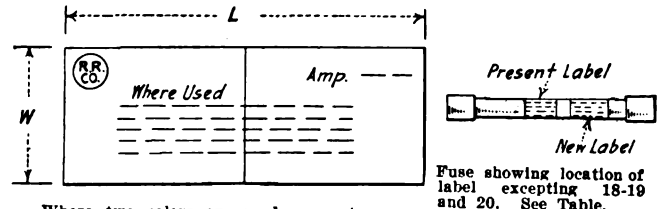
Labeling Fuses Conduces to Safety

Additional Fuse Labels Guarantee Proper Capacity Fuses in All Circuits

BY E. D. RANSOM, B.E.

As a result of certain accidents which occurred on a large street railway system, an investigation showed the cause to be due to fuses of improper capacities in the air compressor circuit. On one occasion a motorman placed a 1-amp. fuse in this circuit where one of 8-amp. capacity should have been used. As the 1-amp. fuse did not have sufficient capacity for the circuit, it "blew," unknown to the motorman. Although sufficient air remained in the main reservoir for a few service applications there was not enough air to make a quick stop, and an accident resulted.

To all external appearances the 1-amp. and 8-amp. fuses are the same with the exception of the capacity label. Where twenty-two different fuses are used in the numerous circuits and types of equipment, the average motorman can not be expected to remember the



Where two colors are used, separate on center line.
Paper label—Gummed on one side.
Note:—Paper to be of good quality and to receive two coats of fish glue gum. Labels 18-19 and 20 to be placed on fuse opposite manufacturers label.

Fuse showing location of label excepting 18-19 and 20. See Table.

PAPER LABEL AND FUSE SHOWING LOCATION OF OLD AND NEW LABEL

correct capacity for each circuit. This also applies to line inspectors, maintenance men and any others who must handle or replace fuses.

The accompanying drawing is of a label which is now placed on all fuses used in car circuits. The table on page 898 shows the fuses of different capacities tabulated by number, color and size of label and the location in which each is used. For example, the 15-amp. fuse bears label No. 8. It is pink in color and is inscribed to show that it can be used in No. 1 heater circuits of ele-

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FUSES TABULATED BY NUMBER, COLOR AND SIZE OF LABEL

Label No.	Amperes	Where Used	L, In.	W, In.	Color
1	1	Signal bell, buzzer and door, center-entrance car; light-elevated, subway and surface cars.	1⅛	¾	White
2	2	Register, center-entrance cars.	1⅛	¾	Blue.
3	5	Fan motor, center-entrance cars; arc light trolley, elevated cars.	1⅛	¾	Light green.
4	5—Special	Battery, elevated cars.	1⅛	¾	Green.
5	8	Pump, No. 1 heater, surface cars.	1⅛	¾	Red.
6	10	Controller relay, center-entrance cars; arc light ground, elevated cars.	1⅛	¾	Yellow.
7	10—Special	Pump, elevated cars.	1⅛	1	Red.
8	15	No. 1 heater, elevated cars; No. 2 heater, surface cars; pump, subway cars.	1⅛	1	Pink.
9	15—Special	Heater, B. O. cars.	1⅛	1	White and red.
10	25	No. 2 heater, elevated; all heaters, subway cars.	1⅛	1	White and green.
11	30	Main heater, center-entrance cars.	1⅛	1	White and blue.
12	35—Special	Heat and light line, elevated trailers.	1⅛	1	Green and yellow.
13	50	Auxiliary, center-entrance cars; heat and light line, elevated motor cars.	1⅛	1	White and brown.
14	150	Main motor, S. T. surface cars.	1⅛	1	White and pink.
15	225	Main motor K-11 controller, surface cars.	1½	1	Red and blue.
16	250	Main motor K-28-L controller, surface cars.	1½	1	Red and green.
17	300	Main motor, convertible surface cars.	1½	1	Red and yellow.
18	15	Emergency lights and compressor control, subway cars.	1½	¾	Red and pink.
19	20	Control, subway cars.	1½	¾	Blue and pink.
20	5	Buzzer, door magnets, empty and load brake and speed control, subway cars.	1⅛	¾	Blue and yellow.
21	3	Speed control, A. C. subway cars.	1⅛	1	Blue and green.
22	75	Main auxiliary, subway cars.	1½	1	Green and pink.

vated cars, in No. 2 heater circuits of surface cars or in compressor circuits of subway cars. The drawing shows the location of the label on the fuse, the method of attaching and instructions as to the division of coloring.

When fuses are ordered, this information is furnished the manufacturer, who properly labels all fuses before delivery. By the use of these labels the proper capacity fuse is insured in its respective circuit by any one who can read, regardless of his knowledge as to the proper capacity fuse required. In addition fuses are sorted and stored easily as it is not necessary to stop and read the capacity label.

Steel Conductors for Transmission Lines

Electrical Distribution Properties Include Low Cost and High Strength

Tests of the electrical properties of steel wires and cables used as conductors of alternating current show attractive possibilities from both commercial and engineering points of view for the use of steel instead of copper in certain classes of work. This statement and supplementary opinions were voiced by H. B. Dwight, Canadian Westinghouse Company, Ltd., Hamilton, Ontario, in a paper on the subject presented at the joint session of the Association of Iron & Steel Electrical Engineers with the American Institute of Electrical Engineers, held in Chicago recently. Mr. Dwight pointed out the advisability of making complete tests of American grades of steel so that transmission-line engineers may be able to learn more fully the characteristics of steel conductors and thus be better able to decide where the use of steel will prove economical and advisable.

The resistance of an iron or steel conductor is considerably greater for alternating current than for direct current. This is partly due to the skin effect, that is, the crowding of the alternating current to the outside parts of the conductor by the alternating magnetic flux in the conductor, and partly to hysteresis caused by the alternating magnetic flux in the steel. In copper or aluminum conductors of the usual size the skin effect increases the effective resistance only 1 or 2 per cent and so is practically negligible. But in steel or iron conductors the flux has a magnetic path and so attains a value of from twenty to several hundred times as great as in a non-magnetic conductor. The result is that the skin effect is very pronounced and the effective resistance is increased by a large amount, in some cases 100 or 200 per cent or more. However, tests indicate that if the strands are moderately fine and are properly put together, the increase of resistance at 25 or 60 cycles may be kept down to a reasonably small percentage. Curves published by the *Elektrotechnische Zeitschrift*, and conclusions stated in Bulletin No. 252 of the U. S. Bureau of Standards regarding the quality of iron or steel to be used, set forth that of the wire tested, the grade with the highest resistance to direct current had the lowest resistance to alternating current, and was also the least expensive.

A large part of the magnetization is caused by the spiraling of the wires in a cable, and if the spiraling of the different groups of wires is properly reversed, the increase in effective resistance can be reduced as much as one-half. The pitch of the spiral should be as long as possible without endangering the strength of the cable.

Another point brought out that should be of particular interest to electric railway distribution engineers and manufacturers of line materials is that the iron and steel conductors have the peculiar property that the effective resistance and reactance increase to a maximum as the current is increased, and then decrease. This is evidently due to the iron becoming saturated. In most cases, especially with larger cables, the decrease is very slow and the resistance maintains approximately its maximum value for most large values of current. This property should prove useful in transmission-line work, for the conductor will have a low impedance to the normal load current but will have about twice as much impedance to the current flowing in the case of a short-circuit. The impedance will also be large to high-frequency surges caused by switching or lightning. Mr. Dwight also points out that it may prove more economical in certain cases to protect the line against short-circuits and surges by using steel conductors than by installing current-limiting reactors, or by increasing the reactance of the transformers. This property also may be of use in the case of feeders of direct-current interurban systems. If the feeder is a steel cable it will have low resistance to direct current, but high impedance to alternating current. It will, therefore, tend to damp out the suddenness of short-circuits and lightning surges which cause synchronous converters and generators to flash over. If the feeder is of steel, and especially if the stranding is coarse, the required protection will be still more complete.

Steel conductors would probably be economical only where it is allowable to use bare cables, for the large size of steel cables compared with copper cables would greatly increase the cost of the insulating covering. The higher conductivity of steel for direct current than for alternating current makes the use of bare steel cables for d.c. feeders more economical than for a.c. lines. A steel cable has about eight times as much resistance to direct current as copper cable of the same size, and, therefore, seven times as much resistance as the copper cable of the same weight, since copper is more dense than steel. But galvanized steel cables usually cost less than one-seventh as much as copper cables per pound, and so should be more economical, other things being equal.

These statements of Mr. Dwight should command

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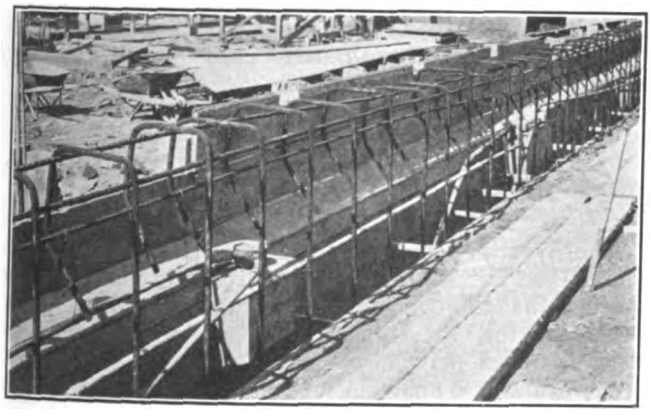
the interest of the distribution engineers on the large group of interurban railways in the Central and Western States. Most of these roads are selling energy from the railway transmission lines for distribution and use in commercial and industrial power and lighting work. With small loads a line with small conductors can be built of steel more cheaply than when minimum size copper is employed. An example is cited of a seven mile line designed for 75 k.v.a., 60 cycles, using a seven wire steel cable with a resistance of 17.6 ohms per mile at full load. The smallest copper line that could be designed would be rated at 750 k.v.a., 11,000 volts being the transmission voltage. While the poles and insulators for this line would be the same in both cases, the steel conductor would cost only $220 against a cost of $2,600 for copper. It is this large difference in cost which has been the main reason for using steel conductors on the branch lines of some of the big power distribution systems. This difference in cost is greatest when the price of copper is highest.

Steel cables have the added advantage of being mechanically stronger and less liable to be burned through arcs. Their useful life is much shorter than that of copper cables and their scrap value practically nothing. The price of copper cable per pound may be assumed as being ten times that of galvanized steel cable. This ratio is the usual one, being approximately true for times of low price of metals as well as for high times, and the use of steel will always increase the reliability of the transmission system.

Installing Pit Lighting Conduit

At the Hooker Street shops of the Springfield (Mass.) Street Railway, now under construction, conduit for pit lighting service is installed in horizontal runs as shown in the accompanying illustration, alternate recesses in



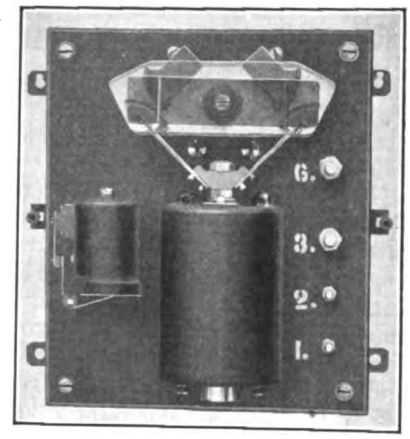
HORIZONTAL RUN, SHOWING CONDUIT AND JUNCTION BOX INSTALLED FOR PIT LIGHTING

the pit walls being equipped with single and double outlets. The pit walls are about 8½ in. thick and are reinforced with ½-in. rods which are tied to the conduit pipes by iron wire at alternate vertical supports. Junction boxes located at the ends of the conduit runs are mounted at the top of wooden form boxes as shown, the concrete being poured around the rods and boxes so as to cover the junctions. The form boxes are removed after the setting of the concrete takes place, leaving the pit outlet recesses open and ready for pulling the wire. Pit recesses equipped with single outlets are 12 in. x 7½ in. x 10 in. x 5 in. in size, and these outlets are provided for drop light service by the use of flexible cords. The recesses containing two outlets each are designed to accommodate pit lamps of the fixed type, and are about double the length of the single recesses.

A New Forced-Ventilation Electric Heater

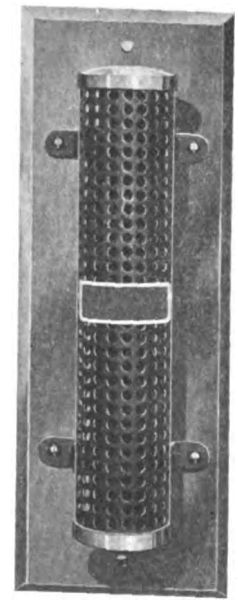
Light Weight Heater Fits Snugly Under End Car Seat, Utilizing Space Otherwise Unoccupied

An electric heater built on the same plan as the coal-burning type of forced ventilation heater manufactured by the Peter Smith Heater Company of Detroit, Mich., has now been perfected and put on the market. The assembled standard outfit consists of a transite lined sheet-steel cabinet containing nine heater coils, a motor resistor and heat fuses assembled between the fresh air receiving chamber and the hot air mixing chamber, and all attached to the motor-driven blower. This arrangement of the elements in the heater gives an air distribution which heats all the coils practically to the same temperature. The heat is distributed through the car by a duct system similar to that employed with the forced ventilation coal heaters manufactured by this company. Fresh air is taken from the outside or the inside of the car as desired, and forced over the heating elements. The standard equipment will deliver from 300 cu. ft. to 500 cu. ft. of air along the floor line. This will heat a cold car starting from depots or layover points in approximately ten minutes. It requires a space 13 in. high, 18 in. wide and 3 ft. long, and exclusive of the duct system weighs 138 lb.



AUTOMATIC SWITCH WITH CASE REMOVED

The heating element consists of resistance wire wound on porcelain spools complete within themselves. These spools make contact automatically when slid into place between two porcelain cheeks which contain the spring connections that make the contact between the coils and the line. The spools are interchangeable, and to remove any or all of them it is only necessary to take off the heat fuse plate, requiring less effort than to replace an ordinary inclosed fuse.



VIEW OF THERMOSTAT

The heater wire proper is a high-grade, non-corrosive alloy which has a temperature coefficient of nearly zero. Such sizes of wire are chosen that the temperature under normal operating conditions never rises above 600 deg. Fahr. Under these conditions the wire attains only 33 1/3 per cent of the allowable temperature at which it could be worked indefinitely. In order to meet the underwriters' requirements provision is made for breaking the heater circuit by heat fuses when the air supply fails. Under normal operating conditions these heat fuses carry the current for which they are intended, but will fuse and cut off the current when the

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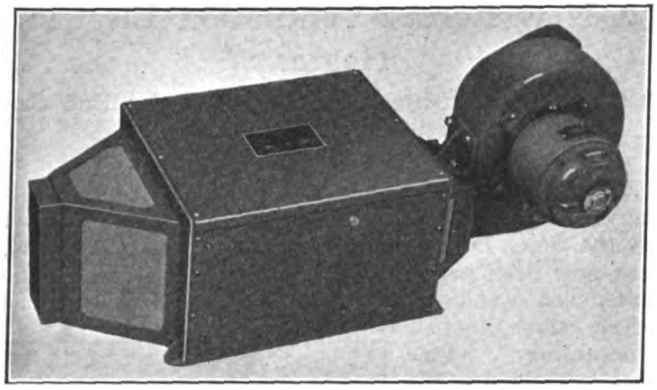


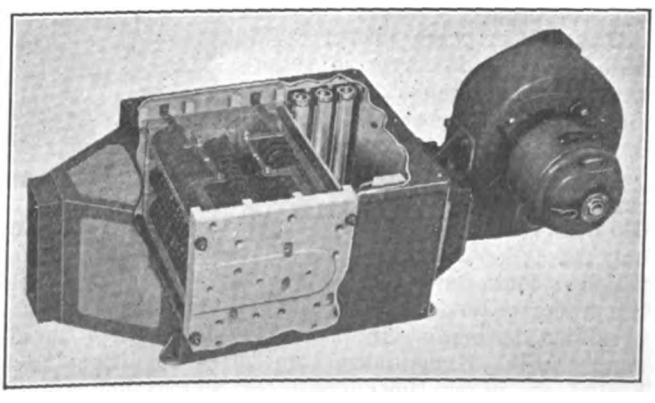
VIEW OF HEATER ASSEMBLED

draft of air is insufficient to keep the temperature below 800 deg. Fahr.

The blower used with this heating equipment is of the multivane type and the fan is built of a number of concave blades mounted like the buckets in a turbine engine. This type of blower is very efficient, as is indicated by the fact that it is but one-half the size, two-thirds the weight and delivers 20 per cent more air than its equivalent in the blade type of fan. The blower has sufficient capacity to furnish from 300 cu. ft. to 500 cu. ft. of fresh air per minute, depending upon the size of the heater and the speed of the fan. The motor which drives this fan was designed especially for this forced ventilation electric heater, and it is both light in weight and as small in size as consistent with good practice. The motor is entirely inclosed to make it dustproof, and a hinged cover is provided over the commutator to make access easy to the brushes and for inspection.

All of the heater motors are insulated to stand a 1200-volt a.c. potential test for a period of three minutes, and they require but little attention, it being necessary to inspect them about once a week during the heating season. The standard heater is equipped with a motor requiring a ½ amp., and the drop across the terminals is 350 volts when the speed of the motor is 2300 r.p.m.

Suitable resistance is connected in series with the motor to form a part of the control circuit and, as mentioned in the beginning of the article, this is mounted in the heater cabinet so that the heat dissipated is not lost. The standard heater outfit may be arranged for any size of car by simply changing the heating elements and the speed of the fan. The capacity of the heater ranges from 12 amp. to 36 amp., or from 7.5 kw. to 22 kw. The over-all dimensions of the standard heater equipment were so selected that it could be installed under the end car seat and utilize space otherwise unoccupied.



VIEW OF HEATER AND PARTS

The coils are arranged in two sections so that they may be controlled manually or through an automatic switch. One group of coils is of such capacity that it will raise the temperature of the ventilating air 70 deg. Fahr. above the outside air, while the total capacity of the sections will raise the temperature 145 deg. Fahr., depending upon the amount of air delivered by the blower.

The automatic control equipment includes an automatic switch and a thermostat. The switch consists of two solenoids, which close the main and auxiliary heater circuits, installed in conjunction with a small relay which is in the thermostat circuit. When the car has reached the predetermined temperature this relay short-circuits the main solenoid which, in releasing, opens the main heater circuit. Line voltage fluctuation was taken into account in the design of these solenoids and magnets as well as the whole heater apparatus. In fact, actual service experience has demonstrated that the apparatus will work satisfactorily when the drop in voltage from normal is 50 per cent, and it will not overheat at 25 per cent rise above normal.

The thermostat used in connection with this forced draft electric heater equipment is of the mercury column contact type, but of special design. Both the difference of the potential and the current employed in the operation of the thermometer is so low that it is in no way destructive to the mercury. Regarding the special construction of this thermometer it may be said that while any thermometer with a wire contact might seem sufficient to control car heating equipment, yet the mercury column bore is accurate to 1/10,000 in., hence the placement of the contact wire in the mercury column and the shape of the wire at the point of contact frequently means the success or failure of the control equipment. To obviate any difficulty which might arise from these sources the thermometers in the automatic control have been very carefully manufactured, and are said to cost about five times as much as the thermometers ordinarily used in thermostatic control.

Convenient Outdoor Metering Equipment

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently placed on the market the outdoor metering equipment shown in an accompanying illustration. Each equipment consists of a standard polyphase watt-hour meter, two current transformers, a polyphase voltage transformer, and three choke coils, all inclosed in a sheet steel case with a cast-iron cover supporting three high-tension outdoor-type terminals.

This device has been developed to be used in 60-cycle polyphase service for voltage ratings from 11,000 volts upward and for current ratings not exceeding 200 amp. The sheet steel case is subdivided into two compartments, one of which is filled with oil, in which the transformers and choke coils are immersed, while the other serves to inclose the meter and meter panel. On this panel are also mounted two fuses to protect the voltage circuit of the meter and two calibrating links located in the current circuit of the meter. These calibrating links consist of fuse clips with a brass tube inserted instead of fuses. The meter may be read or checked upon opening the hinged door which covers the entire front of the meter compartment. The arrangement is such that the entire outfit, including meter panel, can be raised out of the tank without disconnecting the meter leads.

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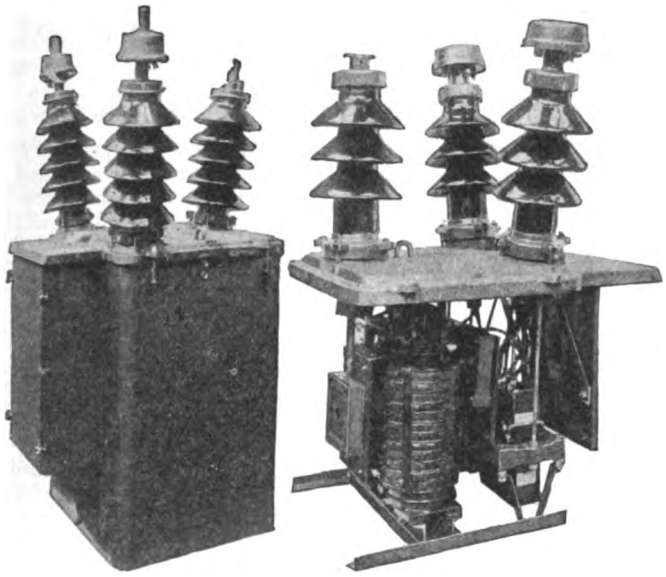
Three primary outlet terminals provide the necessary primary connections, one of the terminals serving as the common connection of the voltage transformer windings, while each of the other two terminals provide connection for one current transformer and one end of one of the voltage transformer windings.

The current transformers each have two primary windings which may be connected in series or in parallel by connecting links in the weatherproof cap at the top of the outlet terminals. The polyphase voltage transformer consists of a three-phase core having windings on the two outer legs only, and is therefore equivalent to two single-phase voltage transformers connected in open delta. Choke coils are inserted between the voltage transformer windings and the outgoing leads to protect the transformer windings against high-frequency disturbances.



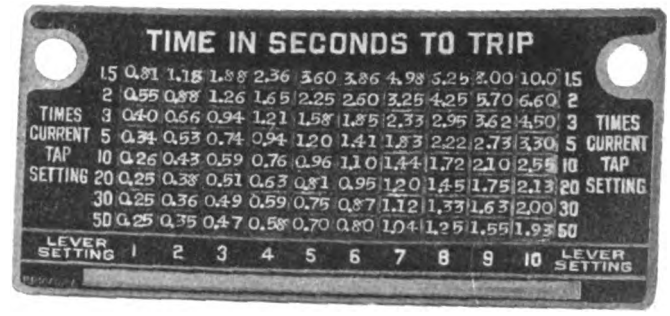
VIEWS OF OUTDOOR METERING EQUIPMENT WITH CASE REMOVED AND WITH CASE INCLOSED

Induction Relay for Selective Overload Protection

An induction-type, time-limit, overload relay which is particularly applicable to those systems where extreme accuracy in timing is required for tripping two or more air or oil circuit breakers selectively has just been placed on the market by the General Electric Company, Schenectady, N. Y.

The operating or characteristic curves for the various time-current settings are entirely separate and distinct at even the heaviest overloads and never become instantaneous. This is because of the inherent characteristics of the relay which produce a curve consisting of an inverse time portion up to approximately 2000 per cent of minimum contact closing current, blended into a definite time portion with a slight downward slope. Consequently, the relay will do the work ordinarily required of both inverse and definite time-limit relays. According to the claims of the maker the heaviest overloads do not disturb the form of the curve nor cause vibration or chattering of the moving parts.

The relay is made in single-pole elements, is circuit closing, and operates with a time delay which is inverse for the lower current values and which approaches a definite minimum for the higher current values. It is designed for use in the secondary of current transformers, the normal load rating being 5 amp. However, by means of the current tap plate, the relay may be set



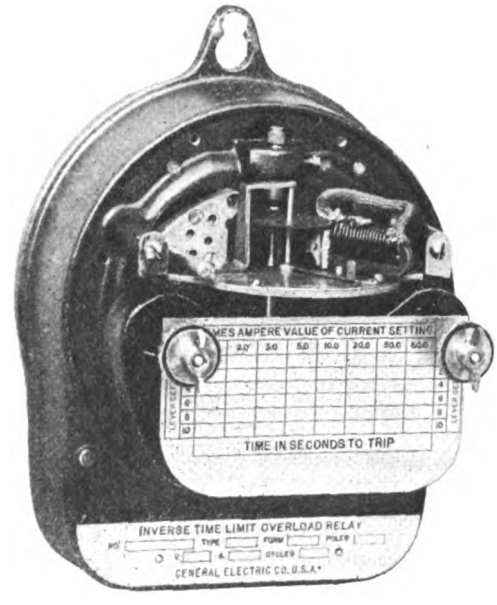
INDEX PLATE WITH TIME DELAY FIGURES

for 4, 5, 6, 8 and 10 amp., positive operation being obtained throughout this range.

The contacts are closed on overload by the rotation of a disk actuated by a "U"-shaped driving magnet with shading coils on the pole pieces. No tripping current is carried through the revolving parts. When the contacts have been closed they are firmly held in that position until tripping occurs, by the armature of a holding coil connected in series with the contacts, the trip coil of the air or oil break circuit breaker and an auxiliary switch which opens when the breaker is tripped. This insures current on the trip coil continuously until the circuit breaker opens, and prevents flashing at the relay contacts.

The values given in vertical columns 1 to 10 on the index plate are the time delays which will be obtained at the different degrees of overload, represented in the "Times Current Tap Setting" columns at the extreme right and left sides of the index plate. The factors appearing in the "Times Current Tap Setting" columns, when multiplied by the current tap setting, represent actual secondary current values.

The contacts, which are made of a special non-corrosive metal, are designed for use on direct current.



TIME LIMIT OVERLOAD RELAY WITH COVER REMOVED

They will carry 18 amp. momentarily without damage to the contact surfaces. A thermostatic device within the relay compensates for any variations in room temperature.

This relay is being furnished in two styles, one for 25-cycle and one for 60-cycle circuits. Although the principle of operation and the inherent characteristics are the same in both relays, the relays themselves differ only in slight details of construction.

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NEWS OF ELECTRIC RAILWAYS

MINNEAPOLIS VALUATION FIGURES PRESENTED

City Engineer Presents Figures in Connection with Franchise Renewal

City Engineer F. W. Cappelen, in a report to the City Council of Minneapolis, Minn., says that a "fair valuation" of the Minneapolis Street Railway is $25,914,308. This is the physical value, the report says, together with capital invested in the development of the property and present commercial value of water power leases. It does not include value of franchise or good will. The report was ordered as a basis for franchise renewal negotiations.

Mr. Cappelen has also submitted an inventory of various items which he did not include in his valuation figures. In the valuation estimate $21,152,221 represents cost to reproduce, less depreciation. In the secondary inventory this item, as cost to produce physical property new, without depreciation, is given as $22,432,073. This secondary estimate also includes value of leased steam station property, valuation of the downtown terminal block owned by a subsidiary of the company, and the cost to reproduce physical property that is in the 5-cent-fare district but outside the city. The total arrived at in this secondary inventory is $28,789,085. This is the table presented by Mr. Cappelen in his first valuation estimate:

Summary of values as of Jan. 1, 1916:	
Present value of physical property, being cost to reproduce new less depreciation, table No. 1	$21,152,221
Capital invested in the development of the property, being the fair going concern value, table No. 2	4,270,230
Total capital invested in the property	$25,422,451
Present commercial value of waterpower leases to July 1, 1923	491,857
Fair value of the property	$25,914,308

The secondary estimate contains these items:

Value of all items inventoried and valued:	
Cost to reproduce physical property new, table No. 1	$22,432,073
Capital invested in the development of the property, table No. 2	4,270,230
Present commercial value of waterpower leases to July 1, 1923	491,857
Value of lease of steam property, table No. 3	140,000
Value of terminal block, table No. 3	1,300,000
Total inside city of Minneapolis	$28,634,160
Cost to reproduce physical property new in 5-cent fare district outside of city, comprising the Columbia Heights and Fort Snelling lines	154,925
Total	$28,789,085

The part of the report wherein is shown the difference between existing value as of Jan. 1, 1916, and the cost of reproduction, as of Jan. 1, 1916, follows:

Item	Cost to reproduce new	Present value
Grading	$13,948	$13,948
Track	4,092,658	3,732,098
Bridges	126,427	126,309
Paving	2,221,029	1,906,208
Electrical distribution system	2,038,675	1,965,434
Rolling stock	4,649,318	4,356,184
Power plant equipment	2,339,603	2,190,007
Substation equipment	549,886	549,886
Buildings	1,504,915	1,451,524
Furniture and fixtures	66,003	57,885
Stores, tools and miscellaneous equipment	700,368	673,497
Real estate	1,088,862	1,088,862
Expenditures due to municipal improvements and real estate dedicated to city	254,206	254,206
Administration, organization and legal expense	329,420	329,420
Taxes during construction period	325,194	325,194
Interest during construction period	2,131,554	2,131,554
Total	$22,432,072	$21,152,221

In commenting on the physical value estimated Mr. Cappelen in his report says:

"All prices on material, apparatus and equipment used in the valuation are the average normal market prices during the five years from 1911 to 1915 or the ten years from 1906 to 1915 as quoted by the manufacturers of each class of material, apparatus and equipment so as to eliminate the abnormally high prices prevailing at the present time due to industrial and war conditions. For illustration, the present market price of copper wire is 100 per cent more per pound than the price used in the valuation; also the present market for high T rail is about 15 per cent more per ton than the price used in the valuation."

NEW CARHOUSES AND SHOPS FOR LOS ANGELES

The Pacific Electric Railway, Los Angeles, Cal., has sold a considerable part of its twenty-acre tract at Seventh and Central Avenues, that city, to the Wholesale Union Terminal Company. This, added to the other land acquired, will give the Union Terminal Company approximately twenty acres on which to construct its buildings and tracks. The Pacific Electric Railway will change the location of its carhouses and tracks now occupying the ground sold. A new carhouse will be constructed in the eastern part of Los Angeles, near Echandia Junction. A similar carhouse will be constructed at Watts. The necessary land is all acquired. In the new buildings recreation rooms will be provided for employees. The cost of the new carhouses will be approximately $120,000, to which value of real estate is to be added to represent the total investment. The shops of the Pacific Electric Railway will be removed from the location adjoining the Union Terminal property to Torrance, in accordance with arrangements made some time ago. The investment will be several hundred thousand dollars.

TENTATIVE TOLEDO DRAFT SUBMITTED

Johnson Thurston, president of the Street Railway Commission of Toledo, Ohio, and Ralph Emery, its general counsel, presented a tentative draft of a street railway ordinance to that body on Oct. 12. They have been working on the ordinance since July 25, when the commission held its last meeting. It suggests two plans in case the city wishes to take over the property from the Community Traction Company, to which the Toledo Railways & Light Company is to sell its property other than its lighting and power equipment, in case a satisfactory agreement is reached.

One plan contemplates an outright purchase at any time the city is able to raise the money. The other provides that after five years the city may lease the property from the Community Traction Company, with a clause in the contract agreeing to buy it. This is a new idea incorporated in the plan. Under it the city would operate the lines, pay the maintenance and operating charges, together with 3 per cent semi-annually on the par value of the stock and 1 per cent semi-annually which would be applied on the purchase price. If the payments were continued the city would discharge the entire purchase price in fifty years, when the property would be taken over.

In a general way this ordinance follows the one outlined some time ago in conference with Henry L. Doherty, chairman of the board of the company, although it was not formulated in the same way at that time. It proposes to grant a franchise to the Community Traction Company, to which the property is to be transferred by the Toledo Railways & Light Company. In some respects the provisions of the grant are similar to those of the Cleveland franchise. One of the features is the establishment of an equalizing fund. This is to be accumulated from the earnings after the payment of 6 per cent dividends on the par value of the stock, allowing for cost of operation, maintenance, depreciation and renewal. After starting with an arbitrary rate of fare, the rate at the end of each six months is to be determined in accordance with the amount of money in the fund. If the sum in this fund has increased beyond a certain fixed amount, the fare will be reduced, and if it has fallen below a certain minimum the fare is to be increased.

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AGREEMENT REACHED IN DALLAS

Conditions Announced Under Which Local Dallas Interests Will Take Over Dallas Properties

An agreement has been reached between all parties interested in the Dallas traction and electric lighting problems by which J. F. Strickland and C. W. Hobson, backed by the General Electric Company, will lease the Oak Cliff street car lines from the Northern Texas Traction Company. This is the announcement made by Mayor Henry D. Lindsley of Dallas on his return from New York and Boston, where for two weeks he had been in conference with representatives of the Stone & Webster interests and the General Electric Company.

According to Mayor Lindsley, the lease agreement permits the consolidation of all the street car lines of Dallas under one management and also gives the city the same option for purchase of these lines as is retained over the lines east of the Trinity River. The lease agreement, however, is conditioned upon two points that must be settled by the people of Dallas. The contests that have been brought in the courts against the model service-at-cost franchises, adopted in the municipal election of last April, must be disposed of so as not to invalidate these ordinances; and the straw vote that is to be taken on the proposed valuation of $8,500,000 for the traction and lighting properties in the city of Dallas instead of the valuation of $7,100,000 as fixed by E. W. Bemis, utility expert, must be favorable to the higher valuation. Steps will be taken at once to dispose of both of these questions in the interest of the lease agreement.

Immediately on his return from the East, Mayor Lindsley prepared a lengthy statement for the Board of City Commissioners reviewing in detail the negotiations and the results obtained in the New York and Boston conferences. This statement, which was approved by the Board of Commissioners and published for the information of the people of Dallas, is as follows:

"After weeks of effort on the part of J. F. Strickland and C. W. Hobson and their associates, a lease has been at last concluded with the Northern Texas Traction Company of the Oak Cliff street railway lines, thereby making it possible for all of the street railway lines in the city of Dallas to be operated under one franchise. This lease gives the city the same control of service and extensions in Oak Cliff as exists with the lines east of the Trinity River. It also provides that the city may buy the Oak Cliff lines on the same terms as would apply to the lines east of the Trinity River. The Oak Cliff situation presented difficulties which at times seemed insurmountable, and Messrs. Strickland and Hobson and their associates have only just been able to conclude a lease which will be approved by the city of Dallas in event the new franchise goes into effect. The people of Dallas have heretofore been advised very fully through the public press relative to the propositions made by Messrs. Strickland and Hobson for a settlement of the traction and electric lighting and power problems.

"1. The maximum rate for electric lights in the city of Dallas will, on Jan. 1, 1919, be reduced to 6 cents per kilowatt-hour, and this rate thereafter will be the permanent maximum rate for lights in the city of Dallas. This means that the maximum rate when the franchises may become effective will be 8 cents per kilowatt-hour; that on Nov. 1, 1917, the maximum rate will be 7 cents per kilowatt-hour and that on Jan. 1, 1919, and thereafter the maximum rate will be 6 cents per kilowatt-hour.

"2. One million dollars additional in cash will be guaranteed to be spent by the electric light and power company within five years from the time the franchise goes into effect; that is, the guarantee will be that $1,000,000 will be spent within eighteen months from the date the franchise becomes effective, and an additional $1,000,000 within the forty-two months succeeding thereafter, making a total of $2,000,000 guaranteed to be spent on the electric light and power property alone.

"3. The basic rate of return on the valuation allowed in the electric light and power franchise will be reduced from 8 per cent per annum to 7 per cent per annum, thus making the basic rate of return on the valuations allowed in both the electric light and power franchise and the street railway franchise 7 per cent per annum.

"4. That twenty-two tickets for a dollar will be sold by the new street railway immediately upon the franchise becoming effective, and that the maximum permanent guaranteed rate thereafter will be 5 cents cash fare and twenty-two tickets for $1 and universal transfers.

"5. That as soon as the street railway lines can earn 8 per cent per annum they will sell six tickets for 25 cents on all street cars in Dallas.

"6. A more definite time has been determined when a second interurban will be built out of Dallas. The agreement is that th second interurban will be commenced within six months after the street railway lines east of the Trinity River equal in gross receipts per mile the receipts per mile in the year 1913, or (if this should occur sooner) when the gross receipts of the street railway lines east of the Trinity River bear the same proportion to the then investment as the gross receipts for these lines in 1913 bore to the valuation of $4,100,000.

"The above enumerates the advantages to the people of Dallas which have been recently secured from Messrs. Strickland and Hobson and their associates in addition to those which have heretofore been stated through the public press.

"An agreement was reached on practically all points except that of valuation. Messrs. Strickland and Hobson had an option on these properties at $8,500,000, at which price they proposed to value them in the franchises. The Board of Commissioners had valued these properties at $7,100,000.

"It was agreed between Messrs. Strickland and Hobson and the Board of Commissioners that the issue would be submitted to the people of Dallas in order that by a postal-card vote the Board of Commissioners might be advised whether our citizens desire to approve the conclusion of franchises with Messrs. Strickland and Hobson.

Prior to the securing of the conditions just mentioned Messrs. Strickland and Hobson, as the result of negotiations with the Mayor and Commissioners since the election last April, had agreed as follows:

"(1) That two interurbans would be built into Dallas of not less than 30 miles each in length, the construction of the first to commence within six months from the time these franchises go into effect and to be completed within eighteen months thereafter. The time for the construction of the second interurban was indefinite, but has recently been made more definite, as above stated.

"(2) That the maximum rate for electricity to be charged small consumers would be 8 cents per kilowatt-hour from the time the franchises would go into effect, and this rate would be 7 cents on Nov. 1, 1917. (As a result of the recent negotiations this maximum rate would be further reduced to 6 cents per kilowatt-hour.)

"(3) That the rate for power in Dallas would be as low as 1 cent per kilowatt-hour.

"(4) That in no case would any rates for light or power now existing in Dallas be increased over present rates, so that if the new schedules of rates do not in every instance enable a reduction in the price of lights and power then, the consumer affected would have the option of retaining the rate now paid.

"(5) That the new terminal building would, at its actual cost, become the property of the new traction company, subjecting it to the control of the city of Dallas in the interest of present and future interurbans.

"(6) That the Oak Cliff street car lines would, through either purchase or lease, be placed on the same basis, and have the same advantages to the citizens of Oak Cliff and to the people of Dallas generally as would pertain to the lines east of the Trinity River.

"(7) That the street railway would expend, within eighteen months from the time the franchises went into effect, $1,000,000 in cash on improvements and extensions of the street railway lines in the city of Dallas.

"(8) That the electric light and power company would expend the sum of $1,000,000 in cash within eighteen months from the time the franchises went into effect in improving and extending the electric light and power system in the city of Dallas. (As a result of the recent negotiations, the

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electric light and power company will contract to expend $2,000,000.)

"(9) That the basic rate of return on the street railway valuation would be 7 per cent per annum, and that the basic rate of return on the electric light and power valuation would be 8 per cent per annum. (As the result of the recent negotiations, the basic rate of return on both of these properties will be 7 per cent per annum.)

"(10) That the 'London Sliding Scale' would be introduced into both the new franchises, permitting the owners and operators of the properties to earn a higher rate of return than the basic rate in event of corresponding reductions in rates for service to the people of Dallas.

"(11) That the holding company, organized under the laws of Maine, known as the 'Dallas Electric Company,' would be eliminated, and that these properties would be held by corporations organized under the laws of the State of Texas, and that all of their stocks and bonds would be held by many investors instead of by a holding company."

The official statement says further:

"All of these agreements Messrs. Strickland and Hobson are now prepared to carry out, and, in addition thereto, the new advantages to the people of Dallas herein specified.

"It is estimated that the two new interurbans will cost at least $3,000,000, which, if added to the $1,000,000 guaranteed to be expended by the street railway company and the $2,000,000 guaranteed to be expended by the electric light and power company, will make a total of about $6,000,000 to be expended in and immediately at Dallas.

"This would mean the withdrawal of Stone & Webster from ownership, control or management of public utilities in Dallas, and the substitution of Dallas men who would have the immediate financial backing of the General Electric Company.

"It would mean that bonds in the total sum of $1,000,000 would be executed in favor of the city to insure the expenditure of $3,000,000 in cash on the street railway and electric light and power properties, and for the building of the two interurbans. In addition, the franchises provide that in event said $3,000,000 is not expended as stipulated the franchise will be forfeited."

It is now proposed by the Board of Commissioners and by Messrs. Strickland and Hobson that copies of these franchises will be shortly mailed to every voter in Dallas; also copies of the Oak Cliff lease; also copies of the contracts to build the two new interurbans; also a statement from the Board of Commissioners; also a statement from Messrs. Strickland and Hobson, and that the citizens be requested to indicate on a card to be inclosed whether they now desire to approve or disapprove the passage of the franchises by the Board of Commissioners. As a result of this postal-card vote the position of the Board of Commissioners will be determined as follows:

"(1) If the franchises are disapproved we shall consider it is not the desire of our citizens for the Board of Commissioners to pass them, and it will not do so.

"(2) If the franchises are approved by a substantial majority of those voting, then the Board of Commissioners will pass them as soon thereafter as will be legal.

"The people of Dallas will then have the opportunity to do one of two things:

"(1) By a referendum vote require that these franchises be submitted at the regular election on the first Tuesday in April, or

"(2) Permit these franchises to become law at the expiration of sixty days after their final passage by the Board of Commissioners, without a referendum vote."

The Board of Commissioners say in conclusion:

"We desire the citizens of Dallas to know that we consider the agreements which have been reached with Messrs. Strickland and Hobson and their associates to embody all of the advantages which can possibly be secured at this time in an amicable settlement of the street railway and electric lighting and power problems. The very best has been done that could be done by the representatives of the people. We leave to the people of Dallas to determine whether the work which has been done is worth while, and whether it is now their desire finally to settle these problems on the basis stated."

SEATTLE AND TACOMA OPPOSE RAILWAY

Puget Sound Company Seeks Relief from Burdensome Franchise Provisions

The City Council of Seattle, Wash., at a recent meeting, adopted a resolution directing Corporation Counsel Hugh M. Caldwell to join with City Attorney U. E. Harmon of Tacoma to resist the application of the Tacoma Railway & Power Company to the Public Service Commission for relief from certain of its franchise obligations. In a communication to the City Council Mr. Caldwell said that the same questions involved in the application of the Puget Sound Traction, Light & Power Company, operating in Seattle, for relief from payment of its gross earnings tax, the pavement of street areas between its tracks, one-third the cost of bridges, and similar obligations, were involved in the Tacoma case. He said that the decision in the Tacoma case would have a most important bearing on the Seattle case. Although the Seattle case has been pending for a longer period than the Tacoma case, the latter will have precedence because the Public Service Commission has made a physical valuation of the Tacoma properties.

The complaint of the Tacoma Railway & Power Company in the matter was filed with the Public Service Commission against the city of Tacoma on Oct. 4. The complaint declares that the revenue of the company is insufficient to comply with any of the provisions of the city franchise, except to render adequate and sufficient service at a fair and reasonable rate. The company lays special stress on the statement that "it is impossible to continue to operate its street railway line for a 5-cent fare throughout the limits of the city of Tacoma, to maintain the present standard of service required by the commission and demanded by the public, and continue to make the payments and contributions required from the plaintiff by the city of Tacoma. The time has arrived when the plaintiff will be forced to cease operation unless it obtains some relief."

A hearing is prayed for by the company, and the plea made that the result will be relief from fulfilling its franchise obligations. Figures compiled by the company show that on Dec. 31, 1915, exclusive of the depreciation costs of physical property, a loss of $218,872 was sustained. It is further shown that within the last five years the company has paid $97,224 in gross earning taxes and $59,334 in contributions to city bridges. During the next five years, the complaint recites, the company will be called upon to pay $175,000 for paving and $100,000 for renewals and maintenance on paving. The gross earnings tax, it is estimated, will be between $16,000 and $20,000 annually. Free transportation furnished to city employees, exclusive of firemen and policemen in uniforms, is placed at approximately $6,000 a year. Through the "gratis franchise rights" tendered the jitney bus the company has not had enough net earnings left to pay the interested on its bonded indebtedness. it is claimed.

Comptroller Shoemaker of the city of Tacoma, in speaking of the complaint, said:

"I am of the opinion that the company has a legitimate complaint in respect to the jitneys. In the franchise to the company the city pledged itself to hold certain streets and avenues exclusively for the operation of street cars without competition. It is my opinion, personally, that the city violated a part of its franchise agreement in allowing the jitney bus to compete with the street cars on streets and avenues given exclusively to the railway company for the operation of its cars. With regard to the gross earnings tax, the maintenance of streets and bridges, and the free transportation to city employees, it is a fact that the company expressed a willingness to do all these things in return for the franchise. If the company believes it has made a bad bargain that is its fault, not the city's."

The City Council has been asked by the city attorney to decide what shall be done by the city by way of reply to the complaint filed by the company. Mayor Fawcett's reply to the company's action was the sending of a letter to Pierce County candidates for the Legislature, asking their support for legislation to abolish the power of the Public Service Commission in interfering with home rule in cities of the first class.

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REPORT ON TRANSIT CONDITIONS IN PITTSBURGH

Attorney C. Elmer Bown, adviser to the Council of Pittsburgh, Pa., in traction matters, has handed in a report winding up with a recommendation that the city take its case for better transportation before the State Public Service Commission. Mr. Bown's report deals with these subjects: Service, transfers, routing, rehabilitation, the finances of the Pittsburgh Railways, the ordinances pending in Council, freight transportation by street cars and new franchises. He says that observations of the rush hour service show that the Pittsburgh Railways is violating the order of the Public Service Commission. The report says that with respect to transfers Pittsburgh is at a disadvantage. In discussing routing of cars Mr. Bown advises that the present system of looping be retained for the regular service, except in some cases where the terminal loops should be lengthened. Some through routes are recommended, and there is a recommendation that the shorter terminal loops should be used for the rush tripper service.

Regarding pending ordinances Mr. Bown advises that two ordinances be not approved. These are the one for tracks in Diamond Street and the one for connections for the belt line. The report closes thus:

"As to the policy to be followed by the city, it is recommended that the questions of service, routing and transfers be made the subject of a complaint to be filed before the Public Service Commission. Negotiations on these subjects have been carried on between the city and the company for about ten years, and the company has positively declined to agree to fix a standard of service, to establish through routes, or to increase the number of transfers issued. While the other subjects mentioned in this report are proper matters for negotiation between the city and the company, the company's attitude on these questions and its defiance of the order of the Railroad Commission indicate that nothing is to be gained by further discussion of these subjects."

At the meeting of Council at which the report from Mr. Bown was received an ordinance was introduced to authorize the Mayor to appoint a transit commissioner. The commissioner must file, soon after his appointment, a budget, showing the number of engineers, draftsmen and other staff help needed. This measure was then referred to the finance committee. The question of taking the case of the city to the Public Service Commission was referred to the public service and surveys committee of the City Council.

On Oct. 13 the City Council affirmed the ordinance for the employment of an $8,000 transit commissioner. The ordinance carries with it an allowance for a corps of assistants for the commissioner.

I. T. S. AGAIN SEEKS CONNECTION IN ST. LOUIS

The St. Louis Electric Railway, which is the St. Louis division of the Illinois Traction System, has renewed its effort to obtain a connection with the Terminal Railroad Association tracts at the St. Louis end of the McKinley bridge. Henry I. Green, Champaign, Ill., counsel for the Illinois Traction System, has filed with the State Public Service Commission an application for an order authorizing the connection of the tracks and apportioning the cost between the two systems. The Public Service Commission has announced that it will allow ten days for the filing of an answer by the Illinois Traction System. It is stated in the petition that the Illinois Traction System does a large business in hauling freight from Illinois and Indiana points, but has never been able to maintain adequate terminal facilities in St. Louis.

About three years ago the Illinois Traction System attempted to have a bill passed in the Municipal Assembly authorizing it to conect its tracks with those of the Terminal Association in the Hall Street yards in North St. Louis. The bill was defeated. The Terminal Association opposed the measure on the ground that it would be required to handle the Illinois Traction System freight on the St. Louis side of the river without receiving any of the arbitrary rate charged for bringing it across the McKinley bridge. The Terminal Association said that under those circumstances the service would be unremunerative. The arbitrary charge on coal brought across the McKinley bridge is 10 cents a ton. This is only half the charge made on the terminal bridges, but it covers delivery to the end of the bridge and hauling from that point must be done by shippers.

NEW YORK POLICE OFF STRIKE DUTY

Chief Police Inspector Max Schmittberger of New York, in an order issued on Oct. 16, reduced the number of policemen assigned to strike duty to 900. The extra men were sent back to their various precincts in the five boroughs. The 900 men remaining on strike duty have been divided by day into automobile and motorcycle squads and will work in citizen's clothes. The motorcycle men will patrol the various lines, while those in charge of the automobiles will hold themselves in readiness for any emergency. The men in plain clothes will ride on the various surface cars, elevated trains, and subway trains. No men in uniform will ride on the cars during the day, but at night a uniformed man will be assigned to every car.

At the chief inspector's office it was said that reports from the street railways showed that most of the roads were running the normal number of cars by day and increasing the number on night service. In the Bronx, it was said, the Union Railway has 150 cars in operation, the normal number, and that by the end of the week cars would be running on the old schedule night and day. Out of the normal number of 927 cars, the New York Railways on Oct. 16 had 726 running day and night. Police reports from the Borough of Queens show that car lines are giving full service by day.

A number of new hurdy-gurdies appeared in the streets of New York on Oct. 16, the operators of which appealed for funds to aid the striking carmen. The machines bore placards with the inscription: "Watch your step on Election Day. Union for Union."

On Oct. 13 F. W. Whitridge, president of the Third Avenue Railway, called the attention of the men still out on strike to the insurance standing in their names under a group contract arranged between the railway and the Travelers Insurance Company. He notified the men that if they did not return to work on or before Oct. 20 the policies would be cancelled. In concluding his statement, Mr. Whitridge said:

"You will perceive that if you desire to continue the policies on your own account you must so notify the Travelers Insurance Company and get the new terms from them. If your union, that is, the Amalgamated Association of Street & Electric Railway Employees of America, were anything more than the irresponsible humbug I have declared it to be, that association might arrange to handle the insurance for you hereafter, but I assume that it will do nothing of the sort and I do not suppose any of you can expect the company to carry this insurance for you any longer. Therefore, if you wish your families to have the benefit of this insurance you must attend to it yourselves. It would be a pity to give it up, and although you have seen fit, without any reason, to part company with me, I urge upon you for the sake of your wives and children to endeavor to take care of this insurance."

CONTRACT AWARDED FOR CINCINNATI BORINGS

The Rapid Transit Commission of Cincinnati, Ohio, awarded a contract on Oct. 13 to A. P. Birnbaum for the borings to be made on Walnut Street for the purpose of testing the nature of the earth to be excavated in building the proposed rapid transit loop.

The conference committee of the Federated Improvement Associations held a meeting on the same day to discuss the terms of a lease to be formulated for the loop. The majority of the members seemed to favor a plan that would allow the city to share in any profits or losses that may accrue from the operation of the line by the leasing company. W. C. Culkins, executive secretary of the Chamber of Commerce, urged that any contract which is formulated be based upon a fair return on a fair valuation. Judging from remarks made by Walter A. Draper, secretary of the Cincinnati Traction Company, his company would hesitate to enter into a leasing agreement with the city if the entire risk of profit or loss must be borne by it.

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HOLYOKE ARBITRATION BOARD REACHES FINDING

The arbitration board sitting in the wages and hours of service case on the Holyoke (Mass.) Street Railway has concluded its investigation. At the final session on Oct. 12, it was announced that Chairman James E. Cotter of Boston would at once draft the report of the board for acceptance by the entire commission. The principal issue between the company and its men was on the question of wages, and whether wages should be paid on a daily or an hourly basis. The arbitration board has decided for an hourly rate, and will set any run of more than eight hours and not more than nine hours as a regular scheduled run to be paid for as such. At present the maximum pay for not more than 9.5 hours is $2.85. The new rate to be fixed by the award for not more than nine hours and not less than eight hours is $2.97, with extra pay for more than nine hours. The pay of those who do not at present draw the maximum rate will be increased in the same proportion over what they now receive. Carhouse and shop employees will be placed on a nine-hour basis, without reduction in pay.

At present the men receive $2.85 for working not more than nine hours on Sundays. Under the previous agreement anything more than two hours counted as five hours on Sunday work and more than 2.5 hours was counted as a full nine hours. The formal finding of the board is expected to discuss various points of this character, some of which have already been concluded in conference between the company and the union. It was the contention of the latter that the Springfield Street Railway maximum wage of $3.10 for a nine-hour day should be granted to Holyoke carmen, but the company's argument that conditions differ in the two cities was favorably received by the board in concluding to establish a maximum of $2.97 a day. Mayor John J. White of Holyoke represented the men. Attorney William H. Brooks was the company's spokesman on the board.

CONDITIONS OF HUDSON & MANHATTAN RAILROAD LABOR SETTLEMENT

The account of the labor settlement on the Hudson & Manhattan Railroad, published in the New York morning papers of Oct. 13 and in this paper last week, was erroneous in so far as it related to a recognition of the union by the company. The facts are that G. H. Sines, vice-president of the Brotherhood of Railroad Trainmen, acted as an individual for the men who had been discharged and not as a representative of the brotherhood. Mr. Fisk agreed on Mr. Sines' representations to take back the thirty-two discharged men, and the men agreed not to request the company to treat with the brotherhood on any subject before Feb. 1, 1918; and also agreed not to engage in any coercive measures among the men on behalf of the brotherhood.

George W. W. Hanger, assistant commissioner of the United States Board of Mediation and Conciliation, on Oct. 12, authorized the publication of the following agreement entered into between Mr. Fisk and Mr. Sines, representing the men:

"The Hudson & Manhattan Railroad has discharged thirty-two men for insubordination in promoting the formation of a lodge of the Brotherhood of Railroad Trainmen, in opposition to the wishes and orders of the management, which has already recognized the Hudson & Manhattan Railroad employees' organization, embracing the trainmen, towermen, stationmen and other employees in the transportation department of the road, and for attempting to enforce the recognition of the Brotherhood of Railroad Trainmen in opposition to the company's orders, and for stirring up trouble and dissension in connection therewith.

"Mr. Sines, acting on behalf of the men who have been discharged, as an individual who has been selected by said employees to represent them in this matter, and not as an official of the Brotherhood of Railroad Trainmen, has claimed that these men have not been intentionally guilty of the offense charged, and has requested that the management of the road should consider the reinstatement of the discharged men upon the following conditions:

"1. Such consideration by the company or the reinstatement of the men in question is not to be construed as a recogniton of or as any promise, expressed or implied, to recognize the Brotherhood of Railroad Trainmen at any time.

"2. The railroad company shall treat solely with the Hudson & Manhattan employees organization in respect to the wages and working conditions of trainmen, towermen, stationmen and other employees of the transportation department, excepting motormen and motor switchmen, and may enter into a contract with the proper representatives of such organization in respect to such conditions.

"3. Any men who may be reinstated, or any other men who may be members of the Brotherhood of Railroad Trainmen, are not to request the company to treat with the said Brotherhood on any subject before Feb. 1, 1918, and are not to engage in any coercion among the men on behalf of said Brotherhood.

"The railroad company agrees to reinstate the men discharged, without pay for time lost, upon the foregoing conditions."

NEW YORK COMMISSION INDORSES FENDER

The Public Service Commission of New York, First District, has adopted a report of its committee on safety devices approving the American Safety Fender, an automatic type of equipment that was described in the ELECTRIC RAILWAY JOURNAL for April 10, 1915. The report, which is signed by W. C. Whitson and George F. Daggett, said that the fender had been submitted to the most drastic tests on rough pavements and with dummy figures. It was used on a large motor truck. "While the demonstration was made on a truck instead of a car," the report says, "we believe that conditions would be at least as favorable for its operation on a street car, and that its adoption on cars as well as upon buses and motor trucks would be a distinct advance in existing means for safeguarding the lives and limbs of persons who are struck or come into contact with vehicles." This is the first device of the kind to receive the indorsement of the New York Commission.

ARBITRATORS NAMED TO CONSIDER CLEVELAND POWER BID

Mayor Harry L. Davis has indicated that he will not approve of the selection of a partisan Democrat as the city's member of the arbitration board which is to decide whether or not the Cleveland Railway shall enter into a contract with the Cleveland Electric Illuminating Company to furnish power for the street railway system to take the place of that at present furnished by the old Cedar Avenue power station of the Cleveland Railway which is to be abandoned. The Council, the majority of whose members are Democrats, is to make the selection, but its action must be approved by the Mayor.

Attorney Thomas L. Sidlo, law partner of Secretary of War Newton D. Baker, has been named by the City Council as the city's member of the board of arbitration to adjust the controversy with the Cleveland Railway over the contract. Joseph Alexander will represent the company and the two men are to select a third member of the board. Both Mr. Sidlo and Mr. Alexander were at one time employed in the Street Railway Commissioner's office during the administration of Peter Witt. Mayor Davis has not intimated what step he will take regarding the appointment.

Muskogee Strike Settled.—After being in progress for more than two weeks, the strike of employees of the Muskogee (Okla.) Electric Traction Company was ended Oct. 11, when a contract was signed by R. D. Long, manager of the company, and the president of the newly organized union.

Final Report on Chicago Traction Situation Being Prepared.—Daily meetings are being held by the Chicago Traction and Subway Commission to consider the many data it has collected for the analysis of existing conditions with a view of recommending transportation improvements. As mentioned previously in these columns, this commission is composed of William Barclay Parsons, Robert Ridgway and Bion J. Arnold. Rumors regarding the findings of this commission have appeared in the local press at different times, but they were premature. The report and recommendations are now in preparation.

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Change in Suburban Franchise. — The Commissioners Court of Dallas County has authorized a change in the franchise granted several years ago to the Dallas (Tex.) Southwestern Traction Company canceling the provision for a 5-cent fare between Dallas and Eagle Ford. In its stead there has been inserted a provision for a 5-cent fare between Dallas and Cement City. A change also has been made to make explicit the provision for hourly service each way between 6 a. m. and 7 p. m. E. P. Turner, president of the company, presented the application for the change in the franchise, explaining that the company planned to build that portion of its proposed line from Dallas to Eagle Ford at once, and later to carry out the rest of the provisions of the franchise by constructing an extension of the line to Cleburne via Grand Prairie.

Chicago Terminal Electrification Recommended.—The Railway Terminal Commission, composed of John F. Wallace, Walter L. Fisher and Bion J. Arnold, has recommended the electrification of the proposed Illinois Central Railroad passenger terminal in a report to the City Council of Chicago. This recommendation was essentially embodied in the following terms: "The commission feels that the development of a terminal station on the lake front of a capacity sufficient to care for all or practically all of the roads having terminals in the territory south of Van Buren Street, between State Street and the Chicago River, will permit the working out of a plan for the adoption of electrification of the passenger traffic of the Chicago terminals, and that the electrification of the passenger terminals will be a step toward electrification of all railroad tracks within the terminal district." This recommendation of the Railway Terminal Commission was made in connection with the petition which was presented for a permit by the Illinois Central Railroad Company to build its new passenger terminal station.

Des Moines Tax Case Decided.—The Supreme Court of Iowa has decided that the Des Moines City Railway must pay $44,040 assessed against the right-of-way of that company for paving on Ingersoll Avenue from Twenty-eighth to Forty-second Street. The high court, in reversing the case, said: "The judgment and order appealed from must be set aside and the cause remanded with directions to the court below to confirm the special assessments as made." The company owns a 20-ft. strip of ground in the center of Ingersoll Avenue on which a double-track line is operated. The city paved on both sides of the right-of-way, but not between the rails or between the tracks, except at the street intersections. The cost was assessed against the abutting property. The company refused to pay the assessments. In the arguments filed in the Supreme Court the company claimed that its right-of-way could not be assessed as "abutting" property, and that the city had no authority to assess the company for street improvements. The company further claimed that it was a street railway and not a railroad, therefore exempt from the liability of a railroad. Justice Weaver, in writing the opinion, says that the company owns the strip of land on which its tracks are laid, and that it is more than a mere right-of-way, "therefore assessments for street improvements is that of a holder or a mere easement."

PROGRAM OF ASSOCIATION MEETING

New England Street Railway Club

In accordance with the plans made by the new administration of the New England Street Railway Club, by which six of the regular club meetings will be in charge of the vice-presidents from the several New England States, the first fall meeting after the summer respite, to be held on Oct. 26, will be Vermont Night, in charge of W. F. Corry, vice-president from that State. Mr. Corry has secured as speaker Clarke C. Fitts, Brattleboro, Vt., a former attorney-general for the State and one of its most prominent citizens. At the present time he is counsel for the New England Power Company, which is interested in the big development of the Connecticut River at South Vernon, Vt., for power purposes. His subject will be "Transportation and White Coal." The meeting is to be held at the Hotel Brunswick, on Boylston Street, just off of Copley Square, Boston.

Financial and Corporate

ANNUAL REPORT

New York Railways

The comparative statement of income, profit and loss of the New York (N. Y.) Railways for the years ended June 30, 1915 and 1916, follows:

	1916	1915*
Gross operating revenue	$13,714,531	$13,399,767
Operating expenses	8,374,079	8,545,043
Net operating revenue	5,340,452	$4,854,724
Taxes	1,038,122	1,042,859
Income from operation	$4,302,330	$3,811,865
Non-operating income	567,869	527,242
Gross income	$4.870,199	$4,339,107
Income deductions:		
Interest on underlying bonds, rents, etc.	$2,707,884	$2,747,404
Interest on New York Railways first real estate and refunding mortgage 4 per cent bonds	722.609	691,538
Total	$3,430,493	$3,438,942
Balance	$1,439,706	$900,165
Add:		
Surplus balance at beginning of year	64	
Addition during the year (net)	145,445	61,279
Net income—surplus available for interest on adjustment mortgage bonds	$1,585,216	$961,445
Interest distributed on adjustment mortgage bonds	1,584,946	961,381
Surplus	$270	$64

*The figures for the year ended June 30, 1915 (as contained in the published annual report of last year) are adjusted in the foregoing to accord with changes in classification made during the year ended June 30, 1916.

The gross passenger revenue for the year was $13,379,048, an increase of $368,115 or 2.83 per cent. Other street railway operating revenue was $335,483, a decrease of $53,351 or 13.72 per cent. This is accounted for principally by a decrease in revenue from advertising and sale of power. The gross operating revenue thus produced was $13,714,531, an increase of $314,764 or 2.35 per cent.

Street railway operating expenses were $8,374,079, a decrease of $170,964 or 2 per cent. The operating ratio was 61.06 per cent, a decrease of 2.71 per cent as compared with the preceding year. There was actually expended in the maintenance of way and structures and equipment $1,898,272, and there was set aside in reserve $844,634, the total charge to the maintenance accounts during the year (equal to 20 per cent of the total operating revenue) amounting to $2,742,906, an increase of $62,953. There was expended during the year for maintenance of track and roadway, electric line, buildings, structures, etc., $1,042,356, and for maintenance of equipment, $855,916.

The transportation expenses were $4,293,407, a decrease of $51,254, while the power supply costs showed a decrease of $93,798. There was an increase of $42,544 in the cost of car operation, due principally to the higher scale of wages prevailing during the last six months of the year. The actual expenditures during the year for injuries to persons and property were $1,054,651, an increase of $125,265 as compared with the preceding year. The cost of injuries and damages, however, as charged to operating expenses was $809,660, the difference being charged to the accumulated accident reserve account on the basis of 7 per cent of the passenger revenue. Detailed comparative figures showing the efficiency of operation are presented in the table on page 908.

There was a decrease in taxes assignable to street railway operations of $4,737 or 0.45 per cent. The taxes during the year amounted to $1,038,122 or 7.76 per cent of the revenue from transportation. The valuations of the special franchises for 1916 were finally fixed by the State Tax Commission at $29,417,000, a decrease of $5,528,000 from the similar valuations for 1915. The litigation which the company instituted in the federal courts to recover the sums which it had paid to the government as excise taxes,

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on account of its various lessors, under the congressional act of 1909, were successfully concluded. Refunds aggregating $29,234 were secured as the result of this litigation.

The non-operating income of the year amounted to $567,869, an increase of $40,627 or 7.71 per cent. Such increase is accounted for by additional income from dividends and interest revenues, the remainder of the items in this account representing decreases in real estate revenues and in net income from operation of local cars over the Williamsburg Bridge. The gross income for the year, viz., $4,870,200, increased $531,092 or 12.24 per cent over the previous year. Income deductions during the year amounted to $3,430,493, a decrease of $8,449. During the year there was credited to surplus as available for interest on the adjustment mortgage bonds, the sum of $128,926, representing an adjustment of accident and damage costs of the calendar year 1912 and the first half of the calendar year 1913.

The aggregate of the tax and other obligation items, estimated in part, for the year ended June 30, 1916, is as follows:

Taxes:	
Gross earnings	$196,257
Stipulated rents	41,000
Car license fees	57,829
Real estate	278,899
Special franchises	278,355
Other obligations:	
Removal of snow and ice	149,022
Paving	293,867
Rent of tracks, ferry terminals, etc	3,054
Williamsburg Bridge tolls	20,593
Track and terminal rental—Williamsburg Bridge	3,916
City inspectors	9,724
Total	$1,332,521

A comparison of similar figures for the other years shows that this total is under rather than above the average. Nevertheless, that total is almost 10 per cent of the gross passenger revenue for the year. If the taxes which the company pays the State and the federal government were included the total and percentage would be much greater. Some arrangement, it is said, should be made for paving and snow removal as well as special tax burdens on a basis that will enable the operating railway companies to secure a reasonable return on the capital invested and proper compensation for services performed.

COMPARATIVE OPERATING STATISTICS FOR THE FISCAL YEARS ENDED JUNE 30, 1916 AND 1915

	1916	1915	Charge
Total revenue from operation	$13,714,531	$13,399,767	+$314,763
Total operating expenses	8,374,078	8,545,042	— 170,964
Per cent of operating expenses to total revenue from operation:			
Maintenance of way and structures:			
Expended	7.60	7.53	+0.07
Reserved	4.15	4.22	—0.07
Maintenance of equipment:			
Expended	6.24	6.82	—0.58
Reserved	2.01	1.43	+0.58
Operation of power plant	6.09	6.93	—0.84
Operation of cars	25.22	25.49	—0.27
Injuries and damages:			
Expended	7.69	6.94	+0.75
Reserved	—1.79	0.35	—2.14
General and miscellaneous expenses	3.85	4.06	—0.21
Total	61.06	63.77	—2.71
Number of passengers carried:			
Cash fares	257,028,563	251,264,521	+5,764,042
Revenue transfers	17,752,628	15,062,586	+2,690,042
Free transfers	108,521,893	109,943,330	—1,421,437
Total	383,303,084	376,270,437	+7,032,647
Per cent of free transfer passengers to revenue passengers	39.49	41.28	—1.79
Average fare per passenger (cents):			
Per passenger (including transfers)	3.490	3.458	+0.032
Per revenue passenger	4.869	4.885	—0.016
Operating expenses per passenger (cents):			
Per passenger (including transfers)	2.185	2.270	—0.085
Per revenue passenger	3.048	3.208	—0.160
Car miles	34,360,986	34,891,203	—530,217

PRESIDENT LILIENTHAL INDORSES UNITED RAILROADS REORGANIZATION PLAN

In referring to the United Railroads of San Francisco reorganization plan, as proposed by the bankers' committee and reviewed in the ELECTRIC RAILWAY JOURNAL of Sept. 30 and Oct. 7, President Lilienthal in an article in the October issue of *The United Railroads Magazine* made a statement in part as follows:

"In the first place, the capital and debts of the company are being reduced from nearly $92,000,000 to about $47,000,000. The holders of the company's 4 per cent bonds are being asked to surrender these bonds and accept in place of them 25 per cent of the amount due them in bonds and 46 per cent of such amount in stock, thus sacrificing at least 29 per cent of the par of their holdings. The holders of the company's notes are asked to surrender these and accept stock in their place.

"If the plan is accepted by the stockholders, as I am sure that it will be, their generosity and their willingness to incur sacrifices will appear to be all the greater when it is remembered that, instead of drawing money out of the system, as our enemies have insinuated, they have, on the contrary, during the last ten years, provided the company with $8,000,000 in cash, of which $5,000,000 was provided immediately after the earthquake and fire of April, 1906, to permit the reconstruction of the road. In addition, the stockholders have offered to lend an additional $5,200,000 now to take care of the underlying bonds, namely, $1,800,000 of Market Street Cable Company bonds, $400,000 of Ferries & Cliff House bonds, $2,000,000 of Omnibus Cable bonds and $1,000,000 of Sutter Street Railway bonds.

"None of us in the organization is responsible for the conditions that have made these great sacrifices necessary. The competition of the municipal lines and of the jitneys, constantly increasing taxes and the high cost of materials are responsible, but it is the part of courage and honesty to look a situation squarely in the face and meet it. I want to make the sacrifices to our creditors as small as possible, but I deem it a paramount duty to apply the knife when it is needed, so that the company may be placed on a sound financial basis, where it cannot be attacked for sinister purposes, where it can perform its whole duty to the public and where it can do full justice to its employees. It is with these objects in view that I am throwing my whole heart into carrying out this reorganization."

Beaumont (Tex.) Traction Company.—An amendment to its charter has been certified to Secretary of State McKay at Austin by the Beaumont Traction Company, increasing its capital stock from $600,000 to $1,000,000.

Dominion Power & Transmission Company, Hamilton, Ont.—At a special sitting of the Supreme Court of Ontario, at Hamilton, on Oct. 2, presided over by Justice Middleton, the hearing of evidence was commenced in the action brought by Charles William Moodie, a shareholder of the Dominion Power & Transmission Company, on behalf of himself and other shareholders of the company, against certain officers and directors of the company. Mr. Moodie contends that some of the properties were secured at excessive prices; that bonds amounting in all to $6,850,000 were sold for inadequate consideration, and that large profits were made in this connection by the defendants. Mr. Moodie asked for damages and an injunction against the continuance of the acts of the directors, and for a receiver of the defendant company. He also wants the court to set aside an issue of $1,000,000 of common stock which, he claims, the defendant directors received as a bonus.

Eastern Pennsylvania Railways, Pottsville, Pa.—The Pottsville Union Traction Company, controlled by the Eastern Pennsylvania Railways, has applied to the Pennsylvania Public Service Commission for permission to purchase the stock of the Pottsville & St. Clair Electric Railway, recently completed.

Kanawha Traction & Electric Company, Parkersburg, W. Va.—The Ohio Public Utilities Commission has authorized the Kanawha Traction & Electric Company to issue $1,700,000 of 5 per cent bonds to be sold at not less than

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86 per cent of par. Of the amount authorized $1,100,000 is to be used to retire two-year notes, $40,000 to be used for improvements in Parkersburg and $33,000 to construct a reinforced concrete viaduct at Boaz, W. Va. The remainder of the issue will be used to retire $150,000 of bonds of the Marietta Traction Company which mature early in 1917. The company asked originally for permission to issue $2,000,000 of bonds.

Louisville (Ky.) Traction Company.—Officials and directors of the Louisville Traction Company, controlling the Louisville Railway and through it the Louisville & Interurban Railway, incorporated with $15,000,000 of capital stock, are considering liquidation of the New Jersey corporation and operation of the system as a single Kentucky corporation. A. P. Humphrey, vice-president and general counsel of the company, in a recent statement, indicated that executives of the company were making preparations for a course of action to be determined upon in the future. The purpose of taking the step proposed would be to reduce tax payments. The new federal revenue act, effective on Jan. 1, increases the tax on corporate earnings from 1 to 2 per cent and assesses a new corporation tax on the capital. Liquidation would eliminate the New Jersey corporation tax and federal, New Jersey and Kentucky inheritance taxes would be affected in favor of the stockholders. The action, it is estimated, would save the company $31,000 annually. The Louisville Railway is a Kentucky corporation, owning the interurban lines and is capitalized at $7,956,500.

Municipal Railway, San Francisco, Cal.—The receipts of the Municipal Railway of San Francisco for September totalled $123,766, or slightly more than $4,000 daily, according to a statement of the bookkeeping bureau of the Board of Public Works. During August the receipts from all sources totalled $123,026, which with operating expenses of $81,715 left a balance of $41,311 to be used for depreciation, payment of bonds, interest and additions to the existing system.

Northern Electric Railway, Chico, Cal.—A suit in equity has been filed in the Superior Court of California by Edward Bonnheim, representing stockholders of the Northern Electric Company, to prevent the reorganization committee from carrying out the recently announced plans for reorganization. A temporary restraining order was also issued to prevent the reorganization committee and the Mercantile Trust Company from foreclosing on the deeds of trust which are held by the latter, on the charge that the committee is controlled by the bankers and that it is their intention to establish first liens on the Northern Electric Railway properties for the benefit of the Northern Electric Railway stockholders. A ninety-page complaint attacking the validity of the Northern Electric Company, the parent corporation, and the $4,000,000 bond issue was filed by Mr. Bonnheim. This complaint undertakes to show that the Northern Electric Company never legally existed because of defects in its incorporation; that its acts in California are void by reason of failure to comply with the laws of the State; that the bond issues are invalid in both Nevada and California; that failure to comply with the law invalidated the deeds of trust, and that the company does not hold first-class liens on all properties, as the plaintiffs also have liens totaling about $2,000,000.

Northern Ohio Electric Corporation, Akron, Ohio.—E. W. Clark & Company, Philadelphia, Pa., and Hodenpyl, Hardy & Company, New York, N. Y., have announced a plan to organize the Northern Ohio Electric Corporation to acquire not less than 95 per cent of the common capital stock of the Northern Ohio Traction & Light Company. They are offering for subscription subject to allotment when, as and if issued, ten shares of 6 per cent preferred stock of the new company of a par value of $100 a share and five shares of common stock without par value for $1,000. The present offering is $6,000,000 of stock. The Northern Ohio Electric Corporation was incorporated under the laws of New York on Oct. 19 with a capital stock of $6 375,000. The circular of the bankers says that the company will have 60,000 shares of 6 per cent cumulative preferred stock of a par value of $100 a share and 75,000 shares of common stock without par value. It is stated that the Northern Ohio Traction & Light Company has outstanding $14,075,000 of bonds and $4,600,000 of preferred stock, but that it has no floating indebtedness other than current accounts and has approximately $1,800,000 in cash in its treasury. The bankers say that to the extent that any stock of the Northern Ohio Traction & Light Company is not acquired the amount of the indebtedness assumed will be reduced and the cash in the treasury of the Northern Ohio Electric Corporation will be increased.

Oxford Electric Company, Mechanic Falls, Me.—The Oxford Electric Company, lately organized, comprises what was formerly the Mechanic Falls Electric Light Company, and the Norway & Paris Street Railway & Power Company.

Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.—At a recent meeting of the directors of the Tuscaloosa Railway & Utilities Company, the following officers were elected: F. S. Morris, Philadelphia, president; C. R. Carter, Birmingham, vice-president; J. L. Etheridge, Philadelphia, secretary and treasurer; D. Swann, Birmingham, assistant secretary; G. A. Daniels, Tuscaloosa, assistant treasurer; I. W. Ross, Tuscaloosa, general manager.

Worcester (Mass.) Consolidated Street Railway.—The Massachusetts Public Service Commission has issued a decision on the petition of the Worcester Consolidated Street Railway allowing it to issue $10,000 of new stock and $60,000 of bonds to be applied to the extinguishment of floating debt.

DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Me., quarterly, one-half of 1 per cent, common.

Cape Breton Electric Company, Ltd., Sydney, N. S., 3 per cent, preferred; 1½ per cent, common.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-quarters of 1 per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, 75 cents preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Northampton (Mass.) Street Railway, 2½ per cent.

Public Service Investment Company, Boston, Mass., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept.,		'16	$36,528	*$25,464	$11,064	.....	.....
1 "	"	'15	35,131	*22,871	12,260	.....	.....

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m., Aug.,		'16	$100,761	*$74,951	$25,810	$27,700	††$1,708
1 "	"	'15	91,618	*67,116	24,502	16,964	‡7,680
2 "	"	'16	198,596	*151,303	47,293	55,531	††7,886
2 "	"	'15	182,862	*129,298	53,564	33,986	‡19,839

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., Aug.,		'16	$628,823	$24,501	$604,322	$720	$603,602
1 "	"	'15	312,737	14,568	298.169	40,833	257,336
12 "	"	'16	7,149,948	219,437	6,930,511	421,003	6,509,508
12 "	"	'15	4,051,578	155,846	3,895,732	490,000	3,405,732

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N Y.

1m., Aug.,		'16	$40,814	*$28,078	$12,736	$7,987	‡$4,811
1 "	"	'15	46,258	*29,937	16,321	8,000	‡8,390
2 "	"	'16	85,745	*58,742	27,003	15,974	‡11,137
2 "	"	'15	96,041	*60,738	35,303	16,000	‡19,443

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.

1m., Aug.,		'16	$473,434	$291,304	$182,130	$47,995	$134,135
1 "	"	'15	360,054	214,559	145,495	53,318	92,177
8 "	"	'16	3,334,077	2,011,571	1,322,506	403,001	919,505
8 "	"	'15	2,488,442	1,535,909	952,533	413,588	538,945

PACIFIC GAS & ELECTRIC COMPANY, SACRAMENTO, CAL.

1m., Aug.,		'16	$1,462,480	*$912,643	$549.837	$337,198	‡$244,558
1 "	"	'15	1,478,867	*898,304	580,563	340,579	‡257,180
12 "	"	'16	18,593,438	*10,764,139	7,829,299	4,069,017	‡4,247,832
12 "	"	'15	17,989,092	*10,324,560	7,664,532	4,292,759	‡3,716,732

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Sept.,		'16	$2,226,059	$1,210,784	$1,015,275	$814,411	$200,864
1 "	"	'15	2,009,979	1,115,491	894,488	815,611	78,877
3 "	"	'16	6,590,825	3,655,733	2,935,092	2,444,689	490,403
3 "	"	'15	5,847,648	3,297,930	2,549,718	2,448,149	101,569

*Includes taxes. †Deficit. ‡Includes non-operating income.

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Traffic and Transportation

HANDLING WORLD SERIES TRAFFIC AT BOSTON

One Hundred and Ninety Cars an Hour Were Operated to the Field Through the Boylston Street Subway at the Height of the Outward Rush

The Boston (Mass.) Elevated Railway handled the heavy extra traffic resulting from the two opening games of the World Series at Braves Field, Allston, without a single accident to passengers or employees. A few days before the games began a conference was held in the office of Edward Dana, superintendent of traffic, at which the detailed arrangements for extra service were prepared with a typewritten outline of the headway planned on the more important lines, the provisions for supplying extra cars, co-operation of different operating divisions and storage facilities for rolling stock during the game itself.

On Oct. 7, the day of the first game, a high-frequency service was inaugurated at 8 a. m. by two-car, motor-trailer trains between the North Station and Braves Field. Between Dudley Street and the latter point at the same time a five-minute service was inaugurated by 25-ft. articulated cars. At 9:30 a. m., the headway on the North Station-Braves Field line was reduced to two minutes, this schedule being maintained until noon, when it was cut to one minute and remained at this figure until the game began at 2 p. m. The Dudley Street service was increased to a three-minute headway from 9 a. m. to 10:30 a. m., and a two-minute headway was maintained until 2 p. m. From 8 a. m. until 2 p. m. trailers were added to the regular four-minute service over the Watertown-Park Street line, and to the six-minute services from Lake Street to Park Street and from Union Square to Park Street. This increase of service provided for through car movements from important subway and elevated transfer stations and certain outlying terminals of the system directly to the ball park, with the result that little congestion occurred on the loading platforms. About 190 cars an hour were operated to the field through the Boylston Street subway at the height of the outward rush, providing a total seating capacity of nearly 20,000 an hour from the down-town district via the underground lines.

The arrangements for supplying cars immediately after the close of the game were highly satisfactory. As described in the ELECTRIC RAILWAY JOURNAL at the opening of Braves Field last year, a prepayment area with trackage facilities for holding twelve two-car trains for immediate use is a prominent feature of the park arrangements. Arriving trains were operated around a loop from Commonwealth Avenue into the prepayment area until the full capacity of the two parallel tracks within had been attained, all passengers being discharged outside the area. Two temporary cross-overs were installed on Commonwealth Avenue between Brighton Avenue and Harvard Street, and a section of the double-tracked line located in the reservation on this avenue was operated as single track, regular cars being flagged through. This released track for the storage of eight trains and five articulated cars within two minutes' run of the park, allowing for stops in loading traffic. Ten trains and three articulated cars were stored on a corresponding temporary single-track section on Brighton Avenue, equally convenient to the grounds; eight trains were stored during the game at Watertown carhouse, ten at Oak Square carhouse, and twelve articulated cars were side-tracked at Allston carhouse.

Prompt work by inspectors at the telephones enabled these cars to be started for the park as soon as the last man was declared out, and in time to load the homeward-bound "fans." As fast as the trains stored on the two tracks of the prepayment area at the field were loaded, additional trains were routed into the area, the average loading period being approximately 1.5 minutes per train. Other extra cars and trains were loaded on the main line tracks outside the grounds.

Twenty minutes after the game the rush was virtually over in the vicinity of the grounds, the total attendance being about 40,000. In the half-hour following the game fifty-six trains and fifteen articulated cars passed through the prepayment area. Many hundreds of private automobiles were parked near the grounds and the police co-operated effectively in handling the street railway traffic. Extra employees of the department of maintenance of way, emergency linemen, inspectors and switchmen manned important points on the main lines to the field.

In speaking of the service the Boston *Globe* stated that "the trolley car arrangements were well-nigh perfect."

COUNCIL PUTS OFF ACTION ON BUFFALO FARES

Little Inclination Manifested to Enter Into Action of Extremely Doubtful Outcome

Action on the recommendation of the corporation counsel of Buffalo, N. Y., urging the City Council to start a proceeding for a reduction in the fare charged by the International Railway from 5 cents to 4 cents within the city, has been postponed until Nov. 9 by a vote of four to one. There appears to be little inclination on the part of four of the five members of the Council to approve the recommendation in view of the situations which prevailed in Cleveland and Detroit during the rate proceedings. Mayor Louis P. Fuhrmann at the last hearing before the Council, asked the corporation counsel for statistics to substantiate his charges of alleged excessive earnings and dividends by the company. The Mayor said:

"You ask for a reduction in fare of 20 per cent, or from 5 cents to 4 cents. The receipts of the International Railway were $6,000,000 last year. You now ask for a reduction of one-fifth that sum or $1,200,000. Have you any figures to show that that is a proper reduction?"

Other members of the Council recalled the so-called Milburn agreement made in 1892 when there were three companies operating in Buffalo—the Buffalo Railway, the Buffalo East Side Railway and the Crosstown Street Railway. This agreement provided for a 5-cent fare with interchange of transfers. It has been ratified by the State Legislature and its provisions are recognized in the public service commission law.

Thomas Penney, vice-president and general counsel for the railway, who has appeared at all hearings, brands the proposal of the city's law department as a mere reprisal against the company because of the latter's civil action to have its alleged exorbitant special franchise assessment reviewed in the courts.

There has been much division of opinion expressed by Buffalo newspapers over the proposed investigation advocated by the corporation counsel in an effort to force the railway to lower its Buffalo city fares. The *Times*, in a recent editorial opposing the investigation, said:

"There ought to be a very thorough understanding of the terms and conditions of the Milburn agreement before the Council becomes too far involved in any litigation with the local public utility corporations. The Milburn agreement has stood since 1892; was ratified by the Legislature, and its provisions are recognized in the public service law of the State. It is all very well to say that it will not be construed to be involved in any of the proposed proceedings, but it is equally possible that able corporation lawyers will involve it because of the closeness of the question, just as they will bring about other very severe entanglements. It would seem to be the part of wisdom for the Council thoroughly to dissect the agreement in the interim during which some of these questions are to be held in abeyance. If the city starts baiting these local corporations it may necessarily mean a battle with all of them all along the line, and the officials should be thoroughly fortified.

"In these battles in Cleveland under Tom Johnson and in Detroit under Mayor Thompson, the first of which was successful and the latter not so much so, the cities were forced to the expenditure of many millions of dollars. Tom Johnson lost his own great fortune, and Detroit was in a municipal riot of one sort or another for upwards of four years. If the city enters into a battle with its public utility corporations, it must go in prepared to fight it out on that line if it takes a decade."

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SUBURBAN FARE INCREASE ALLOWED

New Jersey Commission Grants Request for Increase from 15 to 20 Cents Between Trenton and Princeton

The State Public Utilities Commission of New Jersey has made an order permitting the New Jersey & Pennsylvania Traction Company to increase the rate of fare on its division between Trenton and Princeton from 15 cents to 20 cents, and has dismissed an application by the company for authority to transfer 10,000 shares of capital stock to the Pennsylvania-New Jersey Power & Light Company.

In granting permission to the company to increase its fare to Princeton, the board pointed out that the company's property was worth approximately $575,000. The net profit for the last three years had averaged about $18,000 a year, or a little more than half what the board regarded as a fair return on the investment. The company is still required, however, to sell tickets at the rate of twelve for $1. The board allowed a 5-cent fare to be charged in each of these zones—Trenton to Sand Pit, Sand Pit to Lawrenceville, Lawrenceville to Provinceline, Provinceline to Princeton. The board said that in its opinion the application of the fares mentioned going in either direction between any point in Princeton and the town of Lawrenceville and between any point in Lawrenceville and any point in Trenton should not exceed 10 cents.

The commission, in its report, says that the experience of the company for two years operating the division at a 15-cent fare "demonstrates that the company is still earning less than the return to which the board determined it was entitled in 1913," when the rate was established. The board found in 1913 that the 10-cent rate between Trenton and Princeton was insufficient and fixed the fare at 15 cents for an experimental period of twelve months. That rate was made permanent.

The evidence submitted at a recent hearing, the report says, shows that the net income of the company for the year 1913, after paying taxes, was $18,794; for 1914, $15,451; and for 1915, $17,637. The company, it appears, lengthened its time of running in order to lessen expenses, but even this, the board says, did not change the situation very much:

Continuing the board says:

"The counsel for Trenton frankly admits that the petitioner is not securing a fair and reasonable return. It is objected, however, to an increase of the rate of fare that a competing line charges a fare of 15 cents between Trenton and Princeton and that this petitioner should not be permitted to charge a higher rate than its competitor. This objection ordinarily is an important one, but it must give way when proof of insufficiency of revenue to yield a fair return on its property is adduced by the applicant, and the rate it is proposed to establish does not appear to impose excessive charges for the service afforded.

"It should be noted in this connection that since 1913 substantial improvements have been made in the company's property. New cars of enlarged capacity have been put in operation and the track has been bettered materially. Operating for the greater part of the distance between Trenton and Princeton on private right-of-way the company is able to afford and appears to provide an interurban service, in which large and heavy cars are operated at comparatively high speed. This involves a heavier capital expenditure and a greater expense for maintenance than would be the case where lighter rolling stock is operated at a slower speed. The speedy operation of the new equipment is a detail of the service advantageous to the public and must receive due credit in considering the question of the reasonableness of the company's charges."

The board says that it has adopted the policy recognized by all public utility commissions in the United States that competition between utilities is not to be encouraged because of the inevitable ultimate double burden which must be assumed by the public in the maintenance of the dual system of utilities. The report further says:

"Undoubtedly the existence of a utility in any territory which furnishes satisfactory service is sufficient ground for refusing permission to another utility to enter the same territory. But the policy referred to is of recent origin and the construction of the petitioner's line in the territory served by another line took place at a time when it was the policy of the State to encourage and promote competition in the utility field as well as in all other fields of industry. To deny the company a reasonable return because the State has changed its policy would be an exhibition of bad faith toward the petitioner and an injustice as well."

In its refusal to allow a transfer of the company's capital stock the board says:

"In view of the fact that the New Jersey company in 1913, without the approval of this board, sold to the Bucks County syndicate, the owners of both the New Jersey and the Pennsylvania properties, or some of them now owned by the Pennsylvania company, for $439,445 less than the book value thereof, without a reduction of capitalization or securing permission to set up a property abandoned account, the matter of capitalization and transfer of stock becomes vital. . . . Whether the board will give its approval to a transfer of stock, the only purpose of which is to secure its control by a holding company, which will indirectly be a burden on the New Jersey company, is not now decided."

The board says it wants to be satisfied that the transfer intended will not so intermingle the management and liabilities of the two companies as to make separate operation and supervision practically impossible.

ONE-MAN CAR APPROVED FOR BAY STATE STREET RAILWAY

The Public Service Commission of Massachusetts has issued an order approving the use by the Bay State Street Railway of a type of one-man car closely resembling the Birney design described in the ELECTRIC RAILWAY JOURNAL of March 18, 1916, page 556. The car is to be equipped with double-end control and is 27 ft. 9½ in. long over bumpers. The platform length will be 4 ft. 6 in. and the steps will be of the folding type. Fourteen double cross seats will be provided and the sand box on each platform can be used as a seat. A revolving seat with back is provided on each platform for the use of the motorman. A 26-in. opening will connect the platform and the car interior proper, pipe stanchions being used instead of a bulkhead. A fare box stand will be located slightly to one side of the platform center line, and the car will probably be equipped with 24-in. wheels.

BOSTON TRANSFER HEARING STARTED

The Public Service Commission of Massachusetts gave a hearing on Oct. 6 upon the petition of T. P. King and other patrons of the Boston Elevated Railway for increased transfer facilities at Dewey Square, Boston, in connection with surface lines to and from South Boston. H. B. Potter, assistant to the president, appeared for the company. The petitioners represented a growing manufacturing district and objected to the present limitations placed upon transfers between Summer Street extension cars and various lines passing the South Station.

Mr. Potter emphasized the existing transfer abuses on the system and called attention to the investigation of the company's financial condition now in progress by a special legislative commission, pointing out that some solution of the general transfer problem is necessary. The company maintains that it cannot afford to increase existing transfer facilities at Dewey Square pending the opening of the Summer Street section of the Dorchester tunnel from Washington station to Dewey Square.

In closing the hearing, Chairman McLeod said that the difficulties of dealing with the general transfer situation at Boston along broad lines were great, and that in the main the work of the commission must be associated with the study of specific cases and action thereon. He said:

"It seems to me that the commission is bound to recognize the condition created by the establishment and construction of rapid transit lines, and if the system is to be utilized by the public to its maximum efficiency we cannot expect that after the rapid transit line is built the whole service is going to be duplicated by surface lines. That means bankruptcy to the company—the establishment of a rapid transit line over certain territory must inevitably mean some reduction in surface car facilities if the company is to remain in a proper financial condition to furnish the service the public has the right to expect."

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Key Route Issues Bi-Monthly Publication. — The first issue of *Key System News*, published by the San Francisco-Oakland Terminal Railways, Oakland, Cal., has recently made its appearance. Its aim is "to establish a closer understanding between the management, the employees and the patrons of the Key System," and to act as a "clearing house of information and ideas on transportation needs and problems." The paper is issued the first and fourth Saturdays of the month.

Railway Protests Bus Service.—The International Railway, Buffalo, N. Y., has filed a complaint with the Public Service Commission for the Second District of New York, against automobile owners who are operating a 10-cent motor bus line along the River road from the city line to the Grand Island ferry in competition with the company's stub service car. The Buffalo General Electric Company's new $2,000,000 electric generating plant is being built just north of the city line on the River road and hundreds of employees have been patronizing the motor bus.

"Traveling Conductor" to Study Troubles.—The San Francisco-Oakland Terminal Railways, Oakland, Cal., has appointed one of its trusted employees to the newly-created position of "traveling conductor." It is his duty to travel continuously on the various lines and act as a sort of buffer for alleged complaints from patrons and to assist in any other way possible in increasing efficiency of the platform men and the service generally. He travels in uniform and his title appears on his cap. As the plan has been in effect only a very short time, results cannot be reported at this time.

New Jitney Measure in Effect in Houston.—The new jitney ordinance, requiring an annual license fee of $72 and imposing numerous restrictions as to routes, painted signs on cars, number of passengers, etc., is now in force in Houston, Tex. Only 117 licenses have been issued under the new ordinance, whereas there were more than 500 cars in operation a short time ago. One of the greatest hardships imposed, according to the jitney men, is requiring the cars on the Houston Heights line, which operates from Houston to Houston Heights, either to take out a city license, paying the fee of $72, or to carry only inter-city passengers from a fixed stand in Houston to a fixed stand in Houston Heights.

Additional Testimony Presented in Fare Case.—Additional testimony has been taken by the Board of Public Utility Commissioners of New Jersey in the protest that was filed several weeks ago against the proposal of the Burlington County Transit Company to increase fares on its lines between Mount Holly and Moorestown. The company asked the commission for authority to increase its Mount Holly-Moorestown fare from 15 cents to 20 cents. Some time ago the company was allowed to increase the fare providing it operated additional cars and gave through service. It is alleged that while the company is charging the increased fare, it has not given additional and improved service. Some residents along the line claim that the company, following a serious fire in the carhouse some time ago, purchased second-hand cars and is operating these under the increased fare. The board will announce its decision later.

Writ of Error Denied in Fort Worth Jitney Case.—Application for a writ of error in the case of the Auto Transit Company, *et al.*, versus the city of Fort Worth, Tex., involving the validity of the jitney regulations was refused by the Supreme Court of Texas on Oct. 4. This case originated in the Sixty-seventh District Court of Tarrant County when a petition was filed asking that the city commissioners of Fort Worth be restrained from enforcing the ordinance. A temporary injunction was granted on June 21, 1916, but a permanent injunction was refused after the hearing a few days later. The ordinance was attacked by the jitney men on the grounds that the city had no authority to enact such an ordinance and that the provision of the ordinance requiring an indemnity bond was discriminatory. No written opinion was rendered by the Supreme Court. The case was disposed of by Chief Justice Nelson Phillips and Associate Justice Yantis. Assistant Justice Mawkins did not assent or dissent in the decision, but stated that he would file an opinion in connection with the matter at a later date.

Personal Mention

V. Everit Macy has been elected president of the National Civic Federation by the executive council, to fill the vacancy caused by the death of Seth Low.

B. W. Lynch, formerly assistant general auditor of H. M. Byllesby & Company, Chicago, Ill., has been promoted to the position of general auditor of H. M. Byllesby & Company.

I. W. Ross, formerly connected with the Birmingham-Ensley & Bessemer Railroad, Birmingham, Ala., has been appointed general manager of the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., to succeed C. R. Carter, resigned, as noted elsewhere in this column.

G. R. G. Conway, formerly chief engineer and assistant general manager, and now consulting engineer for the British Columbia Electric Railway, Vancouver, B. C., has left for Mexico City, to represent the bondholders' committees of the Mexican Light & Power Company and the Mexico Tramways.

D. H. Robinson, who on June 1 was appointed overhead superintendent of the Ogden, Logan & Idaho Railway, Ogden, Utah, has been made roadmaster and is filling both positions. Prior to June 1 Mr. Robinson was superintendent of overhead lines of the British Columbia Electric Railway, Vancouver, B. C.

C. R. Carter has resigned as treasurer and general manager of the Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., as most of his time in the future will be taken up in the bond department of Morris Brothers Company, Philadelphia, owners of the property. He continues with the company, however, as vice-president.

William V. Brumby, formerly of the editorial staff of the St. Louis *Republic*, has been appointed editor of the *United Railways Bulletin*, published by the United Railways, St. Louis, Mo., in the interest of its employees. Mr. Brumby succeeds Pope Y. White, who has become connected with the St. Louis *Star*, as noted elsewhere in this column.

Pope Y. White, who has been connected with the United Railways, St. Louis, Mo., for two years as editor of the *United Railways Bulletin*, has resigned from the company to become connected with the St. Louis *Star* in an editorial capacity. Mr. White established the *Bulletin* for the company. Before becoming connected with the railway he was city editor of the St. Louis *Times*. He was engaged in daily newspaper work for fourteen years, advancing from reporter to city editor.

Mason D. Pratt, for nearly four years chief engineer of the United Railways & Electric Company, Baltimore, Md., has severed his connection with that company to resume private practice as consulting and constructing engineer. Mr. Pratt was for many years, during the development of the modern electric railway track, connected with the Lorain and the Pennsylvania Steel Companies. From 1904 to 1913 as consulting engineer in Harrisburg, Pa., he was identified with the rehabilitation work of the Harrisburg Railways, for which company he designed and built the first reinforced concrete carhouses and repair shops so constructed in the United States, as well as a modern power plant which holds a record for continuous, reliable and economical operation. In addition to these, his work included the construction of numerous buildings, bridges, industrial plants, water works, etc. Mr. Pratt will make his headquarters at Roland Park, Md.

Alfred Craven, chief engineer of the Public Service Commission for the First District of New York, was the guest at a dinner at the Harvard Club in New York, given by about 100 friends in honor of his seventieth birthday, which was Sept. 16, 1916. Most of the diners were from the staff of the Public Service Commission, but there were many engineers not connected with the commission, other old friends of Mr. Craven. Among them was William Barclay Parsons, consulting engineer for the Interborough Rapid Transit Company and former chief engineer of the

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old Rapid Transit Commission. Mr. Parsons was the man who built the first subway and Alfred Craven was a division engineer under him. Others from outside the commission who came to do honor to the chief were William R. Wilcox, former chairman, and George V. S. Williams, former member of the Public Service Commission for the First District. Mr. Parsons presented to the guest of the evening a magnificent silver service with the compliments of all those assembled. In the place of speeches, the dinner committee provided vocal and instrumental music.

C. W. **Squier** has resigned as assistant engineer for the New York Municipal Railway, Brooklyn, N. Y., to accept the appointment of assistant electrical engineer with the Public Service Commission for the First District of New York. Mr. Squier was graduated from the University of Michigan with the degree of bachelor of science in electrical engineering in 1898. Since then he has been engaged in electric railway engineering. For four years he was with the General Electric Company as designer of control apparatus, later becoming head designer of multiple-unit train control for the company. He was also connected with the Sprague Electric Company as designing engineer at the time that this company was the pioneer in multiple-unit control apparatus. In 1904 he went to England as electrical engineer on railway apparatus for the British Westinghouse Electric & Manufacturing Company, and while there designed that company's type "T" line of railway controllers, which has since remained standard for tramway work. Mr. Squier returned to the Pittsburgh works of the Westinghouse Company at the time the first New Haven single-phase locomotive was introduced. He followed the testing and equipping of these locomotives as engineer. In 1908 he became engineer for the mechanical department of the Brooklyn Rapid Transit System and since that time has been engaged in operating engineering work for the company and the New York Municipal Railway, which is included in the Brooklyn Rapid Transit System. Mr. Squier has contributed many articles on railway subjects to the ELECTRIC RAILWAY JOURNAL, among them a series, "Equipment Defects," which attracted special attention.

OBITUARY

W. T. **Woodroofe**, who was connected with the British Columbia Electric Railway, Vancouver, B. C., from 1908 to 1912, was killed in action in France while serving with the Canadian forces, according to recent dispatches. After he resigned from the British Columbia Electric Railway, Mr. Woodroofe became city electrician of Vancouver and later superintendent of the municipal railway at Edmonton. Shortly after war was declared he joined the Fifty-fifth Battalion of Edmonton. Two weeks after arriving in England he was transferred to the Victoria Rifles of Montreal. Mr. Woodroofe was born in England. He took up his residence in British Columbia when a young man.

Virgil Gay Bogue, formerly consulting engineer of the Department of Public Works of New York City, died suddenly on Oct. 14 on the Ward Line steamship Esperanza on which he was returning from Mexico. Mr. Bogue was born in Norfolk, N. Y., more than seventy-one years ago, and was graduated from Rensselaer Polytechnic Institute at Troy, N. Y., in 1868 with the degree of C. E. Mr. Bogue managed much important work during his long career. He made the examination and report on the cost of reproducing the lines of the Southern Pacific in Oregon; he prepared the plans of the tidelands and the waterfront improvements of Seattle, Wash.; he was a member of the commission appointed by President Harrison to investigate and report on methods of improving the navigation of the Columbia River at The Dalles and Celilo Rapids; he made the examination and report on the cost of revisions and improvements of the Tehuantepec National Railway of Mexico and its port facilities and the comparison of its improved route with the route of the Panama Railway. In addition to being the consulting engineer of the Department of Public Works in New York, Mr. Bogue was a member of the committee appointed by Mayor Strong to determine the feasibility of operating surface cars on the Brooklyn Bridge. He was one of the commission appointed by the president of the Long Island Railroad to report on the feasibility and cost of a tunnel beneath the East River.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Knoxville (Tenn.) Interurban Railway.**—Application for a charter has been made by the Knoxville Interurban Railway to construct a line from Vestal, south of Knoxville, to Marysville, about 13 miles. Capital stock, $10,000. Incorporators: M. T. DeVault, Norman B. Morrell, E. R. Oates, John H. Knox and John W. Hudson.

***Hopewell & City Point Railway, Hopewell, Va.**—Incorporated to construct a line about 2½ miles long. Capital stock, minimum, $10,000; maximum, $50,000. Officers: James C. Rees, Jr., president, and T. Tyler Ellis, secretary and treasurer, both of Petersburg.

FRANCHISES

Cleveland, Ohio.—The Cleveland, Southwestern & Columbus Railway brought suit in the Common Pleas Court at Cleveland on Oct. 13, to compel the County Commissioners to grant it a franchise to cross certain county highways in building its track around Berea. The Commissioners some time ago refused a franchise without certain grade-crossing eliminations.

San Angelo, Tex.—The Interstate Electric Corporation of New York will operate the electric traction lines in San Angelo under the proposed franchise recently submitted by the city authorities, if the taxpayers of the city approve that franchise in a referendum election. Acceptance of the franchise will mean the immediate expenditure of $125,000 in improvements and betterments to the present street car lines in San Angelo.

Steilacoom, Wash.—The Pacific Traction Company, a subsidiary of the Puget Sound Traction, Light & Power Company, has received a franchise from the City Council to construct, maintain and operate a single or double-track street railway on the following route: on Steilacoom Boulevard, between the town limits of Steilacoom and Starling Street; thence along Starling Street to and into Steilacoom Street; then along Steilacoom Street to and into Union Avenue; thence along Union Avenue, to the intersection of Union Avenue and Lafayette Street; also, consenting to the abandonment of operation of the present line of the Tacoma Railway & Power Company on Lafayette Street, between Wilkes Street and the town limits of Steilacoom, and to the removal of tracks and appurtenances from Lafayette Street, between Wilkes Street and the northerly town limits of Steilacoom. This franchise shall not be considered or construed as an exclusive franchise, the town of Steilacoom reserving the right to grant similar rights and privileges to other persons and incorporations.

TRACK AND ROADWAY

Edmonton (Alta.) Radial Railway.—It is reported that the city of Edmonton plans to spend about $75,000 for extending its street-railway lines.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—It is reported that this company will construct an extension on San Pablo Avenue from Grand Canyon Park up San Pablo Canyon to the new dam of the Peoples Water Company, about 6 miles.

***Havana, Cuba.**—A presidential decree has been granted for the construction and operation of an electric railway between Matanzas and Havana. This road will be about 60 miles long. It is understood that the road will operate at first with steam power and that electrification will be begun in 1917. The concession is held by the Hershey Corporation, a Delaware corporation whose president is Milton W. Hershey. Address Mercaderes 36, Havana.

St. Louis-East Side Belt Terminal Railway, East St. Louis, Ill.—Application has been made by the St. Louis-

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East Side Belt Terminal Railway to the Board of Public Service of St. Louis to use the free bridge when it is completed. It is stated that the company plans to take over the holdings of the Southern Traction Company and operate an electric line from Belleville and other Illinois cities to St. Louis. [July 29, '16.]

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—It is reported that work will be begun in the early part of November by the Southern Illinois & St. Louis Railway on its proposed line from Marion through Harrisburg, Herrin, Benton and West Frankfort to Johnson City. It is estimated that the line will cost about $3,000,000. W. H. Schott, Chicago, president. [April 1, '16.]

Kankakee & Urbana Traction Company, Urbana, Ill.—Work will be begun in the spring by the Kankakee & Urbana Traction Company on the construction of an extension from Paxton to Kankakee, and work of securing the right-of-way will be begun as soon as complete plans are made.

Terre Haute (Ind.), Indianapolis & Eastern Traction Company.—It is reported that the Terre Haute, Indianapolis & Eastern Traction Company will spend $45,000 in raising its tracks 7 in. from Richmond to Indianapolis.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company reports that it is in the market for a second-hand deck girder bridge about 60 ft. long.

Cumberland Traction Company, Edmonton, Ky.—A number of citizens of Metcalf County, Ky., have purchased the property of the Cumberland Traction Company, which was in the hands of Master Commissioner A. J. Thompson, and will endeavor to sell it to some company which will complete it. About $75,000 had been spent and 2 miles of track have been graded on the proposed line between Edmonton and Horse Cave. [Oct. 30, 1915.]

Detroit (Mich.) United Railway.—Operation was begun Oct. 15 on the Kercheval Avenue extension, which includes tracks on Kercheval Avenue from St. Jean to Hart, on Hart to Jefferson and on Lycaste, from Jefferson to Kercheval Avenues. The construction of this extension makes a direct connection between the Sherman and Jefferson Avenue lines.

Michigan Railway, Kalamazoo, Mich.—This company will reconstruct its tracks on South Washington Street from the tracks of the Grand Trunk Railway to Ridge Street.

***Biloxi, Miss.**—Plans are being made by the Biloxi Vegetable and Fruit Growers Association for the construction of a line from Biloxi to Ocean Springs, 8 miles. W. A. Reno, president.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company plans to construct an extension from Twenty-fourth and O Streets to Nineteenth and W Streets.

Morris County Traction Company, Morristown, N. J.—A report from this company states that it has placed a contract for one mile of 7-in. T-rail to be used in the construction of second track from Maplewood to Millburn.

International Railway, Buffalo, N. Y.—This company has been granted permission by the City Council to lay electric conduits in Twenty-fourth Street from Allen to Buffalo Avenue, Niagara Falls.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—The residents of Akron, N. Y., have petitioned the Buffalo & Williamsville Electric Railway to extend its lines from Williamsville to Akron. The company now operates a line between Buffalo and Williamsville and officials of the company are inclined to build the desired extension.

***Asheville, N. C.**—It is reported that surveys are now being made under the direction of the J. G. White Engineering Corporation, New York, for an electric railway from River Falls, S. C., to Asheville, about 60 miles. W. A. Smith, Hendersonville, N. C., is reported interested.

Cleveland, Alliance & Mahoning Valley Railroad, Alliance, Ohio.—It is reported that this company plans the construction of an extension to Hudson.

Cleveland (Ohio) Railway.—This company plans to construct an extension on Lakeside Avenue from Ontario to East Ninth Street.

Oakwood Railroad, Dayton, Ohio.—This company has applied to the Public Utilities Commission for authority to issue $10,000 in bonds, the proceeds to be used for improvements.

Dover (Ohio) Millersburg & Western Railway.—This company plans the construction of six bridges in connection with its proposed line from Dover to Millersburg. D. F. A. Wheelock, Woodward Building, Warren, Pa., engineer. [July 29, 1916.]

***Lorain, Ohio.**—It is reported that plans are being considered by the Board of Commerce of Lorain for the construction of an electric railway to connect the residence and business districts with a new industrial center on the East Side.

***Troy, Ohio.**—Plans are being considered by the Troy Chamber of Commerce for the construction of an electric railway between Troy and Pleasant Hill and probably to Greenville.

Oklahoma Railway Company, Oklahoma City, Okla.—This company has placed a surveying crew in the field for the purpose of locating a line northeast from Guthrie to Langston, Coyle, Perkins and Stillwater for an extension of the interurban line. The proposed new line will traverse a rich agricultural section and also touch two important state institutions, including the Oklahoma Agricultural and Mechanical College at Stillwater.

Tulsa (Okla.) Street Railway.—Plans are being made by the city of Tulsa and the Tulsa Street Railway to repair the Third Street viaduct. The cost is estimated at about $6,071.

Pacific Power & Light Company, Astoria, Ore.—This company has informed the City Council that it is ready to extend its line over Date Street as soon as the improvements under way on that thoroughfare are completed.

Wilkes-Barre & Hazleton Railway, Hazelton, Pa.—It is reported that the Wilkes-Barre & Hazleton Railway plans to construct an extension from Hazleton to Tamaqua. The new line would branch off from the present line near Black Ridge and then pass through Cranberry, Tresckow to Quakake Valley. It would extend to the Tresckow Waterfalls and would also pass over a steep grade on Quakake Mountain.

Hershey (Pa.) Transit Company.—This company reports that it is building two small reinforced concrete bridges near Campbelltown.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—This company is reported to be considering the purchase and electrification of the Pittsburgh, Lisbon & Western Railroad, extending from New Galilee to Lisbon, in addition to the plan of an extension from Darlington, through East Palestine and New Waterford to conenct with the Youngstown & Southern Railway at Columbiana.

Womelsdorf (Pa.) Richland & Myerstown Street Railway.—The Lebanon Valley Construction Company has the contract for the construction of this company's line from Womelsdorf and Myerstown to Richland, 8 miles. [Sept. 30, '16.]

***Greenville, S. C.**—Preliminary surveys are being made for the construction of an electric railway from Greenville to Asheville, N. C., via Hendersonville. Russell N. Edwards, Indianapolis, is interested.

Dallas (Tex.) Northwestern Traction Company.—Work will be begun by this company early in November on the construction of its proposed line from Dallas to Krum. It is proposed eventually to construct the line to Wichita Falls. E. P. Turner, Dallas, president. [Sept. 9, '16.]

El Paso (Tex.) Electric Railway.—This company has asked the City Council for authority to place its wires underground in the downtown district.

San Antonio, Gonzales & Houston Interurban Company, Houston, Tex.—A contract has been awarded by the San Antonio, Gonzales & Interurban Company for the construction of its line between Houston and San Antonio to T. D. McAughan at about $600,000. Steeve Holmes, Leesville, Tex., president.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—Vories P. Brown, president of the San Antonio & Austin Interurban Railway, reports that construction on this company's line to connect San Antonio and Austin will be begun before the end of the year. The project has been

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held up by the European war, but financial backing has now been assured. [Jan. 20, '16.]

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The Board of Public Works, at a recent meeting, granted the petition of the Puget Sound Traction, Light & Power Company to reconstruct its track on Lakeside Avenue and East Sprague Street.

West Virginia Traction & Electric Company, Wheeling, W. Va.—It is reported that this company contemplates the construction of an extension to Morgantown.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company has sold a considerable part of its twenty-acre tract at Seventh and Central Avenues to the wholesale Union Terminal Company and will change the location of its carhouses now occupying the ground sold, to the eastern part of Los Angeles, near Echandia Junction. A similar carhouse will be constructed at Watts. The cost of the new carhouses will be approximately $120,000. The shops of the company will be removed to Torrance.

Illinois Traction System, Peoria, Ill.—A new station will be erected by the Illinois Traction System at Mount Olivet.

International Railway, Buffalo, N. Y.—This company has awarded a general contract to John Moon, Lockport, for the construction of a new passenger terminal in Lockport. The structure will be of concrete and steel construction and will replace the present frame building which has been in use for thirty-five years. Work will be started at once. The new station will be used by the Buffalo & Lockport and Lockport & Olcott divisions of the International Railway and by the Buffalo, Lockport & Rochester Railway. The cost will be about $23 600. The International Railway and the New York Central Railroad will construct a joint passenger terminal for interchange facilities at Burt, N. Y. The Lockport & Olcott division of the International Railway crosses under the Ontario division of the New York Central Railroad at Burt, but the two stations have been almost ½ mile apart. Under an agreement reached, a shelter-house 12 ft. long and 8 ft. deep with an overhanging roof will be built on the New York Central Railroad's right-of-way; a 4-ft. wide stairway will be constructed from the steam tracks to the cut of the electric line and a platform 25 ft. long and 4 ft. wide will be laid along the International Railway's tracks.

Hershey (Pa.) Transit Company.—A report from this company states that it has just completed a new carhouse with a capacity for thirty-five cars.

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has broken ground for a new carhouse at Ravenna Park, near Milwaukee. The new building will replace the old Farwell station, which was erected at North and Farwell Avenues in 1888, when the company was operating horse cars. Included in the facilities in this carhouse will be a running repair shop, car cleaning and washing bays and car storage space. A substation will also be erected on this site to serve East Milwaukee and White Fish Bay, and provisions will be made in this building for the station offices and employees' club rooms.

POWER HOUSE AND SUBSTATIONS

Connecticut Company, New Haven, Conn.—A building permit has been granted the Connecticut Company for the construction of an addition to its power house in Grand Avenue. The structure will be 78 ft. x 148 ft., two stories and of fireproof construction. It is estimated that the new plant, complete with equipment for producing power, will cost about $250,000.

Albia Light & Railway Company, Albia, Iowa.—Preparations are being made by the Albia Light & Railway Company for remodeling its plant. New equipment will include one 100-kw. and one 350-kw. generating unit for light and power, one 200-kw. generator to supply energy for the railway, and three 250-hp. water-tube boilers.

Dover, Millersburg & Western Railway, Dover, Ohio.—This company, which proposes the construction of an electric railway between Dover and Millersburg, will construct a power house and two substations. D. F. A. Wheelock, Woodward Building, Warren, Pa., engineer.

Manufactures and Supplies

FOREHANDEDNESS DESIRABLE IN BUYING

Manufacturers Striving to Make Deliveries—Roads Should Co-operate—Better Prices and Quicker Delivery Will Result

Production is now the watchword in manufacturing circles. Raw materials are high priced and hard to obtain and labor is extremely scarce, so that every manufacturer, big or little, must be on guard to accelerate the progress of all jobs in his plant. This driving spirit which now pervades the manufacturing industry to a greater extent than ever before has brought forth opinions and helpful suggestions pointing toward the betterment of the existing relations of railways and producers of railway supplies.

Many manufacturers stress their organizations and ingenuity to the limit in their endeavor to speed up production only to have their successful efforts nullified by slow freight delivery. In like manner, by strenuous manufacturing efforts, deliveries are made, and then it is learned that the road has not received the complementary materials. Thus one manufacturer's efforts have been for naught because another's delivery was slow or, more likely, because of a lack of systematic ordering by the purchaser.

This has happened so frequently of late that the sales forces of the supply side of the industry are preaching to their customers "forehandedness in buying" at a risk of engendering enmity or at least of straining the harmonious relationships of earlier years—years when any order of any size was welcome, no matter "if it had to be delivered yesterday."

The situation to-day, with the innumerable delays in delivery due to lack of raw materials, car shortage, etc., will no doubt result in an improvement in future buying methods, and benefits will accrue to both buyers and sellers.

One well-informed salesman, in making comparisons with the buying methods in the electric railway and in other industries, characterized the situation as follows: "The average electric railway makes its purchases in a hand-to-mouth way, but as soon as it places an order it puts pressure on the manufacturer in an endeavor to get quick delivery. The electric roads as a class don't look far enough ahead for their construction and maintenance materials. They don't show the forehandedness that is evident in the steam railroad or electric power industries. If the electric railways paid more attention to purchasing their supplies ahead of the time of actual use, that is, sent out specifications, a reasonable period in advance of the purchase dates, they could get better prices and the manufacturer could give better quality and quicker deliveries."

This article was written in a spirit of helpfulness. The same motive actuated the author of the foregoing statement, and if by discussion of this subject of forehandedness in buying, both buyer and seller are helped, this article will indeed have been of service.

It might be well to consider in detail some of the conditions confronting the average buyer. He must first learn what he needs to buy. This information comes from various associates in the other departments of his property. The authority for the expenditure must be given, and the degree of need for the article will establish the requirements for the time of delivery. Unless his associates are well organized the purchasing agent of an electric railway has considerable official work to do in his own organization before he can afford to call in bidders on the material needed. Thus it is seen that the matter of forehandedness in buying is not alone a question for the purchasing department but for the entire engineering and operating staff.

Lack of definiteness in specifications, demands for quick delivery and haste in placing orders, all combine to involve a purchase. If a road waits until the last minute before calling in the manufacturers it often happens that sufficient time is not available in which the salesmen can go to the actual bottom of the proposition and make really close estimates on cost, profit and delivery. Thus the road may not

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have the advantage of final figures from the maximum number of bidders, nor, in the haste for delivery, can the long-time-service basis be used in deciding which material should be purchased. Materials of lowest first cost and of least long-time efficiency usually can be delivered quickest. And so, by delay in buying, a road is sometimes forced to make purchases that otherwise would not be considered. This means increased ultimate cost.

There are instances in which emergencies demand quick delivery. Manufacturers exert every resource to meet these cases. But such orders could much more readily be filled by the manufacturers as a group if a policy of earlier attention to future needs was regularly followed by the railways.

Take, for example, heating and ventilating equipment for cars. Most orders for such material for maintenance and reconstruction uses are being placed now, although they should have been under active consideration in June or July. "Load factor" and "rush hour" problems are just as important to the manufacturer as they are to the railway operator. It has been noticed year after year that the first cold snap of fall brings forth inquiries for heaters and ventilators that might just as well have been discussed by buyer and seller months before when the manufacturer's plant was working part time. On the contrary, a rush comes to his plant in the fall and early winter, and he must run double time. This means a higher average cost for the year's output and a lessening of the rigidity of inspection, for both of which the manufacturer could properly charge the customer. Also it means difficulties in making deliveries. This argument applies to any other seasonable supply just as much as it does to heating and ventilating equipment.

Another point to be considered here is this: Why do some roads order cars for delivery in the spring and summer and yet not specify the heater equipment until fall? Why not order such material earlier and specify future delivery, thus giving the manufacturers' plants a more even load factor and enabling them to produce a product of higher quality? Contract delivery dates could more easily be met, and the cost to the road would be the same. Such orders are paid for on or after delivery, so the only extra cost to the road would be the small effort necessary to advance the date of ordering.

These thoughts are based on the experiences of several years, not on those of the present year when deliveries of raw materials to the manufacturer and finished supplies to the railways have been most uncertain. Reserve stocks were available in 1915 with which to fill the comparatively small orders placed that year, but in 1916 conditions have changed. No warehouse stocks are now available, and the roads have ordered fully twice as great a volume of supplies, so that now no one may safely guarantee prompt deliveries.

It is thought that the present situation with regard to deliveries will have its educational effect, an effect which it is to be hoped will assure greater forehandedness in the buying of electric railway supplies.

INCREASE IN THE PRODUCTION OF LUMBER FOR THE CURRENT YEAR

For the first eight months of 1916 as compared with the same period in 1915, there was an increase of 13.5 per cent more lumber produced and 10.5 per cent more lumber shipped, according to an official statement by the secretary of the National Lumber Manufacturers' Association, Chicago, Ill. This statement was based on reports from more than 500 firms. The total production in 1916 will be approximately 42,000,000,000 ft.

ROLLING STOCK

Cleveland (Ohio) Railway is reported to be in the market for 250 cars.

Detroit United Railways, Detroit, Mich., is contemplating the purchase of 100 cars for city service.

Lake Shore Electric Railway, Cleveland, Ohio, is said to be in the market for fifteen 60-ft. cars.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., is said to be in the market for three interurban cars.

Long Island Railroad, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Sept. 9 as being in the market for forty-five trail cars and fifteen coaches, has ordered this equipment from the Pressed Steel Car Company.

New Jersey Motor Transportation Company, Newark, N. J., has ordered thirty auto-buses from the George C. Marx Company, Brooklyn, N. Y., to be used in and around Newark, N. J. The buses will have a capacity of thirty passengers each.

Michigan United Railways, Jackson, Mich., is reported as considering the purchase of forty trail cars and is receiving this month from the St. Louis Car Company twenty new cars which will be distributed among the local railway properties at Lansing, Kalamazoo and Battle Creek.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., has purchased a snow plow from the Wason Manufacturing Company to be used on interurban service. This is an eight-wheel snow plow with a 30-ft. body, and is somewhat unusual on account of having side wings 5 ft. high extending from the heel of the plow back to the center of the journal box. It will be operated by GE-201 box-type motors, K-35-G controllers, and GE air-brake equipment. Delivery is to be made by Dec. 15, 1916.

TRADE NOTES

L. S. Brach Supply Company, Newark, N. J., has discontinued its branch office, 142 Liberty Street, New York, N. Y., and hereafter all offices will be consolidated at the factory, 127-129 Sussex Avenue, Newark, N. J.

The Ellcon Company, New York, N. Y., has received an order to equip twelve cars being built by the Osgood-Bradley Car Company for the Union Street Railway of New Bedford, Mass., with the Ellcon white porcelain enameled stanchions.

Holden & White, Chicago, Ill., through their Eastern agents, the U. S. Metal & Manufacturing Company, have received an order from the Public Service Railway, Newark, N. J., for 400 Garland ventilators. They have also received an order from the Elmira Water, Light & Railroad Company for four Johnson type "B" fare boxes.

Goldschmidt Thermit Company, New York, N. Y., has nearly completed its first contract with the Public Service Railway of New Jersey which is for 200 welded rail joints made by the thermit insert process. The joints are being installed on Maple Avenue, Merchantville, N. J. The tracks on this street are being relaid, using Pennsylvania Steel Company 80-lb. rails, section 238. On completion of the welding one of the equipments comprising a rail grinder, a squeezing machine and a set of crucibles, preheaters and molds is to be kept in the Camden district and a similar equipment will be kept in the Newark district.

Lord Manufacturing Company, New York, N. Y., reports the receipt of the following orders: six Lord screenless air cleaners from the Boston & Worcester Street Railway, Boston, Mass.; six Q.-P. trolley catchers from the Worcester Consolidated Street Railway, Worcester, Mass.; ten Q.-P. trolley catchers from the Monongahela Valley Traction Company, Claremont, W. Va.; fifty Q.-P. trolley catchers from the International Railways, Buffalo, N. Y.; 152 Giant brakes from the Public Service Railway, Newark, N. J., and Giant brakes from the American Car Company for use on the new cars of the Pekin (Ill.) Traction Company.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, has issued a pamphlet on the Crouse-Hinds Imperial incandescent headlights for interurban service.

The Eureka Company, North East, Pa., has issued a catalog on trolley wheels. Among the latest developments in trolley wheels illustrated are the bushingless wheels and an improved type of sleet cutting wheel.

Chicago Pneumatic Tool Company, Chicago, Ill., has just issued bulletin E-44 superseding bulletin E-31 on Duntley electric portable tools, which include sensitive drilling stands and heavy duty side spindle drills.

Whiting Foundry Equipment Company, Harvey, Ill., has issued catalog 110 describing and illustrating their electric traveling cranes, Gantry traveling cranes, electric mono-rail trolleys, and jib cranes. A large number of illustrations show the various appliances of this company installed on electric railways, industrial and central station plants.

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Electric Railway Journal

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SAVINGS BANK INVESTMENTS

Preparedness is the order of day, and the Investment Bankers' Association of America has not failed to do its share. Foreseeing the time when utility bonds will more generally join the select list of savings-bank investments, the association has outlined certain fundamentals that should aid state legislatures in framing new eligibility laws. The move is wise, for with the present low yields on many legal investments it is quite likely that savings banks will increasingly turn elsewhere to secure the necessary income, and the record of utility bonds entitles them to recognition first. Criticism can hardly be directed against the spirit of the proposed standards, for they are meant to insure only that fair margin of safety, that reasonable relation of property value to bond issues and that justified directness of lien which are demanded by sound financial policy. The real test of the standards, however, must come from their application to actual conditions, and here electric railways and other utilities have a double duty to perform. They should give to their financial reports the uniformity and clarity desired by investment bankers, and they should aid the bankers by applying the standards to their own bonds. If deserving issues are excluded thereby, the bankers want to be so informed, and their request should be granted without delay.

ENCOURAGING FARE INCREASES

Three New England decisions authorizing fare increases above the 5-cent unit to 6, 7 and even 8-cent bases, as noted in the issue of Oct. 14 and elsewhere this week, are most encouraging evidence that the financial necessities of electric railways are becoming more and more appreciated by commissions. Two of these findings concerned interurban roads in New Hampshire serving Manchester, Nashua and Derry in close competition with the Boston & Maine Railroad. The third decision affected the Massachusetts Northeastern Street Railway, the rehabilitated "Lovell" system of the Merrimac Valley. In all these cases the commissions found that the companies were not earning anything like a fair return upon an honest investment, and that the requirements of depreciation as well as the rights of the security holders justified the proposed increases, since all three roads were found to be operated efficiently. Service rendered at a loss, or even at an income barely meeting running expenses and bond interest, was regarded as worthy of better compensation. It is interesting to note that in judging the fare units one commission drew a sharp distinction between the problems of the city road and those of the country or interurban electric railway. Moreover, a very significant utterance is the one of the Massachusetts commission, which states that a company which has foregone dividends for a considerable period in order to provide adequately for maintenance, has an excellent claim for a return upon its common stock materially higher than 6 per cent. All in all, the decisions bear every evidence of thorough and courageous work on the part of the commissions, and indicate a sane understanding of electric railway economics.

LOOKING TO THE FUTURE

Although in the last few years various commissions have granted increased fares to electric railways, as in the three recent instances above noted, the public as a whole is still far from being disabused of the idea that it is entitled to a fixed 5-cent fare, regardless of the rising costs of production. Especially is this true of urban transportation. For this reason we welcome every speech, decision or practice that tends to keep the concept of "cost" before the public mind, while at the same time we must deprecate all movements involving a neglect of this concept. In the latter regard a pertinent example is that of the abolition of the 8-cent exchange tickets under the proposed Philadelphia rapid transit ordinance, mentioned in the issue of Oct. 14. Some of these tickets may have been discriminatory, but on the average they probably no more than paid for the service rendered. The burden of their abolition may be lightened or removed by sinking fund and tax concessions, but the departure from principle is still there. In abolishing such tickets in the interest of a flat nickel fare, the proposed ordinance tends to disregard that fundamental cost principle which is certain to demand more open consideration in city transportation before the expiration of the fifty-year life of the ordinance. In this and other cases of outlining a transportation policy for years to come, it is hardly wise to allow present-day customs fully to restrict the future development of progressive ideas. It is as important to cities as to railways that the latter have at all times the assurance of an opportunity for untrammeled growth without having to pay for the privilege of serving the public.

THE VEHICULAR TRAFFIC MENACE

It is noteworthy that at both the National Safety Congress, last week in Detroit, and at the Claims Convention, the week previous in Atlantic City, special attention was directed to the growing menace to safety in the streets from automobile traffic. With the Ford factory turning out cars at the rate of more

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than 2000 per day and other factories in proportion, it is no wonder that the effects of traffic congestion are being found in our large cities. Another serious factor of the situation is that with such a multiplicity of cars, all degrees of recklessness in driving may be expected. Obviously the danger is not confined to any one class of occupants of the street. All are involved—the pedestrian, the local railway company and the users of all other vehicles. Hence, in its demand for some amelioration of this growing evil, the railway company is not acting alone. In this effort it should, and we believe will, receive the hearty support and assistance of all. The remedies are not so easy to enumerate, but some are obvious. They should begin with better control of vehicular traffic, stricter discipline of careless vehicle drivers, and more rigorous requirements for driver licenses. With these regulations there should be some means for reducing the parking evil in the more congested streets, forbidding the practice in many of them and possibly excluding automobiles entirely from the most congested streets, at least during certain hours. While, as we have said, all classes of the community are concerned in these reforms, the railways which are so vitally concerned can well lead the movement.

INTERURBANS IN THE LIGHTING BUSINESS

The sale of electric energy by interurban railways to the small towns along their routes, as outlined in our leading article of this week, has been demonstrated to be a thoroughly effective means for increasing revenue. Although the returns from any one community may appear at first glance to be petty, the aggregate may easily constitute an appreciable fraction of the railway company's income, and under proper conditions the business should be very much more profitable than transportation.

In the performance of this service an interurban railway has the primary advantage of an existing transmission system that frequently is supplied from a power station of considerable size, and it is therefore able to offer lower rates than a small local lighting plant. In addition, the influence of the diversity factor makes it just as logical for the interurban railway power station to supply small lighting systems as it is for large lighting and power companies to furnish energy for small railway properties. From the standpoint of theoretical economics, perhaps, the ideal arrangement would be that where a large power company extended a network of line to supply a whole district, including railways as well as the towns within a wide radius, as is done in western New York. But, unfortunately, such conditions are the exception rather than the rule, and there are many communities wherein the only source from which electric light and power may be obtained is either the interurban railway that passes through the town or a small and inefficient isolated central station. Of the two the railway is infinitely preferable.

Apparently, entry into such a lighting and power business is one of the easiest things that an interurban railway can do. All that seems to be necessary is to express a willingness to supply energy and the community does the rest. There is, however, one feature that is worthy of careful consideration, and that is the making of rates. These must be in such form that, no matter what vagaries the all-important element of load factor may assume in the future, the business may always be conducted at a profit. At the present time, when many interurban railways have surplus generating capacity, it is possible for a company to make extraordinarily low rates and still show a profit. But such conditions will hardly obtain five or six years hence, and a company that undertakes long-term lighting contracts at low rates merely to dispose of surplus power that it happens to have immediately available is likely to be deceiving itself as to the future success of the enterprise.

USING REBUILT EQUIPMENT

The high prices and slow deliveries which have prevailed relative to new equipment of all kinds during the last two years have led many electric railways to rebuild and place in active service old rolling stock equipment that otherwise would have found its way to the junk pile. Old motors are heavier and less efficient and cost more to maintain than do new ones. Old cars, while they may, in some cases, be equipped with modern safety devices and made fairly presentable at a reasonable cost, after all are not as good as new. While the operating and maintenance charges, measured in cents per car-mile, are therefore higher for rebuilt than for new equipment, the use of rebuilt equipment for certain services may in some cases be justified from an economic standpoint.

This is particularly apt to be true for equipment used in rush-hour and special services on small and medium sized roads where the peak-load periods are of short duration. And the reason is high fixed charges, or charges such as interest, taxes, depreciation, etc., which go on accumulating whether the wheels turn around or not. For new equipment these charges, measured in cents per car-mile, are higher than one might expect. For example, on a $4,500 car operated two hours per day at a schedule speed of 8 m.p.h., and with the sum of these charges assumed as 16 per cent of the cost, they are approximately two and one-half 5-cent fares per car-mile. And with the present interest and tax rates and rapid evolution in car design, 16 per cent for fixed charges is not by any means excessive.

In a steam power plant which is used in reserve service and carries load for only a few days in the year, economy in operation and low maintenance costs are of little importance as compared with low fixed charges. As with the reserve power plant so it is with rush-hour equipment, it being, of course, assumed that the matter of reliability always has due consideration. In any event, good engineering dictates that before a change of any kind is made, whether in the way of supplanting old equipment with new or of rebuilding the old, the costs entering into the proposed change should be correctly counted.

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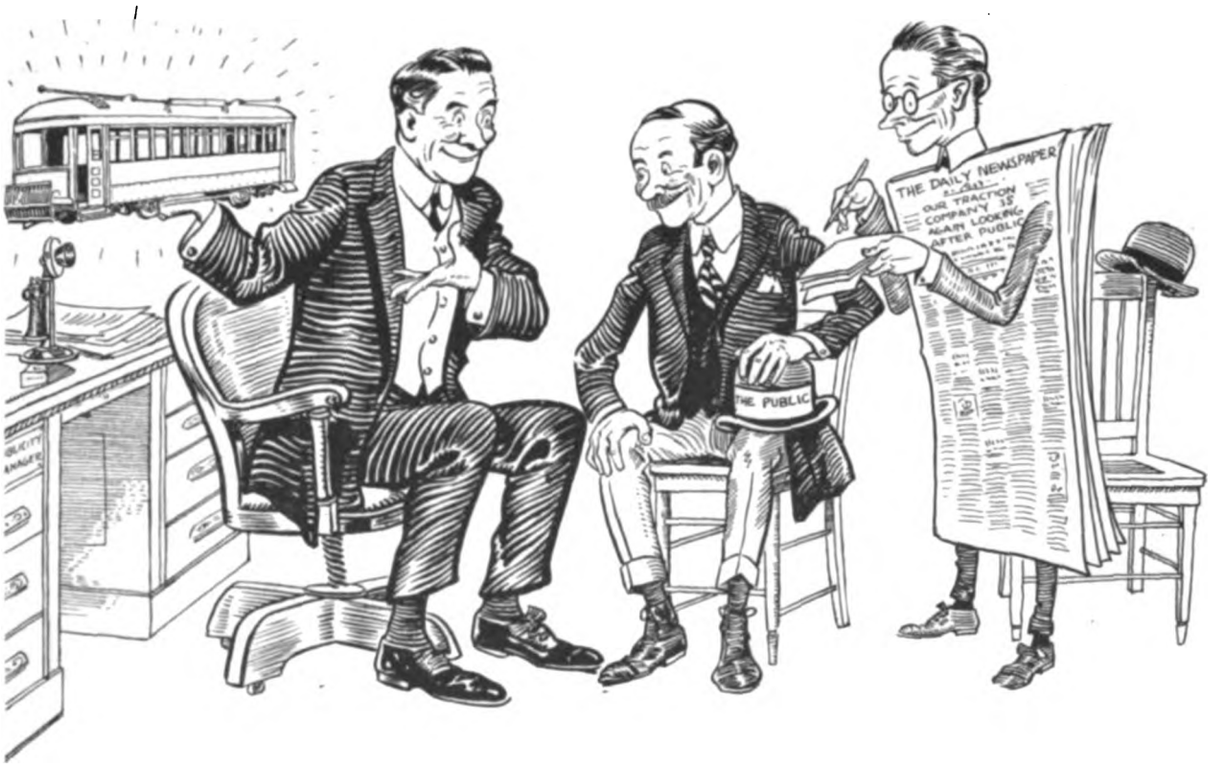
What Is a Publicity Man?



The Publicity Man Discussing Matters with the Public and the Press

TO make a rabbit pie it is first necessary to catch your rabbit.

It is the same with publicity; you must first catch the right man to make the campaign.

If you do not happen to have an embryonic E. H. Gary on your staff, a publicity man is most likely to be found in a local newspaper office.

But all newspaper men are not good publicity men.

A lot of disappointment has been caused by the hiring of reporter press-agents on the vague theory that they know the newspaper game.

Don't hire any man unless he has ENOUGH SIZE AND WEIGHT to make his superiors allow him to do the right thing in spite of their prejudices and previous habits in dealing with the public.

The publicity man who merely gives out what is handed to him by his boss isn't worth having around.

Neither is the man who thinks of his work only in the terms of what, from the newspaper point of view, is a good story.

The successful publicity man must have the corporation as well as the newspaper viewpoint.

And he must be big enough to be taken into and MADE A PART of a public utility organization. Just as much a part of it as the general counsel.

The worth-while publicity man must ask himself every day: What's wrong? What's right that people think is wrong?

What is complained of that is not our fault? How can I prove it?

And then he must prove it, and re-prove it and then prove it again.

He must plan, prepare the public mind for things to come and make the newspapers want to come to him before they go off half cocked.

These are some of the things that a publicity man is and must do.

He is not a miracle worker; he can't suppress news or put anything over on the newspapers.

He can't change hostile public opinion in a day.

But he can, if you will give him a chance, secure for any decently-conducted corporation a square deal from press and public.

EVERY PUBLIC SERVICE CORPORATION NEEDS A PUBLICITY MAN IN ITS BUSINESS.

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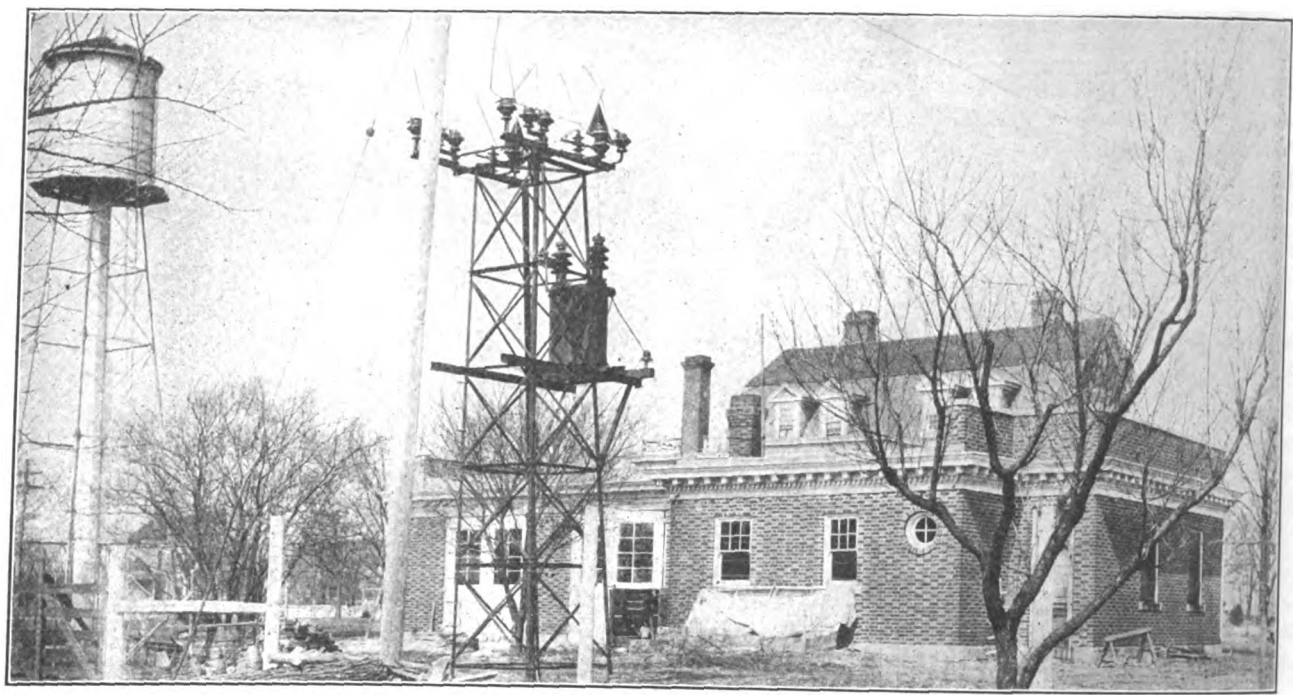
Selling Energy Along Interurban Railways

A Number of Interurban Roads Have Undertaken to Furnish Electric Power for Lighting and Industrial Use in Small Towns Along Their Routes—Invariably This Business Has Been Profitable and No Special Effort Has Been Required for Its Development and Continuance



INTERURBAN POWER SALES—TEN-KILOWATT FARM SERVICE SUBSTATION ON OHIO ELECTRIC RAILWAY

THE sale of energy for light and power by interurban railways to the communities that they serve has proved to be a desirable and profitable field of development, and at the present time it is being cultivated in all of the Central States. Although there has been some competition, the fact that the railway was initially serving the community has, in most instances, given it a special advantage in furnishing the additional service, and since the load carried at an interurban railway generating station frequently has no sustained peaks, the railway is in a better position to supply energy at low yet profitable rates than is a company designed only to furnish light and power.

Generally speaking, there is no difference of opinion as to the desirability and profitableness of energy sales by electric railways, but there is considerable disagreement as to how to go about obtaining this business. This is, perhaps, due to the fact that its development is comparatively recent. As a matter of fact the business depression of the past two years or more has awakened many managements to the great possibilities of supplying this profitable service in which a minimum investment is required. Contracts for supplying energy to wholesale and retail consumers vary from the plan usually followed by lighting and power companies, where energy is retailed to individuals. Instead, it is customary merely to supply a community or an industry from a tap to the railway transmission lines. Under the latter plan the consumer carries the entire investment charge, including the cost of transformation and the distributing plant, and the railway company agrees to furnish energy at a given potential when power is on the lines. Occasionally competition has forced the railways to assume the cost of stepping down the potential to the consumer's distributing system, and in a few instances some companies have even been compelled to retail the energy to individuals in order to obtain the business. In any case, however, the rate is based upon the investment, transformer and line losses, and a proper proportion of the cost of delivering the energy to the high-tension lines.

Comparatively few companies have found it necessary to add to the generating capacity already provided to care for the railway peak loads. As a matter of fact, most companies have found that the sale of surplus energy for this purpose has tended to improve the load factor where sufficient business has been obtained.

The amount of such business contracted for by different railways produces a gross income varying from $10,000 to more than $500,000 per annum, and in some instances the lighting and power load at the generating station equals that used by the cars, the railway load on one property making up only one-third of the total output of the station. Where the energy is sold by a contract requiring no investment on the part of the railway, the ratio of profit in the revenue produced by the lighting and power business is large, but even where the rates include the proper allowances to cover fixed charges on the maximum demand, and the railway furnishes the substation equipment, the business has proved profitable.

PRACTICABILITY OF 25-CYCLE ENERGY

To those who have not investigated the results that are being obtained through the sale of energy by electric interurban railway companies, there appears the

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objection that energy cannot be furnished at 60 cycles. However, the slightly increased cost of motors and other electrical equipment designed for 25-cycle energy is practically negligible, and in so far as the undesirability of this frequency for lighting purposes is concerned it may be said that the opposite view is held by those who are now using it. Practice has shown that with close frequency regulation at 25 cycles there is no perceptible flickering with tungsten and nitrogen lamps.

In some instances, to close contracts for the sale of energy, it has been necessary for the railway company to provide a motor-generator set, or a frequency changer, but this requirement is rarely encountered. Where a community or a consumer assumes the cost of transformation and distribution, it makes little difference with the railway company what frequency is adopted. As a matter of fact, in a few isolated cases rotary converters have been installed and direct-current energy distributed to consumers. Obviously when such is the case no limitations are placed on the domestic appliances available to purchasers of power.

Another objection sometimes raised to an electric railway entering the power and lighting field is that this business would require the railway company's generating station to furnish a twenty-four-hour service instead of running only eighteen or twenty hours to carry the railway load. Some companies, of course, keep their generating stations in service twenty-four hours to move freight trains over the road during the night, but many of the stations are shut down from about 1 a. m. to 4.30 a. m. Where the latter situation exists it is provided for in the contracts with consumers of energy for light and power, and with the class of business the electric railways have been obtaining, this arrangement has not been found to be in any way objectionable.

Usually when this point is raised by prospective customers it is disposed of by simply calling attention to the low rates that apply to the railway power. In quite a number of instances direct-current motor installations are served, energy being supplied from the trolley feeders, and such contracts, of course, are accepted only where the fluctuating voltage is not disadvantageous to the consumer.

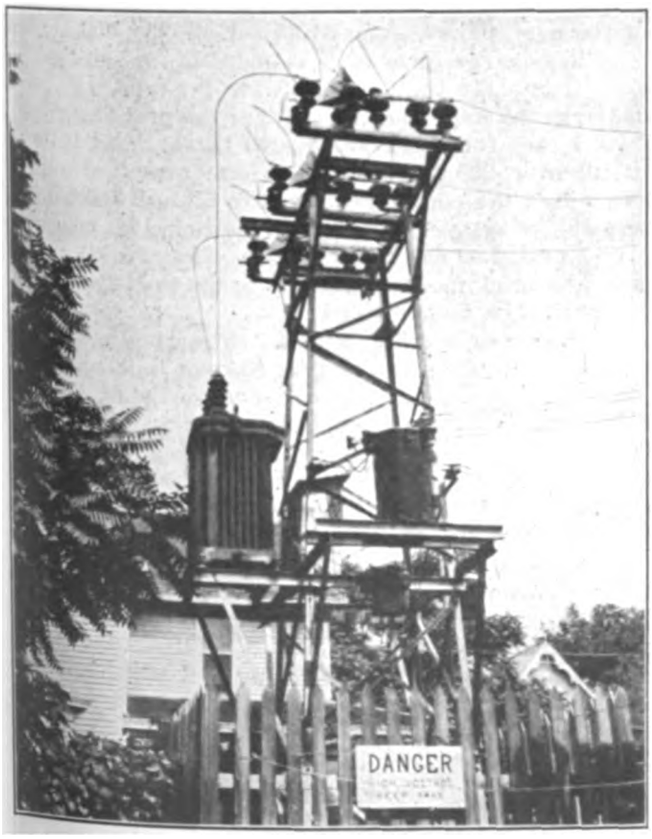
Most of the contracts for energy for lighting and power purposes have been made with municipalities, although there are quite a number of large industrial consumers, and in a few instances individuals have made contracts with both the railway and the municipality to operate an independent lighting company. Where the municipality owns and operates the plant, the rates to the consumers are so fixed that the profit will be sufficient to pay the cost of street lighting, and in some instances, also, to pay for pumping the city water supply.

The rates to make this possible are generally calculated by the railway's engineers, and it is an exception to the rule when there is insufficient profit to provide a sinking fund as well as to pay for the street lighting. When energy is sold in this manner either to municipalities or private parties, the wholesale rates apply and the railway company has only one meter reading to make.

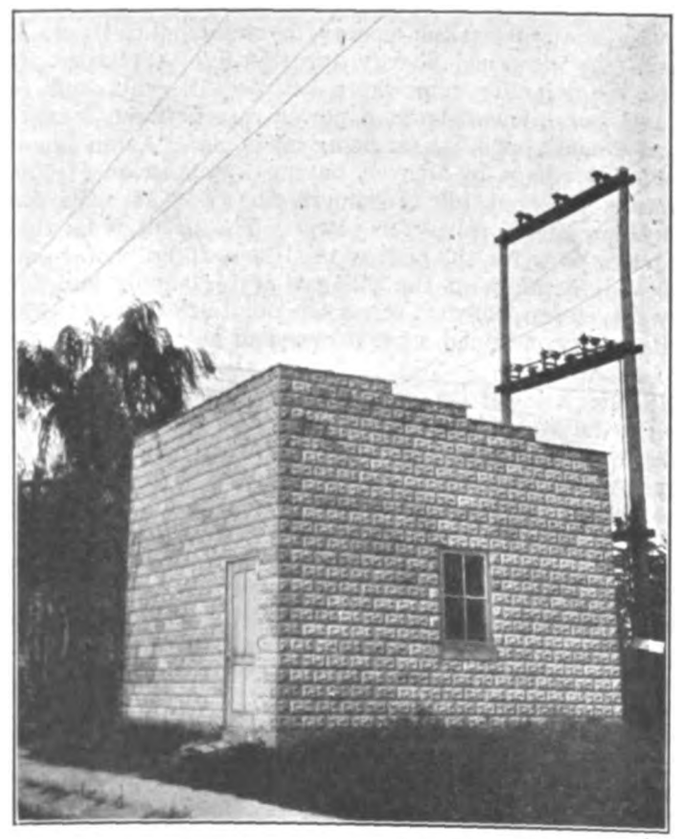
SPECIAL ORGANIZATION UNNECESSARY

Since most interurban railways companies are wholesale producers of energy for their own use, practically no special organization is required either to develop or retain a lighting and power business. It appears to be customary for the electrical engineer and his assistants to devote a portion of their time to supervising the lighting and power development, while the substation inspectors, ticket agents and attendants read the meters and collect the bills, this arrangement being perfectly feasible in small communities where the attendant is not required to leave his station for extended periods of time to read meters.

In the beginning the business of selling energy for power and lighting came to most of the electric rail-



INTERURBAN POWER SALES—TYPICAL OUTDOOR SUBSTATION FOR LIGHTING SYSTEM FOR TOWN OF 450 POPULATION



INTERURBAN POWER SALES—SUBSTATION FOR LIGHTING TOWN OF 800 POPULATION ON LINES OF T. H. I. & E.

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ways unsolicited. Even at the present time many companies have adhered to a policy of not actively promoting sales, because it places them in a more favorable position when contracts are being negotiated. Also, many of the communities served by the interurban railways are so small that the available gross business does not warrant the expense of a special department for solicitation.

Aside from the increased revenue to be obtained, it has actually been found that the beginning of contracts for power and lighting has tended to improve public relations in the small communities; particularly so when the railway company's engineers see that the municipal plants are so engineered and the rates so fixed that they can be operated on a profitable basis. Obviously, the interurban railways brought the advantages of the city practically to the doors of the rural communities which they serve, and for them to supply energy for power and lighting to these communities is a thoroughly logical step.

PRACTICE OF AN IOWA RAILWAY IN DISTRIBUTING ENERGY TO MUNICIPALITIES

As an example of the experience and practice of an Iowa road it may be said that the Waterloo, Cedar Falls & Northern Railroad Company has developed, within the past year, a revenue of approximately $1,000 per month from this source, the majority of the contracts being for wholesaling energy to municipalities. As a rule the electrical energy for lighting is retailed by the municipality somewhere between 10 cents and 15 cents per kilowatt-hour, a power rate between 5 cents and 6 cents per kilowatt being made also. As an example, the village of Denver, having a population of 500, retails to about 100 consumers energy at 11 cents for lighting and 5 cents for power. The profit from this service pays for the energy used by a 30-hp. motor employed in pumping the village's water supply and for twenty-seven 100-watt street lamps. In the year of 1915 the village obtained a profit over and above all expenses of about $400.

Under most of its contracts the railway company supplies the transformer equipment in the substation and the community or private corporation distributes the energy to consumers and steps it down where necessary at the distribution centers. Where the transformers are installed between substations the outdoor type of station is used with Burke horn-gap series-resistance lightning arresters with the gap set quite wide so that it arcs only in extreme surges. The experience of this company has demonstrated that when the gaps are close many of the disturbances that occur are really not necessary.

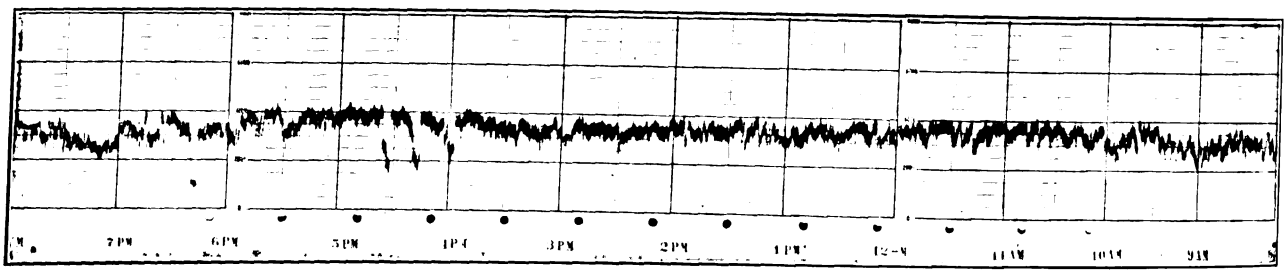
A charge of 8 cents is made for the first 100 kw.-hr. used monthly, 6 cents for the next 100 kw.-hr., and 4 cents for all energy in excess of 200 kw.-hr. This low rate attracts the retired farmer to the small town, the railway profiting by the increased population, and in addition the moderate charges have tended to increase the number of industries in small towns and thus make them self-sustaining.

ILLINOIS TRACTION'S METHODS AND POLICIES

A gross revenue of approximately $50,000 per year, received in amounts varying from $50 to $100 per month, is obtained by the Illinois Traction System, Peoria, Ill., through wholesaling surplus power to communities and industries along its lines, although some direct-current energy is retailed direct to grain elevators. Rates for various services have been standardized by this company and are essentially as follows: Direct-current for grain elevators is sold on a demand-and-energy schedule. The demand charge is $3.50 per kilowatt and the energy charges range from 6 cents to 1¼ cents per kilowatt-hour. A minimum of $1.50 per kilowatt of capacity per month is also charged. The wholesale demand charge for alternating current, both single and three-phase, is $2.50 for the first 20 kw., $2 for the next 80 kw., and $1.75 for demands in excess of 100 kw.

To this demand charge is added a secondary charge for energy of 2 cents for the first 1000 kw.-hr., 1¾ cents for the next 3000 kw.-hr., 1½ cents for the next 96,000 kw.-hr., and 1¼ cents for all over 100,000 kw.-hr.

In a few instances three-phase alternating current is retailed for power purposes, and the following demand charges are applied: $2 for the first 50 kw., $1.50 for the next 450 kw., and $1.25 for all over 500 kw. A secondary charge for energy is added to this, amounting to 1½ cents for the first 7500 kw.-hr. used, 1¼ cents for the next 7500 kw.-hr., 1 cent for the next 85,000 kw.-hr., 0.9 cent for the next 100,000 kw.-hr., and 0.8 cent for all over 200,000 kw.-hr. These rates are applied only where the capacity exceeds to 50 hp., and a minimum bill of $1 per month is required. All contracts cover a period of five or ten years. The consumer is required to build lines satisfactory to the railway company and guarantee their condition.



INTERURBAN POWER SALES—TYPICAL DAILY LOAD CHART FOR

Continuity of service for the lighting and power customers of the Illinois Traction System is insured by a loop transmission system, and practically no business is accepted off of such sections of the company's lines. This arrangement also insures good regulation and a special effort is made to maintain the frequency at least up to 25 cycles, so that there will be no complaints. While some farm service is supplied through privately-owned plants, the railway company has not found the demand sufficient to warrant the installation of transformer equipment to supply individual customers.

It has been found that no additional hazard has been created by taking on this lighting and power business, and that interruptions to the railway service have not been increased thereby. The character of line construction and the installation is supervised by the railway company, hence it is of a known standard. As a protection against interruptions arising from this source, however, a low-voltage automatic switch has been installed in connection with each lighting and power in-

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stallation. Lightning protection on the 2300-volt side usually consists of a horn gap and choke coil. Electrolytic lightning arresters are provided on the transmission lines, but the small lighting and power installations do not warrant the use of such expensive protection. The horn gap and choke coil allows occasional interruptions, but these are not sufficiently serious to make the service unsatisfactory.

A twenty-four-hour service is furnished over the entire system because it is necessary to keep the power houses in operation during the night to move the sleeping cars and freight trains over the road. In fact, the power output for the entire twenty-four-hour period is practically a straight line. The demand falls off somewhat about 6.30 p. m.; hence, if the amount of energy sold for lighting were large it would actually tend to improve the generating station conditions between that time and midnight.

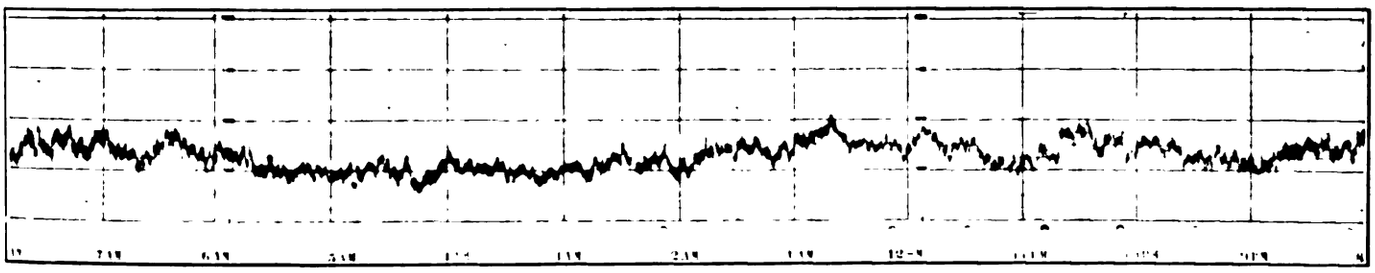
METHODS OF TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

The Terre Haute, Indianapolis & Eastern Traction Company is selling direct current and alternating current both three-phase and single-phase to municipalities, large industries and to a few individual consumers. At the present time this company is selling approximately 70,000 kw.-hr. per month, and it obtains a revenue of approximately $2,000 a month. The retail rates are as follows: Up to 25 kw.-hr. per month a charge of 10 cents per kilowatt-hour is made; for from 25 to 50 kw.-hr. per month a charge of 9 cents per kilowatt-hour is made, and the charge for 50 kw.-hr. or more per month is 8 cents per kilowatt-hour. A cash discount is allowed for payment before the tenth of the month, which begins with 5 per cent for amounts less than 100 kw.-hr., with an increase of 5 per cent in the amount of the discount for each increase of 100 kw.-hr. per month from 100 kw.-hr. to 600 kw.-hr., and a further graduated increase in the discount in 200 kw.-hr. steps from 600 to 2000, where a discount of 50 per cent is allowed. In connection with these rates a minimum of 50 cents per rated horsepower per motor is charged, but in no instance is the minimum charge per month less than $2 for any one installation.

Wholesale energy rates are based on a yearly guarantee. Thus, a purchase of $500 per year gross receives a rate of 4 cents per kilowatt-hour; a purchase of $1,000 per year receives a rate of 3½ cents per kilowatt-hour, and $1,500 per year gross receives a rate of 3 cents per kilowatt-hour. Aside from these wholesale and retail rates, special contracts are made with large industries based on the maximum demand. There is charged a rate of 1¾ cents per kilowatt-hour for the first 5000 kw.-hr. per month, 1.6 cents per kilowatt-hour for the second 5000 kw.-hr. per month, and 1.5 cents per kilowatt-hour for all over 10,000 kw.-hr. per month. A readiness-to-serve charge of $1 per kilowatt per month is added, and no contract is accepted at these rates for less than 100 kw. of maximum demand for a period of less than five years. As a rule, under these special contracts, which are termed off-peak-load contracts, the railway company installs the necessary transformers and other equipment.

For the development of this lighting and power business the superintendent of distribution and substations keeps in touch with prospective customers through his division foremen and by occasional personal calls. With the permission of the management he is frequently appointed the engineer for the municipality, prepares the plans and specifications, and inspects the completed installations, which, as a rule, are put in under contract. This arrangement has been found very satisfactory, because the municipality pays the company's engineer for his work and, at the same time, the engineer is in a position to see that an installation is provided that is satisfactory to the railway company as well as to the community. It tends also to bring the railway representatives into close personal relations with the community, which also redounds to the company's future good.

In practically every instance where the railway has contracted with a municipality to furnish energy for lighting and power purposes, the municipality has paid the entire cost of the installation including the transformer equipment, but excepting the cost of the tap to the transmission line. These contracts also do not provide for a twenty-four-hour service. As a rule the maximum time during which the energy is off the line is between 1 a. m. and 4.30 a. m. In addition to carrying the investment charge on the transformer equipment, the community is charged for the transformer core losses, while the railway assumes the cost of the copper losses. The fact that the transformer core losses will in most cases amount to a great deal more than the revenue for energy sold during the period that the power is off the lines, furnishes an excellent argument against all-night service in small communities.



RIVERTON POWER STATION OF ILLINOIS TRACTION SYSTEM

Incidentally, it has been this railway's experience that consumers in the small villages along its lines buy electrical service from municipal plants more readily than they do from privately-owned plants. The success with which these municipal plants are meeting perhaps is best evidenced by producing facts from their annual statements. A municipal plant was completed and put in service on Dec. 23, 1915, at Lewisville, Ind., a village of 450 population. On Aug. 1, 1916, 100 meters had been installed, although there are only 125 houses in the town. The village of Advance, Ind., with a population of 416, has installed 105 meters and collected a gross revenue of approximately $1,500 for the year 1915. The total cost of this municipality's plant was approximately $7,500, and the amount paid to the railway company for energy was, in round figures, $640. The difference between the collections and the amount paid the railway company, which included the energy used by twenty-two 150-watt and 250-watt street lamps, left $860 with which to pay interest on the investment. The village of Coatesville, Ind., with a population

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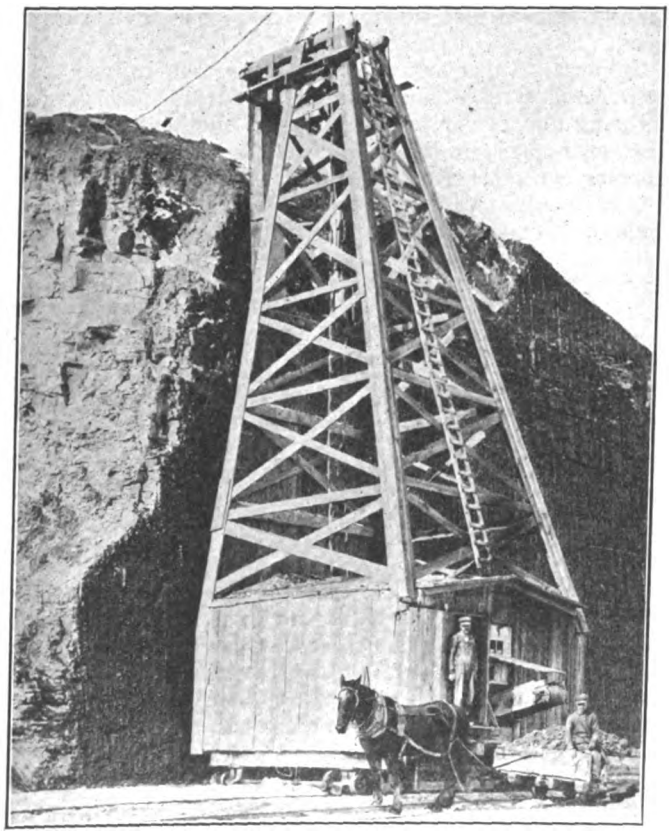
of 470, has 165 consumers which produced a gross annual revenue of $2,185 in 1915. After deducting the amount paid the railway and that spent in maintaining the system, approximately $620 was left with which to pay interest on a plant costing approximately $5,700. The village of Centerville, with a population of 800, has 187 consumers which produced an annual revenue of $2,160 in 1915. The expense of operation, including the cost of energy purchased from the railway and the current consumed by thirty-three 100-watt and 200-watt street lamps, was $2,040. The plant in this instance cost, in round figures, $7,450.

The equipment installed for these light and power installations, either in the company's substations or where the current is taken direct from the high-tension line, is standardized as far as the requirements of the community will permit. When energy is supplied from a substation, the secondary voltage is usually stepped



INTERURBAN POWER SALES—EQUIPMENT IN INDIANA SHALE QUARRY OPERATED BY D.-C. MOTOR ON INTERURBAN TROLLEY CIRCUIT

up to 2300 volts by small transformers, located, as a rule, outside of the station. In some cases, however, where the substation is located within the town, the secondary voltage of approximately 370 volts is stepped down to 220 volts, or 110 volts by transformers outside the substation, and distributed by a three-wire system.

RESULTS ON OTHER INDIANA RAILWAYS

The Union Traction Company of Indiana also is furnishing energy for light and power to twenty-six municipalities, varying in size from 200 to 1500 population. Through a subsidiary company franchises have been obtained in twenty-three of these towns for retailing energy to individual consumers. In two cases the energy is sold wholesale to municipalities, and in another it is sold to private corporations which distribute to the individual consumers. The gross revenue obtained from this source is about $45,000 per year.

The Fort Wayne & Northern Indiana Traction Company and its subsidiary, the Wabash Valley Utilities Company, which distributes to communities not located on the interurban railway divisions, has developed the sale of energy for light and power purposes until it receives a gross income of approximately $500,000 a year. This energy is sold outside of Fort Wayne and La Fayette to communities varying in size from 200 population up to more than 2000. Energy is sold at an established rate of 10 cents per kilowatt-hour for lighting service, and power rates vary, dependent upon the demand, down to as low as 2 cents per kilowatt-hour. This company furnishes a twenty-four-hour service to all consumers, because its plants are in operation for that period to supply energy to Fort Wayne and La Fayette for lighting and power purposes.

The Indianapolis & Cincinnati Traction Company supplies energy to eleven lighting plants in small towns and villages, and a number of motor installations in grain elevators are supplied at 3300 volts direct from the single-phase trolley. In all cases but one this company deals direct with the consumer, and it installs the transformation and distribution systems. A retail residence lighting rate is made to all communities as follows: Ten cents per kilowatt-hour for all energy up to 25 kw.-hr. per month, and 8 cents per kilowatt-hour for all energy in excess of 50 kw.-hr. per month. A minimum charge of $1 per month is made to all consumers, and a discount of 1 cent per kilowatt-hour is made to all those who pay within the ten-day period. The special rate for power is as follows: Energy used up to 100 kw.-hr. per month is sold at 7 cents; 100 kw.-hr. per month and less than 300 kw.-hr. is sold at 6 cents; 300 kw.-hr. per month and less than 500 kw.-hr. is sold at 5 cents; 500 kw.-hr. per month and less than 1000 kw.-hr. is sold at 4 cents, and 1000 kw.-hr. per month and over is sold at 3 cents. In connection with these rates a cash discount of 5 per cent is allowed on all bills if paid within ten days after the meter reading date, and a minimum charge of $1 is made for any installation.

PRACTICE OF WESTERN OHIO RAILWAY

Undoubtedly the most extensive sales of energy for light and power made by an interurban railway in the Central West are those of the Western Ohio Railway Company, whose railroad load makes up less than 50 per cent of the total. The output of energy for power and lighting purposes is about 2,500,000 kw.-hr. per month, one customer taking approximately 1,000,000 kw.-hr. per month. The question of rates for energy is regulated by the State Public Utilities Commission, and most of the energy is sold to individual consumers. Even though the amount of energy sold for lighting and power is greater than that used by the railway, this company has no special organization for soliciting or maintaining it. Generation is under the supervision of the electrical engineer, and the distribution and development is taken care of by the superintendent of overhead lines.

This company does not encourage the use of direct-current motors, because of the marked fluctuation in the trolley voltage due to the heavy freight service. In practically all cases energy is supplied at the standard voltages, single phase or three phase. Where it is necessary for the railway to operate the plant as a light and power company in order to obtain the business, it does not hesitate to make a contract; but where the energy can be sold to the municipality wholesale, or to a private corporation, this is also done. Competition in the territory served by the Western Ohio Railway has been rather keen in some localities, hence it has been

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necessary to adopt this broad policy regarding the service. Energy is retailed in eight small towns at 25 cycles, but in some of the larger cities, particularly where old plants have been displaced, it is necessary to supply the energy at 60 cycles. Practically all of these contracts are made for a period of ten years with an option for renewal, and a twenty-four-hour service is furnished. It is also interesting to note that while most other railway companies have not extended their transmission lines beyond their rights-of-way, this company has two branch transmission lines, one seven miles in length and the other five miles.

Although this company generates energy at a single power house, interruptions to the lighting and power service are comparatively infrequent. The reliability and continuity of this service are maintained at a high standard by careful and frequent inspection of all the transmission lines, and especially the insulators.

Rates for power and commercial lighting range from 4 cents down to 2 cents net per kilowatt-hour, the latter applying to customers using more than 3000 kw.-hr. per month. There is no monthly minimum charge. For domestic or residence lighting the rate ranges from 8 cents net per kilowatt-hour down to 3.5 cents, with a minimum charge of $1 per month. Wholesale rates to electric railroads or resale companies with a connected load of 100 kva. or over, range from 2 cents per kilowatt-hour down to 1.1 cents when more than 450,000 kw.-hr. are used.

RATES OF OTHER OHIO ROADS

Energy is supplied to eighteen towns and villages, and a number of other manufacturing and individual customers along the lines of the Ohio Electric Railway. The total amount of energy sold during the month of June, 1916, was 128,283 kw.-hr., the maximum to any one customer being 26,550 kw.-hr., and the minimum 690 kw.-hr. Three schedules of rates have been promulgated, namely, a wholesale rate for villages where there is a single installation of 25 kw., a wholesale rate to villages where there is an installation of 50 kw. or over, and a retail rate to small communities where the railway company provides the distribution system and sells direct to the consumer. Where the village is incorporated the energy is sold to the village authorities, but where it is unincorporated energy is sold direct to the consumers. In a few instances a rural lighting and power business is being developed by paralleling the railway's overhead lines with a 440-volt or 220-volt single or three-phase line mounted on the same poles. One 12-mile installation of this kind has worked out very satisfactorily.

The rates for the three classes of service furnished by this railway are as follows: Where there is a single installation of 25 kw., for the first 100 kw.-hr. consumed the rate is 8 cents per kilowatt-hour, and this ranges down to 4 cents for amounts in excess of 1000 kw.-hr. There is a minimum charge of $50 per month. For an installation of 50 kw. or over the charge is $1 per kilowatt of transformers installed plus 2 cents per kilowatt hour. There is a discount allowed on bills if paid before the fifteenth of the month. On bills of $400 or less per month this amounts to 5 per cent, and it ranges up to 20 per cent on bills over $500 per month. The schedule for retailing current in small communities includes a rate, for the first 30 kw.-hr. consumed, of 10 cents per kilowatt-hour, and this ranges down to 4 cents for amounts in excess of 1000 kw.-hr. There is a minimum charge of $1 per month.

Where energy is wholesaled to municipalities or individuals the railway pays the cost of installing the transformers and the meters, and the consumers pay the cost of the distribution system. Except for the lines east of Columbus, Ohio, a twenty-four-hour service is furnished on all contracts for lighting and power. On some of the railway lines, where a twenty-four-hour service was not originally in effect, special arrangements were made to render service during this period in order to obtain the business. Experience has shown that as a rule the twenty-four-hour service only requires a small machine to take care of the load, and this may be operated economically and without adding materially to the cost of the service. In summing up the business on the lines of the Ohio Electric Railway, it can be said that the lighting load has had the effect of improving the generating-station load factor. This is not true, however, of the power load, which is principally a day load. On the other hand, the lighting and power business has been found to be both desirable and profitable and well worthy of intensive cultivation.

Another of the interurban lines operating in Ohio which sells a proportionately large amount of energy for power and lighting is the Cleveland, Painesville & Eastern Railroad Company. In round figures, 15 per cent of this company's gross income, or about $75,000 per year, is obtained from power and lighting sales. Its total output averages from 175,000 kw.-hr. to 200,000 kw.-hr. per month, with one customer requiring about 60,000 kw.-hr. This company's consumers include municipalities, private corporations and individuals, and it has adopted the policy of paying for all transformers and meters, and it makes house connections free of charge where they are within 150 ft. of the distribution lines. It has also been the policy to pay for all extensions, providing there is a sufficient amount of business to warrant so doing, but energy is not refused where the consumer provides the distribution system. At the present time the lighting and power load makes up about 20 per cent of the total load carried by the railway company's power station.

A schedule of rates providing for wholesale and retail light and power customers has been filed with the Public Service Commission. Essentially the rate to light consumers is 11 cents per kilowatt-hour, with a discount of 2 cents per kilowatt-hour if paid within ten days after bill is rendered. Power rates range from 5 cents to 1¾ cents per kilowatt-hour with a minimum charge of $1 per horsepower per month.

New York Association Appointments

J. P. Barnes, president New York Electric Railway Association, has made the following committe appointments for 1915-1916:

Committee on standards: W. G. Gove, chairman; J. S. McWhirter, W. J. Harvie, B. Penoyer, J. P. Ripley.

Committee on military operation: W. C. Fisk, chairman; J. E. Hewes, J. J. Dempsey, George V. Snyder, J. S. Kineon.

Committee on membership: J. E. Hewes, chairman; B. A. Hegeman, H. N. Ransom, J. J. Dempsey, W. H. Collins.

Committee on taxation and rates of fare: W. H. Collins, chairman; C. F. Hewitt, Thomas Penny, J. H. Bennington, J. H. Pardee, R. L. Rand, Ralph Norton.

Committee on compensation insurance: E. A. Maher, Jr., chairman; C. F. Hewitt, C. L. Stone, C. S. Banghart, W. H. Collins.

Committee on public relations: J. K. Choate, chairman; Frank Hedley, E. A. Maher, Jr., E. G. Connette, L. S. Storrs.

Committee on safety rules: B. Penoyer, chairman; F. A. Bagg, C. A. Brooks.

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Utility Bonds for Savings Banks

Committee of Investment Bankers' Association at Recent Convention in Cincinnati Suggested Certain Legal Standards for Utility Bonds as Savings Bank Investments—Co-operation of Utility Managers Asked in Applying Tests to Particular Issues

THE work of the public service corporations committee of the Investment Bankers' Association of America during the last year, as reported to the fifth annual convention of this association in Cincinnati, Ohio, on Oct. 1-4, was largely taken up with the consideration of provisions for a proposed savings bank law covering investment in public utility bonds. In presenting the report Chairman John E. Oldham, of Merrill, Oldham & Company, Boston, Mass., stated that the committee was not making definite recommendations, but rather suggestions, which were subject to further study. If the provisions were acceptable to the association the committee would be glad to have public utilities test their bond issues thereby, and it would then give further consideration to the question, if necessary, so as not to bar out issues that ought to be included among permissible savings bank investments. The main sections of the report, which was approved by the association, and a few points brought out in the discussion thereon, are presented in abstract in the following paragraphs.

SUGGESTED STANDARDS

Gross earnings of at least $500,000.

Gross earnings equal to four times fixed charges.

Net earnings equal to one and three-quarters times fixed charges.

Investment restricted to utilities in states having commission regulation.

Bonds in general secured by direct lien on operating property.

A REQUEST

"The committee would be glad to have utility managers use its tests on particular bond issues and see how they would qualify. If it finds in actual practice that it is barring out securities that should be eligible, it must see if it cannot word the law so as to include every issue that should legitimately come in."

In the early deliberations of the committee it became apparent that no single law could be drawn which would be adapted to conditions in all states. It is true that the requirements and purposes of savings banks, wherever located, appear to be much the same, the aim being to invest small savings safely and pay depositors dividends at the rate of 4 per cent annually. In general, the average expense, including taxes, of running savings banks amounts to about three-fourths of 1 per cent of the deposits, and an additional one-eighth to one-fourth of 1 per cent is desired for the purpose of a reserve. To pay dividends of 4 per cent, therefore, requires an average return on investments not far from 5 per cent.

The opportunities for investment in different states, however, vary to such an extent that the methods of obtaining a 5 per cent return also show considerable variation. In some states 50 to 60 per cent of savings bank assets are found to be invested in real estate mortgages and personal loans. As these investments usually yield fairly generous returns, such long-term securities as are purchased can be of a kind to yield a lower income return than would be the case if the yield from the bulk of the investments was not so large. In states of slow industrial growth, however, where few new enterprises are being developed, opportunities to invest in local real estate mortgages and personal loans are often very limited, and it therefore becomes necessary to seek among other forms of investment something which will produce income enough to bring up the general level and permit a 4 per cent dividend rate for the depositor. Situations of this kind, in the opinion of the committee, apparently provide the most favorable field for the introduction of well-secured public utility bonds to savings bank investment, inasmuch as such bonds are adapted to yield the desired income and furnish the necessary requirements of safety and marketability. The committee undertook, therefore, to make suggestions for situations of the latter kind, leaving a law for the other to be considered at some future date.

RELATION OF PROPERTY VALUE AND EARNINGS

In the first place, the committee stated, it will be generally agreed that the face value of the securities proposed to be made eligible for savings bank investment should not exceed the investment value of the property, and that net earnings should exceed the amount of interest charges. While property values and gross and net earnings may appear at first sight to be unrelated, and while, of necessity, there can be no definite and fixed relation which will apply alike in all cases, yet, as both gross and net earnings are so largely determined by rates for service permitted by regulating commissions, and as the investment value of a property is so important a factor in determining rates to be allowed, the committee felt that there is some kind of relationship, and some conclusion as to this relationship must be reached and recognized before undertaking to work out the provisions of a law of this kind. In using the term "investment value of property" the committee had in mind the probable value which will serve as a basis in making rates for service, which, under average conditions, would doubtless be less than the fair market value of the property.

From an examination of a large amount of railroad statistics, public utility appraisals and various rate decisions, it appears that there is little reason to expect a rate basis substantially in excess of an investment of $5 for $1 of gross earnings. It is seldom that a value is accepted which exceeds this amount, and more often the relation is $4.50 to $1, or $4 to $1. The committee believed that a large number of the cases where property investment exceeds five times gross earnings will fall under one of two heads. Either rates are low compared with companies operating in similar circumstances, and the company does not receive the gross earnings to which it is entitled for the amount of investment; or the investment, although made in good faith, fails to realize the results which were anticipated in the way of obtaining business. In the former case, readjustment of rates to a higher level by commissions or

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otherwise tends to bring the ratio of earnings and investment to that stated. In the second case, however, if sufficient business does not exist to justify the investment, rates on the business which does exist cannot fairly be raised to a point to yield a return on the entire property even if it were practicable to obtain the business at such rates. As the company will probably be obliged to operate under a scale of rates similar to those of companies whose investment represents only $4 or $5 to $1 of gross earnings, it will be most difficult to obtain a return on the excess of investment, and as the excess investment cannot earn a return and probably will not be recognized for purposes of rate-making, the value of the property to all intents and purposes is reduced to the average level.

Calculating the Margin Over Fixed Charges

In cases where commissions have been called upon to determine the rate of return on the investment, they have usually reached conclusions that 6 to 8 per cent was reasonable. If this conclusion is applied to the relationship between gross earnings and investment, as noted above, the amounts necessary to give a 6 to 8 per cent return would require a sum equivalent to between 24 per cent and 40 per cent of the gross earnings. That is, a 6 per cent return on a property value of four times the gross earnings would give 24 per cent of the gross earnings. Eight per cent on five times the amount of gross earnings would give 40 per cent of the gross earnings. It appears from this that from 32 to 40 per cent of gross receipts would be the maximum amount to be expected as an allowance for a return on invested capital where companies are under the supervision of a commission.

From the foregoing, the committee said, it appears that the limit to which money may be loaned upon property must be safely within the amount of four or five times the gross earnings of the property and that the fixed charges must be safely within an amount of from 32 to 40 per cent of the gross earnings. The relationship of the amount of the loan to the property value will be apparent from the amount of bonds, and the relationship to earnings will be apparent from the amount of fixed charges. As the charges bear a fixed relation to the amount of bonds, they may be taken as the starting point in the establishment of standards for such purposes as the proposed law. They may be measured in their relation to net earnings representing a basis of earning power, or in their relation to gross earnings to show indirectly the relationship of bonds to the value of property.

If a sufficient margin of net earnings over interest charges were the only requirement, the committee observed, it might occur that this margin was obtained as the result of abnormally high rates for service, abnormally low wages or power costs, or insufficient maintenance of the property. In these cases the net earnings might be obtained from gross earnings on a smaller investment than would warrant the amount of bonds indicated by fixed charges. If investigation were made by a commission, net earnings might be allowed only on such investment, which would not give enough of a margin over fixed charges. Or the advantage from low operating costs might disappear as conditions changed, and the margin be dangerously reduced from this cause.

Large net earnings resulting from a low operating ratio were said to indicate either more than an average investment on which the usual return is allowed, or an abnormal rate of return on what is recognized as an average investment. An abnormal return on invested capital would not be likely to continue indefinitely but would result in agitation for lower rates for service, which, if brought about, would be followed by a decrease of both gross and net earnings. The final result would then be to establish a relation of earnings to property investment such as is found under average conditions. On the other hand, if the relationship of fixed charges to gross earnings, as showing the relation of bonds to property value, should be taken alone, a generous margin of value over bonds might exist, but the property might be burdened with heavy expenses which would leave net earnings entirely insufficient to provide a safe margin over charges.

Both Gross and Net Earnings Must Be Considered

After consideration and experimenting, the committee decided that net earnings equal to one and three-quarters times fixed charges offer a fair margin of safety and that gross earnings equal to four times fixed charges offer sufficient evidence of a property value in fair proportion to the amount of bonds.

It is necessary, however, to combine these requirements as a check upon each other. For instance, in the case of a property with $100,000 of gross earnings the value might be $500,000. If it were bonded for this entire amount, the fixed charges would be $25,000, and the requirement that gross earnings should be four times the fixed charges, would be met. To show one and three-quarters times these charges, however, would require $43,750 of net earnings applicable to a return on capital and allowance for depreciation. This is not an uncommon proportion of net earnings to gross; and yet if the company were involved in a rate case before a commission, it would probably not be allowed in excess of 6 to 8 per cent return on $500,000 investment, or only from $30,000 to $40,000, which would not provide a sufficient margin over the $25,000 fixed charges to comply with the requirement.

On the other hand, the committee cited the case of a company with $100,000 of gross earnings operated for 44 per cent and having $56,000 of net earnings. This, at a ratio of one and three-quarters to one, would justify $32,000 of fixed charges, equal to 5 per cent on $640,000 bonds, an amount probably in excess of any property value which the commission would find. Gross earnings, however, would not be four times the charges; consequently, such bonds could not qualify.

While situations may exist, because of special circumstances, where a return may be allowed on more than average investment value, or the rate of return allowed may be above the average, at the same time the committee believed that in drafting a law of this kind it should have in mind average and not special conditions. The restrictions suggested would guard against investments based on excessive property values unaccompanied by necessary earning power both gross and net. The provisions for gross earnings would be a protection against larger net earnings than could probably be maintained, and the margin between net earnings and fixed charges would provide against decrease in net earnings due either to falling off of business, reduction in rates, increase in cost of operation or other unforeseen causes.

Kinds of Utilities to be Eligible

In regard to the kinds of utilities which afford a suitable field for savings bank investment, the committee felt that it is advisable, for the present at least, to include only companies furnishing artificial gas, electric light and power, local transportation and telephone and telegraph service. It was suggested that the recent development of the jitney and other independent

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systems for local transportation makes it desirable to specify in the law that local transportation companies must operate cars running on tracks. Furthermore, it was not deemed sufficient for the purpose of savings bank investment that the corporations whose securities are made eligible should be engaged in the kinds of business above designated—they must be engaged in them in a really public way. The earning power needs to have the stability afforded by an income derived from the general distribution of service. A power company selling its entire product to a few large manufacturing concerns would not come within the requirements of the law as proposed.

The committee, after some study of various utility properties and the market for their securities, suggested that companies must have at least $500,000 of gross earnings in order that their securities may qualify for investment. It was believed that this figure fairly marks the point where the advantages of a well established market for the securities of a corporation may be expected to exist. The committee also suggested, in order that there may be assurance that earnings are derived from a general distribution of service, that if 10 per cent or more of the gross earnings is derived from any one customer, the revenue from that customer shall be excluded in determining the size of the corporation. It is not the intent, however, to exclude these earnings in the other provisions of the law. The committee proposed that investment should be limited to companies located within the United States, and it believed that investment can to advantage be further limited to those states which have public utility commissions with powers of protection of utilities and their investments.

The committee was of the opinion that it would be unwise to try to draft definite provisions in regard to franchises. To require that all franchises should extend beyond the life of the bond would disqualify some of the best securities, and possibly place in a doubtful position corporations operating in states providing for the so-called indeterminate franchise. To require that the principal franchise should extend beyond the life of the bond would raise the difficult question as to what the principal franchise of a particular corporation is. The committee believed, therefore, that in limiting investment to the securities of corporations operating in those states which have public service commissions with jurisdiction over rates and requiring a certificate of public convenience and necessity, it had done as much as is practicable in the form of a general rule in safeguarding investment against franchise difficulties.

DEFINING FINANCIAL TERMS

It appeared best to the committee to adopt a principle which would limit the proposed investments to the securities of operating companies except as further noted, and only to those securities which possessed a direct lien on property operated in the service of the public. This would insure that the earnings on which the restrictions were based should come directly from the operation of a utility, rather than in the form of interest or dividends, and that in case of trouble the security holders could at once take possession of the operating property.

This led to the proposed definition of gross earnings as income received from properties owned and operated, or leased and operated (intercompany items excluded). In some cases the earnings of properties controlled (by stock ownership) and operated, might be so merged in a company's statement of gross earnings as to make their inclusion necessary, and it is possible that some provision should be made for situations of this kind. This, however, is open to the objection that securities issued by a company which merely controls its subsidiaries, usually can give a lien only upon their securities and not upon the properties, and therefore do not meet the requirement calling for a lien upon actual property used in operation. It is possible, however, that it may be advisable to make provision for companies owning the entire amount of securities of operating companies and pledging the same as security for bond issues in such a way that in event of foreclosure the property could be reached as effectively as if secured by direct mortgage.

With regard to net earnings, these were defined by the committee as "the amount remaining after deducting from gross earnings the amount of operating expenses (including therein expenses of reasonable and proper repairs, current renewals and maintenance, license charges, taxes and insurance) for all properties, the income from which is included in gross earnings." The committee said that it might be open to discussion what should be the exact wording of this definition, particularly with regard to maintenance and possible provision against depreciation. Moreover, it believed that there might properly be added to this definition a provision for the inclusion of income from outside sources, such as securities owned. An objection to this would be that bonds could be issued on the basis of net earnings which might come from other than public utility operation, but the required ratio between gross earnings from operation and fixed charges would act as a check to prevent a company from taking advantage of this provision except to a small extent.

Fixed charges in a general way were said to include all interest paid upon the direct and assumed obligations of a company and all rentals paid, whether in the form of cash payments or dividends or interest on securities of leased properties. These charges, however, include such payments only when made outside the company and do not include interest or dividends on securities held by the company itself.

SECURITIES THAT WOULD QUALIFY

The committee suggested, as before stated, that in selecting the securities of companies which qualify for investment, the principle should be followed of allowing only bonds which are secured by a direct lien on operating property from which the company's gross earnings are derived, and are the direct or assumed obligations of the company which qualifies or are bonds of leased and operated properties guaranteed as to both principal and interest by indorsement by such a company. This limits investment to mortgage bonds except that the committee believed that an exception may safely be made in the case of a bond issue secured by entire issues of first mortgage bonds of operating properties whose gross earnings are included in a company's statement of gross earnings, as such an issue would give in effect a first lien on operating property.

With the above exception the eligible classes of bonds recommended by the committee would be either first mortgage bonds, refunding mortgage bonds or bonds underlying a refunding mortgage. No minimum amount was thought necessary as to the size of a bond issue to qualify under the law. First mortgage bonds would have the requirement of having been secured on all the property of the issuing company at the time of issue (though not necessarily secured by a first mortgage), and of being secured by a first mortgage on this property at the time of investment (though not necessarily on the entire property of the company at that time). Refunding mortgage bonds would be secured by a mortgage on all the property of the company at the

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time of issue, would provide for the payment at maturity and retirement of all underlying bonds and would mature at a later date than any of such underlying bonds. It was also thought best to require that the amount of additional bonds issued under the refunding mortgage shall be at least equal to the amount of underlying bonds. The inclusion of refunding mortgage bonds makes it logical to include also the bonds underlying such refunding mortgage. Some of these may already qualify as first mortgage bonds, and as those which do not are acknowledged by the company creating the refunding mortgage as prior obligations and are to be replaced by bonds qualifying as legal, it seems reasonable to include them as eligible.

In addition to the bonds already considered, the committee discussed the senior bond issues of companies whose junior issues would not qualify. It suggested the inclusion of first mortgage bonds of such companies which conform in their fixed charges (interest on first mortgage bonds plus rentals of the company) to ratios of 1 to 5 and 1 to 2 with the gross and net earnings respectively. The committee also recommended the inclusion of refunding bonds on similar terms for companies not complying with the credit requirements.

MISCELLANEOUS REQUIREMENTS

The committee suggested that where for the purposes of the law a certain ratio of earnings to fixed charges is required, this ratio must have existed in the three fiscal years of the company next preceding investment. The requirement as to amount of gross earnings, however, need have existed only in the fiscal year next preceding investment.

It was believed that a provision should be included similar to that in some existing savings bank investment laws, permitting a company's securities to remain legal although the company fails in one fiscal year to maintain its standard of general credit. This should follow the existing laws, however, in not allowing further investment in such a company's securities until the company has again attained the required standard, and in not allowing the term of probation to extend more than one year.

It was proposed by the committee that, at the request of any bank, the bank commissioner shall give his opinion as to whether a bond satisfies the requirements of the act. He may accept as evidence the regular annual financial statement, including the income account and balance sheet of the corporation, verified by the affidavit of the president or vice-president or treasurer. The bank commissioner, however, may require such further evidence as he may desire. He shall publish each year a list of the bonds approved. Unless notified by the commission to the contrary, a savings bank may consider any bond appearing on the list as an investment which it is authorized to make until a new list is published in which the bond does not appear. Unless the corporation, whose bonds have been approved by the bank commissioner as a legal investment, shall within three months after the close of its fiscal year furnish to the bank commissioner evidence of the regular annual financial statement, the bank commissioner may notify any savings bank, or all savings banks, that they are not authorized to make further investments in such bonds until contrary notice is given by their inclusion in the printed list or otherwise.

DISCUSSION ON THE REPORT

In reply to a question whether or not the field might be so narrowed as to have eligible securities quoted at a premium with less than a 5 per cent yield, Mr. Oldham stated that in the committee's opinion the foregoing restrictions represent the minimum ones which banks can use and be safe, whether they narrow the field or not. As regards the companies that will qualify, it has been absolutely impossible to obtain at the present time from public sources information which will satisfactorily test the provisions. The thought of the committee was that if it could come to some conclusions as to what were desirable provisions and restrictions, then it would get into touch with the public utility managers and hear what they have to propose. The committee stated that it would be glad to have them use this test on the bonds of their corporations and see how many of them will qualify and what provision it is that bars them out. If it finds in actual practice that it is barring out securities that ought to come in, it must see if it cannot word the law so as to include everything that can legitimately come in. Mr. Oldham said that the committee cannot make the test of every situation on the basis of information which is to-day available. Reports are made in all kinds of forms and the information is very incomplete. In his opinion, the statements of public utilities, if the utility bonds are going to take their proper place in the market, should show greater uniformity.

In regard to depreciation Mr. Oldham stated that the ratio of 1¾ to 1 for net earnings to fixed charges would allow sufficient margin to cover that item. If companies were starting afresh, depreciation should be included in operating expenses, in which case the ratio of net earnings to fixed charges might be only 1½ to 1. Practices in accounting for depreciation differed, but the committee felt that it was willing to stand for the 1¾ to 1 ratio, which would provide enough to take care of the decreased earnings and proper charges for depreciation.

Demand Charges and Purchased Power

In a paper on "Demand and Load-Factor Systems," presented by R. S. Hale, of the Boston Edison Company, at the recent convention of the New England Section of the National Electric Light Association in Pittsfield, Mass., reference was made to the purchase of power by street railways. The author compared a number of different systems of demand measurement and charge bases, pointing out that for a street railway, and especially for one of small size, the difference in charge between a five-minute and a thirty-minute demand would be large; probably 20 or 30 per cent, if not more. A small street railway with about the same business each month would have the highest demand on a system of demand measurement in which the highest five-minute peak is taken each month by itself, so far as eleven schedules compared in the paper were concerned. Such a road would have the next highest demand on a schedule taking the single highest fifteen-minute peak in the preceding twelve months. The next highest peak would be obtained on a system of charging based on the highest half-hour peak occurring since the last annual readjustment of demand by the central station organization. The next would be on a system averaging the four highest half-hour peaks, one on each of four different days in any one month, taking the highest month of the previous twelve months. The next highest demand for such a road would be obtained on a system averaging the 150 highest half-hour peaks (whether on the same day or on different days) in the whole previous twelve months, or a pro-rata number if the road has been connected less than a year. There would be perhaps 50 per cent difference between the first and last of the foregoing outlined methods.

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Fifth National Safety Congress

Street and Other Accident Reduction, Vehicular Traffic Regulation, the National Electrical Safety Code and Power Plant Hazards Were Among Topics Discussed at the Congress Last Week

THE fifth annual national safety congress, under the auspices of the National Safety Council, was held at the Hotel Statler, Detroit, Mich., from Oct. 17 to 20 inclusive. It was attended by about 1200 representatives of manufacturing industries, railroads and public service companies. The meetings were largely of a sectional character. The electric railway section meetings were attended by about sixty men, and nine papers were read and discussed at two meetings held on Thursday. Some of the discussion before the public utilities and public safety sections was also of interest to the electric railway men. An abstract of some of this material follows:

Electric Railway Section

THURSDAY MORNING SESSION

In opening the sectional meeting Chairman G. O. Smith, Doherty Operating Company, New York, explained that since the section was formed one year ago the activities had been confined to the membership campaign and the inauguration of the bulletin service. He then called for committee reports.

H. A. Bullock, Brooklyn Rapid Transit System, reported for the membership committee that eighty-nine electric railways are now enrolled, as compared with thirty-four a year ago. He stated that very pleasant relations have been established with the American Electric Railway Association and that arrangements are being made for reciprocal relations with the Safety Federation of America and the American Museum of Safety. He moved a vote of thanks, which was passed, to James H. McGraw and his associates on the ELECTRIC RAILWAY JOURNAL for their co-operation in this campaign. He also distributed copies of a catalog of lantern slides on safety topics, prepared originally for the Brooklyn Rapid Transit Company. Arrangements have been made by which these slides can be procured at a nominal price through the National Safety Council, Chicago, Ill.

After an informal report by Secretary C. B. Scott, Bureau of Safety, Chicago, Ill., the report of the committee on standards was read. This committee approved the use of near-side stops where possible and also the joint report on protection at grade crossings prepared by representatives of the American Railway Association and the National Association of Railroad Commissioners. However, as the American Electric Railway Association and the National Safety Council did not participate in this report it was recommended that a committee on the subject be appointed to work in conjunction with the American Railway Association and the American Electric Railway Association. The committee also indorsed the recommendations of the Massachusetts Highway Commission relating to increasing safety at the sites of eliminated grade crossings.

The standards committee also submitted an outline of the practice of one company in educating employees, and a list of car equipment features affecting safety. Among other things it recommended that no men on the extra list be appointed to safety committees and that members of such committees be paid for the time put upon this work. Instruction schools, with sample equipment where practicable, were recommended for all companies which can maintain them.

For the committee on bulletin service Chairman Smith reported that special electric railway bulletins had been furnished during the year, although it had proved difficult to get this work started. Co-operation is needed, but ample material can be obtained.

RELATIONS WITH EMPLOYEES AND THE PUBLIC

Two papers on this general subject were presented by J. L. Roche, Pittsburgh Railways, and H. H. Norris, ELECTRIC RAILWAY JOURNAL. C. G. Rice, Pittsburgh Railways, was scheduled to speak on "How the Attitude of the Public Toward the Railroad Company Is Influenced By Systematic Safety Work." He was not able to be present and Mr. Roche spoke in his place from Mr. Rice's notes.

Mr. Roche said that progressive corporations to-day have adopted a policy of fairness and frankness. The Pittsburgh Railways have a number of fundamental principles which serve as a guide to employees. These are illustrated in the code of ethics and policies outlined in the issue of this paper for Sept. 7, 1916, page 712. He said further that all accidents are due to human or material failure. The first results from incapacity, negligence due to lack of understanding or to monotony of task, etc., and willful negligence. The remedies were stated to be as follows:

Incapacity can be eliminated by careful selection of men and proper training and inspection thereafter. Negligence, other than willful, can be corrected by instruction, mental examination, inspection, discipline, welfare work and physical examination. Willful negligence can only be eliminated by discharge.

Coming to the public phase Mr. Roche said that there are three classes of chance takers: (1) Those who realize the danger and deliberately take the chance; (2) those who realize the danger but act thoughtlessly, and (3) those who do not realize the danger. In reducing the number of chance takers, explanation and seeking of co-operation are the factors. He then explained what the Pittsburgh Railways have done to control accidents, with the understanding that safety work must be sincere, systematic and persistent. This included an exhibit throughout the winter at a local exposition, the distribution of the "Pla-Safe" game invented by one of the company's men, the circulation of safety coins, etc., in other words, continually impressing the slogan "Safety Always."

Mr. Roche confessed that in spite of this work accidents have increased, but it has held down the rate of increase. He believed that a large part of accidents are preventable, that carelessness should be made a criminal offense, that safety rules should be standardized and that the means employed in safety work are incidental as compared with the object in view.

Mr. Norris next read his paper on "How the Safety Movement Is Helping the Electric Railway Solve Its Problems." He explained first that the purpose of the

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paper was to draw, from a survey of the recent safety work of a number of typical railways, a few conclusions as to what is being definitely accomplished, with a view to justifying a reasonable and continuous expenditure of funds in this direction.

Eliminating from consideration all railway problems very remotely concerned he divided the remainder in two ways:

First, those in which money considerations are involved, and others in which the financial aspects are secondary.

Second, those which bear on the relations of a company with the public, and those in which only employees are concerned.

He said that the most critical problem in the electric railway to-day is how, while maintaining good service, to preserve a reasonable net return on investment in spite of increased service requirements on one hand and decreased income, as measured by purchasing power, on the other. Next in importance is the preservation and cultivation of good will on the part of the public, so that reasonable operating conditions may be assured and the confidence of investors maintained. A third problem is the cultivation of such relations with employees that loyalty and co-operation may be fostered for the purpose of aiding in the solution of the other two. He then raised the queries:

(1) Does systematic safety work pay in dollars and cents; (2) does it pay in fostering public good will, and (3) does it conduce to loyalty on the part of employees?

Mr. Norris then proceeded to answer these questions by means of examples drawn from the experience of many companies and introduced quotations from letters from leading railway men. His conclusions were as follows:

1. The safety movement is contributing to the solution of the most difficult problems before the electric railway to-day.

2. The contribution is more important in the way of providing means for the public, the employee and the company officials to meet upon a platform of common interest than in direct money saving.

3. The movement among electric railways is gaining momentum rapidly, but after this momentum has been acquired a sustained effort will be needed to maintain it.

Mr. Bullock opened the discussion on the papers by Messrs. Rice and Norris by stating that as papers like these accumulate in the reports of the section meetings they will furnish valuable material for safety campaigns. He firmly believed that applying the principles of safety will overcome prejudice and promote friendly public relations. J. H. Harvey, Kansas City Railways, agreed that when the keynote of the work is good will, pleasant relations with public and employee will result.

In reply to a question suggested by Mr. Norris's paper Mr. Smith explained that certain committees of trainmen sent out by the Toledo Railways & Light Company to inspect safety work on other properties had presented interesting reports, copies of which could probably be furnished if desired. Other speakers dwelt upon the factor of the problem introduced by the difficulty of getting and holding good men due to abnormal industrial conditions.

AUTOMOBILE HAZARDS

The next paper read by the author, W. W. Lowe, Toledo Railways & Light Company, was entitled "Preventing Accidents Between Street Cars and Automobiles." He first pointed out that automobiles have both reduced revenues and increased accidents. In endeavoring to reduce the latter he believed that humanitarianism should be the basis of effort. He then quoted statistics from H. G. Winsor's Atlantic City convention paper on this subject, showing the tremendous increase in numbers of automobiles registered and of collisions. It was estimated that 5,000,000 cars would be in use in this country in 1920. Mr. Lowe said that in Toledo 78 per cent of the accidents occur outside of the congested district, the peak occurring when people are returning from work.

Taking up remedial measures Mr. Lowe divided them between education and restriction. The latter plan is successful abroad. He mentioned the following measures: (1) Systematic education of railway employees; (2) following up their training; (3) education of automobile drivers as to the results of carelessness; (4) restrictions as to the issuing of chauffeurs' licenses; (5) traffic regulations, and (6) enforcement of the last-named.

He thought this subject important enough for special consideration by a committee.

The discussion on Mr. Lowe's paper was opened by W. E. Cann, Detroit United Railway, who referred to the appalling recent increase in collisions with vehicles in Detroit. This is an automobile city, and there is much reckless driving. The effort to educate drivers has not been successful. He advocated the locking up of law-breakers' machines and said that electric railways must get behind law enforcement. On motion of Mr. Scott the section then approved Mr. Lowe's suggestions and requested the Council to carry them out.

F. E. Rankin, Detroit United Railway, said that good drivers caused as many collisions as green ones. Another speaker considered most traffic ordinances too complex, as even the traffic officers do not always understand them. He thought that the proposed committee should attempt to standardize these ordinances. His company trains its chauffeurs just like motormen, and he said that drivers among the public should be similarly trained.

In response to a question as to the offsetting of increases in automobile collisions through reductions in other types Mr. Lowe said that the totals have increased. H. B. Adams, Aurora, Elgin & Chicago Railroad, Aurora, Ill., then described a letter campaign conducted in conjunction with automobile clubs, which he said had produced a good response. Mr. Cann also described a recent check made at a crossing to determine the effect of the warning bell. Seventy per cent of the drivers paid no attention to the bell and 30 per cent crossed while the bell was ringing.

Dr. F. D. Patterson, Pennsylvania Division of Labor and Industry, Harrisburg, Pa., said that there should be a law requiring a driver to carry a card with his photograph upon it, and on the back of this card his court record could be entered. While agreeing that this would be good S. H. Reid, Middle West Utilities Company, Chicago, Ill., thought it could not be introduced soon. Referring to a motorman in Philadelphia who did not have an accident in forty-five years and to other cases of men who do not have accidents, he said that education of motormen will bring good results. On the other hand, J. C. Rose, chief claim agent Pennsylvania Railroad, said that the burden is on the vehicle driver. In answer to a question as to the prosecution of automobile drivers, Dr. Patterson said that it is the custom of the Long Island Railroad to prosecute those who cause damage. The railroad sues for the amount of the damage and sometimes collects it. In response to another question F. W. Fisher, Rochester (N. Y.) Railway & Light Company, said that at a crossing near Rochester automobiles are required to stop before crossing a high-speed interurban line.

The last paper on Thursday morning was by H. W. Clapp, Columbus Railway, Power & Light Company,

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Columbus, Ohio, on "How Graphic Charts and Bulletins Help in Safety Education." He began with the statement: "Charts are the text-book of safety" and explained that in his company systematic educational work was undertaken because the spasmodic work was seen not to have been successful. He said that cartoons had proved efficacious in interesting indifferent bulletin board readers. In the bulletins this company uses graphics freely and feels that the boards are responsible for much of the interest in safety.

Mr. Clapp exhibited some sample charts in which the records of collisions with automobiles and related data were clearly shown. The cartoons were in blue print form. The result of the work has been to keep down the rate of increase in these accidents as compared with other cities. The result would have been better but for the large number of new men employed, as new men cause accidents. At present a safety contest is on. At its close $1,000 will be distributed so that men in the winning carhouse will receive two days' pay each and those in the second carhouse one day's pay.

In the discussion of this paper Mr. Bullock said that Mr. Clapp's plan for comparing data of successive years requires reasonably stable conditions in the districts served by the different carhouses, otherwise inequalities could creep in. In Brooklyn, for example, the population shifts radically at times. To this Mr. Clapp agreed, stating that in Columbus there are no violent changes in population. Furthermore on account of the low fare, averaging 2.65 cents gross, the extension requirements are reasonable. Under the present franchise the population is not being spread out much. Conditions are ideal for the present contest.

NEW OFFICERS OF THE SECTION

Before closing the Thursday morning session the following elections for the ensuing year occurred: Chairman, H. A. Bullock, Brooklyn Rapid Transit System; vice-chairman, E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa.; secretary, J. H. Harvey, Kansas City Railways; chairmen of committees—membership, George Oliver Smith, Doherty Operating Company, New York; standards, C. G. Rice, Pittsburgh Railways; safe practices, H. W. Clapp, Columbus (Ohio) Railway, Power & Light Company; program, H. G. Winsor, Puget Sound Electric Railway, Tacoma, Wash.

Electric Railway Section

THURSDAY AFTERNOON SESSION

The first paper at the second session was by J. H. Harvey, Kansas City Railways, on "Safety and Efficiency," in which he described the recent campaign inaugurated by his company. The situation in Kansas City regarding the former attitude of the public was described in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 30, page 667. Before beginning its campaign the company sent a representative to other cities to study the results of campaigns, and membership in the National Safety Council was taken out.

Mr. Harvey explained that the safety organization provided comprised the following: A general safety committee consisting of representatives of the claim and legal department, the publicity agent and the superintendent of efficiency; a supervisor of safety directly under the foregoing; a central safety committee consisting of the heads of nine departments, and departmental and local committees. The work was organized to reach the schools, vehicle drivers and owners, the general public and the employees. The details of the several divisions of the work were then discussed by the speaker, indicating that the campaign is being conducted along modern lines.

The discussion was opened by C. C. Johnson, Virginia Railway & Power Company, Richmond, Va., who explained the plan for the coming safety-first week in that city. This will begin on Nov. 6 and will be conducted in connection with the Boy Scouts and with the cooperation of the police department. Mr. Scott agreed with Mr. Harvey in the contention that safety work with employees is most important. He expressed belief in an organization which makes trainmen an important part of the safety work, and in the importance of holding meetings with them if possible every thirty days.

THE NATIONAL ELECTRICAL SAFETY CODE

The second paper was by W. J. Canada, United States Bureau of Standards, Washington, D. C., on "The Application of the National Electrical Safety Code to Electric Railway Construction and Operation." He first traced briefly the history of the code and said that the American Electric Railway Association and the National Safety Council began very early the constructive criticism of the code, and the assistance which these associations thus gave has been very helpful.

There are still, however, certain apprehensions remaining in the minds of some of those least thoroughly acquainted with the safety code as to the effect that even the trial adoption and use of the code will have on the electrical industry. These apprehensions have, in general, been growing less as the acquaintance with the code has become closer through careful study of its provisions.

Commissions in general are approaching the introduction of the code with full appreciation of the difficulties involved in applying a definite standard to a kind of construction and operating practice in many ways as yet not standardized. They express the intent to make their administration moderate and reasonable and the feeling that standardization in closer detail will be feasible and desirable at a later date than is practicable at the present time.

Referring next particularly to the electric railways Mr. Canada said that the principal life hazards of electric railways are traffic hazards, but the electric life hazards, while less, are still unnecessarily great, since many of them are known to be avoidable through feasible precautions, such as the safety code presents. Most, even of the electrical safety problems of electric railways, are common to all branches of the electrical industry. For example, the electrical utilization hazards in railway carhouses and in the electrical car equipment handled by the motormen are, except in detail, the same as those of electrically equipped factories where the electrical equipment is incidental to the other processes carried on and requiring attention of the workers.

In outlining those code rules which refer especially to electric railway conditions, Mr. Canada said that all transmission lines, underground distribution and overhead feeders are classified in the code with electrical supply lines of the same voltage and general character and are required to comply with all the rules for strength of their construction in the same way as such supply lines. Where practicable, overhead lines of various users should be arranged by mutual agreement of the utilities concerned at standardized levels throughout a given community in order to minimize difficulties and dangers when new crossings or extensions to existing lines are to be installed. Parallel pole lines, where practicable, should be so separated from each other as

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not to conflict; but if this is not practicable, a common pole line is preferable to two conflicting lines, unless the high voltage of certain circuits or the large number of conductors make the use of a single pole line undesirable or impracticable.

The speaker then took up in considerable technical detail the special rules governing the construction of the electric railway itself. For example, third-rails are required to be protected, where not on fenced rights-of-way, by suitable overlapping guards. Third-rails may well be protected even on fenced rights-of-way where the presence of employees is often necessary. Trolley contact conductors under 750 volts are to be maintained at sufficient tension and with supports sufficiently close together so that the breaking or loosening of a single conductor fastening will not allow the trolley conductor at any point to come within 10 ft. from the ground, etc.

On the subject of "Operating Precautions for Electrical Workmen and for Trainmen," he said that the precautions which can be expected of motormen or conductors in the handling of electrical equipment on cars are very limited, and no rules for them have been included in the code. When some adjustment has to be made under the car or on top of the car or within the car, and not directly affecting car movement, it is presumed that the general instructions to trainmen will call for removal of current collectors from trolley contact conductor or third-rail before proceeding. Adjustments on top of cars are always dangerous because of proximity to live trolley wire. For adjustments concerned with ordinary operation of the car, or necessary in emergencies while car is running, no precautions against electrical shock or burn should be demanded of the trainmen. His undivided attention is demanded for his handling of his car's movement in such a way as best to protect passengers and exterior traffic. The line and car construction requirements of the safety code outlined in the code will assure the trainmen of reasonable immunity from electrical dangers during ordinary car operation, and by protecting him will also safeguard his passengers.

A brief discussion followed the presentation of the above paper relating principally to technical details of grounding transmission lines and cables for the protection of workmen.

POWER HOUSE HAZARDS

F. W. Fisher, Rochester (N. Y.) Railway & Light Company, next read a paper on "Hazards in Power Houses and Their Remedies." He divided the former into two classes—construction and operation. The former, he said, were thoroughly covered in the paper by Mr. Penrose, abstracted on the next page. In operation there are those hazards which are common to all industries and those inherent to power house operation. Of power house accidents, from the experience of his company, he had found that 16 per cent were non-electrical burns, 16 per cent were electrical burns, 15 per cent were due to falls, etc., 13 per cent to falling materials and the remainder to sundry causes. Of this class of accidents 38 per cent were inherent to power house work. Some were due to faulty design, others to faulty operation of machinery.

Mr. Fisher felt that new power plants are being built with due regard to safety considerations, and he had in mind in his paper particularly those of the older type. He put in a plea for a careful safety study of individual properties, particularly of those which had been built for some time.

W. F. M. Werth, Detroit United Railway, opened the discussion by referring to the special hazards of the boiler room which he thought should have more attention. The men in the boiler room are apt to become slack and to incur unnecessary risks. He raised a question as to Mr. Fisher's recommendation that switchboards should be isolated from the engine room on account of safety. Mr. Fisher said that in some cases this is desirable to protect them from escaping steam.

Mr. Scott said that he considered the percentage of accidents of an inherent power house nature, as reported by Mr. Fisher, to be quite high. In an analysis made by himself only 8 per cent of 6000 accidents were due to electric current. However these represented 70 per cent of the money cost of the accidents, and 71 per cent of the fatalities and of the time lost over thirty days. In response to a question as to what he termed an accident Mr. Fisher replied that in his data anything reported to a foreman was so considered.

CAR EQUIPMENT AND SAFETY

The next paper was one by C. H. Cross, Milwaukee (Wis.) Electric Railway & Light Company, on "Safety Devices on Electric Street and Interurban Cars." These he divided into two classes, audible devices and visible devices. He first showed that inclosing the motorman's platform to protect him makes it more difficult for the motorman to operate his car safely.

Mr. Cross then took up systematically all of the devices on the car which affect safety of operation. In so doing he mentioned the present tendencies in each case and commented upon the efficacy of the several devices. He also recommended the standardization of signal operating parts in the interest of safety.

The list of devices covered by the speaker included brakes, buffers, controller locks, circuit breakers, grounding connections, prepayment equipment, safety gates, door signals, fenders, fire extinguishers, headlights, safety signs, sanders, safety treads, tail lights, window guards, etc.

Under the head "platform safety" he discussed briefly the organization and discipline necessary in making the above-mentioned devices effective.

PHYSICAL EXAMINATION AND SAFETY

At this point Dr. C. M. Harper, surgeon Toledo Railways & Light Company, was called upon and responded with some cautions regarding physical examination of employees. He said that many of these are farces and that a thorough examination requires at least two hours. Team work among physicians is necessary so that the services of specialists in several lines may be utilized. This costs money, but it is a good investment. Companies cannot expect good work if they pay for it in passes only.

INSTRUCTION OF MOTORMEN

The last of the electric railway papers was by H. B. Adams, Aurora, Elgin & Chicago Railroad, Wheaton, Ill., on "Methods of Instructing New Motormen in Their Duties." It was a description of the method used on a modern property where the instruction is not done in a school, but is given by the motormen, the shop foremen, the service inspector and the safety supervisor. The applicant serves for a time with a motorman on each of the city and interurban lines and the third-rail line, is shown the equipment in the shop and is subjected to numerous examinations.

In response to a question Mr. Adams said that the motormen are all re-examined every six months.

CLOSE OF ELECTRIC RAILWAY SESSION

In bringing the electric railway meetings to a close Mr. Bullock took the chair and announced the plan for the coming year. He said that first the effort will be

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to expand the membership and to cement the friendly relation with the American Electric Railway Association. Next the special bulletin service will be developed and made more responsive to the needs of the members. In co-operation with the United States Bureau of Education the school safety work will be pushed. Finally it is hoped that the committee on standards may get up a set of safety organization plans adapted to the several requirements of typical classes of roads.

Notes on Other Section Meetings

In addition to the special electric railway section meetings several papers at other section meetings related more or less closely to the electric railway field. This is true particularly of the public safety and public utilities sectional meetings.

PUBLIC SAFETY WORK OF PUBLIC SERVICE COMPANIES

Under the above title, at the public safety meeting held on Friday, H. A. Bullock, Brooklyn Rapid Transit System, traced the relation of public safety and public relations, stating first that public street hazards are the largest element of electric railway hazards. In this work a friendly atmosphere must first be produced and then the proper mental attitude of the public must be created.

The public attitude is made up of a number of elements: prejudice, indifference, objection to interference with personal liberty, political interference and natural carelessness and recklessness. These points Mr. Bullock took up in order somewhat as follows: First, prejudice must be overcome by the railway "cleaning house" itself and furnishing service with a degree of safety compatible with the conditions of operation of an inherently dangerous business. Then the facts must be duly advertised.

To overcome indifference statistics and details of accidents must be given out. People will be reasonable also if they realize that safety comes about through self-imposed restraint, and this they can be made to do through suitable advertising. As to political interference, the best plan is to leave office holders alone, as they will be glad to take hold after the work has been started. Finally, on the matter of recklessness it should be remembered that long protection of the individual by society has caused him to relax his vigilance. He needs further protection from his own sense of security. Patience and experiment are needed at this point, and the schools and the newspapers will be the potent factors in this work.

LOCAL ORGANIZATIONS FOR SAFETY ACTIVITIES

At the public safety meeting another speaker was R. W. Campbell, Illinois Steel Company, Chicago, Ill., who also presided in the absence of Chairman E. C. Spring, Lehigh Valley Transit Company, Allentown, Pa.

Mr. Campbell outlined the ideal safety organization in a community under the direction of a local branch of the National Safety Council. His plan comprehended the co-ordination of all local activities under appropriate committees. His complete plan is available in pamphlet form.

STREET TRAFFIC REGULATION

Still another topic relating to public safety was that of street traffic regulation, as presented by William P. Eno, traffic expert. Mr. Eno presented an abstract of a pamphlet on this subject which has also been issued by the Council.

POWER STATION SAFEGUARDING

Reference was made earlier in this report to a paper by Charles Penrose, Philadelphia Electric Company, on means for preventing accidents in power plants. In connection with this paper Mr. Penrose showed a number of lantern slides from drawings and views of one of the newer plants of his company. He divided his topic into erection safeguards, permanent safeguards and the relation of the employee to station safeguarding. The paper was so exhaustive that only a brief abstract is possible here. However, the following points are typical of the line of treatment.

During construction, electrical equipment should be largely used, and it should be installed with care, especially wiring and transformers. The architect's specifications should be so drawn that suitable safety clauses are provided. During construction there should be full co-operation with the local inspection bureau. As the work proceeds the clean-up gang should do its work properly to eliminate risks caused by rubbish. It might be well for the utility to employ a safety inspector to study accident hazard continually.

Assuming the building itself to be well constructed there next comes the layout of the equipment to eliminate risk. The modern plant is simple in construction and is provided with oil switches and reactors as protection. The high-tension apparatus is isolated and suitable indicating devices show the condition of switches. Duplicate bus bars are provided for emergency use. Stairways are used in place of ladders, pipe lines are plainly designated by distinctive painting, and foolproof signal systems, etc., are used.

Finally every possible device is used to encourage the employee to protect himself.

ELECTRIC RAILWAYS REPRESENTED

The following is a list of the electric railway companies represented at the meeting:

Aurora, Elgin & Chicago Railroad, Aurora, Ill.
Boston (Mass.) Elevated Railway.
Brooklyn (N. Y.) Rapid Transit Company.
Columbus (Ohio) Railway, Power & Light Company.
Columbus (Ga.) Railroad.
Connecticut Company, New Haven, Conn.
Detroit (Mich.) United Railway.
Doherty Operating Company, New York, N. Y.
East St. Louis & Suburban Railway, East St. Louis, Ill.
Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.
Grand Rapids, Grand Haven & Muskegon Railroad, Grand Rapids, Mich.
Houghton County Traction Company, Houghton, Mich.
Kansas City (Mo.) Railways.
Keokuk (Iowa) Electric Company.
Louisville & Southern Indiana Traction Company, Chicago, Ill.
Middle West Utilities Company, Chicago, Ill.
Milwaukee Electric Railway & Light Company, Milwaukee, Wis.
Ohio Electric Railway, Springfield, Ohio.
People's Railway, Dayton, Ohio.
Pittsburgh (Pa.) Railways.
Rochester Railway & Light Company, Rochester, N. Y.
Shore Line Electric Railway, Norwich, Conn.
Toledo Railways & Light Company, Toledo, Ohio.
Virginia Railway & Power Company, Richmond, Va.

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American Association News

The Mid-Year Meeting of the Association Will Be Held in Boston—President Storrs Made a Surprise Visit to the Public Service Section at Its Meeting on Oct. 19—Reports of Various Other Company Section Meetings Are Recorded

Boston Selected City for Next Mid-Year Convention

The city of Boston has been selected by the executive committee as the place for holding the next mid-year convention of the American Electric Railway Association, and the date has been set tentatively as Feb. 2. The meeting will be in general charge of Matthew C. Brush, president Boston Elevated Railway Company, who has been appointed by President Storrs to be chairman of the mid-year meeting and dinner committee.

Meeting of Denver Tramway Company Section

The first regular meeting of the Denver Tramway Company Section for the coming season occurred on Sept. 26 and was the thirty-seventh monthly gathering of the section. The paper of the evening was presented by A. M. Evans, assistant in charge of track, and described a trip of inspection recently made by him to the Pacific Coast. The paper which was illustrated by lantern slides gave an account of the standards and practice in Salt Lake City, Los Angeles, San Francisco, Oakland and Portland, and related particularly to the track standards in those cities.

Public Service Company Section Elects Officers

The first meeting of the Public Service Section was held in the new auditorium of the Public Service Terminal on Oct. 19. President Graham, division superintendent, of Camden, N. J., occupied the chair.

As a surprise to the members, L. S. Storrs, president of the Connecticut Company, who was recently elected president of the American Electric Railway Association, was present. He was introduced by Martin Schreiber and gave a brief talk on the future of the association. Harlow C. Clark, of the association office, then spoke on the activities of the association and characterized the meeting at Atlantic City as the best convention ever held by that body. Martin Schreiber, engineer maintenance of way, outlined a campaign for obtaining individual membership, and spoke of the success that the committee on individual membership had already achieved. L. C. Bradley of Houston, Tex., who was recently elected president of the American Electric Railway Transportation & Traffic Association, was scheduled to speak on training men for supervisory and executive positions but was unable to be present, having been called back to Texas on important business.

H. F. Burr, C. F. Backman, D. C. McDougall, F. L. Walsh and W. J. Hughes, who acted as delegates to the convention from the Public Service Railway, gave a short review of matters of interest to the members which pertained to their departments.

The annual election of officers which was then held resulted as follows: President, A. T. Warner; vice-president, H. D. Briggs; director, F. L. Folks; secretary, Frank Davis, and treasurer, A. H. Jones. Resolutions of sympathy for Messrs. Harrison and McCourt, who have been called to the great beyond since the last regular meeting, were passed.

Washington Railway & Electric Company Section Meeting

The meeting of the company section of the Washington Railway & Electric Company, Washington, D. C., was held on the evening of Oct. 16, and the principal speakers were W. F. Ham, vice-president of the company, and J. T. Moffett, superintendent of transportation, and the newly elected president of the company section. Mr. Ham reviewed the work done at the recent convention at Atlantic City. He also discussed the fare problem and referred to grants of higher fares than 5 cents in some New England cities. The talk of Mr. Moffett related principally to the subject of car standards. The following officers were elected to serve for the ensuing year: J. T. Moffett, president; William L. Clarke, vice-president, and L. B. Schloss and W. F. Degment, directors, and R. A. Vetter, secretary and treasurer. C. P. King, president, and W. F. Ham, vice-president Washington Railway & Electric Company, were elected ex-officio members of the board of directors.

Milwaukee Section Hears Announcement About Medal

At a meeting of the Milwaukee Company Section, held on Oct. 12, President Dentz announced the award to Bert Hall at the American Electric Railway Convention in Atlantic City for his paper on "Co-operative Activities," this being selected as the best company section paper read during the previous year and submitted in competition. The section then listened to an address by M. C. Potter, superintendent of schools, city of Milwaukee, who said he had been much impressed with the work being undertaken by the Employees' Mutual Benefit Association toward conserving the health of its employees. He also discussed the Page bill, which is intended to provide an appropriation for industrial schools in different cities.

After some musical selections Henry Grimm, of the claim department, read a short paper on current events in that department. The trials and tribulations of an investigator were described, and numerous instances were cited to show the unnecessary expenditure of money by the company because of insufficient information being furnished to the claim department. Before the close of the meeting the president announced that the nomination and election of officers for the ensuing year would take place at the next meeting, and that the way and structures department would prepare and read a paper on current events at that time.

Capital Traction Section Elects Officers

The annual election of the Capital Traction Company Section No. 8, American Electric Railway Association, was held on Thursday evening, Oct. 19, in the Assembly Hall, Thirty-sixth and M Streets, N. W. About 100 were present. After the meeting was regularly called to order by President Dalgleish, at 8.15 p. m., the following officers were elected for the ensuing year: President, F. Morrill; vice-president, Elon von Culin; secretary, J. E. Heberle; treasurer, A. Wilkinson; director

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(for three years), John McKay. Each of the newly-elected officers was called upon and made a few remarks.

Col. C. W. Kutz, engineer commissioner of the District of Columbia and chairman of the Public Utilities Commission of the District, addressed the meeting on "Some Phases of the Engineering Work of the District of Columbia," illustrating his remarks with a number of lantern slides. The address included a description of the sewer department, street cleaning division, bridges, water service, trees and parking, and schools. He also spoke of the relations between the commission and the utilities and among other things said:

"The Public Utilities Commission was not created by Congress for the purpose of exercising an arbitrary jurisdiction over the utilities of the District, but was intended to act as an agency for doing justice to both the public and the utility companies, and this is the spirit which actuates the commission."

Col. R. D. Simms, treasurer of the company, and A. Wilkinson of the claim department, were called upon and entertained the section with a number of short stories. At the conclusion of the meeting a buffet luncheon was served.

COMMUNICATIONS

Newspaper Publicity Commended

SOUTHERN PUBLIC UTILITY COMPANY,
CHARLOTTE, N. C., Oct. 23, 1916.

To the Editors:

Since my return from the Atlantic City convention of the American Electric Railway Association I have taken the time to study carefully the papers presented on publicity and the discussion resulting from them, and I am struck with the fact that practically nothing was said concerning the use of newspapers by public utility companies. This, to my mind, was not an oversight on the part of those discussing publicity, but resulted, I believe, from the fact that the program of the Transportation & Traffic Association dealt with "Company Publications, Their Use and Value; and Their Preparation and Publication." Not even in the address of Mr. Lee, who is admitted to be a leader in corporation publicity, was there great stress laid upon the use of regular newspaper advertising, and it occurs to me that in future sessions of these associations it would be well to include in the discussion of this important subject the matter of using the newspapers of the localities in which the various newspapers are published.

It is true, undoubtedly, that there is a value to company publications, yet they do not nor can they take the place of the legitimate newspaper advertising. And I note with great pleasure and with full approval, the campaign of the ELECTRIC RAILWAY JOURNAL toward the frank discussion of the problems arising in the operation of public utility companies, through the newspapers, for the information of the general public which, as is manifest, constitutes our patrons and customers.

There is a danger, however, of the too free use of newspaper advertising by reason of the fact that it is an easy matter to leave the impression on the publishers of newspapers that the utility company is attempting to influence their attitude toward them and toward the public service. Such a situation is one which should scrupulously be avoided. A newspaper should at all times, in my opinion, reflect public opinion. It is true that in some cases the newspapers attempt to make public opinion for reasons best known to themselves, and occasionally it is the case that they use their power in the community to the detriment of the utility company. But it has been my experience that the public is not to be hoodwinked in this regard for long at a time, and invariably it is the newspaper that suffers when a movement of this sort is attempted.

The newspapers should always be given the facts in the case, and after more than sixteen years' work with newspapers and newspaper men I have met but one who would refuse to deal fairly with the corporation and with the public. The newspaper which can be "controlled" by the utility company is not a friend of that company, no matter how strenuously it may strive to be. This is because the public will soon arrive at an understanding of the facts in the case and realize fully that the paper is not printing all the news but that it is deceiving its subscribers into believing that it is protecting their interests when, as a matter of fact, it is assisting the corporation to suppress facts of which the public should have knowledge.

At the same time every public utility company should use all the advertising space in its local newspapers that will bring results. There are several reasons for this, the first being that the American people read the daily newspaper, and if the utility company presents its position, day after day, through this medium, the public will eventually come to a better understanding of the facts and will be able to better judge between the claims of the demagogue and the representative of the company when controversies arise.

And another and important reason is that in every community, and I say this without fear of successful contradiction, the newspapers are community builders. They do more toward building bigger and better cities and towns and more to develop the latent resources of a section than all the boards of trade and chambers of commerce and rotary clubs ever organized. And with more people, better living conditions and increase in the wealth in a given section comes more business of a more satisfactory sort for the utility company. Therefore I say that the support of the local daily newspapers is a most essential means through which to add to the revenues of a company serving the general public, aside from the direct returns from the use of advertising space at a reasonable and fair rate.

It is true that occasionally it is good business to use advertising space in a newspaper that is manifestly unfair and unjust to the utility company? This is questioned in some sections, and I can readily understand the position taken and the reason for it. But if a newspaper is really unfair and unwilling to give the company a square deal, it is still possible that its readers do not form their opinion from its attitude, and advertising space relative to the use of electric and gas energy will oftentimes bring direct results. In cities in the Middle and Far West I have personally known this to be true.

The use of advertising space to educate the public concerning the abuses of public utility companies' property is one of the methods I have in mind. For instance, the practice of certain automobile owners and drivers to ignore municipal laws and regulations relative to the movement of traffic. Instances of accidents occurring as a result of these violations are numerous, and by using advertising space in the newspapers it is possible so to arouse public opinion as to lessen this danger, to say the least, if not to entirely eliminate it.

There are numberless ways in which the utility com-

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pany may and should use advertising space in the newspapers, in connection with the company's publications, each of which will commend itself to the serious consideration of the management of every company when all the facts are known.

It is for these reasons that I suggest, through the ELECTRIC RAILWAY JOURNAL, that at some early session of the American Electric Railway Association and its affiliated organizations, arrangements be made for a discussion of the entire question of publicity from every possible angle.

LEAKE CARRAWAY,
Director of Publicity.

Accounting Inconsistencies and Fallacies

UNION TRACTION COMPANY OF INDIANA
ANDERSON, IND., Oct. 18, 1916.

To the Editors:

I have read with interest the editorial, "Facts—and the Wider Vision," in your issue of Oct. 14.

The public accountant who discussed inconsistencies and fallacies in commission accounting regulations at the Accountants' Convention devoted considerable time to criticizing the steam road classification of equipment rental accounts.

I am wondering if the speaker (Mr. Dunn) has read the electric railway classifications. If he were familiar with them and had known something of their history he should have known that the electric railway accountants persuaded the Interstate Commerce Commission long ago to avoid the very inconsistency regarding rentals which Mr. Dunn so sharply criticizes. I refer Mr. Dunn to Accounts Nos. 97, 98, 115, 116, etc., in the Interstate Commerce Commission System of Accounts for Electric Railways, issue of 1914, also your editorial entitled "Accounting for Rents" in the issue of Nov. 13, 1915, in which you say "the electric railway method of accounting for rents constitutes a real advance in utility accounting, secured through the earnest efforts of electric railway accountants."

Mr. Dunn waves a red flag and shouts "danger," figuratively speaking, at sight of "Surplus Appropriations" accounts in the classifications. These are about as dangerous, in the writer's opinion, as a man of straw. In the first place, their use is not mandatory, and, in the second place, I doubt if they are used by one railway accountant in fifty.

Mr. Dunn sends "a message to executives and directors to beware of appropriation accounts." I think most accountants, directors and executives pay little attention to these accounts, which are usually considered not nearly so important as the criticism would indicate. The surplus may be appropriated "at the option of the carrier," as clearly stated in the General Instructions of the Interstate Commerce Commission. If the appropriation accounts were used they would be memoranda and as such relatively unimportant. Mr. Dunn assumes that if such memorandum accounts were entered, the carrier might be stopped from later making any different disposition of the actual cash surplus by declaration of dividends or otherwise. I do not understand this to be the case. If a dividend had been earned and the directors decided to pay it, the situation would not be changed if some memorandum accounts had been made up concerning a tentative disposition or "appropriation" of surplus earnings.

Mr. Dunn also touches upon the subject of Sinking Fund Reserves, and he might well have devoted some time to specific criticisms of the treatment of Sinking Funds, such as the Wisconsin requirement that accruals to Sinking Funds be charged against the monthly income account and the New York requirement that sinking fund accruals be included in a group of "Income Deductions Accounts."

Electric railway accountants are aware of the seeming inconsistency of the Interstate Commerce Commission treatment of depreciation accounting and the lack of harmony between features of the accounting systems prescribed by regulatory commissions, such as the Montana requirement that depreciation expense account shall cover "all expenditures for ordinary repairs, renewals or replacements," etc., and the provision by New Jersey and Maryland that amounts charged to the maintenance accounts for repairs shall be deducted from the amount estimated to cover the wear and tear, obsolescence and inadequacy for the period, crediting only the difference to depreciation reserve. None of these inconsistencies was mentioned in Mr. Dunn's interesting treatment of the subject.

An effort was made to procure advance copies of Mr. Dunn's paper, but this was not possible. Otherwise there might have been a very valuable discussion and some constructive, rather than destructive, criticism of some of the subjects mentioned in his address.

W. H. FORSE, JR.

Interurban Electric Railway Finances

MILWAUKEE, WIS., Oct. 21, 1916.

To the Editors:

Referring to the contributed comment by A. J. Boardman to the article on "Present and Future Development of Interurban Railways," contained in your issue of Oct. 7, I would suggest that the criticism is somewhat premature. This article and those succeeding are not intended to reflect upon the financial standing of any property but rather to indicate in a general way after a survey of the situation throughout the country some of the facts which have affected the development of the interurban railway and the more pressing problems now confronting it.

The statement "that the interurban is not a device for promoting the growth of communities," to which exception is taken is not exact, the actual quotation from the article being "The place of the electric interurban in the economic scheme of the country is that of a transportation agency and not primarily that of a device for promoting growth of communities. In so far as it may be self-supporting as a transportation agency, it may serve the other purpose as well, but privately owned it must earn or go out of business." While there are a number of towns that have been largely built up by the coming of the interurban, this does not alter the fact that the greater number have been disappointed in the fact that the actual development has not conformed to the anticipated growth of the towns served. The interurban has been dependent for its earnings primarily upon existing need for transportation rather than upon prospective town development.

Discussion of financial results will be contained in forthcoming articles. It may be pointed out, however, at this time, that many electric railway operators have found difficulty, under existing conditions, in building their lines at a figure of $30,000 a mile, such as Mr. Boardman cites, and operating them with a ratio of 58 or 60 per cent for expenses, when there is included in expenses such items as taxes and reserves to insure the replacement of the physical property where it can no longer be economically repaired.

F. W. DOOLITTLE.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Soldered Bonds Prove Reliable—Gas-Welding in the Car Shop—Safe Method of Supplying Current to Cars in the Shop —Third-Rail Bonding in New York Subway—Unloading Cars at Small Expense—Other Items of Practical Interest

Soldered Bonds Make Good Record

Seattle Railway After Twelve Years' Experience Believes This Type of Bond to Be the Most Reliable

BY E. J. MC ILRAITH
Superintendent of Way and Structures, Puget Sound Traction, Light & Power Company.

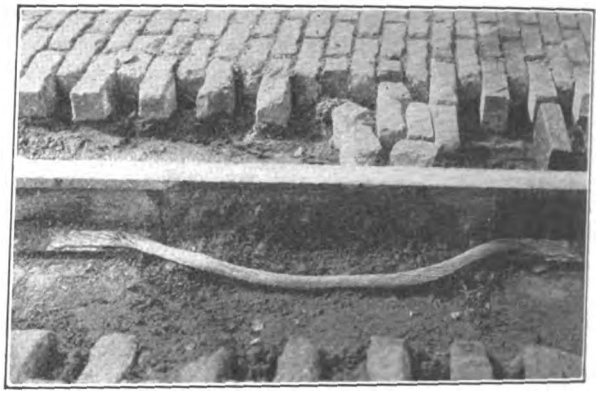
The Seattle (Wash.) Division of the Puget Sound Traction, Light & Power Company has been using only the soldered type of bonds for many years. Since this company is one of the few using soldered bonds, the performance data and costs of installation may be of interest.

Prior to four years ago, a considerable number of concealed bonds with solid formed ends were soldered to the web of the rail, but these were poorly installed, and many were stuck only at one end when placed. This type still shows a high percentage in the list of defective bonds. Others that run high each year, in the number giving high resistance, are the No. 00 exposed cable bonds that were put on at the time when bonds were considered merely a necessary evil, not an asset. We are replacing these rapidly as the loosening of the plates lowers the conductivity of the joint below our standard.

There are on the system of 203 miles of track 40,794 bonds, exclusive of those used around special work. These are tested twice each year at a cost of 0.375 cent per bond. On most of the track a resistance per bond equivalent to 12 ft. of rail is the maximum allowed before rebonding, but on tracks of heavy current flow 10 ft. is used. On this basis the defective bonds found in the last semi-annual test were classified as follows:

Type of Bond	Number of Bonds	Per Cent of Total Bonds Installed
2/0 cable (exposed) found too small	196	0.48
Concealed, formed and soldered	466	1.14
4/0 cable, broken strands	41	0.10
4/0 cable, poor contact	5	0.012
Cable bonds (exposed) stolen	55	0.134
New joints where rails were cut	41	0.100
Total	804	1.97

It is seen from the table that only 101 bonds of the class used mostly during the last twelve years have proved defective or have been stolen. This is about one-quarter of 1 per cent of the total number of the bonds now in use.

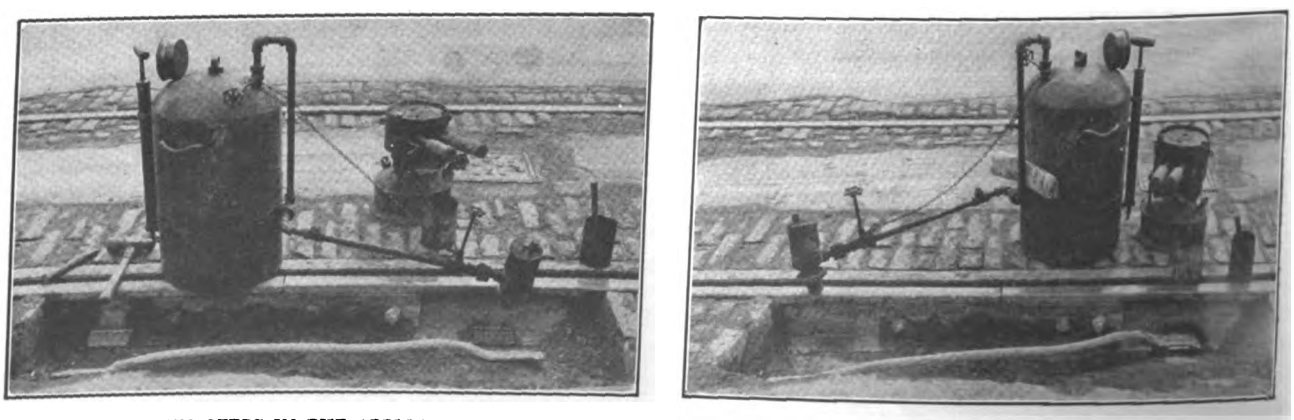


FINISHED INSTALLATION OF SOLDERED BOND

The cost of these bonds installed, with copper and solder prices about 25 cents per lb., and wages of men averaging 28 cents per hour, is $1.50 per 350,000 circ. mil. bond and $2 per 500,000 circ. mil. bond. The resistance per bond is 0.0001085 ohm and 0.0000740 ohm respectively. There is a little difference in the lengths of the two sizes as installed. The resistance of an equal length of 80-lb. rail using an 8-in. No. 0000 concealed bond, would be about 0.000065 ohm.

This company has had excellent service during the last twelve years from stranded cable, outside bonds soldered to the base of the rail. The cost per bond is high, but good reliability is obtained. The cost of replacing a defective concealed bond in paving is much greater than the cost of replacing an outside bond, owing to the bolt wastage, the extra paving disturbance and the removal of the joint plates, which cannot always be replaced in as good condition as before.

The writer does not feel that the records of other types of bonds can show the reliability per mile of track that a well soldered bond of this company's type is showing. Possibly a short gas welded bond placed on the head of the rail will prove equally desirable, and this type is being experimented with as the only one that in our opinion gives the same reliable, continuous



TWO STEPS IN THE APPLICATION OF A SOLDERED BOND, SHOWING METHOD OF HEATING THE RAIL

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circuit. The cost for the same conductivity is about 45 per cent of that for the outside stranded cable bond.

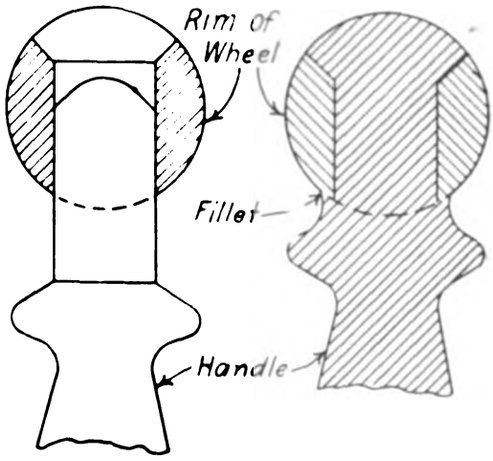
Acetylene in the Car Shop

In Cutting, Softening and Welding, This Gas Proves Useful and Economical in the Shop

BY G. E. HAAR
Master Mechanic, Washington Railway & Electric Company, Washington, D. C.

In the shops of this company acetylene gas has proved useful in a number of ways and has been the source of a considerable saving of money. A few instances showing how we have utilized its properties may be of interest to readers of the ELECTRIC RAILWAY JOURNAL.

In cases where steel or iron is to be bent and a forge is not at hand or cannot be conveniently applied to the work, acetylene can be readily used for softening purposes. As an example, this company had a rectangular steel truck frame badly bent in a collision. To have taken it to the shop in this condition and taken it apart



TWO STEPS IN THE PROCESS OF GAS-WELDING BRASS HANDLES TO BRAKE WHEELS

for straightening and squaring would have been a time-consuming and expensive operation. A gas equipment was taken to the spot, the truck frame was heated, and by means of wrenches was promptly repaired in the yard.

Of course, there is no novelty in the use of the acetylene flame in cutting metals, and we naturally considered it in removing steel tires from wheel centers. However, we first found that if the flange was cut through and a shallow cut taken in the tread, a blow of a sledge-hammer would crack the tire through. Later we found that it was only necessary to cut through the flange, after which a short hammer blow cut the tire instantly. This is our present practice in removing tires, and the time required is practically negligible as compared with the practice formerly used.

An example of acetylene welding which interested the writer very much personally was as follows: The Public Utilities Commission of the District of Columbia ruled that the brass brake wheels which were used on a number of the cars must be provided with handles. To have changed the wheels would have cost about $20 net per car, and the expense involved was sufficient to cause us to consider carefully other possibilities. The following plan was adopted so that brass handles were added to the wheels at a cost of about 90 cents per car, including all labor and materials.

As shown in the accompanying diagram, the rim of the wheel, which was 1¼ in. in diameter, was drilled through for a tight fit with a ¾-in. projection on the end of the handle. One side of the hole was chamfered out. The handle was then pushed into place and the brass was puddled by means of the flame, as shown, welding one side of the rim firmly to the projection of the handle. A fillet was also welded around the junction of the handle proper and the other side of the rim. After the welds had been smoothed over there resulted a wheel and handle as good as if the two had been cast together.

Another operation worth mentioning was the cutting of a 36-in. I-beam used in connection with the old power house and directly in the path of our underground construction for the new extension on Fourteenth Street from F Street. It took one man three hours to make two cuts on this I-beam, and 110 cu. ft. of oxygen and 50 cu. ft. of acetylene were consumed.

In our work we use what are designated as No. 4 to No. 10 tips, a tank containing 100 cu. ft. of oxygen, and an acetylene tank containing 225 cu. ft., or 15½ lb., of acetylene. The oxygen and acetylene costs about 2 cents per cubic foot.

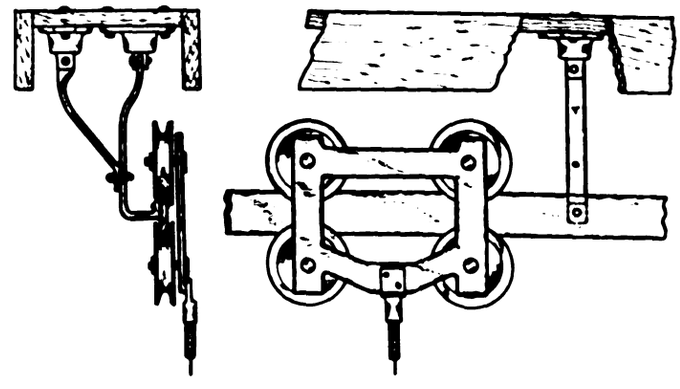
A Movable Carriage for Current Collection

Convenient Method of Supplying Current to Cars Not Equipped for Trolley Operation

BY G. B. TANIS

Electric railway operation offers many problems which usually do not submit themselves to simple solutions. The design of a contact system for furnishing current to moving equipments in yards and shops presents a typical case, particularly when the cars are not adapted for trolley operation. Some third-rail equipments are provided with trolley poles, in which case standard overhead construction can be used. The presence of a live rail near the track is not only dangerous in a shop, but it is a hindrance to the men in doing their work.

A surface depot with which the writer is familiar was recently converted into a shop for inspecting subway cars, making it necessary to devise some scheme for



MOVABLE CARRIAGE TO SUPPLY CURRENT FOR OPERATING CARS IN THE REPAIR SHOP

delivering power to the cars. This was accomplished by substituting for the trolley wire an iron bar, on which was mounted a movable carriage, current being supplied to the third-rail shoes through a No. 0000 lead connected to the carriage which is drawn forward as the car moves along the track.

The iron bar is of 3 in. x 7/16 in. wrought iron, and extends the entire length of the shop. It is supported by brackets bolted to standard trough hangers, which in turn are bolted to the wooden trough formerly used for the trolley. The brackets are made of two 1¼-in. x

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5/16-in. pieces of wrought iron erected as shown in the sketch. The carriage is composed of four standard trolley wheels held in position by a forged yoke of wrought iron. To this yoke the lead is connected by an ordinary terminal. The end of the lead which connects to the car shoe has a spring clip attached so that it can be easily snapped on or off as desired.

Rail Joint Tests in A. R. E. A. Bulletin

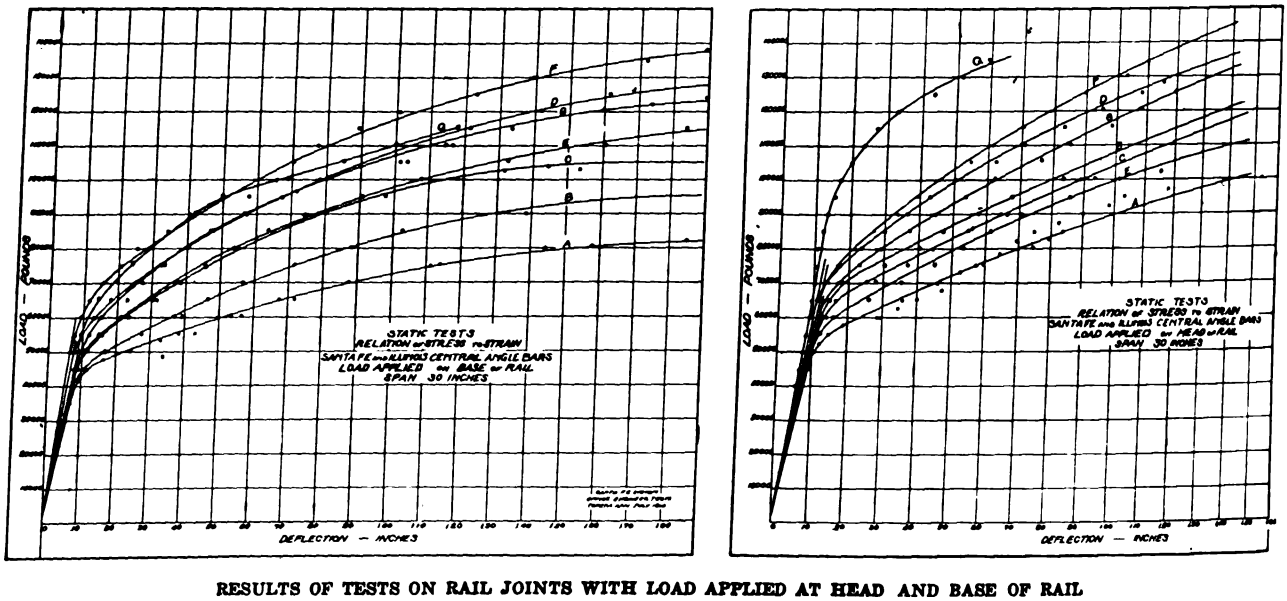
The August, 1916, bulletin of the American Railway Engineering Association, recently issued, contains some studies by M. H. Wickhorst, engineer of tests of the rail committee, on the strength of angle bars with varying carbon content and of quenched bars, and also on the strength of oil-quenched, medium-carbon steel track bolts as compared with untreated, low-carbon steel track bolts. The material used in the test included forty-eight pairs of bars, forty-two of which were Santa Fé Railroad's experimental angles of different carbon range, and six were Illinois Central Railroad's medium-carbon quenched bars.

Both static and drop test were used. In the static test, the angle bars were bolted to two 90-lb. Santa Fé standard rail sections, about 3 ft. long, and the joint was supported by heavy knife edges set 30 in. apart on the bed of a 200,000-lb. Olsen testing machine. The load was applied at the center of the joint by means of another knife edge and a suitable block to simulate wheel pressure. The bars were bolted together on the rail so as to allow a ⅜-in. opening between the rail ends, and the bolts were stressed to approximately 20,000 lb. Care was exercised to have a good fit between the angle bars and the rail.

In the drop test the bars were bolted to 90-lb. Santa Fé rail sections as in the static tests. The joint was placed on the supports of an M. C. B. drop-test machine, using a 36-in. span. A 2000-lb. tup was used with a fall of 8 ft. 6 in., which is one-half the height required by the American Railway Engineering Association specifications for 90-lb. rail. The results of the static test with the load applied on the head and on the base of the rail are shown by the two sets of curves herewith. The letters on these charts indicate different sets of bars.

In the drop test the bars were given a succession of drops on the head or base until failure resulted. The bars were deflected on the first drop to an extent that the rail ends were usually together at the top and slightly over 1 in. apart at the bottom. After the rails had been deflected so that the ends came together at the top, the bars would tend to shear the bolts on being deflected further. As a result of these tests the bars were badly distorted, a condition which is shown in a number of illustrations which accompany this report. For the low-carbon steel bolts three of the four joints failed by shearing the bolts, all failing on the third drop. For the oil-quenched bolts two of the four joints failed from shearing of the bolts, and both these two joints failed on the fourth drop. These data show that the oil-quenched bolts offer greater resistance to shear than the untreated low-carbon steel bolts.

As a result of these tests the following conclusions were drawn: 1. The strength and rigidity of the track joint are dependent on the strength of the joint bar. 2. The strength of material varies with the carbon content when other elements are constant and the material is handled in the same manner regarding heat treatment and quenching. 3. Proper quenching of the material raises both the yield point and the ultimate strength of the steel and results in a stronger joint, as pointed out in the comparison of the quenched medium steel bars with untreated bars having the same composition. 4. The strength and rigidity of the joint are influenced to a slight extent by the strength of the bolt, both in static and dynamic tests, showing in favor of the oil-quenched, medium-carbon steel bolt over the untreated, low-carbon steel bolt.



RESULTS OF TESTS ON RAIL JOINTS WITH LOAD APPLIED AT HEAD AND BASE OF RAIL

3,000,000 Circ. Mil Bonding for New York Subway Third-Rail

The bond shown in the accompanying illustration has been developed for the bonding of the 150-lb. third-rail which is to be installed by the Interborough Rapid Transit Company on its portion of the dual system of rapid transit of New York City. The bond is of the compressed terminal cable type, 20 in. long and made up of 127 strands having a combined cross-section of 750,000 circ. mil. Four of these bonds, placed two on each side of the rail, are to be used at each joint, giving a total cross-section of 3,000,000 circ. mil. The bonds are being made by the Ohio Brass Company, and this will be the heaviest compressed terminal bonding on record.

The web of the rail is 2⅛ in. thick which is said to be the greatest thickness on which compressed terminal bonds have been used. For installing the bonds a

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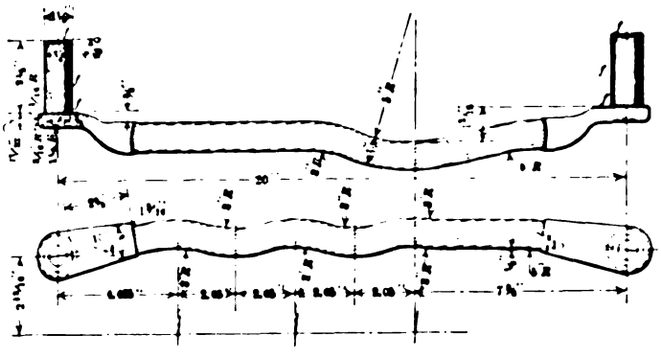
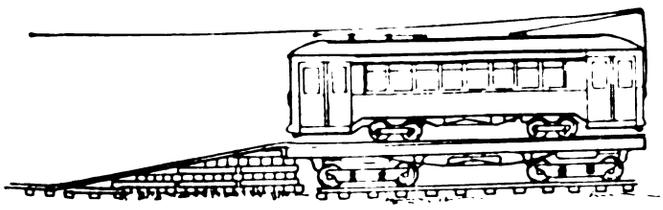
special, hand-operated, hydraulic compressor has been developed. Oil is the liquid used and the pressure is raised to 45 tons before the terminal is released. By an attachment on the compressor, a tape is punched when the required pressure is reached. As the terminal is not released until the tape is punched this device insures that the bond is installed with the required 45-ton pressure. Tests made by sawing through the rail and bond show that this pressure is sufficient to give good contact between the copper and the rail. If it should be necessary for any reason to release the pressure before the compression is complete, this can be done by opening an emergency valve.



BOND TO BE USED ON 150-LB. NEW THIRD-RAIL OF INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK CITY

New Cars Unloaded Without Special Apparatus

The accompanying illustration shows the scheme used by J. L. Brown, master mechanic, Dallas (Tex.) Consolidated Electric Street Railway, for unloading a shipment of thirty-five cars. A location in the company's spur track was selected where the joints in the rails were opposite each other. The splice plates were unbolted, and the track was raised by cribbing up in the manner shown. The flat cars on which the new cars were shipped were run up to this scaffolding where a temporary connection was made with the nearby trolley wire, and the cars were unloaded by their own power. Three men were kept busy knocking off the blocks which held the cars on the flats, and two motormen ran the new cars to the car-house. With this method of operation the average time required to transfer a car from the flat car to the carhouse was sixteen minutes.



SKETCH SHOWING TEMPORARY TRACK CONSTRUCTION FOR UNLOADING CARS

A machine for forming elliptic springs has recently been put on the market by Joseph T. Ryerson & Son of Chicago, Ill. It is known as the "Riley Universal Elliptic Spring Forming Machine," and is primarily designed for railroad spring shop use. In the operation of this machine, the hot spring leaf, is formed next to the cold plate against which it fits in the spring, thus giving an accurate camber to the hot leaf.

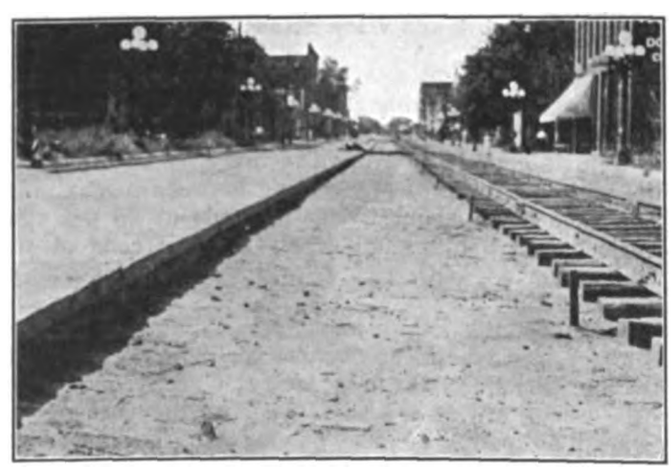
Railway Uses Old Sandstone Blocks for Paving Foundation

In doing its repaving, the Topeka (Kan.) Railway is using as a base, 6-in.x6-in.x8-in. Colorado sandstone blocks which have been in use in the paving since 1886. These old blocks would otherwise have been thrown away or broken up for use in concrete.

In paving a street the track is shifted to one side, and a 2-in.x9-ft. trench in dug. The sandstone blocks are laid on a 1-in. layer of cinders and thoroughly grouted. One of the accompanying illustrations shows a gang of laborers mixing the cement and brushing it into the crevices between the blocks, while the other picture shows the sandstone blocks after the grouting has been done. After the completion of the grouting the track is moved back onto this foundation and the space around the ties is filled in with Joplin chats. Spread over this foundation is a 3-in. course of concrete which joins on either side the concrete foundation installed by the city. On top of this the regular sand cushion and brick block paving is laid the full width of the street.

GROUTING SANDSTONE BLOCKS ON TOPEKA (KAN.) RAILWAY

The Topeka Railway has 10 miles of track on streets having sandstone block paving, and in the future it is planned to do the repaving in this manner. The new paving is permanent in character and less expensive than solid concrete, and it is the opinion of the company that it will cushion the rail better than the solid type of construction.



SANDSTONE FOUNDATION READY FOR INSTALLATION OF TRACKS TOPEKA (KAN.) RAILWAY

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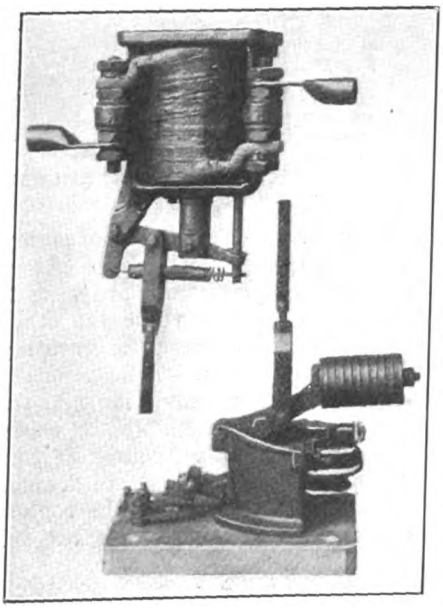
A High-Voltage, Overload Relay for Alternating-Current Circuits

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently placed on the market type HB overload relay for high voltage alternating-current circuits of any frequency.

This relay consists of a strongly built solenoid mechanism which operates a timing and circuit-closing element through a micarta chain of such length as to provide ample insulation for the voltage in use. There is no lost motion in the chain as it is constantly in tension, the action of the solenoid raising a weight on the contact mechanism. For voltages up to 44,000 the chain consists of twelve links. Twenty links are provided for voltages up to 66,000, and thirty links up to 110,000 volts. The links may be removed to shorten the chain down to a minimum of one link for each 6600 volts.

The relay coil is inserted in the high-voltage line, but the contacts and timing parts are thoroughly insulated and can be handled, adjusted or tested without disconnecting the feeder. The coil can be mounted on a disconnecting switch or choke coil and the use of separate insulators avoided, while the contact mechanism can be mounted in the position most convenient.



SOLENOID MECHANISM OF OVERLOAD RELAY; BELLOWS AND VALVE BELOW

This HB relay is furnished in two forms—one having an inverse time element, the other a definite time element. The inverse time-element relay can be set to act practically instantaneously. In this form of relay the solenoid and chain are opposed in their motion by a bellows with an adjustable valve. The valve has a small numbered dial which permits of any setting between a maximum time element of about twenty seconds at 25 per cent overload and a minimum of about one second at the same overload. With greater overload the relay acts in a shorter time.

In the definite time-element relay the same kind of bellows and valve are used as for the inverse time limit, but the solenoid chain does not act directly on it. As these relays are controlled by bellows they are not as accurate as to time element as magnetically damped relays. Their time element will be found sufficiently accurate to afford protection on the circuit to which applied, though selective protection with regard to other circuits in the system cannot always be satisfactorily obtained.

This relay is intended for mounting on a disconnecting switch or other support on the high-tension line. One relay is required to protect a single-phase circuit, two relays for a two-phase or three-phase ungrounded neutral circuit, and three relays for a three-phase grounded neutral circuit.

Girder Rails Replaced by T-Rails in Cambridge, Mass.

The Boston Elevated Railway in reconstructing 2200 ft. of track on Massachusetts Avenue, Cambridge, Mass., is replacing 9-in. girder rails with 95-lb. Lorain Steel Company, section No. 400, T-rail, 7 in. high.

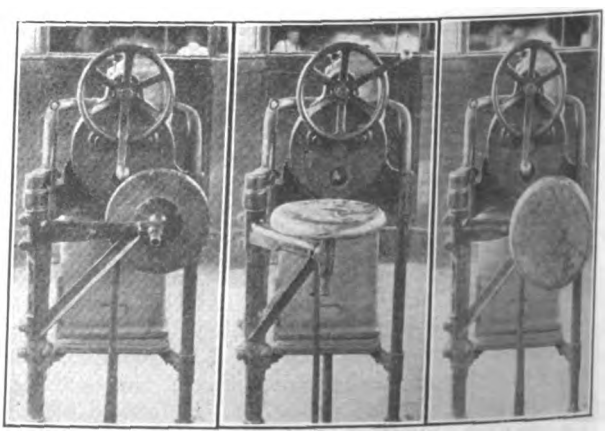
The accompanying illustrations show the work in progress. Creosoted hard pine ties measuring 7 in. x 7 in. x 7 ft. are laid with 2-ft. spacing on a 3-in. foundation of stone ballast. The tracks are laid with tie rods spaced every 5 ft., and four lag screws per tie hold the rails to the ties. Crushed stone is filled in between the ties to a depth of 2 in. and tamped, pneumatic tie tampers being used. On top of the crushed stone is a concrete slab, the mixture being one part cement to six parts gravel taken from the street. In mixing only a little water is used.

BALLASTING T-RAIL TRACK IN CAMBRIDGE, MASS.

A layer of beach sand, 1 in. to 1½ in. in thickness, is spread over the ties to form a cushion for the 5-in. granite paving blocks. These are laid in an arch form so that the paving in the center of the track is level with the top of the rail. This is a crown of 1¼ in. The paving is then flooded with thin grout and swept. On completion of this work there will be about 10 miles of this general type of track construction on the system.

Conductor's Seat Made Adjustable

The adaptation of any one of the conductors' folding seats that was on the market to the different types of cars of the Northern Ohio Traction & Light Company, Akron, Ohio, was found to be impractical, and accordingly P. J. Wood, master mechanic, designed and built one of his own which is now being manufactured and sold by the Cleveland Trolley Supply Company, Cleve-



THREE POSISTIONS OF SEAT USED BY CONDUCTORS ON THE NORTHERN OHIO TRACTION COMPANY

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In 1899 the amount of capital employed in manufacturing was $1,770 to each person employed, in 1904 it was $2,117, in 1909 it was $2,448 and in 1914 it was $2,848. Every increase in the supply of capital makes an additional demand for labor, and with capital increasing faster than population, as it does, there is bound to be an upward tendency in wages. The 1916 figures would be interesting, if available.

BROOKLYN ORDERS COASTING RECORDERS

The New York Municipal Railway Corporation, which operates the extensive rapid transit lines built or building in Brooklyn and part of New York, has placed an order with the Railway Improvement Company for 300 type "H" coasting recorders, a number of Rico terminal clocks and other supplies. The present order will take care of all the New York Municipal cars now in service, but the railway has the option of ordering 600 additional recorders at the same price on or before June 1, 1917. In accordance with an agreement with the City of New York, the purchase of all equipment by the operators of the new rapid transit lines is subject to review by the Public Service Commission, First District. Following this procedure the commission has given its approval to the purchase of 900 coasting recorders by the New York Municipal Railway.

BEMIS CAR TRUCK COMPANY ACQUIRES ALL RIGHTS TO LORD BALTIMORE TRUCKS

A change of importance to the users of Lord Baltimore trucks is the acquirement from the Baltimore (Md.) Car Wheel Company by the Bemis Car Truck Company, Springfield, Mass., of all the former company's patent rights, good-will, patterns, etc., covering the manufacture and maintenance of Lord Baltimore trucks. The Bemis Company announces, through Warren L. Boyer, president, that it will soon be able to supply all orders for replacement parts of these trucks.

The purchase of the Lord Baltimore truck rights by this company is a logical expansion of its present business in the manufacture of case-hardened and manganese specialties for trucks of .all kinds. Recently the company has added a fine-thread turnbuckle to its other products. The shops at Springfield have lately been equipped with additional machinery to help the company handle expeditiously its largely increased business.

ROLLING STOCK

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., is reported as considering the purchase of ten one-man cars.

Mobile, Volanta & Pensacola Railroad, Volanta, Ala., is in the market for one gasoline or gas-electric car seating not less than thirty passengers.

Towson & Cockeysville Electric Railway Company, Towson, Md., recently placed in operation an 18-ft. storage-battery car built by The J. G. Brill Company, Philadelphia.

United Railways & Electric Company, Md., noted in the ELECTRIC RAILWAY JOURNAL of Oct. 14, 1916, as being in the market for seventy-five double-truck, semi-convertible, four-motor, pay-within cars, has ordered this equipment from The J. G. Brill Company of Philadelphia, Pa.

TRADE NOTES

General Electric Company, Schenectady, N. Y., has received an order for seventy-five four-motor GE-200 equipments with type K control from the United Railways & Electric Co., Baltimore, Md.

Consolidated Car-Heating Company, Albany, N. Y., has received an order from the Boston Elevated Railway for 100 equipments of pneumatic door engines for the 100 new cars which this company recently ordered.

Westinghouse Air Brake Company and Westinghouse Traction Brake Company, Pittsburgh, Pa., have received an order for the straight air brake equipment to be used on the seventy-five cars of the United Railways & Electric Company of Baltimore, Md.

Holden & White, Chicago, Ill., general sales agents for the Garland Ventilator Company, have received an order from The Milwaukee Electric Railway & Light Company for 600 Garland ventilators for fifty new cars.

The Grayson Railway Supply Company, St. Louis, Mo., will hereafter represent Holden & White, Chicago, Ill., in the sale of Perry anti-friction side bearings and Hartman centering center plates in Texas, Oklahoma, Arkansas, Louisiana and western Tennessee.

Nordberg Manufacturing Company, Milwaukee, Wis., builders of steam and electric hoists, Corliss engines, poppet valve engines, air compressors, oil engines and Nordberg-Carels Diesel engines, announce the appointment of H. W. Dow as sales manager, Mr. Dow has been associated with this company in the engineering and sales departments for twelve years.

G. A. White, formerly metallurgist of the American Sheet & Tin Plate Company, is now associated with the Titanium Alloy Manufacturing Company of Niagara Falls, N. Y., in the same capacity. Prior to his connection with the American Sheet & Tin Plate Company, Mr. White was for a considerable time with the Rock Island Railroad and also with the Eastern Steel Company, Pottsville, Pa., where he was engaged in the manufacture of structural material.

Roller-Smith Company, New York, N. Y., announces that it is now represented in Seattle, Wash., by C. K. Hillman, Pacific Block Building. Mr. Hillman will handle Roller-Smith instruments, circuit breakers and Columbia meters in Washington, Alaska, and parts of the States of Oregon and Idaho. This company has recently added Charles E. Kahant to its sales organization. Mr. Kahant will be connected with the main office at 233 Broadway, New York City. He has specialized in radio work for the past eight years and for the past four years had occupied the position of assistant manager of the Atlantic Communication Company, 90 West Street, New York, N. Y.

ADVERTISING LITERATURE

Chicago (Ill.) Varnish Company has issued a pamphlet on its "Ce Ve" process of steel car painting.

Spray Engineering Company, Boston, Mass., has issued an illustrated folder describing its new "Spraco" paint gun for all kinds of painting.

Electrose Manufacturing Company, Brooklyn N. Y., has issued its No. 14 bulletin describing and illustrating railway overhead, surface and underground line insulators.

Columbia Nut & Bolt Company, Bridgeport, Conn., has issued a pamphlet describing and illustrating its Columbia lock nut, and square and hexagon gib nuts.

Aberthaw Construction Company, Boston, Mass., has just issued a preliminary report on the "Effects of Vibration in Structures." In this report are incorporated a number of vibration records of buildings showing rates of vibration due to different disturbances. A unique device described is the vibration recorder, which is modeled on the principle of the seismograph originally developed from the study of earthquake phenomena.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued its publication No. 1574, describing and illustrating the maintenance of equipment in the Harvard shops of the Cleveland (Ohio) Railway Company, which were described in the ELECTRIC RAILWAY JOURNAL of Jan. 23, 1915, page 168 and Feb. 19, 1916, page 344. This seventy-five-page publication contains more than 100 halftones and is neatly bound in a four-color cover. In addition to covering the work done at the Harvard shops of the company, it includes an account of the work done at the operating stations, such as inspections, repairs, etc., including the washing and cleaning of cars. One of the most interesting sections is that devoted to shop practices. Both the old and new ways of removing trucks from car bodies, removing armatures from box or split-frame motors, cleaning motors after removal from trucks, and removing pinions, are illustrated and described. In addition, all of the practices of the armature room, such as blowing out, rewinding and soldering armatures, are given in detail. The latest up-to-date methods of repairing field coils, banding armatures, slotting commutators, and dipping and baking armature coils are also described. This is an excellent publication from the maintenance viewpoint and should be of great interest to master mechanics and maintenance men in general.

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Manufactures and Supplies

VENTILATOR MANUFACTURERS REPORT ACTIVITY

Several Large Orders Received—Difficulties of Street Car Ventilation—Purchasing on an Efficiency Basis—Need for Standardization

Several recent large orders for car ventilating equipment emphasize the statements made by ventilator manufacturers that business is steadily increasing. Last week the Chicago Surface Lines ordered 16,000 exhaust ventilators, and within the last few weeks the Public Service Railway Company ordered 800, and the Milwaukee Electric Railway & Light Company ordered 600. Definite attention has been actively directed to the car ventilation problem for only four or five years, but now the specification of exhaust ventilators for practically every car ordered and the sales of ventilators for installation on old monitor-deck cars point toward better days for the manufacturers of this type of car equipment.

A great deal of educational work has been necessary in order to bring the ventilator business to its present state. One of the noticeable features in this work has been the need for showing the railways that car ventilation was a real factor in good transportation service. The monitor-deck sash served its purpose for a great many years, but with the refinements in equipment and the use of the arch-roof car, the exhaust ventilator is now recognized to be an essential part of a car which has been designed to render full service to the public.

Experience in the design and installation of ventilators has proved that the street railway car offers a more difficult problem for the ventilation engineer than does the steam coach. This is largely due to the difference in service conditions. The differences lie in the frequent stops, rush-hour loads, and comparatively low speed of the street car as compared with the smaller loading, higher average speed, and fewer stops of the steam coach. The length of stopping time plays an important part in ventilator design, because when a car is standing and the wind is blowing at right angles to the track there is a tendency for the ventilators on one side of the car to act as intakes and those on the opposite side to act as exhausts, thus changing the operating conditions as compared with those when the car is moving and all ventilators are exhausting.

The first car ventilators of any kind were designed because of the need for changing the air in refrigerator cars. Next came the steam-coach ventilators and later the electric-car types. With the advent of the fully-inclosed car, the need for air intakes as well as exhaust ventilators presented itself. And now the development points toward an automatically-balanced or compensating system including intake and exhaust ventilators so designed that the intakes supply fresh air in an amount to balance that withdrawn by the exhaust ventilators. A compensating intake ventilator exhibited at the Atlantic City convention attracted considerable attention. This unit is designed for mounting on the car roof, and it is so arranged and adjusted that the amount of fresh air fed into the car is uniform at various speeds of the car and various wind pressures. The total amount admitted under any condition also is limited.

One of the selling problems of the ventilator manufacturer has been that of educating the electric railways to buy ventilation equipment on an efficiency basis. There has been a tendency until recently to install low-priced devices without definite regard for their mechanical efficiency in the removal of definite quantities of air. For a time it looked as though ventilating equipment was being bought on price rather than on quality of product. But the manufacturers have recommended and urged the sale of those devices which are known from broad experience to be the most efficient ventilators. Such devices cost more to manufacture and from the car-service standpoint are worth far more to the railroad than mere coverings for roof openings.

As a matter of fact, it was difficult at the start of the ventilator selling campaigns a few years ago to convince the mechanical officers of the roads how much it actually cost to manufacture a good ventilator. The master mechanic would say, "How do you people ever expect to justify a price like that on a sheet-metal box?" But whenever a road has attempted to build its own ventilators, justification for the manufacturers' price has been found in the high labor cost for shaping, forming and assembling ventilators. The prices for standard types of exhaust ventilators now range from $3.50 to $7.50, depending on the performance of the units. It is difficult to see how any reduction in these prices can reasonably be expected. However, one manufacturer points out that if the purchaser will agree he can manufacture ventilators more economically by using black sheet iron and spot welding it than by the present practice of using galvanized iron and riveting it. The black iron ventilators could be dipped in enamel and baked so that they would be rust-resisting.

Standardization of the ventilation openings also might make possible an economy in manufacture. As conditions now exist practically every ventilator order is a custom-made job. This is particularly true for the deck-sash ventilators. A standard size ventilator hole would enable the manufacturers to simplify their work, reduce the number of dies and make ventilators for stock. It is now the practice to specify ventilators by certain sizes, these sizes being the dimensions of the hole in the monitor deck or through the arch roof. If, through the American Electric Railway Engineering Association's committee on equipment and with the co-operation of the car builders, standard ventilator opening dimensions could be adopted and accepted by the operating companies, then the ventilator manufacturers would be in a position more economically to manufacture advance stocks and thus accelerate deliveries.

The tendencies in the ventilator trade are toward the acceptance of a combined system to include separate intake and exhaust units. The practice on many roads also points toward delivering the air below the breathing line after first having warmed it. The prospects for ventilator orders depend now very largely on the orders placed for new cars, but the general increase in business is also dependent on orders for ventilators to be installed on old equipment.

LABOR IN THE INDUSTRIAL FIELD

It Is Constantly Obtaining an Increased Share of the Profits of Manufacture

In these days of labor disputes in industrial undertakings it is of value to note that labor is constantly receiving an increased share of the profits of manufacturing. This statement, long maintained by economists, receives confirmation from statistics recently issued by the Census Bureau showing the situation in 1914 and in the three preceding five-year periods. A digest follows:

	Percentage of Increase		
	1904 over 1899	1909 over 1904	1914 over 1909
Capital employed	41.2	45.4	23.7
Primary horsepower	33.6	38.5	20.7
Wage earners, average number	16.0	21.0	6.4
Total wage payments	30.0	31.0	19.0
Value of products	29.7	39.7	17.3
Value added by manufacture	30.3	35.5	15.8

A careful inspection of this table shows, first, that the percentage of increase of capital in 1914 over 1909 is less than during either of the other periods, indicating that the profits were less. It also shows that the increase in the number of wage-earners was less than that of amount of capital, total wage payments or value added by manufacture. This indicates an increase in the proportion that capital contributes to the finished product as compared with the part contributed by labor, as well as a higher wage payment per employee. In other words, the wage-earners not only gain in wages but they have their manufacturing done for them at lower cost through the increasing use of capital. In a statement by The National City Bank of New York it is pointed out that if the wage-earner's position does not improve absolutely, the explanation must be found in the prices of materials and other things outside of the field in which labor and capital are the chief factors.

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A committee has been appointed to aid in bringing about this new transportation link, for which a franchise has already been granted in Doylestown. [March 18, '16.]

Montgomery Transit Company, Norristown, Pa.—Plans are being made by this company to construct an extension to Souderton.

Ardmore & Llanerch Street Railway, Upper Darby, Pa.—This company has begun double-tracking its Ardmore branch from the end of its double-track line near Oakmont to County Line Road, Ardmore.

Philadelphia & West Chester Traction Company, Upper Darby, Pa.—A contract has been awarded by the Philadelphia & West Chester Traction Company to William J. Torrington, Philadelphia, for grading, masonry and roadway construction on its lines.

Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.—A bridge will be constructed by the Womelsdorf, Richland & Myerstown Street Railway over the Lebanon branch of the Philadelphia & Reading Railway. R. J. Lawrence, 525 East Gates Street, Philadelphia, engineer. [Sept. 30, '16.]

San Antonio, Gonzales & Houston Interurban Company, Houston, Tex.—A contract has been awarded by this company to J. H. Berryman & Company of Houston for the construction of the first 60 miles of its proposed line between Houston and San Antonio, and actual construction will soon be begun. At a recent meeting of the stockholders, Ed Kennedy, who promoted the road, retired as vice-president, and W. A. Reinhart, Houston, was elected to fill the vacancy. [Sept. 23, '16.]

Paris (Tex.) Transit Company.—This company has increased its capital stock from $60,000 to $80,000 and will improve and extend its street-railway system.

Salt Lake & Los Angeles Railway, Salt Lake City, Utah.—Plans are being made for the electrification of the Salt Lake & Los Angeles Railway and the construction of an extension to Garfield. Connections will be made with the Utah Light & Traction Company. A bond issue of $300,000 to cover the cost will be floated at once and contracts let for both construction and power. The latter will be furnished by the Utah Power & Light Company.

SHOPS AND BUILDINGS

Tri-City Railway Company of Illinois, Rock Island, Ill.—Work has been begun by this company on the construction of a carhouse at Muscatine for both the city and interurban cars. The structure will be about 300 ft. long and about 60 ft. wide, of concrete or tile construction with a steel roof, and is to be so constructed that permanent additions can be made at any time. About half of the building will be fitted up as a machine shop. Clubrooms for street railway employees will also be provided for in the new structure.

Worcester (Mass.) Consolidated Street Railway.—This company plans to construct an addition to the carhouse of its valley division at North Uxbridge, which will double its capacity and add a large storage room for supplies at the rear of the structure. Plans have been drawn for the addition, which will be 20 ft. by 120 ft., one-story high, conforming to the architecture of the present carhouse. The new structure will extend back nearly 20 ft. beyond the present house and will give room for four extra tracks for storing cars. These new tracks will be built without the customary repair pits, as the barn is amply supplied with pits for this purpose. At the rear there will be a storage room for keeping sand, salt and other supplies. It will be fitted with a rear entrance so that teams can drive into the storehouse from the Elm Street side of the property.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—Plans are being made by this company to construct a new station at University Place, Princeton.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded a contract to Louis Wechsler, New York City, for the construction of station finish for six stations on the new rapid transit lines. The contract price was $382,521. Five of the stations are located on the new Seventh Avenue line. The sixth station under this contract is the Diagonal Station at Forty-second Street, between Park and Lexington Avenues, near which the new Lexington Avenue line connects with the first subway. All work is to be completed within six months of the delivery of the contract, save for certain minor details.

Jefferson County Traction Company, Beaumont, Tex.—This company plans to construct a new brick station and make other improvements in Port Arthur.

Texas Electric Railway, Dallas, Tex.—The J. F. Strickland interests have purchased the block of ground bounded by Young, Jefferson, Wood and Market Streets, Dallas, and will construct thereon a new interurban express station. The tract lies one block east of the new union station of the railroads. Plans for the building have not yet been decided upon.

Tacoma (Wash.) Railway & Power Company.—The Tacoma Railway & Power Company is remodeling the Thirteenth Street corner of its carhouse to provide new quarters for the general offices of that company and the Puget Sound Electric Railway. In the new arrangement all the general offices will be on the first floor. The car finishing department, which formerly occupied that portion of the building, has been moved across the street to the first floor of the building in which the general offices are located. The men's recreation room in the basement at Thirteenth and A Streets has been moved to the Puyallup Avenue building, in which the freight offices are located. This building was recently remodeled at a cost of about $4,500. The basement of the Thirteenth Street building will be used for a motor room and storage.

POWER HOUSES AND SUBSTATIONS

Centerville Light & Traction Company, Centerville, Iowa.—This company expects to erect a 33,000-volt, three-phase, 60-cycle transmission line from Centerville to Allerton, about 12 miles, after Jan. 1.

Bangor Railway & Electric Company, Bangor, Me.—A contract has been awarded to William E. Fish, Bangor, for the construction of this company's new substation at Corinth, and work will be begun at once.

Detroit (Mich.) United Railway.—This company is planning to modernize the boiler section of one of its two power plants in Detroit early in the coming spring. This is the plant, known locally as plant B, which contains steam turbines of a combined capacity of 10,500 kw. The changes contemplated are the substitution of six Stirling-type boilers for eight of the B. & W. type, the installation of forced-draft stokers and the building of a large brick stack. In providing further for the rapidly increasing demand for power it is proposed to contract with the Detroit Edison Company for from 3000 to 3500 kw. in addition to the present contract for 10,500 kw. This is in accordance with the policy of the company to purchase power wherever possible on its system in order to provide insurance against breakdown.

Morristown & Erie Railroad, Morristown, N. J.—In connection with the proposed electrification of its railroad from Morristown to Essex Fells, the Morristown & Erie Railroad Company will erect a substation in Morristown. Energy will be furnished by the Morris & Somerset Electric Company.

Bristol (Tenn.) Traction Company.—A contract has been awarded by the Bristol Traction Company to Robert Hutinson for the construction of a dam across the Holston River, near Big Creek. The power station at the dam will be equipped with three turbines capable of developing 1000 hp. The cost of the work is estimated at $75,000.

Texas Traction Company, Dallas, Tex.—The power plant of the Denison-Sherman Interurban Company at Woodlake has been sold to the Stone & Webster Engineering Corporation and will be dismantled and shipped to Fort Worth. The Denison-Sherman Interurban is now a part of the Texas Traction Company and the power that operates the cars is generated in Fort Worth.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.—This company plans to erect a substation adjacent to Little Lake Butte des Mortes to supply additional energy in Neenah.

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North Center Street, Bloomington, preparatory to the installation of a new pavement.

*Boone, Iowa.—Plans are being made to construct a line from Woodward to Boone. The Boone Commercial Association is interested.

Tri-City Railway Company of Iowa, Davenport, Iowa.—This company is planning the installation of another curve at Twentieth Street and Third Avenue. The company is also double-tracking its line to the Watch Tower and is making improvements on the track on Forty-third Street and Seventeenth Street, Moline, Ill.

Des Moines (Iowa) City Railway.—Double-tracking the entire Clark Street line will be done next spring if the city is able to put through a plan to widen the streets from Twelfth and Center Streets to Thirteenth and Clark Streets. City Engineer Kastberg has been asked to estimate the damages and expense of the proposed improvement. The first part of the work is planned to be the filling of Center Street from Ninth to Twelfth Streets. At one point the fill would be 4 ft.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—The plans of the Kansas City, Kaw Valley & Western Railway for entering Lawrence over the new bridge have been forwarded by a recent decision of the Supreme Court of Kansas, which allows plans for the bridge to proceed. A citizen had asked an injunction against the construction, on the ground that it would cost more than $200,000, the limit which a county may spend on a bridge. The court declared that since the county would pay only $200,000 of the cost, the remainder to be paid by the Santa Fé Railroad, the injunction could not stand. The railway is now entering Lawrence over a temporary bridge.

Cumberland & Manchester Railroad, Manchester, Ky.—Plans are being considered by this company for the construction of an extension from Manchester to Beattyville. M. E. S. Posey, Barbourville, chief engineer. [Aug. 12, '16.]

Great Northern Railroad, St. Paul, Minn.—Plans are being worked out by the Great Northern Railroad for the electrification of more than 300 miles of main line between Spokane and Seattle and other mountain divisions in the West. The Great Northern Railroad, through a subsidiary company, controls water rights on Lake Chelan, in Washington, and the present plans, it is said, include the raising of the level of Lake Chelan, near which the main power plant would be established. It is understood that actual preliminary work on the project will be started by next summer.

*Biloxi, Miss.—Plans are being considered by the Biloxi Vegetable and Fruit Growers' Association for the construction of a line between Biloxi and Ocean Springs. Two propositions for a right-of-way are under consideration, one to traverse the ridge part of Back Bay and the other along the water front.

Kansas City (Mo.) Railways.—Work will be begun at once by this company on the construction of a line on Thirteenth Street from Minnesota Avenue to Central Avenue. A line will also be built on Eighteenth Street south from Central Avenue to Kansas Avenue, crossing the new Kansas Avenue Viaduct.

St. Joseph (Mo.) Electric Railway.—Extensive improvements to its system are being planned by the St. Joseph Electric Railway.

United Railways of St. Louis, St. Louis, Mo.—The annual report of the Director of Public Utilities, recently submitted, contains a plan to elevate the tracks of the Hodiamont Street line of the United Railways from Vandeventer Avenue and Morgan Street to Hodiamont and Maple Avenues. The plan provides for the construction of reinforced concrete walls for the elevated railway, with a 16-ft. clearance on each street. The cost is estimated at $600,000. The Hodiamont line east of Vandeventer Avenue would become an express line, with stops only at Grand Avenue, Garrison Avenue, Jefferson Avenue, Eighteenth Street and all streets east of Thirteenth Street. Plans for the building of a subway to connect with the elevated are contained in the report. The subway would be built under Morgan and Franklin Avenues, connecting with the elevated at Vandeventer Avenue. The extension of the Hodiamont line west on Maple Avenue to the Creve Coeur Lake tracks is suggested.

International Railway, Buffalo, N. Y.—The 70-mile gale which swept western New York Oct. 16 caused great damage on the Lockport & Olcott division of the International Railway, and no cars were operated over the line for almost thirty-six hours. Miles of poles were broken, wires were leveled and the Olcott sub-station was temporarily put out of commission. The Buffalo, Lockport & Rochester line was tied up for a short time during the worst of the gale.

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received by the Public Service Commission for the First District of New York until Nov. 9 for the construction of signal towers for parts of the Seventh Avenue-Lexington Avenue, White Plains Road and Queensboro Subway Rapid Transit Railroads. Further information may be obtained at the office of the commission, 120 Broadway.

Rochester (N. Y.) Connecting Railroad.—The Public Service Commission for the Second District of New York has denied the application of the Rochester Connecting Railway for a certificate of convenience and necessity and approval of the exercise of its rights and franchise. This proposed road was the complement of the proposed Niagara River & Eastern Railway to afford east and west outlets to the Buffalo, Lockport & Rochester Railway, and it was projected so that the three properties might eventually form a connecting link in a new transcontinental trunk line through the extension of the Canadian Northern Railway to the Niagara Gorge and the building of a new international bridge. The Rochester Connecting Railroad was to connect the eastern end of this system with the Pennsylvania and Erie Railroads at Rochester. The commission recently denied the application of the Niagara & Eastern Railway upon the ground that the rest of the project was still too indefinite.

Northern Ohio Electric Corporation, Akron, Ohio.—This company has been organized with a capital stock of $6,375,000 to take over the property of the Northern Ohio Traction & Light Company.

Ardmore (Okla.) Railway.—It is reported that bids will be opened this month or early in November by the Ardmore Railway for the construction of its proposed line from Ardmore to the Fox oil fields. The route has not yet been definitely decided upon, but surveys are in progress.

*Hamilton, Ont.—It is reported that the City Council of Hamilton and the Hydro Commission are considering the construction of an electric incline railway on Sherman Avenue at a cost of about $200,000.

Toronto, Ont.—The Toronto Suburban Railway has received permission from the Ontario Railway Board to extend its tracks on Davenport Road easterly from Bathurst Street.

Toronto & York Radial Railway, Toronto, Ont.—At a recent joint meeting of the Ontario Railway and Municipal Board and the Dominion Railway Commission the application of the town of Aurora for interswitching facilities between the Grand Trunk Railway and the Toronto & York Radial Railway was granted. A switch 1100 yd. long will be constructed by the Toronto & York Radial Railway, providing for the hauling of freight cars from the Grand Trunk line to the factories located on the west side of the town.

Southern Oregon Traction Company, Medford, Ore.—Work will be begun at once by this company on the construction of three miles of track between Medford and Jacksonville.

Perkiomen Valley Traction Company, Collegeville, Pa.—The Public Service Commission of Pennsylvania has granted the Perkiomen Valley Traction Company a certificate of public convenience to construct its proposed line from Collegeville to Green Lane. James L. Wolcott, Dover, Del., president. [March 11, '16.]

Doylestown, Pa.—Speaking before the Borough Council of Doylestown, Louis A. Kellich, of Philadelphia, an engineer, announced that the proposed new trolley line from Doylestown to Perkasie would be constructed and that the line will eventually connect Doylestown with Harrisburg.

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Personal Mention

A. W. Baker has assumed the position of new business manager for the Athens Railway Electric Company, Athens, Ga., to succeed W. P. Strobhar, resigned, who has gone to Ohio.

Maj. J. L. Schley, formerly executive officer of the Public Utilities Commission of the District of Columbia, having been detailed to the United States Engineer Office at New Orleans, La., the commission has appointed Walter C. Allen, formerly electrical engineer of the District of Columbia, as its executive secretary.

Alfred Craven, at present chief engineer of the Public Service Commission for the First District of New York, has been appointed consulting engineer of the commission, effective on Nov. 1. The position was created for the purpose and in recognition of Mr. Craven's valuable services to the city and to the commission. At the same time the commission designated Daniel L. Turner, who is now deputy engineer of subway construction, as acting chief engineer. Mr. Craven was appointed chief engineer of the commission on Oct. 1, 1911.

D. J. McGrath, for the last two years research assistant in the electrical engineering department of the Massachusetts Institute of Technology, has severed his connection with the Institute and joined the staff of the Boston (Mass.) Elevated Railway. Mr. McGrath has been made a special assistant to M. C. Brush, president of the company, in connection with the revenue inquiry now being conducted into the company's affairs by the legislative recess commission established for that purpose. Mr. McGrath is the author of a number of notable articles on electric railway economics, with special reference to fare problems, and before leaving the Institute was occupied with the preparation of a report summarizing the investigations of the department upon electric railway costs and revenues in the past two or three years. At the mid-year meeting of the American Electric Railway Association on Feb. 4, 1916, Mr. McGrath presented a notable paper dealing with the return on Massachusetts investments.

OBITUARY

William Ward Hincher, Chicago manager of the Albert & J. M. Anderson Manufacturing Company, and Mrs. Hincher, while driving from Chicago to the Jovian convention at Indianapolis, met with an accident near Shelby, Ind., on Oct. 18, in which their automobile was overturned, causing the death of both.

Harry H. Gribben, superintendent of the Oakland, Cal., factory of the Standard Underground Cable Company, died suddenly on Sept. 25 at his home in Oakland, aged fifty-six years. Mr. Gribben was a native of Pittsburgh, Pa., and lived there until 1899, when he moved to California to take charge of the factory which the Standard company had just then completed. Previous to this he was general foreman in the company's Pittsburgh factory. He had been in the employ of the company more than thirty years.

Fenwick E. Low died suddenly at Milwaukee recently at the age of forty-two. He was formerly superintendent of the St. Paul lines of the Twin City Rapid Transit Company and later division superintendent of the Chicago & Milwaukee Electric Railroad, now the Chicago, North Shore & Milwaukee Railroad. Mr. Low became associated with the Twin City Rapid Transit Company subsequent to his connection with the Pullman Car Company, as general agent at Minneapolis. He was chief clerk to the general manager of the Twin City company for a year before being assigned to the management of the St. Paul lines. He was very active during the building of the Selby tunnel in St. Paul in 1907, thereby endangering his health to the extent that early in 1908 he decided to retire from the company. After six months' rest he returned to railway work as manager of the Chatham, Essex & Lake Shore Railway in Canada. Later he entered the employ of the Chicago & Milwaukee Electric Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Berwyn, Ill.—The Metropolitan West Side Elevated Railway has accepted the ordinance granting franchise rights in Berwyn.

Blue Island, Ill.—The Chicago & Interurban Traction Company has accepted a new ordinance recently passed by the City Council of Blue Island extending its rights in that city for a period of twenty years from the date of the passage of the ordinance.

Litchfield, Ill.—The Illinois Traction System has received permission from the City Council of Litchfield to reroute the tracks leading into the city from Mount Olive. The change will take the tracks over State Street from the city limits to Water Street, thus eliminating several sharp curves and a dangerous railroad crossing.

Springfield, Ill.—The Springfield Consolidated Railway has received a franchise from the Council of Springfield for the construction of a single-track line from the end of its line in East Capitol Avenue to Bergen Park.

Moundsville, W. Va.—The Wheeling Traction Company has applied to the City Council for a change in its franchise in Moundsville and proposes to construct an extension of its tracks.

TRACK AND ROADWAY

Mobile, Volanta & Pensacola Railroad, Volanta, Ala.—This company reports that it expects to place contracts during the next four weeks for 20 miles of rails. The company plans to build 40 miles of new track.

British Columbia Electric Railway Company, Ltd., Vancouver, B. C.—It is reported that the City Council of Vancouver will request the British Columbia Electric Railway to continue double-tracking its lines on Hastings Street from Renfrew Street to Boundary Road.

Sacramento Valley Electric Railroad, Dixon, Cal.—This company plans to construct an extension from Dixon to Woodland.

Tampa & Eastern Traction Company, Tampa, Fla.—Construction has been begun near Gary on this company's proposed line from Tampa to Lakeland, about 33 miles. F. W. Cole, Tampa, president. [July 1, '16.]

Chicago & Interurban Traction Company, Chicago, Ill.—In accordance with the new franchise accepted by the Chicago & Interurban Traction Company in Blue Island, reconstruction of the company's double-track lines will be carried out under a three-year program, with 91-lb. 7-in. T-rail on wooden ties set in concrete, with furnace-slag or crushed-stone foundation and granite-block paving. The tracks in Burr Oak Avenue and Western Avenue are to be reconstructed during the first year, the Calumet Grove line the second year and the Vincennes Avenue tracks the third year. The company will furnish on all of its poles on Western Avenue and on certain poles on Burr Oak Avenue and Vincennes Avenue brackets to carry lights to be furnished by the city, which is also permitted to use the poles for its police and fire-alarm wires.

Kewanee & Eastern Electric Railway, Kewanee, Ill.—This company has filed a permit with the Public Utilities Commission of Illinois to construct a 120-mile line from a point opposite Muscatine, Iowa, to Streator, Ill. C. G. Lampman, Cedar Rapids, is interested. [Sept. 9, '16.]

Illinois Traction System, Peoria, Ill.—This company is reconstructing its tracks on West Market Street, Bloomington. That portion of the extreme west end of the line which has not been used for a number of years will not be relaid. The company is also reballasting its tracks on

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Derry, or by mileage, 27 cents. The commission said that the rates on an interurban road must be expected to be lower than by steam railroad, because the service, though more frequent, is notably inferior in speed, and that they must also be expected to be higher than on a purely urban street railway, on account of the lower density of traffic and longer ride. The only question is whether the relative proportion which the proposed rates bear to normal street railway rates on the one hand and to railroad rates on the other is so manifestly irrational that they cannot be permitted, regardless of the company's financial condition. No such disproportion in the present case could be found. The commission therefore authorized the 8-cent rate to go into effect on Oct. 1.

Safety-First Exhibit in Louisville.—In connection with a safety-first exhibit which the Boy Scouts organization at Louisville, Ky., is planning, the Louisville Railway and the Louisville & Southern Indiana Traction Company have loaned to the Scouts placards which the companies are using in their cars. These will be displayed in groups and the scout master in charge will explain the purposes of the placards to those who stop at his booth.

Tulsa Jitneys Under Restraint.—Jitney buses in Tulsa, Okla., were forced out of business by a city ordinance that went into effect on Oct. 19. This ordinance requires heavy indemnity bonds from the jitneys and regulates the routes, forcing them to streets on which the street railway has no tracks. Considerable inconvenience was experienced for several days, as the Tulsa Traction Company was not fully prepared to handle the additional traffic that was suddenly thrown on it. This situation was quickly adjusted.

Near Side Stops in Portland, Ore.—On Oct. 1, cars of the Portland Railway, Light & Power Company, Portland, Ore., began stopping on the near side of street intersections on paved streets, instead of on the far side, as in the past. The change is included in the new city traffic ordinance and will be applied by the street railway company, in spite of the fact that enforcement of the traffic ordinance has been suspended by the city temporarily. The street cars carried placards announcing the new method, and carmen were instructed to use discretion in assisting the public to become accustomed to the change.

Fall Service Advertised Again at Louisville.—The Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company are consistently using printers' ink in encouraging travel. At this time of the year the advertisements extoll the beauties of the autumn foliage on Silver Hills and along Silver Creek, near New Albany, Ind. It is suggested day after day that patrons of the company can ride over from Louisville, go to the woods and gather the bright-hued leaves. The advertisements are inserted on the amusement advertising scale, which entitles the advertiser to reading notices elsewhere.

Parlor-Café Cars for Texas Road.—The Texas Electric Railway, Dallas, Tex., will inaugurate interurban parlor-café cars about Jan. 1, 1917, on its lines between Denison and Corsicana and Waco. Announcement to this effect has been made by Burr Martin, general manager of the Southern Traction Company and the Texas Traction Company. The parlor-café cars will be attached as trailers to the regular interurban trains as now operated. Six new passenger cars, acquired by the Strickland interests when they purchased the Dallas-Waxahachie interurban from Stone & Webster in 1912, will be converted into parlor-café cars, the work being done in the Strickland shops at Monroe, south of Oak Cliff.

Advertising Campaign Against Jitneys.—The Dallas (Tex.) street railways are seizing on opportune themes for their advertisements in their campaign for business against the jitneys. An advertisement that appeared in the daily newspapers during the Texas State Fair at Dallas, Oct. 14-29, addressed to "Fair Visitors," said "Why take chances of being robbed or assaulted by thugs or bandits, Ride the street cars. The safe way. Dallas Electric Railways, E. T. Moore, manager." The appeal in this ad was based on the fact that there had been numerous robberies and holdups by persons pretending to operate jitneys. Getting their intended victims in their car, they would drive to some lonely place and there assault and rob them.

Change in Traffic Regulations at Toledo, Ohio.—A special committee of the City Council at Toledo, Ohio, submitted a report to the committee on railways and telegraphs on Oct. 18 which, it is believed, will result in an improvement in the street railway service. At several of the stops in the busiest districts provision is made for loading two cars at a time, and it is recommended that chains be placed about the safety strip, so that vehicular traffic may be continuous. At other points it is recommended that the cars cross the street before loading and unloading, that two cars be loaded at the same time and that chains be placed about the safety strips. At a few other points the committee advises that vehicles be stopped when street cars are in the process of loading or unloading.

San Francisco Considers Bus Line Auxiliary Service.—In a recent report to the Board of Supervisors, M. M. O'Shaughnessy, city engineer of San Francisco, Cal., suggested that further study be made of the feasibility of putting in operation an auto bus line to extend the service of the Municipal Railway System into the Hunters Point district. The bus line route would be from the present terminal of the Potrero Avenue branch, which is about 3 miles distant from the industrial center at Hunters Point. The idea is not that the line would be profitable at first, but that if it is decided to meet the service needs of this district, the service could be supplied at least cost by auto buses. A branch of the municipal line could be built later if sufficient traffic developed to warrant the construction of the line.

Through Service Connection Ordered at Boston. — The Public Service Commission of Massachusetts has issued an order requiring the Boston Elevated Railway and the Bay State Street Railway to install a track connection in Arlington, to provide for the operation of through cars between Winchester and Harvard Square, Cambridge. The Bay State Street Railway operates cars at present from Winchester to Arlington Center and the remainder of the trip to Harvard Square is made in cars of the Boston Elevated Railway. It is urged that the installation of through service will shorten the running time between Boston and Winchester and give residents of the latter municipality the advantages of a through connection with Cambridge subway trains, which will shortly be operated through Summer Street, Boston, to the South Station.

Another New Jersey Line Seeks to Increase Its Fare.—The Bucks County Interurban Railway, Trenton, N. J., has applied to the Public Utility Commission of New Jersey and the Public Service Commission of Pennsylvania for permisson to put into effect a new schedule of rates, providing for several increases in fares. The company desires the new schedule to become effective on Nov. 26. The proposed schedule provides for an advance of 5 cents in the fare between Trenton and Lambertville, bringing the total fare up to 30 cents. It also provides for an increase from 15 cents to 20 cents in the fare from Trenton to Newtown, Pa., and a 5-cent increase in the fare from Newtown to Bristol, Pa., and from Newtown to Doylestown. No advance is proposed in the fare between Trenton and Morrisville, Pa., between Trenton and Yardley, or between Yardley and Newtown.

Injunction Obtained in Rochester Fare Case.—The New York State Railways, operating the Rochester city lines, has obtained an injunction in the Supreme Court of Monroe County against the enforcement of certain sections of the amended Rochester city charter regulating and reducing rates of fare charged by the company. The company was recently ordered to reduce its fare from Rochester to Charlotte territory from 10 cents to 5 cents, but pending the final outcome of the court action a 10-cent fare is being charged. Passengers who pay the extra 5 cents receive a claim coupon which will be redeemed for cash at the company's offices if the rate reduction is sustained. The company maintains that the 5-cent fare zone ends at the city line and therefore has been charging an extra 5 cents between the Rochester city line and Charlotte, a distance of almost 4 miles. Charlotte is on the shore of Lake Ontario and there is heavy travel between the city of Rochester and Charlotte.

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finally made and furnished to all those interested. Another hearing was held on Sept. 6, 1916.

The commission says that in determining what standards should be applied it has refrained from changing materially the service which is being furnished on the average by the electric railways in the district. It says that a close relation naturally exists between the service and the price paid for the service. In this connection it calls attention to the valuation now being made of the electric railways in the district, and says that when the valuation has been completed "the commission will be in a position to determine what is fair and adequate service and what are fair and reasonable rates therefor."

At the hearings the Washington Railway & Electric Company took the position that there is no authority in the Public Utilities Act for adopting any measurement or standard of electric railway service; that the establishment of such a standard involves the question of rate of fare; that there are no complaints of the existing service; that standards would interfere with interstate traffic; and that the commission has no authority to require the electric railways to make observations of traffic or to require the procedure outlined in connection with the commission's non-compliance notice. In this connection the commission says that changes have been made in the original draft relative to making observations of traffic in order to remove "legally technical objections." It expresses the belief that with these changes made the objections of the company to the regulations are without foundation.

The Capital Traction Company suggested that the commission go no farther than the establishment of a rush standard at present, and that this standard receive a trial for a definite period of time before adoption. It argued that the order should exempt traffic covering periods of unusual demand such as baseball games, the inaugural exercises, etc.

The commission expresses the opinion that there is no danger to the electric railways from the formal adoption of the standards, and says that it was found that the regulations standardize rather than increase the service now being furnished. It says that to include in the regulations a general clause exempting from the operation of the standards the special classes of traffic referred to would practically nullify the effect of the whole order.

On Oct. 7 the Washington Railway & Electric Company filed with the Public Utilities Commission a letter asking reconsideration of the order recently adopted by the commission establishing standards for service in the district. Seven specific objections are filed by the company. The two most prominent are that the order involves a rate question and that the commission heretofore has refused to consider rate questions pending completion of the valuation, and that the company is engaged largely in interstate business, which would make compliance with the order difficult, since it applies only to the district.

RIGHT OF CITY TO REGULATE JITNEYS SUSTAINED

The contention of the city of Dallas, Tex., that jitneys operating on the streets of Dallas are subject to police regulation, is upheld in the decision of the State Supreme Court in the case styled C. C. Booth et al. vs. the city of Dallas, injunction, known as the "Dallas Jitney Case," which had gone to the State Supreme Court on application for writ of error. The highest state court refused the application for a writ of error, thereby sustaining the decision of the lower court in which the right of the city to regulate jitneys was acknowledged.

In the trial court, in which the Jitney Drivers' Union of Dallas sought to secure an injunction restraining the city of Dallas from interfering with the free and untrammelled operation of jitney buses over the streets of the city, three district judges sitting en banc refused the injunction. The case was appealed to the Court of Civil Appeals where the decision of the district court was upheld. The case was then carried to the Supreme Court on application for a writ of error and the decision of the district court was again upheld.

The Dallas jitney case is one of two cases involving the right of a city to regulate jitneys to reach the Supreme Court, and in each case the decision of the court has been favorable to the cities seeking to regulate jitney traffic.

EIGHT-CENT FARE UNIT AUTHORIZED

Decision of New Hampshire Commission in Manchester & Derry Street Railway Case Makes Company Just Self-Supporting

The establishment of an 8-cent fare unit in place of the existing 5-cent unit on the Manchester & Derry Street Railway was recently authorized by the New Hampshire Public Service Commission. The cars, in operating from Derry to Manchester, run over the company's own lines, a distance of 8.03 miles to the tracks of the Manchester & Nashua Street Railway, thence to Goffs Falls, and over the tracks of the Manchester Street Railway to Manchester, a distance of 4.451 miles. The fare has hitherto been 5 cents for each zone, viz., Manchester to Goffs Falls, Goffs Falls to Londonderry and Londonderry to Derry. The company desired to increase the two fares on the Derry road to 8 cents each. The former fare from any point in Manchester to Londonderry was 10 cents, and the fare to Derry 15 cents from Manchester. These it was proposed to increase to 13 and 21 cents, respectively.

The road began operation about eight years ago. Its capital stock is $175,000; bonded indebtedness, $125,000, and notes, $51,000. The notes were in part used to meet the deficit from operations, which in the eight years amounted to $43,008. The condition of the company does not seem to be improving, as the deficit for the nine months ended March 31, 1916, was $6,001, without any depreciation allowance. At least $300,000 was expended on the property. The cost was not abnormal, the decision stated, and there is no evidence or indication of any bad judgment or extravagance in construction, except as it may have been an error of judgment to build the road at all. The commission held that those who had invested their money in good faith in a public service enterprise where the demand for the service was insufficient at any reasonable price to yield a normal return upon the investment could not expect such a return, but the investors ought not to be compelled to continue to render the service at a loss. On the face of the figures the company was paying for the privilege of serving the public.

A careful scrutiny of the company's operating expense failed to disclose any item in which substantial reduction could be effected. On the other hand, it appeared that operating expenses should be increased by larger expenditures for maintenance, and the failure to maintain a depreciation reserve made more pressing the need for such a reserve in the future. Up to the present the company had been free from taxation, but beginning with 1918 it would inevitably have to meet a substantial annual charge for taxes. The company obviously needed more money, the decision stated, and it could be obtained only through increase of rates.

The proposed schedule, based on the traffic for the fiscal year 1915, would produce increased revenue of $17,050, assuming that no diminution in patronage followed the increase in rates. Such an assumption, however, was said to be unsafe. To take care of the annual deficit and necessary increased provision for maintenance would require more than $8,000. An annual depreciation reserve of about $5,000 could not be deemed excessive. This would leave $4,000 to $5,000 to be applied in reduction of the accrued deficit until such time as the property would come in for taxation, when the whole balance, if not more, would probably be required for that purpose. The proposed rate, therefore, might make the company self-supporting, but it could hardly do more. It offers no substantial hope of any return whatever on the investment in the near future, if at all.

In such a situation, the commission held, it does not see how it could justify a refusal of the rate increase. The road is in active competition with the Boston & Maine Railroad, and its fares cannot be judged by the standard of an urban street railway having a monopoly. It occupies, in this respect, a position intermediate between the street railway and the steam railroad. The proposed fare of 16 cents, computed on the total length of its line, amounts to 1.99 cents per mile. Including the fare of 5 cents on the Manchester city road, the total proposed fare from Manchester to Derry becomes 21 cents. On the Boston & Maine Railroad the fare is 28 cents from Manchester to

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Traffic and Transportation

FARE INCREASE IN MASSACHUSETTS

Six-cent Rate Approved for Major Portion of Massachusetts Northeastern Street Railway by Commission—Honest Capitalization and Efficient Management Accredited to Road

On Oct. 14 the Massachusetts Public Service Commission approved the general establishment of a 6-cent fare unit by the Massachusetts Northeastern Street Railway, with exceptions in certain city districts traversed by the company's lines in competition with the Bay State Street Railway and in other urban centers where the sale of tickets at five for 25 cents is required by the board. The company operates 128.31 miles of single track, of which 82.44 miles are in Massachusetts and 45.87 miles in New Hampshire. The road was originally called the Haverhill & Southern New Hampshire Street Railway, and was used as the medium under which ten other street railways under common control and management were merged into one in 1913. All the common stock of the Massachusetts Northeastern Street Railway is held by the New Hampshire Electric Railways.

The outstanding capitalization on June 30, 1916, including short-term notes, was $3,576,000. The total permanent investment was carried on the company's balance sheet at $3,573,917, or about $30,000 per mile of single track. The commission held that the present capitalization of the company in stock and bonds represents capital honestly and prudently invested in property, which (allowing for replacements) still exists. The capitalization per mile was found to be moderate.

The company has never been a paying property. With the exception of two lines, none of the companies included in the 1913 merger ever paid a dividend. The physical condition of both these roads was poor, and more than $300,000 has been expended in their rehabilitation in recent years. Since the 1913 merger, the Massachusetts Northeastern Street Railway has paid no dividends whatever upon its common stock. In 1914 a 3 per cent dividend was declared upon the preferred stock, but no other payments have been made. The surplus over fixed charges in the last fiscal year amounted to less than 6 per cent upon the preferred stock, eliminating the common stock, and it was even less in the two previous years. Only $3,329 was set aside for depreciation in 1916, or one-half of 1 per cent on the cost of the equipment.

The commission found the property to be well managed, with every effort being made properly to allocate general expenses between the various utilities affiliated with the road, which include properties in New Hampshire and Maine. The railway pays 1.4 cents per kilowatt-hour, and operates and maintains its substations, assuming all transforming losses. Including the latter, the price of power for 1915 was about 1.75 cents per kilowatt-hour. The commission looked upon this cost as relatively high, although it recognized that interest and depreciation charges on a generating station and transmission lines were saved. The resulting cost per car-mile is high on the Massachusetts Northeastern Street Railway, being 6.19 cents in 1915 and 6.36 cents in 1916. The commission, however, was unable to say that the company could secure its power upon more advantageous terms in any other way. The character of the system and of its business is not favorable to low-cost power, the summer peak loads at week-ends and holidays being far beyond the normal peaks throughout the year.

The cars are operated with a reasonable measure of efficiency. The schedule speed in 1914 was 11.55 m.p.h., only two other large systems in the state providing faster service. In recent years the running time has been reduced upon several routes. The cars are in general in good repair and well painted. While much of the equipment is of a type that would hardly be selected at present, few of the cars are fifteen or more years of age, and the management has recently ordered a number of more modern semi-convertible cars. The trucks are in general of a standard type. Barns, shops and storerooms appear to be in good condition and well handled. Salaries are moderate, and general and miscellaneous expenses comparatively low. In 1915 these expenses amounted to 9.73 per cent of operating revenue, compared with an average of 10.73 per cent for all the railways of the State.

Maintenance expenditures for the last ten years amounted to 20.71 per cent of operating revenue. The commission commended the management for sacrificing dividends in favor of a liberal maintenance policy. It pointed out that there are important items which will be subject to replacement later, viz.: cars, rails, buildings and power apparatus. The company has set aside no fund for the renewal of these items, barring the wholly inadequate provision for rolling stock depreciation which it has set aside in the last two years. Such a provision should be made and the public should meet its requirements. In general, it was held that the company is not earning a reasonable return upon the capital honestly and prudently invested in its system.

On the assumption that the new rates would yield 15 per cent additional revenue, the total increase in earnings would amount to about $115,000 on the 1916 traffic basis. In view of the experience with similar increases in fares upon other Massachusetts street railways, this estimate is probably high. If additional revenue of that amount had been secured in 1916, the net income would have been sufficient for the payment of dividends of 6 per cent upon the common and preferred stock, leaving about $25,000 for depreciation and the retirement of floating debt, an amount said to be certainly not excessive and probably inadequate. Moreover, a company which has for so long a time gone without dividend payments, and has, by this sacrifice, maintained its property in good operating condition, has an excellent claim to a return upon its common stock materially higher than 6 per cent.

The zones on the Massachusetts Northeastern are comparatively long. Excluding the beach sections, where only summer service is given, the average length of the fare sections on all divisions is 4.04 miles, which, on the basis of a 6-cent fare, is at the rate of 1.48 cents per mile. The length of the present zones radiating from Haverhill and Lawrence ranges from 3.75 to 5.94 miles. In view of the length of these zones and the character of the system as a whole, the commission did not feel that the company can fairly be required to retain the 5-cent fare throughout the entire distance, in each instance, except so far as the necessity of meeting the competition of the shorter Bay State line between Haverhill and Lawrence makes it to its own business interest to do so. The commission was of the opinion that the company, by the sale of five tickets for 25 cents, should maintain a 5-cent rate upon such portions of the zones in question as are within a distance of about 3.5 miles from the centers of the respective cities, local conditions to determine the exact distance. With the establishment of the 6-cent fare, school tickets will be sold at 3 cents instead of 2.5 cents each and all other existing reduced-fare tickets will be advanced 20 per cent in price. The case may be reopened after a year.

STANDARDS OF SERVICE ADOPTED FOR WASHINGTON

The Public Utilities Commission of the District of Columbia has adopted the regulations regarding standards of electric railway service in the district effective on Nov. 1. These standards are substantially the same as the tentative ones reviewed in the ELECTRIC RAILWAY JOURNAL of Sept. 2, page 419.

In its review of the matter the commission says that having in mind the possible adoption of standards of service studies were made of the application of the principles involved to the service and a public hearing was held on Oct. 26, 1914. After additional studies a second public hearing was held on June 19, 1916. Further studies were then made and conferences were held with representatives of the electric railways. A complete draft of the order was

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pany, Harris, Forbes & Company and Kissel, Kinnicutt & Company. The bankers have also taken an option on another block of the same size. The bonds will be offered at 98¾. The same bankers headed other selling syndicates for this issue of Interborough Rapid Transit Company bonds, the proceeds of which go to the construction of the new subways. The Public Service Commission authorized a total amount of $106,957,000 of the bonds, of which only $12 229,000 will remain to be disposed of when the latest transactions are completed. The bonds are callable at 110 and interest on any interest date, in any amount for the sinking fund, or at the option of the company either as a whole or in blocks of not less than $500,000.

Kentucky Traction & Terminal Company, Lexington, Ky.—John Skain and George K. Graves, both of Lexington, were added to the directorate of the Kentucky Traction & Terminal Company at the annual meeting recently held in that city. The other directors were re-elected.

Ottumwa Railway & Light Company, Ottumwa, Iowa.—Fox, Hoyt & Company, Milwaukee, Wis., are offering at 97½ and interest, to yield 5.40 per cent, a block of first and refunding mortgage 5 per cent gold bonds of the Ottumwa Railway & Light Company dated Jan. 1, 1906, and due Jan. 1, 1924. These bonds are part of an issue limited to $1,500,000, of which $1,063,000 is outstanding, $73,000 has been retired through sinking fund and $86,000 is held in escrow for improvements.

Public Service Corporation of New Jersey, Newark, N. J.—A gross increase of $423,477 in total business for September, 1916, over September, 1915, an increase of 13.2 per cent, is shown by the financial statement just issued by the Public Service Corporation of New Jersey for September last. For the nine months ended Sept. 30, 1916, the gross increase in total business over the corresponding period in 1915 was $3,630,253, representing an increase of 13.3 per cent. For the month of September, 1916, the balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus, was $562,707, and the increase in surplus available for dividends over the corresponding month of 1915 was $98,439. For the nine months ended Sept. 30, 1916, the balance available for amortization, dividends and surplus totaled $3,927,314, while the increase in surplus available for dividends amounted to $888,504.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.—The Missouri Public Service Commission has signed the order permitting the St. Joseph Railway, Light, Heat & Power Company to create a new mortgage to secure first and refunding mortgage sinking fund 5 per cent thirty-year gold bonds, due 1946. The company was authorized to issue $751,000 of the bonds immediately, $326,000 being utilized to retire the bonds outstanding on its interurban railway property. The new bonds are secured by a first mortgage upon the electric railway running between St. Joseph and Savannah, and by a second mortgage upon the remainder of the property of the company, including the street railway system and electric light and power plant and a central heating station serving St. Joseph.

Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—Plans have been perfected for the reorganization of the Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad. The plans provide that the present holders of first mortgage bonds of the Syracuse & South Bay road will receive a $300 5 per cent mortgage bond and $600 in new first preferred stock for each $1000 bond held. In the Syracuse, Watertown & St. Lawrence River road arrangements present first mortgage bondholders will receive a $200 5 per cent mortgage bond and $475 of first preferred stock for each $1000 held. Holders of other securities will receive an equal amount of second preferred stock for those held. Holders of present first preferred stock of the South Bay line will receive new common stock equal in value to 50 per cent of their old stock. Through this procedure the common stock of both roads will be eliminated. The present bond issue will be reduced from $375,000 to $205,000. In order to meet the current expenses and the cost of the receivership a $50,000 first lien note issue is proposed.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ontario, quarterly, 1 per cent, ordinary.

Cities Service Company, New York, N. Y., monthly, one-half of 1 per cent, preferred; monthly, one-half of 1 per cent, common.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred B; quarterly, 1¼ per cent, common.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, common and preferred.

Lehigh Valley Transit Company, Allentown, Pa., quarterly, 1¼ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Aug.,	'16	$17,352	*$8,528	$8,824	$3,528	$5,296
1 "	"	'15	15,284	*8,715	6,569	2,169	4,400
12 "	"	'16	207,284	*104,233	103,051	37,623	65,428
12 "	"	'15	183,355	*109,968	73,387	25,420	49,967

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m.,	Aug.,	'16	$15,933	*$10,446	$5,487	$1,105	$4,382
1 "	"	'16	14,394	*9,070	5,324	1,107	4,217
12 "	"	'16	120,329	*103,765	16,564	13,241	3,322
12 "	"	'15	116,775	*99,084	17,691	13,602	4,089

COLUMBUS (GA.) ELECTRIC COMPANY

1m.,	Aug.,	'16	$74,427	*$29,465	$44,962	$28,654	$16,308
1 "	"	'15	55,999	*25,760	30,239	28,679	1,560
12 "	"	'16	814,064	*339,132	474,932	344,091	130,841
12 "	"	'15	701,435	*321,247	380,188	345,000	35,188

DALLAS (TEX.) ELECTRIC COMPANY

1m.,	Aug.,	'16	$149,870	*$96,559	$53,311	$36,587	‡$18,724
1 "	"	'15	147,944	*92,059	55,885	33,398	22,487
12 "	"	'16	1,903,196	*1,181,133	722,063	430,362	‡308,901
12 "	"	'15	1,906,442	*1,114,880	791,562	400,741	390,821

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m.,	Aug.,	'16	$71,088	*$39,148	$31,940	$9,059	$22,881
1 "	"	'15	55,065	*29,325	25,740	8,930	16,810
12 "	"	'16	813,903	*428,527	385,375	106,249	279,126
12 "	"	'15	670,497	*378,939	291,558	104,831	186,727

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

1m.,	Aug.,	'16	$203,228	*$129,261	$73,967	$48,296	$25,671
1 "	"	'15	179,548	*120,996	58,552	48,550	10,002
8 "	"	'16	1,657,124	*1,116,855	540,269	389,228	151,041
8 "	"	'15	1,533,164	*1,016,899	516,265	394,811	121,454

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m.,	Aug.,	'16	$168,724	*$104,365	$64,359	$36,429	$27,930
1 "	"	'15	135,756	*89,610	46,146	35,915	10,231
12 "	"	'16	1,935,343	*1,215,651	719,692	437,338	282,354
12 "	"	'15	2,039,965	*1,216,817	823,148	432,926	390,222

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m.,	Aug.,	'16	$29,459	*$16,327	$13,132	$5,241	$7,891
1 "	"	'15	25,511	*12,903	12,608	5,522	7,086
12 "	"	'16	313,999	*175,833	138,166	65,042	73,124
12 "	"	'15	264,104	*163,413	100,691	66,888	33,803

JACKSONVILLE (FLA.) TRACTION COMPANY

1m.,	Aug.,	'16	$49,422	*$34,769	$14,653	$15,408	†$755
1 "	"	'15	47,613	*35,436	12,177	14,601	†2,424
12 "	"	'16	617,874	*419,744	198,130	180,890	17,240
12 "	"	'15	629,754	*441,863	187,891	170,292	17,599

NORTHERN TEXAS ELECTRIC COMPANY, FT. WORTH, TEX.

1m.,	Aug.,	'16	$155,378	*$97,617	$57,761	$28,916	$28,845
1 "	"	'15	147,065	*89,337	57,728	27,631	30,097
12 "	"	'16	1,844,384	*1,131,646	712,738	341,845	370,893
12 "	"	'15	1,755,262	*1,039,550	715,712	327,835	387,877

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m.,	Aug.,	'16	$671,861	*$421,667	$250,194	$184,963	$65,231
1 "	"	'15	606,229	*387,167	219,063	182,894	36,169
12 "	"	'16	7,775,272	*4,988,526	2,786,746	2,204,547	582,199
12 "	"	'15	7,763,789	*4,787,515	2,976,274	2,160,424	815,850

SAVANNAH (GA.) ELECTRIC COMPANY

1m.,	Aug.,	'16	$69,891	*$47,833	$22,058	$23,713	†$1,655
1 "	"	'15	65,767	*44,786	20,981	23,274	†2,293
12 "	"	'16	795,821	*535,472	260,349	280,513	†20,164
12 "	"	'15	801,161	*520,838	280,323	278,030	2,293

*Includes taxes. †Deficit. ‡Includes non-operating income.

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B. R. T. GROSS INCREASES

According to the report of the Brooklyn (N.Y.) Rapid Transit Company for the quarter ended Sept. 30, 1916, the gross operating revenues showed an increase of $418,006 or 5.7 per cent over those of the corresponding period in 1915. The operating expenses, however, also increased $313,430 or 8.1 per cent, so that the net revenue from operation rose only $104,756 or 3.0 per cent. Taxes jumped materially, to the extent of $107,848 or 24.9 per cent.; non-operating income showed a slight falling off, and, owing to new rapid transit lines being placed in operation, income deductions rose $239,475 or 20.6 per cent. The net result of these factors was a decrease in surplus of $246,573 or 12.4 per cent. The comparative statement for the third quarter in 1915 and 1916 follows:

	1916	1915
Gross operating revenue	$7,719,324	$7,301,318
Operating expenses	4,175,597	3,862,167
Net revenue from operation	$3,543,727	$3,439,151
Taxes	539,779	431,931
Operating income	$3,003,948	$3,007,220
Non-operating income	125,709	129,535
Gross income	$3,129,657	$3,136,755
Income deductions	1,401,837	1,162,362
Surplus	$1,727,820	$1,974,393

TAXES ASSESSED IN VIRGINIA

The total value of the tangible and physical property of electric railways in Virginia, as assessed by the State Corporation Commission for the year 1915, was $8,891,358. The State property tax on this assessed value, the tax on money and the franchise tax amounted to $65,901. The total State tax assessed against electric railways for 1914 was $83,225, a decrease of $17,324 in 1915, caused chiefly by the reduction of the rate from $0.35 to $0.10 on $100 of value. The accompanying table shows the detailed tax figures for the various companies. The tax on money is omitted, the total for all companies being only $1,255.

The total value of the tangible and physical properties of the canals and steam railroads in the State for 1915 was $127,840,979, the total taxes thereon amounting to $1,430,827, an increase of $346,608 over 1914. The value of the property of light, heat, power, gas and water companies operating in the State was fixed at $10,481,241, while the taxes thereon totaled $37,608, a decrease of $22,628 from 1914 owing to the reduction in the rate from 1 per cent to one-half of 1 per cent.

1915 Taxable Values of Virginia Electric Railways with Taxes Assessed Thereon, and the Franchise Tax Assessed on the Gross Transportation Receipts for Year Ended June 30, 1915.

Name of Company	Miles	Total Property Value	Tax on Property	Franchise Tax	Total Tax
Appalachian Pr. Co.	1.05	$11,856	$12	$134	$146
Blue Ridge Lt. & Pr. Co.	5.30	35,937	36	165	202
Bristol Trac. Co.	3.57	13,983	14	79	93
Charlottesville & Albemarle Ry.	3.53	125,985	126	474	600
Danville Tr. & Pr. Co.	6.35	167,420	167	1,479	1,685
Henrico & Chesterfield Ry.	2.50	3,750	3	....	3
Lynchburg Tr. & Lt. Co.	14.74	455,635	455	2,677	3,132
Mill Mountain Incline Co.	0.37	13,950	14	45	60
Newport News & Hampton Ry., Gas & Elec. Co.	32.54	901,940	902	3,718	4,806
Norfolk City & Suburban Ry.	4.50	27,322	27	76	104
Norfolk & Ocean View Ry.	8.88	111,729	112	694	806
Norfolk Ry. & Lt. Co.	32.39	685,310	685	....	685
Radford Wtr. & Pr. Co.	2.63	16,922	17	102	120
Richmond & Chesapeake Bay Ry.	14.72	304,085	305	624	941
Richmond & Henrico Ry.	....	.....	....	594	594
Richmond Ry. & Viaduct Co.	4.93	406,060	406	710	1,116
Richmond & Rappahannock River Ry.	25.44	158,031	158	573	731
Roanoke Ry. & Elec. Co.	24.57	515,352	515	3,567	4,082
Tazewell St. Ry.	1.97	7,410	7	103	116
Virginia Ry. & Pr. Co.	137.04	3,401,111	3,401	30,964	35,316
Washington & Old Dominion Ry.	69.99	932,977	933	4,769	5,702
Washington Utilities Co.	....	.....	....	....	10
Washington-Virginia Ry.	38.39	593,808	594	4,201	4,841
Total	435.41	$8,891,358	$8,891	$55,754	$65,901

ANOTHER OHIO DEAL REPORTED

Reports from Cleveland printed in the daily papers say that a holding company is in formation to take over stocks of Cleveland, Southwestern & Columbus Railway, Lake Shore Electric Railway, Lorain Street Railway, Sandusky, Fremont & Southern Railway, Cleveland, Painesville & Eastern Railway, and Cleveland, Painesville & Ashtabula Railroad. The Cleveland, Southwestern & Columbus Railway is controlled by Mandlebaum interests of Cleveland, while the other lines are controlled by E. W. Moore and H. A. Everett. The lines in the proposed new consolidation operate 400 miles from Toledo to Ashtabula and south from Cleveland to Wooster and Bucyrus, with through service to Columbus by traffic arrangements with lines south from Bucyrus.

The resident correspondent of the ELECTRIC RAILWAY JOURNAL in Cleveland reported on Oct. 25 that officials of the Lake Shore Electric Railway, the Cleveland, Painesville & Eastern Railway and the Cleveland, Southwestern & Columbus Railway stated they know nothing of negotiations of Eastern capitalists for the control of these properties. One of the men interviewed stated distinctly that up to that time there had been no negotiations so far as he was aware.

BEST YEAR FOR CALIFORNIA UTILITIES

What is called the "banner year" for public utility business in California is described in advance sheets of the annual report of the State Railroad Commission. The total operating revenue of California public utilities, including the entire business of the interstate railroads, which has not been segregated by them, was $384,617,734 for the year ended June 30, 1916. The operating expenses were $249,303,932, leaving net operating revenue for the year of $135,313,802. These figures do not reflect the very great increase in the earnings of the steam railroads during the fiscal year, for which the data are not yet completely available. Under regulation by the commission and notwithstanding general financial depression, the net operating revenues of California utilities were $2,879,708 greater in 1915 than in 1913 and $5,710,327 greater in 1915 than in 1914.

During the years 1913, 1914 and 1915, additions, betterments and new construction were made by the principal classes of California utilities as follows: Steam railroads, $55,048,885; electric railroads, $15,603,661; electric companies, $56,381,721; gas companies, $10,099,696; telephone companies, $46,374,853; water companies, $6,999,708; total, $190,508,527. Much more than $200,000,000 in cash has gone into the further development of California public utilities during the period of supervision and regulation by the commission.

Electric Bond & Share Company, New York, N. Y.—The Electric Bond & Share Company has declared an extra dividend of $1,000,000 on its common stock, all of which will go to the General Electric Company, as owner of the $6,000,000 of common stock outstanding. The directors have also authorized the issue of $2,000,000 additional preferred stock and a like amount of new common. The preferred will be offered at par and accrued dividends to holders of preferred stock of record at the close of business on Oct. 31, in the proportion of one share of new stock for each three shares held. The entire issue has been underwritten by William P. Bonbright & Company. The new common stock will be subscribed and paid for upon delivery to the General Electric Company. With the increases in effect, the company will have outstanding $8,000,000 of each class of stock.

Evanston (Ill.) Railway.—The Illinois Public Utility Commission has authorized the Evanston Railway to make a mortgage in favor of the Merchants' Loan & Trust Company, Chicago, Ill., as trustee to secure an issue of $44,800 of first and general mortgage bonds.

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company has sold $12,229,000 of 5 per cent first and refunding mortgage bonds to a syndicate headed by Lee, Higginson & Com-

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Financial and Corporate

EARNINGS STATISTICS FOR JULY

Returns for 1916 and 1915 Indicate Lack of Improvement in West—Operating Expenses and Taxes Advance

A comparison of electric railway statistics for July, 1916, with figures for the corresponding month of 1915, made by the information bureau of the American Electric Railway Association, indicate some improvement in the electric railway business of the East and the South, together with a depression in the West, while there has been an advance in the operating expenses and taxes of all districts. Returns representing 7129 miles of line of companies scattered throughout the country show an increase in operating revenues of 5.54 per cent, in operating expenses of 5.49 per cent and in net earnings of 5.61 per cent, while returns representing 5826 miles of line show an increase in taxes of 9.61 per cent and in operating income of 5.13 per cent.

Of the three groups shown in the accompanying table the Eastern, represented by 4563 miles of line, or about 50 per cent of the total mileage, shows an increase in operating revenue of 7.92 per cent, in operating expenses of 7.68 per cent and in net earnings of 8.27 per cent. Returns representing 3724 miles of line show an increase in the amount of taxes paid of 11.28 per cent and in operating income of 6.84 per cent.

The Southern group, represented by 749 miles of line, had an increase of 5.70 per cent in operating revenues and net earnings, while operating expenses increased 5.69 per cent. Returns for about 65 per cent of this mileage indicate an increase in net income of 8.30 per cent.

The Western group alone shows no improvement. Returns from companies represented by 1817 miles of line show a decrease in operating revenues of 1.05 per cent, almost no change in operating expenses and a decrease in net earnings of 2.78 per cent. Moreover, returns for about 87 per cent of this mileage show an increase in the amount of taxes paid of 6.65 per cent and a decrease in net income of 1.33 per cent.

There was almost no change in the operating ratio of all the districts, the operating ratio of the United States as a whole decreasing from 59.55 per cent in 1915 to 59.52 per cent in 1916.

REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR JULY, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
*United States**	Amount	Per Cent Increase	Amount	Per Cent Increase
Operating revenues	$17,114,046	5.54	$15,938,372	5.35
Operating expenses	10,187,289	5.49	9,465,371	5.04
Net earnings	6,926,757	5.61	6,473,001	5.82
Taxes	.....	...	1,029,340	9.61
Operating income	.....	...	5,443,661	5.13
Operating ratio, per cent:				
1915	59.55	...	59.56	...
1916	59.52	...	59.38	...
Miles of line represented	7,129	...	5,826	...
*Eastern District**				
Operating revenues	$12,199,886	7.92	$11,648,387	7.47
Operating expenses	7,080,538	7.68	6,780,488	7.47
Net earnings	5,119,348	8.27	4,867,899	7.47
Taxes	.....	...	719,052	11.28
Operating income	.....	...	4,148,847	6.84
Operating ratio, per cent:				
1915	58.17	...	58.21	...
1916	58.03	...	58.20	...
Miles of line represented	4,563	...	3,724	...
*Southern District**				
Operating revenues	$841,815	5.70	$549,704	5.04
Operating expenses	493,437	5.69	307,929	3.53
Net earnings	348,378	5.70	241,775	7.03
Taxes	.....	...	43,359	1.61
Operating income	.....	...	198,416	8.30
Operating ratio, per cent:				
1915	58.61	...	56.83	...
1916	58.62	...	56.01	...
Miles of line represented	749	...	499	...
*Western District**				
Operating revenues	$4,072,345	*d1.05*	$3,740,281	*d0.69*
Operating expenses	2,613,314	*d0.05*	2,376,954	*d1.16*
Net earnings	1,459,031	*d3.78*	1,363,327	0.14
Taxes	.....	...	266,929	6.65
Operating income	.....	...	1,096,398	*d1.33*
Operating ratio, per cent:				
1915	63.53	...	63.85	...
1916	64.17	...	63.55	...
Miles of line represented	1,817	...	1,603	...

NOTE.—Letter *d* denotes a decrease.
*Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River, exclusive of Greater New York. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

ANNUAL REPORT

Boston Elevated Railway

The statement of income, profit and loss of the Boston (Mass.) Elevated Railway for the fiscal year ended June 30, 1916, follows:

Railway operating revenues	$18,686,971
Operating expenses:	
Maintenance of way and structures	$1,733,379
Maintenance of equipment	1,324,964
Power	1,233,259
Conducting transportation	5,928,095
Traffic	18,901
General and miscellaneous	1,841,396
Total	$12,079,996
Net revenue—railway operations	$6,606,975
Taxes assignable to railway operations	1,043,041
Operating income	$5,563,934
Non-operating income	94,356
Gross income	$5,658,290
Deductions from gross income:	
*Rent for leased roads	$2,580,490
†Miscellaneous rents	730,505
Net loss on miscellaneous physical property	5,261
Interest on funded debt	1,064,624
Interest on unfunded debt	65,052
Amortization of discount on funded debt	3,755
Miscellaneous debits	4,828
Total	$4,454,520
Net income	$1,203,770
Dividends	1,193,970
Balance to surplus	$9,800

*Includes rent of Tremont Street subway. †Rents of all other subways and tunnels.

During the last fiscal year the revenue passengers carried totaled 363,477,041, an increase over the previous year of 17,160,457 or 4.9 per cent. The gross operating revenues increased $888,364 or 4.9 per cent, while the operating expenses rose $792,013 or 7.0 per cent. The net revenue from railway operations, therefore, increased only $96,351 or about 1.5 per cent. Every group in the operating expense division showed increases except power, the expenses for which fell off $57,058 or 4.4 per cent. The other items increased as follows: Maintenance of way and structures, $303,812 or 21.2 per cent.; maintenance of equipment, $121,613 or 10.1 per cent.; conducting transportation, $307,266 or 5.4 per cent; traffic, $13,611 or more than 250 per cent, and general and miscellaneous, $102,767 or 5.9 per cent.

The total charges against the income account for taxes, rent of leased roads, rent of subways and tunnels, interest on funded debt, interest on unfunded debt and miscellaneous items for the last year amounted to $5,497,562, an increase over the previous year of $223,214. The items which increased were as follows: Interest on funded debt, $101,005; rent of leased roads, $70,515; rent of subways and tunnels, $89,696, and miscellaneous items, $9,258. The interest on the unfunded debt was $21,113 less than for the preceding year. The net income for the last year showed a decrease of $120,449 or 9.0 per cent. The dividend payments were decreased from 5½ per cent to 5 per cent, and the balance to surplus declined from $10,852 to $9,800.

The revenue car miles run during the year totaled 58,572,308, and the revenue car hours 5,515.231. The total surface track on June 30, 1916, was 486.85 miles, and the total rapid transit track 36.85 miles, or together 523.70 miles. The company had on the above-named date 5946 stockholders, owning 238,794 shares. Of these 5271, owning 215,149 shares, were in Massachusetts.

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BUFFALO LINES CO-OPERATE IN POWER MOVEMENT

The International Railway, Buffalo, N. Y., and the Niagara Junction Railway, Niagara Falls, N. Y., are co-operating in the movement for greater diversion of water from the Niagara River for power development. Maj. Harry Burgess, of the United States lake survey, who held a hearing recently on the necessity for greater power development, received formal statements from the two electric lines relative to the acute shortage of power. The Ontario Hydro-Electric Commission has stopped the exportation of one large block of energy to American consumers and threatens to stop all exportation by the Canadian-Niagara Power Company, Ltd. This would have a serious effect upon the two railways mentioned previously as well as upon other large users of Canadian power along the Niagara frontier. With the advent of the operation of the International Railway's new double-track fast line between Buffalo and Niagara Falls next summer the company will require additional current, and increased business on the Niagara Junction Railway has forced that company to seek additional power.

NEW EXPRESS TERMINAL FOR DALLAS

J. F. Strickland, president of the Texas Electric Railway, has purchased an entire block of ground bounded by Young, Jefferson, Market and Wood Streets, Dallas, Tex., near the new $5,000,000 passenger terminal station of the steam railways for $175,000, and will erect a commodious electric express terminal thereon. This new express terminal for all electric lines entering Dallas will be the largest terminal of its kind in the world, according to Burr Martin, general manager of the Texas Traction Company and the Southern Traction Company, and Louis Horner, president of the Electric Express Company. Messrs. Martin and Horner are now working out plans for the building and trackage facilities from the interurban lines on Jefferson Street.

TRAFFIC REPORT AT ROCHESTER

Bion J. Arnold, who has been acting as consulting engineer of the Chamber of Commerce of Rochester, N. Y., on the local railway situation, has just presented a report. He recommends (1) rerouteing, (2) improvements in operation to accelerate traffic, (3) more strict traffic regulations, (4) street widening and new bridges, (5) improvements in physical property and (6) track extensions. The improvements in operation recommended include double berth operation at downtown crossings, more rapid acceleration, substitution of near-side for far-side stops, increase in stop spacing and front-end exit. The improvements in physical property include alterations in car platform arrangement to facilitate loading, more destination signs and electrically operated track switches at certain points. The proposed extensions include a suggestion that the abandoned Erie Canal has possibilities for the use of a high-speed interurban entrance to the city.

Buffalo Tax Review Case.—The City Council of Buffalo, N. Y., has appropriated $20,000 to be used by the law department in defending the action brought by the International Railway for a review of its special franchise assessment and has authorized the corporation counsel to spend up to $50,000 to defend the case. The Council has failed to approve the corporation counsel's request for an additional $5,000 with which to start an action against the International Railway to determine whether or not the rate of fare in Buffalo should be reduced from 5 cents to 4 cents.

Dynamite Exploded in New York Subway.—A charge of dynamite which injured two persons, tore up a rail, and blew a hole 18 in. deep in the cement bed of the track was set off at 4.37 a. m. on Oct. 25 at the southern end of the platform of the subway station at 110th Street and Lenox Avenue, New York. The police asserted that in their opinion the dynamite was set off by persons sympathizing with the strike of Interborough Rapid Transit Company employees, though they said they had no evidence to connect the crime with any individual. Of the two persons injured one was the ticket agent, who was cut by glass. The other was a negro who was descending the steps of the south end of the station.

Selection of Third Cleveland Arbitrator Up to Court.—The two members of the board of arbitration, selected to settle the dispute between the Cleveland Railway and the city of Cleveland over the power contract with the Cleveland Electric Illuminating Company, failed at their final meeting on Oct. 23 to agree upon a third member. The selection will be made by Federal Judge John M. Killits of Toledo. Engineer Joseph Alexander represents the company and Attorney T. L. Sidlo represents the city. Each of them had offered a score of names for consideration. The company suggested A. B. Du Pont among others. He represented the city in a former arbitration. Attorney Sidlo asked for more time, but finally agreed to place the matter in the hands of Judge Killits at once.

Plans Made for Restoring Service in Yonkers.—Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., and of its subsidiary, the Yonkers Railroad, notified Mayor James T. Lennon on Oct. 25 that he would operate cars in Yonkers on Oct. 26. When a similar attempt was made on Oct. 1 cars were wrecked. The cars were then withdrawn until now Yonkers has been without electric railway service for nearly nine weeks. Mayor Lennon, apparently having the earlier disorder in mind, issued a proclamation reviewing the obligations of the citizens and warning them of the dangers which attach to participation in disorder. It is understood that Mr. Whitridge has induced many of his old employees to return to work, and with these will be sent new crews to acquire the experience demanded by the fifteen-day ordinance.

Referendum Asked on Strike Prevention Plan.—The Chamber of Commerce of the United States, in accordance with instructions given by the Board of Directors, has been requested to submit to its constituent members, in the form of a referendum, the plan suggested by the Merchants' Association of New York for preventing the interruption of the operation of public utilities. The principle indorsed by the association is based upon the establishment of a contractual relation between employers and employees upon public utilities. Upon this basis a plan was worked out in detail by Henry R. Towne. The association accepted this plan, but expressed its willingness to give its approval to any other practical method of insuring the freedom of public utilities from interruption. Copies of the pamphlet containing the plan and the resolutions of the board of directors have been sent to all the commercial organizations of the United States. A digest of the plan was published in this paper for Sept. 30, page 692, in connection with the account of the strike in New York.

Additional Transit Facilities Urged for Brooklyn.—With a letter urging citizens of Brooklyn to support the proposals of the Public Service Commission for the First District of New York for the betterment of transit conditions in Brooklyn, the Committee of One Hundred has presented the commission's comprehensive program of rapid transit for all Brooklyn. The program suggests the construction of a Livingston-Clinton Street subway, with an Ashland Place connection, and the construction of many crosstown lines from Long Island Sound to the Atlantic Ocean, all at a cost of $14,000,000. The Public Service Commission recommends negotiations with the Brooklyn Rapid Transit Company toward a fixation of a price at which the existing railroads may be taken over, and suggests that the matter of valuation be referred to a committee of ten, five to be appointed by the railway company and five by the Public Service Commission. In calling the attention of the citizens of Brooklyn to the proposals, the committee urges that the extra tax of 1 per cent a year on the value of real-estate holdings for a term of ten years will be more than repaid by the benefit to such real estate.

PROGRAM OF ASSOCIATION MEETING

Illinois Electric Railways Association

The next meeting of the Illinois Electric Railways Association will be held at the La Salle Hotel, Chicago, Ill., at 10 a. m. on Nov. 17. The program will be announced later. It is expected that the topics presented will include one-man cars, charges for baggage, the safety code, personal injury and damage claims and regulation by commissions.

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UNION RESTRAINED IN MISSOURI STRIKE

The original restraining order in connection with the strike of the employees of the Springfield (Mo.) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of Oct. 7, page 741, preventing the union from striking was dismissed by Judge Woodrough. His opinion was that the company should arbitrate, not because an employee had been unjustly discharged, but for the satisfaction of the remaining members of the union. The company immediately offered to arbitrate. The union, however, refused arbitration and demanded the immediate reinstatement of the discharged employee with pay from the date of discharge. The company refused this demand and the union employees struck. Judge Pollock then granted a temporary restraining order against the union and the union sympathizers from interference with the operation of the traction company. This temporary writ of restraint was returnable on Oct. 20 before Judge Van Valkenburg, who rendered an opinion on Oct. 23 granting the traction company a temporary injunction against interference by the union or union sympathizers. The company is now operating 75 per cent of the regular number of cars, with service on all but two minor lines.

ANOTHER PLEA FOR LENIENCY

Donald C. Barnes, manager of the Everett Railway, Light & Power Company, Everett, Wash., in a letter written to petitioners for an extension of the Summit Avenue line of the company, said in part:

"We have your petition for the extension of our lines on Summit Avenue, and take this opportunity to present to you our position in this matter. The street railway business in this city has never been profitable, and unless the company receives some relief from its franchise obligations, such as the rescinding of free transfers, paving requirements, etc., or freedom from unregulated jitney competition, the present business cannot be continued. The results of operation of last year were: gross earnings, $97,948; operating expenses, $94,384; balance, $3,563; taxes, $12,837; deficit, $9,937. In other words, the revenue was not sufficient to pay operating expenses and taxes, with no provision for interest and the sinking fund.

"It is impossible to raise further funds for extensions until the money already invested can be made to show some returns. The city now has an ordinance which levies an annual license tax of $400 on peddlers with motor vehicles. This was passed to protect the merchants who have established business here and are entitled to this protection. The case of the jitney operator is analogous. He is a peddler who, paying only a nominal tax and incurring no obligations of service, comes in to-day, skims the cream of an established business, and is gone to-morrow. He runs his vehicle only on the streets which the street railway has helped to pave, and duplicates the service already provided. The time is soon coming when the public must choose between the two, and the only way you can secure extensions and an adequate system of transportation is by directing your efforts to the elimination of jitney competition."

COMMISSION UPHELD IN IMPROVEMENT CASE

The Public Service Commission for the First District of New York has recently been upheld by unanimous decision of the Court of Appeals as to its powers to direct public service corporations to undertake "reasonable improvements." This decision reverses a unanimous decision of the Appellate Division, First Department, which annulled an order of the commission made on March 19, 1915, directing the New York & Queens Gas Company to extend its mains and supply service from Bayside, Queens, to Douglaston and Douglaston Manor, sections without illuminating gas. Judge Cuddeback, writing the opinion of the Court of Appeals, holds that the courts have no right to exercise administrative powers such as those possessed by the Public Service Commission. The commission directed the extension of the gas mains after several hearings. The gas company appealed. It contended that the cost would be greater than any financial return possible in the succeeding few years warranted. The Appellate Division upheld this view, and describing the order of the commission as unreasonable, annulled it. The Court of Appeals, however, has decided that the order of the commission was reasonable and should stand. Counsel for the commission contended in the latter tribunal that the lower court had assumed to itself powers and duties belonging to the commission. This view the court took, Judge Cuddeback holding that the Appellate Division had the power only to determine that the commission's order was unreasonable in that it was "an unlawful, arbitrary or capricious exercise of power." He held further that if the decision of the Appellate Division were allowed to stand it would "go far toward defeating the efforts of the Legislature to establish agencies to regulate the great public service corporations."

NEW WORKING AGREEMENT IN CHATTANOOGA

Brief Review Is Presented of Negotiations Leading Up to Settlement Arranged on Oct. 7 for a Year and a Half

The Chattanooga Railway & Light Company, Chattanooga, Tenn., has made a new working agreement with its employees, dated Oct. 7, to be effective for a year and a half. The agreement is on the open shop basis. It is the outcome of negotiations in progress since last August and differs materially in several respects from the conditions of the working agreement incorrectly reported in the issue of this paper for Sept. 9. A brief review of the labor situation in Chattanooga follows:

The Chattanooga Railway & Light Company has always operated on the open shop principle. Early in August representatives of the Amalgamated Association attempted to unionize the property and force a closed shop. The company had, of its own accord, increased the wages of the platform men effective on Aug. 1, and most of the men were satisfied with the wage schedules and working conditions. The Amalgamated representatives did not meet with much success. With the assistance of local unions, principally the machinists' union, however, they commenced to intimidate the platform men in an endeavor to force them from the cars or join the union. On the evening of Aug. 21 a mob of several hundred union men and sympathizers commenced pulling them from the platforms of the cars in the down-town districts. Considerable disorder followed and the Commissioner of Police put in a riot call and called out the fire department to clear the streets. The trouble resulted in a walk-out, and it was late that night before all the cars could be put back in the carhouses.

The day following, negotiations were opened through the Mayor of the city and a conference was held between the local labor union and officials of the company. At that time the men agreed to return to work, and the company agreed to recognize the men as heretofore on the open shop basis and drew up a new working agreement. Service was resumed and has continued uninterruptedly ever since that date. About Oct. 1, however, the officers of the Amalgamated Association again appeared upon the scene and insisted upon a closed shop agreement. This was declined by the company and it looked for a time as if there would be more trouble. The majority of the platform men, however, satisfied with their working conditions and the wage schedule, which had just been increased, refused to call a strike and the Amalgamated officers left the city.

On Oct. 7 the company made a new working agreement with its employees to be effective for one year and a half. This agreement is on the open shop basis, the company agreeing merely not to discriminate against those of its employees who are members of the union.

The wage scale remains the same as fixed on Aug. 1, prior to the walkout. It is as follows: first six months, 18 cents an hour; second six months, 20 cents an hour; second year, 22 cents an hour; third year, 23 cents an hour; fourth year, 24 cents an hour; fifth year and over, 25 cents an hour.

The working agreement is for a period of one year and a half. Arbitration is provided for as a means of adjusting the question of wages only, which the company agrees to advance if the earnings warrant. The employees are to ask abritration on this point if they cannot agree with the company, but once fixed, wages are to remain in force for one year thereafter. All other working conditions remain the same as they were bulletined and in effect prior to the date of making the new agreement.

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ADDITIONAL TIME IN TACOMA CASE

Mayor of Tacoma Attacks Motives of Tacoma Railway & Power Company in Seeking Relief from Franchise Provisions

By an order of the Public Service Commission of the State of Washington, the city of Tacoma has been granted an additional twenty days in which to answer the complaint of the Tacoma Railway & Power Company, in which the company asks to be relieved by the Public Service Commission from various franchise obligations. Mayor Fawcett, of Tacoma, quoting from the petition of the company the paragraph setting forth that "it is impossible for the plaintiff to continue to operate its street railway lines for a 5-cent fare throughout the limits of the city of Tacoma, to maintain its present service," etc., answered the charge of Louis Bean, manager of the company, with the rejoinder that the Stone-Webster subsidiary, in its complaint, is attempting to bring about an increase in its fares on lines extending to outlying points.

Mr. Bean, in answering the statement made by the Mayor, said in part:

"In the statement appearing in local papers, with reference to the so-called 'relief petition' of the Tacoma Railway & Power Company, the Mayor has stated in effect that the company was seeking to raise fares to Fernhill, Larchmont, South Tacoma, Point Defiance, etc. His statement is entirely without foundation. It is our understanding that at this time the State law prescribes a 5-cent fare within the limits of incorporated cities. For the information of the public, we present herewith our prayer in petition for relief:

"Wherefore, the plaintiff craves that a citation be issued directed to the city of Tacoma, requiring it to answer this complaint, and that a hearing thereon be had; that an order be entered relieving the plaintiff from any obligations to pay any gross earnings tax, and from contributing to the cost of bridges, to pave or pay therefor; from maintaining and repairing streets; from furnishing any free transportation, and that the plaintiff be relieved from any further provisions of the franchises under which it operates, except to give adequate and sufficient service at fair and reasonable rates."

Mayor Fawcett, in return, said in part:

"Manager Bean says he did not ask the commission for increased fares. Stone-Webster's manager would not be so crude as to blurt out: 'We want 10-cent fare to Fernhill and South Tacoma.' He knows what a row that would have made. Mr. Bean publishes the prayer of his petition to show he didn't ask it. Please note the last line of the prayer: 'at fair and reasonable rates'! What does that mean? Hasn't this city been entertained ever since the Fernhill fight with mournful bleatings of street railway officials that a 5-cent fare is not a 'fair and reasonable rate' to Fernhill and other outlying districts?

"Again, in its plea to the commission, after recounting the things the franchises require the company to do, it says: 'It will be absolutely impossible for the plaintiff to comply with such provision and to charge only a 5-cent fare within the corporation limits of the city of Tacoma.' Oh, no! Mr. Bean did not ask for a fare boost. He just fixed it so the commission would either have to commit hari-kari or else give it to him as the only solution to his company's distress. The people have got to elect a Legislature that will wipe out the Washington Public Service Commission."

City attorneys Dan F. North of Bellingham, William A. Johnson of Everett, Hugh M. Caldwell of Seattle, J. M. Geraghty of Spokane, City Attorney Harmon and Assistant Attorney Carnahan of Tacoma, together with Mayor Fawcett and the Tacoma City Commissioners met in secret session in Tacoma recently to perfect plans to unite against the company's petition. If the Public Service Commission decides against the city, a writ of prohibition will be sought in the Superior Court at Olympia, thus taking the question out of the hands of the Public Service Commission. If this defense is lost, the city of Tacoma will then have to answer the complaint before the Public Service Commission.

IMPORTANT SUBURBAN FRANCHISE RENEWED

Blue Island (Ill.) Grants Twenty-Year Extension of Rights to the Chicago & Interurban Traction Company

The Chicago & Interurban Traction Company, which operates an interurban line from Vincennes Avenue and 119th Street, the city limits of Chicago, to Kankakee, Ill., has accepted a new ordinance passed by the City Council of Blue Island extending its rights in that city for a period of twenty years from the date of passage of the ordinance. The former ordinance, which was originally granted to the Englewood & Chicago Electric Street Railway and the only franchise of brief duration held by the Chicago & Southern Traction Company when the present company acquired its property outside the city of Chicago in 1912, expired in Februrary, 1916.

The acquisition of the extension franchise is of particular significance to the company in that its rights in Blue Island were attacked by the city authorities shortly after the organization of the Chicago & Interurban Traction Company in 1912, and recourse to the courts was necessary to prevent interference with the operation of the company's cars. The new ordinance disposes of all matters in controversy between the company and the city.

Reconstruction of the company's double track lines will be carried out under a three-year program, with 91-lb. 7-in. T-rail on wood ties set in concrete, with furnace slag or crushed stone foundation and granite block paving. Specifications are included in the ordinance. The tracks in Burr Oak Avenue and Western Avenue are to be reconstructed in the first year, the Calumet Grove line the second year, and the Vincennes Avenue tracks the third year. The company will furnish on all of its poles on Western Avenue and on certain poles on Burr Oak Avenue and Vincennes Avenue brackets to carry lights to be furnished by the city, and wires for the police and fire-alarm systems.

Service regulation by yearly terms is provided for by agreement between the president of the company and a representative of the city to be appointed by the City Council. If the two cannot agree, an arbitrator is to be appointed by the City Council and the president of the company, and the findings of a majority of the arbitration board thus created will bind the company, a thirty-day period being given in which to carry new schedules into effect. It is intended that the first schedules thus established shall go into effect about Jan. 1, 1917. In the meantime the schedules are to be as prescribed in the ordinance, the week-day schedule varying from a ten-minute headway between 6 a. m. and 7:20 a. m. and 4:30 p. m. and 6:40 p. m., with a twenty-minute headway during the middle of the day to a maximum headway of eighty minutes between 1:30 a. m. and 4 a. m. The present fares remain unchanged.

In the event of annexation of the city of Blue Island to the city of Chicago, the company agrees to sell its lines within the annexed territory to the Chicago City Railway.

CITY AND COMPANY AGREE ON EXTENSIONS

M. E. Sampsell, president of the Seattle-Renton Railway, operating in Seattle, Wash., after a recent conference with the City Council of that city, agreed to begin the Genesee Street extension of the Rainier Avenue line as soon as possible. This promise was made in consideration of concessions relative to paving between rails of the line. According to the terms of the franchise of the company, the Genesee line must be completed within a year from last June, when court proceedings over the Seattle, Renton & Southern Railway ceased. The Genesee line will be single track. The company will not have to pave east of Forty-seventh Street. The City Council granted practically every concession asked by the railway. According to present plans the company will proceed with an early expenditure of approximately $150,000, making it possible, when the work is completed, to reduce the running time from Renton to the Seattle terminus by ten minutes. Mr. Sampsell made it plain to city officials that his company desires to work harmoniously with the city. Mr. Sampsell has been negotiating with the city for common user rights on Fourth Avenue for cars on the Seattle Municipal Railway.

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NEWS OF ELECTRIC RAILWAYS

MR. CLARK MAKES PLEA FOR FAIR TREATMENT

Course Outlined Necessary to Restoring Confidence in Municipal Attitude Toward Portland (Ore.) Company

C. M. Clark, Philadelphia, Pa., chairman of the executive committee of the Portland Railway, Light & Power Company, Portland, Ore., was the guest of honor and the chief speaker at the weekly luncheon of the Progressive Business Men's Club of that city on Oct. 12. Mr. Clark's principal topics were the jitney, the attitude of the Pacific Coast toward the Eastern investor and the competition in the lighting field in Portland. He said that there was a growing concern among Eastern investors over the apparent lack of interest on the Pacific Coast in the rights of those who have furnished funds for the development of the resources of the West, and he referred to the need for refinancing which will present itself to the company through the maturity of $5,500,000 of notes on May 1, 1917. He said that while the Pacific Coast was the great home of the jitney, he thought that the climate has very little to do with its prevalence there. The reason for its existence was the way Pacific Coast cities were governed and the lack of thought or responsibility in the public mind to property interests and to franchises already given. The chairman of the meeting had made that suggestion. Otherwise, Mr. Clark said, he would not have spoken of it, but there was an obligation of a municipality to a franchise contract under which vast sums of money had been invested. He thought the chairman made a good point and was glad to enlarge upon it. He considered the inadequate control of the jitney on the Pacific Coast to be a reflection upon the government of the Pacific Coast cities.

In Mr. Clark's opinion, the city of Portland or any other city could never be served adequately by the jitney service. He did not believe any of the gentlemen present thought it could, nor did he think the Council of the city of Portland thought that it could. If there was any question as to the correct answer to that interrogation, undoubtedly the proper thing for the Council of Portland to do was to grant a franchise to some responsible jitney organization and let them try it out. In granting such franchise the very smallest consideration for fair play and for common municipal honesty would require that any ordinance for a single jitney or a combination of jitneys to operate in Portland should contain restrictions, regulations, taxation, etc., similar to those under which the Portland Railway, Light & Power Company operated. That was the least obligation which the city government of the city of Portland owed to vested interests. All that the stockholders of the Portland Railway, Light & Power Company wanted from the city and the people was fair play and the same treatment as was received by its competitors. If the Council granted a franchise to a jitney organization or to individual jitney drivers, giving them privileges and concessions and conditions which were decidedly more favorable than those received by the Portland Railway, Light & Power Company, that company would expect exactly those same concessions.

In referring to the financial situation, Mr. Clark said that to his mind it was the crux of the whole matter. The financial history of the past few years of the Portland Railway, Light & Power Company had been absolutely disastrous. Since 1913 practically the entire surplus earnings had been taken away from the company through absolutely no fault of its own, except that the company had expanded to take care of the growth of the city of Portland which was indicated by its previous history. That was a mistake and the company owned up to it. The bonds of the company, which three years ago were worth 97½, Mr. Clark bought that week for 70. The two-year notes of the company, which come due next May, $5,000,000 of them, were offered at present at 90. The stock, which was in the seventies and eighties, before assessments of 10 per cent were called, was now at nine, after payment of $10 a share in assessments. He was asked constantly the question, "What under the sun is the matter with Portland?"

As to prospects Mr. Clark said that if the jitney was removed the company would immediately get back the business which belonged to it before. If good times came again the company would get back what it lost through the industrial depression, and could then go ahead and attend to business. As for the competition of the Northwestern Electric, the Portland Railway, Light & Power Company would never get back its loss from that source, but with the growth of the demand for electric light and power it may be able to build up enough business for both, although it would probably take a great many years to do it.

NIAGARA & EASTERN TO REAPPLY FOR CONSTRUCTION RIGHTS

Despite the action of the Public Service Commission for the Second District of New York, which has denied a certificate of convenience and necessity to the Niagara & Eastern Railroad, Lockport, N. Y., for the construction of an electric railway to connect the Buffalo, Lockport & Rochester Railway with the Niagara frontier at a point where it is proposed to build a new international bridge across the gorge at the Devil's Hole, Judge Charles Hickey, Lockport, president of the line, says a modified application will immediately be made to the commission.

The construction of the proposed line is embodied in a comprehensive plan which would involve the expenditure of several millions of dollars in electric railway properties throughout western New York and in Canada between Toronto, Ont., and the Niagara frontier. Surveys have been made and options have been obtained for a tentative right-of-way between Hinman, N. Y., on the Buffalo & Lockport division of the International Railway, and a point on the Niagara gorge near the Devil's Hole. Property has been bought on the American and Canadian sides of the gorge near this point for abutments for the proposed international bridge.

The road is being promoted as a connecting link in the new transcontinental line, involving the extension of the Canadian Northern Railway from its present eastern terminus at Toronto, Ont., to the Niagara escarpment, where a new international bridge would connect it with the proposed Niagara & Eastern at the Devil's Hole, then to Hinman and Lockport and over the Buffalo, Lockport & Rochester Railway to Rochester, where it would connect with other eastern systems.

Commissioner Devoe P. Hodson, Buffalo, who wrote the commission's majority opinion, from which only Commissioner William Temple Emmet dissents, says that the possibility of consummating the connections across the Niagara gorge and with the eastern terminus of the Canadian Northern in Toronto, 80 miles away, is too remote to be considered in its present application. Without this connection the commission finds that there would be no public necessity for the Niagara & Eastern line as a whole from Lockport to the gorge. While intimating that the commission might consider a future application for a certificate for that part of the line which would connect the Buffalo, Lockport & Rochester Railway with the International Railway and the Erie Railroad at Hinman, Commissioner Hodson finds the commission is without power under the law to separate the present application into two parts.

President Hickey of the Niagara & Eastern Railroad is quoted as stating that the new line will be financed by interests identified with the International Railway, Buffalo, and declares there will be no delay in making another application to the commission in a somewhat modified form.

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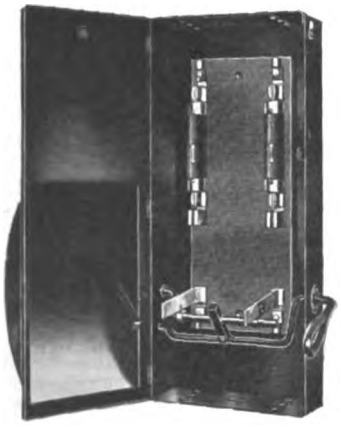
land, Ohio. This seat has been adapted to an ordinary prepayment-fare stand. It consists of a malleable iron bracket supporting the seat itself and attached to a pipe standard. The distance between this standard and the standards supporting the fare box is adjustable, and the position of the seat bracket on its supporting standard can also be varied. The supporting bracket revolves about the pipe standard, and its position may be fixed in the space back of the fare box or swung around in position for the conductor, or it may serve to obstruct the exit aisle.

The seat proper can be adjusted to any height within the range of the length of the screw upon which it is mounted, and may be fixed in a horizontal position, or swung to a vertical position on either side of the bracket as shown in the accompanying illustrations. The latching is accomplished by a tip on the casting which supports the seat. This fits into three different slots in the end of the horizontal member of the malleable iron bracket proper.

Improved Safety Switch

An inclosed, theft and fool proof, safety switch designed to replace the dangerous, exposed switch on 600-volt railway circuits has recently been placed on the market by the Western Electric Company, Chicago, Ill.

As shown in the illustration herewith, this switch is inclosed in a metal box provided with a hinged cover which is held closed by a spring latch. The switch



IMPROVED SAFETY SWITCH

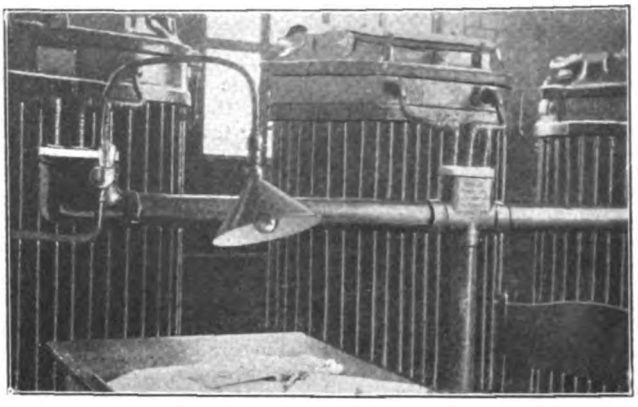
terminals and fuses are under lock and key, and while the current can be turned on or off by means of the handle outside the box, the current carrying parts and wiring remain inaccessible. This prevents the theft of current, which is generally accomplished by wiring around the meter. The switch mechanism is of a quick-break type. When the door is closed, a gasket in the lid renders the box fire and waterproof. This switch has a maximum capacity of 600 amp. on 600 volts.

An innovation in country elevator structures has been introduced on the Illinois Traction System at Evans, Ill., where there has been erected a concrete and steel tank elevator. A round steel tank 26 ft. in diameter, 45 ft. high and weighing 40,000 lb. is divided into four bins, each holding 3000 bushels. The first story or working floor, under the tank is of concrete reinforced with steel and the structure is rat and mouse proof, as well as fireproof. This is one of twenty-five grain elevators ranging in capacity from 10,000 to 50,000 bushels along the lines of the Illinois Traction System.

Special Outlets for Conduit

The conduit wiring for transformers as shown in the accompanying illustration is a feature of the South Deerfield (Mass.) substation of the Greenfield Electric Light & Power Company, which supplies power for the Connecticut Valley Street Railway at this point by use of a motor generator set.

The installation consists of three 100-kva. General Electric oil-cooled units, delivering current at 4600 volts for local distribution and receiving 13,200-volt energy from the Greenfield company's local transmission net-



CONDUIT OUTLET WITH RECEPTACLE FOR PILOT LAMP AND CONNECTION FOR OPERATOR'S DESK LAMP

work. Both primary and secondary leads are wired in pipe duct, with Crouse-Hind "condulet" fittings, the arrangement providing an unusually compact installation. A special feature is the provision of an outlet in one of the "condulets" over the operator's desk to carry a lamp feed from the substation lighting circuit supply. The outlet also carries a receptacle holding a 10-watt lamp which serves as a pilot when the station is otherwise darkened for that portion of the night after a railway motor-generator set in the room has been shut down. A swinging lamp bracket over the desk is threaded into the outlet for convenient handling and the provision of a metal reflector and 40-watt lamp enables the operator to read the watt-hour meters installed on the switchboard 12 ft. away without carrying lamp cord and portable unit about the substation.

Delivering Hard-Road Material on the Ohio Electric

Crushed stone for hard roads or other purposes is being handled in large quantities by the Ohio Electric Railway, Springfield, Ohio. This material is delivered from quarries located on this company's lines and from connecting steam railroads. Cars loaded with crushed stone are usually handled by the regular freight trains, but in a number of instances special switching service is required to make deliveries. The crushed stone is loaded into side-dump cars, flat-bottom gondola cars and hopper-bottom gondola cars. The hopper-bottom cars are dumped into pits on side tracks, the gondola cars are set out on side tracks, the side-dump cars are delivered at any specified points along the right-of-way, and the material is unloaded by hand shoveling. When side-dump cars are unloaded from the main line, they are handled by a switching locomotive between the regular scheduled trains. An embankment along a highway is the most desirable location for unloading crushed stone from side-dump cars. The convenience of deliveries made in this way has been a large factor in the railway's obtaining this class of freight.

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SETTING BUSINESS MEN TO THINKING

The appointment of a special committee by the Portland (Ore.) Chamber of Commerce to consider the financial plight of the local railway shows that the recent striking address of C. M. Clark in that city, as noted in last week's issue, has already set the business men of the community to thinking. While this does not mean an immediate assurance of that public fairness toward invested capital which is so needed by the Portland company and other Western railways, it is a marked step forward. We know of no better way to overcome that lack of interest in vested rights which is causing such concern to Eastern investors than by securing a better understanding between the investment banker and the local business man. On the one hand is the man who can fully foresee the disastrous results to the community of not carrying out its contractual obligation to protect the capital dedicated to public service, and on the other is the man who from his daily experience can appreciate the bearing of contractual integrity upon credit and by his influence can gradually bring the public to a better realization of its responsibility for utility development. From the ethical standpoint of duty as well as the practical standpoint of expediency the public ought to be honest with utility investments, but a new publicity is needed to make it understand fully its moral obligation and the common interests of utility and community. In this publicity the investment banker and the business man can be most efficient allies, and this phase of public-relations work should not be overlooked.

STANDARDIZING SMALL PURCHASES

Much emphasis is laid by H. B. Twyford, in an article published this week, on proper and uniform specifications and descriptions for materials and supplies. Without a doubt this is a matter to be carefully watched by all purchasing agents, particularly with reference to the many small articles that are bought. As Mr. Twyford states, the work of the purchasing agent in connection with heavy and highly technical purchases is largely that of specializing on prices and delivery, for the specifications to be followed are furnished by the engineering department. In the case of many small articles and miscellaneous materials, however, no standard specifications or descriptions are formulated in any department, with the result that the various parties concerned in making a requisition and order often seem widely apart in their statements of what they want. Where this condition obtains, the purchasing department has the opportunity to initiate a real reform by originating and putting into force uniform rules throughout the whole organization. The plan suggested by Mr. Twyford of having suitable sketches with standard specifications or descriptions placed on the purchase-order record and the storeroom record is one that would, if put into practice, result in intelligent purchasing work and save much confusion and delay, perhaps at times of emergency. Moreover, competitive bidding, the general requisite of efficient purchasing, loses its value if based upon any misconceptions of the article desired, and the desire to avoid these would alone warrant the use of such a plan as described.

SUPERVISING SECURITY ISSUES

The opinion of the Illinois Public Service Commission on the consolidation of the Illinois Northern Utilities Company, the Freeport Railway & Light Company and the Tri-County Light & Power Company, abstracted elsewhere in this issue, has to do with a case relatively insignificant from the point of view of national utility financing. It is, however, of great value in outlining the proper functions of the commission in all security issuance cases under the Illinois law, and also in laying down a general policy along this line that ought to be adopted by all public service commissions. In its broadest aspects, the decision relates to commission regulation of the old securities of consolidated companies, the new security issues of existing utilities whether consolidated or not, and the security issues of entirely new companies. In the first case the commission does not at all feel called upon to make a physical valuation of the consolidated companies, when the new consolidated stock does not exceed the sum of the capital stocks of the constituent companies, for the new stock is by nature really a reissue of old securities, with which the commission is not concerned for the purpose of correcting any evils of former years. Nevertheless, to take up the two other cases, the commission intends to see that new issues of existing utilities represent actual property (thereby in cases of over-capitalization gradually raising the general property-security ratio), and that every $1 of securities of entirely new companies stands for $1 of actual property.

POLICY WISELY EXPLAINED

The sanity of the platform embodied in these three cases is hardly open to question. Undoubtedly, as the commission states, a sudden upheaval of utility financing in Illinois would result if that body were to attempt to make all outstanding securities conform to present-day business ethics. Yet, to disregard this point of expediency, the commission on the grounds

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of simple equity to existing security holders, maintains that it should not now constitute itself a moral censor of past practices involved in the issuance of securities under laws then publicly sanctioned. The dead past should be allowed to bury its dead. The commission is concerned with the task of enforcing a unity ratio of property to securities only in connection with new securities, which is exactly as it should be. In order, however, to give wider publicity to its security-authorizing functions, the commission in the decision cited has adopted the interesting expedient of requiring on each stock certificate of the consolidated company a recital to the effect that the authorization of the consolidated stock does not import that it has passed upon the value of the property. This is simply one phase of a general warning to investors that, later in the decision itself, finds expression in the words: "An approval by this commission of securities of any character whatsoever is not a guarantee on the part of the State as to the value of tangible property, as to an annual rate of return or as to the success of the utility's management." In buying utility securities the investor must exercise the same business judgment that he would use in buying the securities of any other sort of business. In other words, he must make the necessary investigation to determine to his own satisfaction how new securities authorized by the commission and old securities neither validated nor approved by it, will be mutually affected so as to fix the real value and future possibilities of the company in question as an investment. It would be a wise step if all commissions would explain to the public as clearly as the young Illinois body has done, that they are not banking agencies of any sort, for it would be a sorry day for regulation if the public in general should get the idea that the commissions are responsible for the success or failure of its investments.

CO-OPERATION WITH LABOR

Of the many experiments in the management of labor which have been inaugurated in recent years, few have demonstrated their practicability as conclusively as the co-operative plan instituted by the Philadelphia Rapid Transit Company in 1911. The details of the plan and its results in operation are described in an article appearing in this issue. The co-operative plan has stood the most severe test to which it could be subjected. A strike recently called was a complete failure. Not a run was missed. Less than 5 per cent of the men answered the strike call. Philadelphia was the scene of serious street railway strikes in 1909 and 1910. The co-operative plan in six years has worked a complete transformation in the relations of the men to the company, and out of the better feeling thus engendered has grown a loyalty which made the recent strike impossible of success.

Operating officials of many other properties can profitably study the Philadelphia plan. Stripped of details, its essential feature is a joint committee, composed of representatives elected by the men meeting with the division superintendents of the company. This committee passes upon a wide range of questions not affecting matters of policy. The success of the plan is due, in part, to the type of operating official working under it, but it possesses in addition the great advantage of furnishing a medium by which the minor discomforts and complaints of the men may be threshed out with the officials of the company. Out of a multitude of these petty annoyances, most of which in the experience of Philadelphia can be readily adjusted, is bred the spirit of aloofness between employer and employee which furnishes the opportunity for the strike organizer. The additional advantage is secured that it brings an understanding of the difficulties of management directly to the employee. It is an easy thing to criticise some method or practice, but if the man who thus criticises is placed in a position where he is able to remove the difficulty if he can recommend a better plan, he sometimes finds that no other plan is practicable.

It would not be contended that the co-operative plan is the best solution of the labor problem on all systems. It has been an emphatic success, but it does not follow that it would meet the conditions in every community. In many respects the co-operative committee does not differ from the grievance committee on some systems. The Philadelphia officials dislike the phrase "grievance committee." They argue that it proceeds on a false psychological basis. Matters should be settled before they become grievances. The basis to be sought is one of co-operation between the company and its employees in the fullest sense of that term.

One of the most interesting features of the co-operative plan is the creation of a wage fund, to which 22 per cent of the gross earnings is appropriated and from which operating wages are paid. As the fund increases wages are advanced. The men are made, in effect, partners sharing in the gross receipts of the company. The percentage was fixed upon the basis of the amount which the men were receiving at the time the plan was put in operation. Through economies in operating methods, earnings per car-hour have been increased some 21 per cent, with a proportionate advance in wages. The success of the co-operative plan is due in a large measure to its ability to provide an advance in wages.

In securing operating economies certain adjustments of working conditions, frequently distasteful to labor, were necessary. Swing runs were substituted in part for the universal straight runs which had theretofore prevailed. Divisions were consolidated, with the result that many men with preferred runs had to take others of less desirability. These and many other changes of a like character were effected without difficulty because of the fact that advances in wages depended upon such improvements, and this could always be kept before the men.

Whether the co-operative plan will be as successful in periods of stationary or declining earnings, when wages cannot be advanced, and whether the labor situation in Philadelphia will always remain as satisfactory as at present, are matters which only the future can decide. Five years of experience, however, can leave no doubt of the great advantages of this plan as applied during that time in Philadelphia.

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Every Employee a Publicity Representative

This Conductor Was Never Taught to Cultivate Good Public Relations

WHAT determines a purchaser's opinion of what he buys and of the concern he buys from?

It is the quality of the merchandise and the treatment received from the salesman.

The platform men of an electric railway are so many retail salesmen of transportation. This isn't merely a figure of speech; it is a PLAIN FACT.

And the platform man can make a railway liked or disliked, just as any other salesman can make friends or enemies for his concern.

A few years ago an analysis of about 800 complaints on an eastern electric railway showed that nearly 75 per cent of them were due to incivility or worse on the part of platform men.

It is evident from the nature of the electric railway business that motormen and conductors can make an appalling number of enemies for a road.

Fortunately it is just as true that they have it in their power to make a great many friends.

But the management must educate them in the business of friend-making; a few cut-and-dried paragraphs in the rule book will not do it.

Every successful merchant has it clearly in his mind and effectively impresses it upon his employees that the making of satisfied customers is Rule No. 1.

For some reason neither managements nor men of electric railways work very hard toward this end, though the policy of the successful merchant applies as well to the railroad as to the department store.

EVERY EMPLOYEE of a railway, especially the ones immediately in contact with the public, IS A POTENTIAL PUBLICITY MAN.

Good, agreeable treatment of the individual car rider will go a long way toward making a road popular.

Professions of good intent are all right, but they do not find ready lodgment in the mind of a man rankling from a row with an impudent conductor.

A passenger left standing in the rain by an unobservant motorman should be able to give an impartial hearing to a plea for fair adjustment of a franchise controversy, but, being human, he doesn't do it. It ought to be a rule on every electric railroad that in any difference of opinion between passengers and subordinate employees THE PASSENGER IS ALWAYS RIGHT.

For what shall it profit a railroad to collect a 5-cent fare from a man who thinks he has already paid, and thereby incur $17 worth of ill-will?

Here is a not-often-reckoned factor in the bringing about of good public relations:

The railroad educates itself and its men at the same time it is educating the public.

Where a road is endeavoring by a frank policy of publicity to set itself right with the public, its employees are led inevitably to adopt the same attitude.

There are 99 reasons why every public service corporation should adopt a policy of publicity, but the effect of such a policy upon the men within these organizations is ALONE reason enough.

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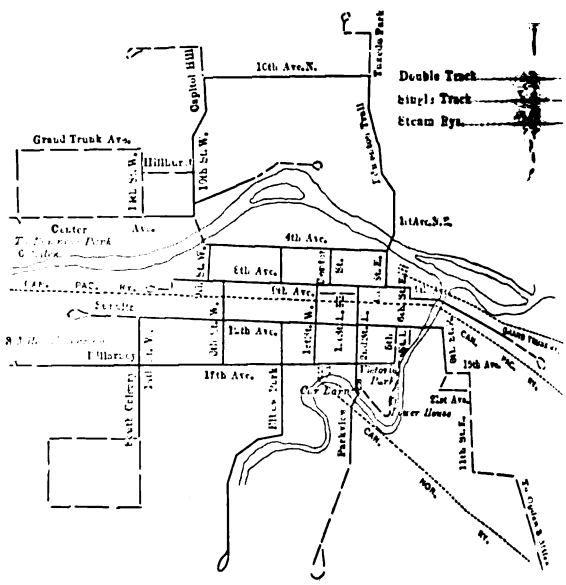
War Checks the Growth of Calgary Street Railway

Canadian Railway Effects Economies by Using One-Man Cars and Reducing Schedules—Wages of Employees Have Not Been Cut.

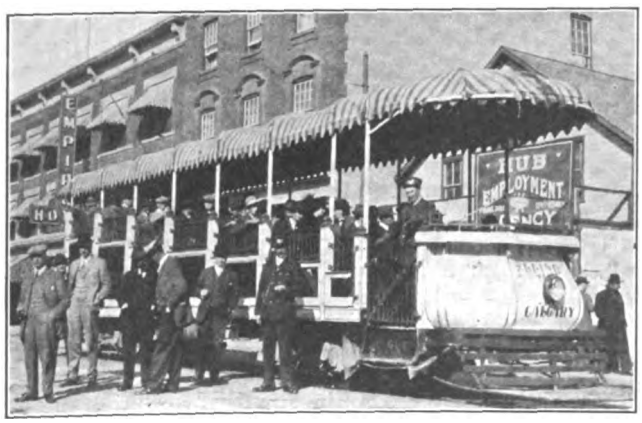
AFTER the city of Calgary, Alberta, had come to the conclusion that a street railway system was a necessity there was a long struggle between advocates of private ownership and adherents of a municipal system, in which the latter won. Construction work was begun in September, 1908, and was pushed along so rapidly that within a year there were 16½ miles of track and twelve cars in operation. But so rapid was the growth of the city, that during the next five years it was necessary continually to extend the lines and to increase the number of cars, so that just prior to the commencement of the war there were 74 miles of track and a total of ninety-eight cars, comprising seventy-eight passenger motor cars, six trailers, eight work cars, three sprinklers, a large power construction car, an observation car and a sweeper. Table I shows how the railway has kept pace with the growth of the city.

The accompanying map of the city shows the layout of tracks which comprises twelve main routes. On Eighth Avenue, the main business street, a one-minute headway is maintained. The other streets, located in the central part of the city, have two-minute to five-minute service. The belt line which encircles the business section and the better class, centrally located, residential sections operates on a headway of seven and one-half minutes. The routes leading to the suburbs are operated on headways of from ten minutes to thirty minutes, depending on the distance covered and the population served.

The general offices, carhouse, repair shop and storage yards of the system occupy a site 500 ft. long and 220 ft. deep which fronts on Second Street East, at the southern limits of the city. The track plan, page



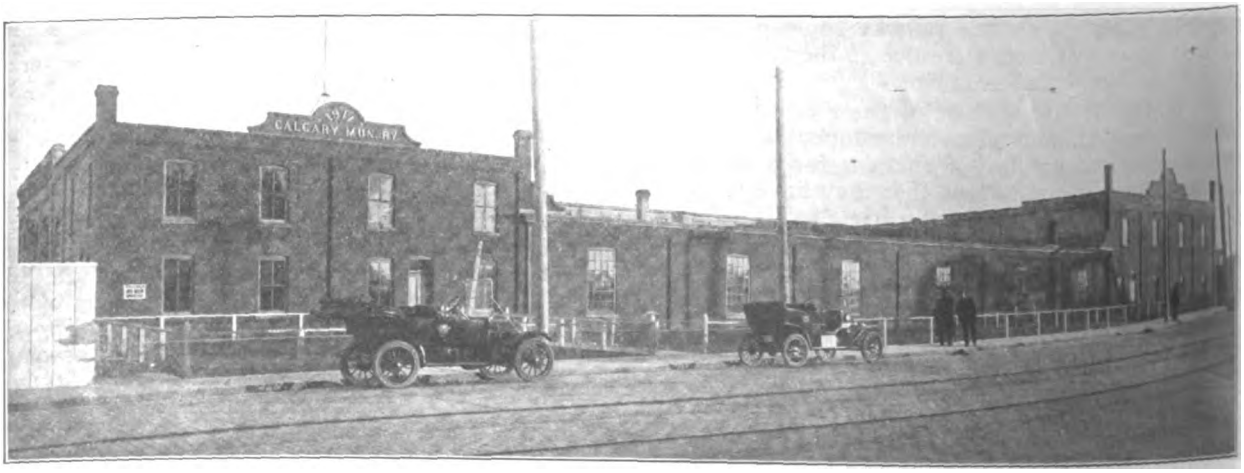
CALGARY STREET RAILWAY—MAP OF CAR LINES



CALGARY STREET RAILWAY—SIGHTSEEING CAR

TABLE I—SHOWING THE GROWTH OF CALGARY, ALTA., AND ITS RAILWAY SYSTEM

Date	Estimated Population	Cars Operated	Miles of Track	Men Employed
July 5, 1909	35,000	2	3.0	15
July 1, 1910	50,000	15	16.5	62
July 1, 1911	55,000	22	26.5	102
July 1, 1912	70,000	48	54.0	246
July 1, 1913	90,000	65	70.5	348
July 1, 1914	90,000	65	71.5	322
July 1, 1915	75,000	60	71.5	272
July 1, 1916	60,000	60	74.0	263



CALGARY STREET RAILWAY—EXTERIOR VIEW OF OFFICE AND CARHOUSE

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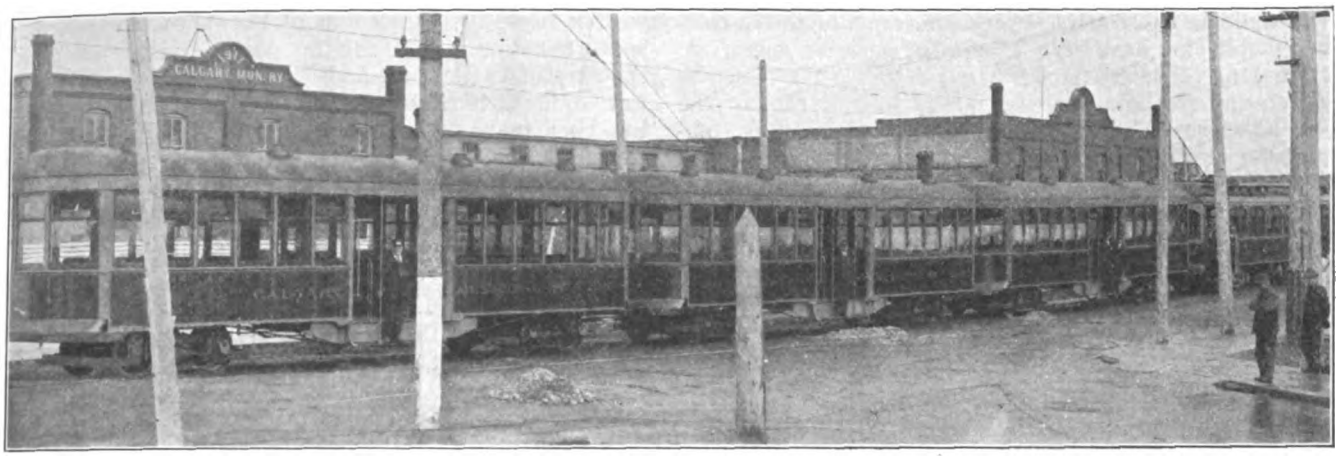


CALGARY STREET RAILWAY—STRING OF MOTOR CAR AND TRAILERS

964, shows the general layout of repair pits, shops and offices on this site. On the second floor over the offices the employees' club rooms are located, and there is an assembly and dance hall over the paint shop.

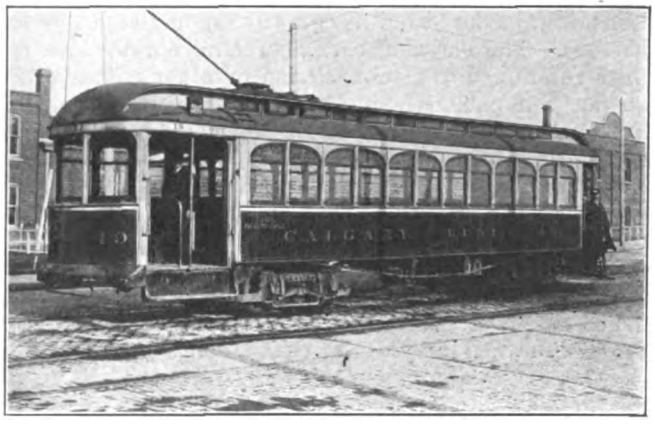
About one-half of the total track mileage of the system is on paved streets. Contrary to the usual practice which has descended from the days of the horse car, the Calgary Street Railway has to assume no responsibility for the care of the pavement between the tracks except for the sub-base, which consists of 4 in. of concrete. The track work consists of 60-lb. and 80-lb. Lorain Steel Company rails, with 6-in. and 7-in. sections, which are laid on ties, spaced 4 ft. apart and thoroughly grouted in cement. The rails are bonded with double compressed bonds. All special work is of manganese steel supplied by the United Steel Company and Hadfields, Manchester, England. Overhead wires are used exclusively except in the business sections of the city where the feeders and connections between the main power stations are placed underground.

The Calgary railway, having no power plant of its own, purchases all the power which it consumes from the city at the rate of 1½ cents per kilowatt-hour. The system uses between 20,000 kw.-hr. and 30,000 kw.-hr. per day.

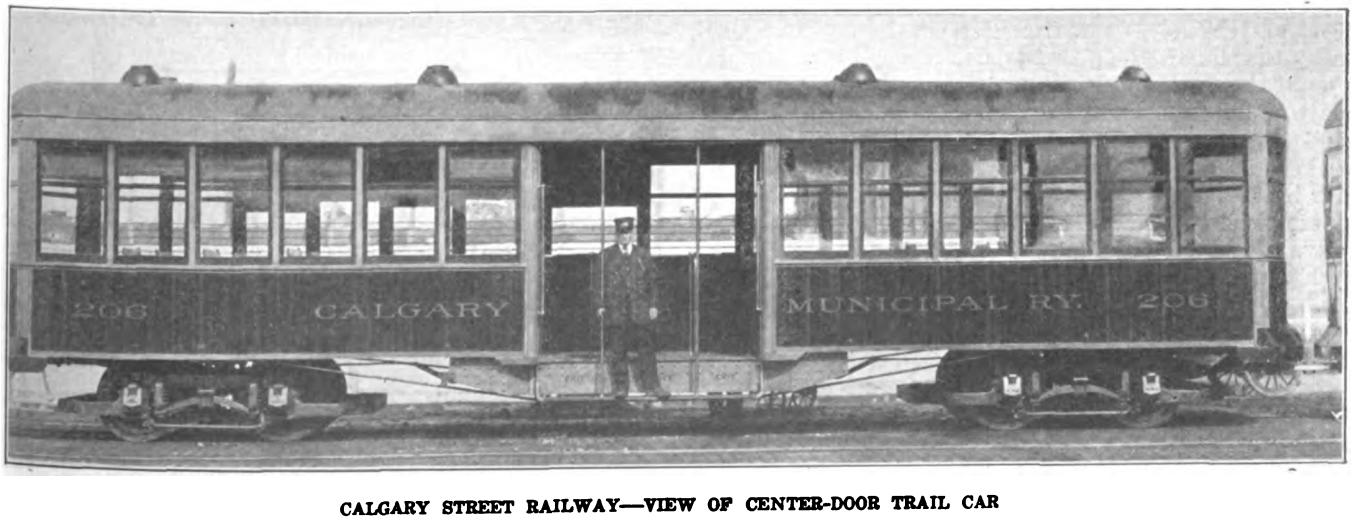
An unusual feature of the car equipment is the "Seeing Calgary" car which is shown in one of the accompanying illustrations. The car is 46 ft. long with the seats arranged in tiers. The panels on the side of the car are beveled plate-glass mirrors, and the fittings are nickel-plated. In the summer the car makes hourly trips over all the interesting routes of the city, the fare charged being 25 cents. It is also frequently used by the city in entertaining official visitors. This car, built by the Preston (Ont.) Car Company, at a cost of $7,500, has proved to be a good investment, earning as much as $124 per nine-hour day during the prosperous times.

The motor cars of the system, which are of the pay-as-you-enter type, were built by the Ottawa Car Company and the Preston Car Company, both Canadian concerns. They include two sizes of double-truck cars. The larger car seats forty-eight passengers and is 46 ft. 6 in. long; the smaller one seats forty passengers and is 41 ft. 6 in. in length. There are also single-truck cars which seat twenty-eight passengers each. There are six trail cars built by The J. G. Brill Company of Philadelphia, Pa. These are of center-door type 41 ft. 6 in. long with a seating capacity of sixty passengers.

In order to effect economies, made necessary by the



CALGARY STREET RAILWAY—TYPE OF MOTOR CAR USED



CALGARY STREET RAILWAY—VIEW OF CENTER-DOOR TRAIL CAR

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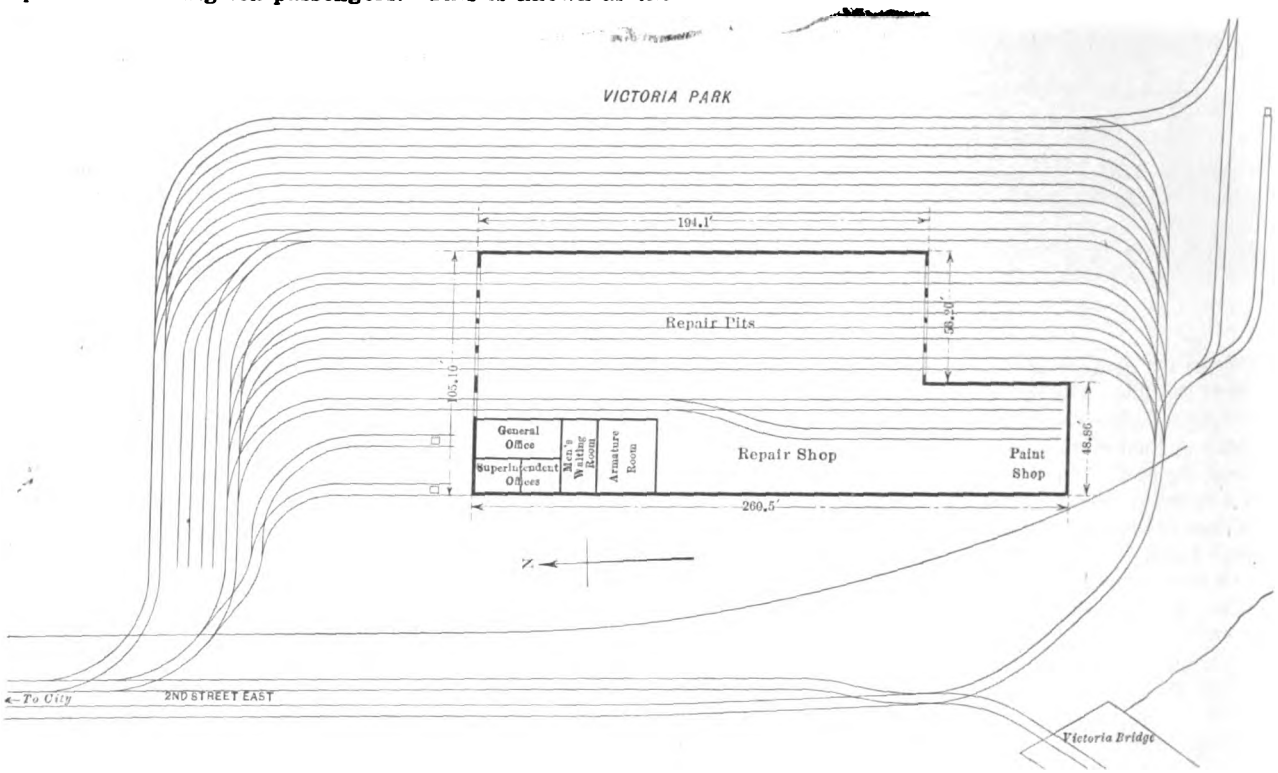
war and the subsequent depression, some of the double-end motor cars have been altered for one-man operation. In making the alterations the rear door was permanently closed and the coin box was moved to the front of the car. The rear vestibule was made into a smoking compartment seating ten passengers. This is known as the "smoking parlor" and is greatly appreciated by the patrons. The one-man cars are being operated on the lines running to the suburbs and on other routes which do not run primarily in the business districts. They have been willingly accepted by the public, and the operation is said to be very satisfactory. The fact that a large proportion of the passengers use tickets facilitates the fare collection. The most competent and best-paid trainmen on the system are employed on the one-man cars.

There is a marked contrast between the fares established on this system and those charged by most of the privately-owned lines. There are no passes issued on the Calgary system, but five classes of special rate tickets are sold. School tickets, sold at the rate of ten for 25 cents, may be used by children at any time, and by adults traveling to and from school. Work tickets, at eight for 25 cents, may be used by all passengers from 6 a. m. to 8 a. m. and from 5 p. m. to 7 p. m. Ordinary tickets, of which twenty-five in book form are sold for $1, are good at any time. Twice a week on market days these tickets can be purchased singly for trips to and from the public market. The civic employees have tickets sold in pads of thirty for $1, which are paid for by the departments whose employees use them. All these tickets are good for transfers to any part of the city.

Naturally when the European war broke out the result was reflected in the operation of the railway. Expenses had to be curtailed, the number of cars operated were reduced, some of the men were laid off, and other economies were resorted to, including the operation of the one-man cars above described. During the summer time practically all of the motor cars are operated with but two 40-hp. motors per car, thus saving a large amount of power. Four motors are necessary in the winter, however, on account of the increased traffic and snow resistance. By cutting out the insurance on all the cars of the system and supplying each with Pyrene fire extinguishers, a further saving of $600 per year has been made. The wages of the men have not been reduced.



CALGARY STREET RAILWAY—PLAN OF OFFICES, REPAIR SHOP AND STORAGE YARD

Table II gives briefly the operating data for the three years ending June 30, 1916, and while it shows the effects of the war on the railway, it also indicates that the reduction in the volume of traffic has not been as great in 1916 as in 1915. It is hoped therefore that the greatest depression has been reached and that an improvement will shortly take place.

TABLE II—SHOWING THE EFFECT OF THE WAR ON THE RAILWAY OPERATION

	1914	1915	1916
Total passengers carried	24,037,860	19,073,378	17,486,234
Passenger car-miles	3,213,132	2,819,804	2,524,860
Freight, mail and express car-miles	500	2,895	2,550
Average fare all passengers, cents	3.014	3.058	3.058
Car earnings per mile, cents	22.797	21.328	21.302
Operating expenses per car-mile, cents	17.752	15.191	14.868

Safety Films Exhibited in Schools

A room has been set aside by the Kansas City (Mo.) Railways for its safety department, under W. S. Woodland, superintendent. Equipment of portable screen, portable projecting machine, cabinets for literature and posters, and other materials have been supplied. Mr. Woodland recently received the directors of the company there, and outlined the safety work. He has started the motion-picture work in the schools, using the portable machine, with carbon filament light and slow-burning film, by which a picture in the film can be kept on the screen for ten or fifteen minutes. The school board has permitted safety programs for the schools, the picture being shown and lecture given in the school auditoriums or in the largest rooms during school hours. At each of these meetings the children receive buttons bearing the name of the school and the school colors. The company has also started its distribution of folders in its cars.

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Consolidated Stock Not Limited by Fair Value

Illinois Commission Not Concerned with Past Evils—Without Valuation Allows New Stock Equal to Combined Outstanding Issues of Consolidated Companies—States Position in Recital on Each Certificate

IN permitting the consolidation of utilities, should a public service commission approve a new capitalization based on fair value of the properties involved, or should it permit new capital stock issues equal to the sum of the capital stock issues of the constituent corporations? A sensible answer to this important question in corporate financing is contained in a recent decision of the Illinois Public Utilities Commission *in re* the application of the Illinois Northern Utilities Company, the Freeport Railway & Light Company and the Tri-County Light & Power Company to be allowed to consolidate. In speaking for the majority, Commissioner O. P. Thompson holds that when the proposed capital stock issues of a consolidated company do not exceed the sum of the capital stocks of the combined companies, the commission is not required to determine the value of the property of the companies. In authorizing new issues of stock the commission always endeavors to prevent issuance except in exchange for money or property equal to the par value, but in its opinion the issuance of the stock of a consolidated corporation in lieu of a like amount of stock of the constituent companies is to be regarded as somewhat in the nature of a reissue of existing stock rather than as the issuance of wholly new stock.

A GOOD PLATFORM

"Where the proposed capital stock of a consolidated company does not exceed the sum of the capital stocks of the constituent corporations, the commission is not required to determine the value of the property of the companies. . . . [Such consolidated stock] is to be regarded as somewhat in the nature of a reissue of existing stock, rather than as a wholly new issue."

"The law as written intends that this commission should see that new security issues of existing utilities represent actual property, and it does not contemplate that the commission should concern itself with past security issues for the purpose of correcting the evils of former years."

"In the case of an entirely new concern, however, $1 of securities should stand for $1 of actual property."

In order to give wider publicity to these points, however, the commission in the present case has deemed it proper to direct the attention of the investing public to the fact that the authorization of the consolidated capital stock does not import that it has passed upon the value of the property. This is done by requiring that each certificate of stock of the consolidated company shall contain the following recital:

"The Illinois Northern Utilities Company is a corporation formed by the consolidation of the Illinois Northern Utilities Company, the Tri-County Light & Power Company and the Freeport Railway & Light Company, as authorized by the Illinois Public Utilities Commission, by its order of May 31, 1916, and the amount of stock by said order authorized to be issued on such consolidation was fixed at $8,191,300 (being an amount equal to the aggregate outstanding stock of the constituent corporations), without investigation by said commission of the value of the assets of said corporations."

DISSENTERS HOLD DECISION TO BE CONTRARY TO LAW

The various questions involved in the decision are well brought out by the supplementary opinions filed by members of the commission, a joint dissenting opinion by Frank H. Funk and Richard Yates and a concurring opinion by Walter A. Shaw. Messrs. Funk and Yates aver that the issuance of any stock without a determination of the value behind the stock is contrary to the spirit and purpose of the public utilities law and contrary to public policy. They are not ready to accept the view that the law radically changes the procedure to be followed in the authorization of stock for consolidation purposes from the procedure laid down for the issuance of securities generally, or that the commission has no alternative but to issue an amount of stock equal to the sum of the stocks of the constituent companies. Furthermore, they object to the placing of the foregoing statement upon the new stock certificates because of the confusion and misrepresentation that they are sure will follow when in the future additional stock of the consolidated company is issued under the authorization of the commission without having any such statement printed on it.

COMMISSIONER SHAW SHOWS DIFFERENCE BETWEEN REORGANIZATION AND CONSOLIDATION

The concurring opinion by Commissioner Shaw, however, so explicitly expounds the Illinois law and the principles of equity behind the commission's decision that it is worth giving in detail. In the first place, Commissioner Shaw points out that the Illinois law treats of consolidations separately and distinctly from reorganizations. Relative to reorganizations of public utilities in this State, he says, the Legislature has spoken quite definitely and has decreed that the capitalization shall not exceed the fair value of the property. Relative to consolidations of public utilities, however, the Legislature has spoken definitely only in limiting the capital stock to an amount not exceeding the sum of the capital stocks of the corporations consolidated and any additional sum actually paid in cash for improvements. The Legislature undoubtedly had in mind that capital stock issues of anything less than or equal to such a limit would be proper.

The Legislature no doubt foresaw that the conditions involved in a consolidation of utilities are far different from the conditions prevalent under a reorganization. A reorganization, as Commissioner Shaw describes it, is generally the last chapter in a corporate history embracing a period of poor financing, faulty management, bad investments, unlucky operations, receivership and forced sale. Upon reorganization it is essential that some properly constituted administrative body should carefully scrutinize all the details by which it is purposed to place the defunct corporation on a proper financial basis, and it is quite natural that the best criterion for guidance in a reorganization is a valuation

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of the corporation's tangible property. In consolidations, however, the public itself is often the beneficiary, and the Legislature, in recognizing the many purposes for which consolidation may be legitimate, quite wisely refrained from making requirements to which it would be difficult to conform in effecting a consolidation. It is only fair to assume that, had the Legislature deemed it proper to require valuations to be made upon a consolidation of utility properties, it would have distinctly said so, and would not have left to the commission the determination of the rate cases wherein such a valuation might be necessary to protect the rights of the public.

INVESTOR IS FULLY ADVISED WITHOUT VALUATION

In regard to the assertion that a valuation should be required in the present consolidation case and that the total securities authorized should not exceed the value determined, Commissioner Shaw emphasizes the fact that no benefit would be derived from a valuation of the properties, even if the technical provisions of the law were different. The recital required to be placed on the new stock in effect advises all prospective purchasers that the stamped stock is issued as a result of a consolidation, that the total amount of consolidated stock is equal to the sum of the outstanding stocks of the underlying companies and that no valuation has been determined by the commission. To his mind, therefore, ample notice regarding the conditions under which the new stock has been issued is given to all prospective purchasers. In other words, the investor is advised fully that the new stock issue is no more valuable and has no more property behind it than the combined stocks of the underlying companies which it replaces, for conditions respecting the property are not changed by the decision of the commission. Had the commission refused to approve the new stock issue and thereby prevented the consolidation, the same amount of stock would be outstanding and subject to sale. Under the conditions of consolidation as stated, however, the investing public is really protected to a greater extent than formerly, for it is now advised by a recital in which the commission specifically calls attention to the fact that no valuation has been made of a property in which it (the investing public) is buying a shareholder's interest. Such a notice should tend to put a purchaser upon his guard, and to cause him to make the necessary investigation to satisfy himself as to the real value and future possibilities of the stock in which he contemplates investing his money.

RECITAL ON CERTIFICATES WILL NOT BE OBJECTIONABLE

As to printing special conditions upon the stock of the consolidated company and thereby making possible the future establishing of two styles of stock which in reality represent identical property interests, Commissioner Shaw confesses that a situation might arise wherein stock issued subsequent to the consolidation would not be stamped with the specific provision before noted. He doubts, however, that such a situation would be serious. The same situation is prevalent in almost all issues of securities which are approved by the commission for extensions and betterments. If a mixture of stock might be objectionable, it certainly could not be more objectionable than having outstanding, and in the hands of the public, stock issued prior to the creation and without the approval of the commission, and stock issued subsequently to the creation of the commission and bearing its general stamp of approval. It may be that many persons would believe that the commission's stamp of approval adds value to the one class of stock for the reason that the commission requires that property or money to the par value of the stock be behind the issue, but the commission's approval adds no value above whatever the combined intrinsic value of all the securities may be.

USELESSNESS OF VALUATIONS IN ALL SECURITY CASES

If it should be deemed necessary to cause a valuation of the property to be made whenever consolidations are contemplated and to disapprove consolidations unless such a valuation is made, Commissioner Shaw believes that the same policy should be pursued whenever the commission authorizes a security issue for any purpose whatsoever in connection with an existing utility. In such an event, it would naturally follow that, should it develop in a given case that the outstanding securities (par value) are in excess of the value of property, no funds could be raised for additions and betterments. If the commission should create such a condition, the result doubtlessly would be that the public would receive inadequate service and higher rates, and the utility in many instances would be forced into receivership.

And even if a valuation should be made in all security issuance cases, Commissioner Shaw seriously doubts that either the present owners of stock or the general public would be greatly benefited. Possibly future purchasers of stock would benefit by the knowledge of actual tangible values of property behind the stock issuance. But after all, he says, the value of stock either to the present stockholders or to the future investors is established and determined by the net earnings which the company is able to make, by the confidence in the company's officials, by the wisdom of its management and by its prospects. He cannot believe, therefore, that the Illinois public utilities law contemplates the impractical and endless task of making valuations of every utility property against which securities are to be issued. An accurate appraisal and a proper valuation necessitate expenditures of a magnitude requiring mature consideration before inflicting them upon the taxpayers of the State.

RELATION OF OLD AND NEW SECURITIES

Commissioner Shaw then takes up the question of securities issued under the laws of the State prior to the enactment of the public utilities law, and of securities now approved by the commission. To show how these are related he cites the following example:

"Assume a quite common case of a company which was capitalized some years ago at $100,000, which has installed plant and equipment to the value of $50,000 and which has issued capital stock to the full amount of $100,000. As the company grows, improvements and betterments costing another $100,000 may be installed. Meanwhile a regulatory body has been established, and this regulatory body authorizes the issuance of another $100,000 of capital stock against betterments which actually cost $100,000. Now there exists a condition wherein the total capital issue is $200,000 based on property costing $150,000 to install. The initial stock ratio, which was 50 cents on $1, in mingling with the new stock has reached a ratio of 75 cents on $1. Likewise the new stock, which bears the commission's stamp of approval, signifying to all intents and purposes that such new stock represents actual property to the par value of the stock, in mingling with the old stock also reaches a ratio of 75 cents on $1.

"Obviously, without a reorganization, the ratio of such combined stock will never reach unity, but under a continuance of regulation conditions surely will improve with time. Despite the most earnest and painstaking

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efforts of regulatory bodies, it is practically impossible to remedy in a jump such past corporation practices as have done much to necessitate the regulation of public utilities. During the transition period from a careless past to a better future, the investigating public will be misled if it assumes without inquiry that the authorization which the commission causes to be stamped on all securities issued at the present time by public utilities is a guaranty of the value of tangible property."

COMMISSION IS NOT INTENDED TO CORRECT PAST EVILS

Continuing along this line, the commissioner makes the following pointed statement concerning the jurisdiction of his regulatory body over securities issued under olden-day business ethics:

"I do not believe that it is the intent of the law that this commission should undertake to correct all the evils that grew under past unregulated conditions; or that this commission should act retroactively, so to speak, by requiring valuations of all existing utility property when allowing additional securities to cover additions and betterments in cases where previously existing outstanding securities may exceed the value of the tangible property. Should the commission adopt a policy of entering upon valuations whenever security issues are involved, it is predicted that a general financial upheaval as far as the public utilities of the State of Illinois are concerned would result therefrom. In the final analysis the public would be the loser.

"The law as written intends that this commission should see that new security issues of existing utilities represent actual property, and the law does not contemplate that this commission should concern itself with past issues for the purpose of correcting the evils of former years. This commission, by insisting that new securities be represented by property, in a reasonable length of time will secure an adjustment in the relation between outstanding securities and the value of property. In the case of an entirely new concern, however, I am firmly of the opinion that $1 of securities should stand for $1 of actual property."

NOT EVEN SECURITIES OF NEW COMPANIES ARE GUARANTEED

Desiring, however, to reiterate the position of the commission in regard to guaranteeing even the securities of new companies, Commissioner Shaw adds:

"Even in a case where a public utility is created and organized at this time under authority of this commission, and where all securities issued by the utility are approved by this commission with the understanding that every $1 of such securities represents an equal amount of either property or money, this commission can not state to the investing public that the investment is a good one. The commission in no manner can be held responsible for the management and future development of the property, nor may it essay to state whether or not the venture will prove a success. The commission can not, and should not, pass upon the many elements which may have a great bearing upon the earnings that reflect the value of stocks. The stockholders carry the risk. The bonds are an indebtedness which takes preference as to both principal and interest. That portion of the property and of the earnings which remains after meeting preferential obligations to the bondholders, accrues to the credit of the stockholders. In other words, after interest upon all bonded and floating indebtedness and all proper fixed charges have been met, the remainder goes to the stockholders. This residue, quite naturally, is affected by the character of the year's business, by the management, by local surroundings, by the general trend of finance and markets, and by many other possible uncertainties—all factors not ascertainable by a commission.

"In my opinion, the public should be advised as fully as possible that an approval by this commission of securities of any character whatsoever is not a guaranty on the part of the State as to the value of tangible property, as to an annual rate-of-return or as to the success of a utility's management. Moreover, it is to be impressed upon the public that past securities are neither validated nor approved, and that necessarily all future securities must be affected by existing outstanding securities. The public should be advised that it must exercise the same business judgment in dealing in public utility securities that it exercises in dealing in securities covering any other character of business. When this commission advises the public as fully as possible and when it has complied with the substance of the law, it has performed its full duty. I believe it would be a very unfortunate condition of affairs should the public ever believe that an approval of securities by any governmental agency carries with it or implies a broad guaranty of future earnings."

New Haven Electrification Situation Discussed

Specifications for Sixty More Electric Locomotives Are Being Prepared

AT an investigation of the passenger train-service of the New York, New Haven & Hartford Railroad held by the Massachusetts Public Service Commission at Boston, Oct. 17, Howard Elliott, president of the company, stated that motive-power specifications now being drawn include sixty additional electric locomotives for passenger, freight and switching service in the zone between New York and New Haven. The installation of these units will release steam equipment for other parts of the system, indirectly improving service at present handicapped by lack of tractive power. Mr. Elliott said that until the company gets upon its feet again financially, nothing can be done in the direction of electrification at Boston, but that this problem would naturally be taken up in the event of the road's reaching a financial basis exhibiting funds applicable to such a development. The company is endeavoring at present to utilize its existing electrical equipment and electrified zone to the utmost advantage and is not considering extending the electric service beyond New Haven. Speaking of the need of additional income, Mr. Elliott said that this applies to the electric railways controlled by the company as well as to the steam lines, especially in view of the rising costs of materials and labor.

A. R. Whaley, vice-president, said that the New Haven is at present provided with overhead equipment for electric train service from New York City to New Haven, but that seventy additional electric locomotives will be required to handle the entire passenger and freight traffic electrically throughout the zone. All the passenger service between New York and Stamford is handled electrically, and as many trains between Stamford and New Haven with such portion of the freight from the Harlem River to New Haven as the number of electric locomotives available permits. A total of 170 electric locomotives is needed to handle all the passenger and freight service of the New York-New Haven zone electrically.

The electric locomotives cost at least $50,000 a piece at present. The cost of steam locomotives has risen in some instances from $28.000 to $42,000 in the past three years, according to Mr. Elliott. The company cannot as yet say when it will have 100 per cent electrical operation in the New York-New Haven zone.

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Solving the Labor Problem in Philadelphia

There Are Few Instances of Such a Remarkable Change in the Sentiments of Employees Toward Employer as That Furnished by the Philadelphia Rapid Transit Company—In Five Years the Company Has Built Up a Spirit of Concord and Loyalty to the Point Where a Strike Was Impossible of Success

By THOMAS CONWAY, Jr., Ph. D.
Professor of Finance, Wharton School of Finance and Commerce, University of Pennsylvania, Philadelphia, Pa.

THE details of the abortive Philadelphia strike of three months ago were given in the columns of the ELECTRIC RAILWAY JOURNAL of Aug. 12, page 288. The officials of the Amalgamated Association of Street & Electric Railway Employees of America issued a strike order effective Aug. 7. In response to this order, only 425 out of the 6200 motormen and conductors employed by the company responded. As soon as information was received that a strike was impending, the officials of the company sent out a circular letter to those men who had left its employ in good standing, stating that applications would be received from these men for re-entry into the service. This step was an exception to the rule of the company that a man who leaves its employ, no matter for what reason, will not be taken back. Impressed by the large number of men who desired to return, but who had not been able to do so because of this rule, the company felt that a considerable number of experienced motormen and conductors, familiar with operating conditions in Philadelphia, could be secured by this method. More than 2000 men applied, from which number 600 were selected to take the places of the strikers. The strike was a complete failure. Not a single trip was lost. The places of the strikers have been permanently filled by former employees.

Philadelphia has been the scene of a number of serious street railway strikes. During 1909 and 1910, the two years preceding the advent of the present management, there was a total of sixty-five days of declared strike, resulting in a loss of over $500,000 in wages to the men, the loss of the larger portion of the normal earnings for these days to the company, and extraordinary expenses exceeding $400,000. In addition, the city of Philadelphia was put to a heavy expense for extra police service. These strikes were symptomatic of a condition of great unrest among the employees. A record of the comparative number of conductors and motormen leaving the service for a number of years prior to the change in management follows:

	Year Ending May 31				
	1906	1907	1908	1909	1910
Resigned	3,226	3,922	2,853	1,494	3,787
Discharged	1,278	1,374	2,038	1,075	2,376
Deceased	*23	45	25	27	45
	4,527	5,341	4,916	2,596	6,208

*Includes deaths occurring between Jan. 1 and May 31, 1906, only. No record kept prior to Jan. 1, 1906.

In the year 1909-1910 the labor turn-over exceeded 85 per cent of the trainmen. Under such conditions, the creation of proper relations between the men and the company was impossible. It should be added, in passing, that these statistics do not take into consideration any of the men leaving in either strike. The large number of men who resigned was indicative of the general attitude which labor had to employment with the company. It was regarded as a makeshift—something to which men turned in the absence of a better opening and which they gave up as soon as employment in other lines could be secured. Few men looked upon it as a permanent calling. This was doubtless due in part to the large number of discharges, which created a spirit of uneasiness among the men.

ADVENT OF THE STOTESBURY MANAGEMENT

As the result of a number of conditions, of which strikes and labor difficulties were an important element, the financial affairs of the Philadelphia Rapid Transit Company reached a serious pass in the fall of 1910. Interests representing a majority of the stock of the company decided that the situation demanded heroic action, and an invitation was extended to E. T. Stotesbury, of the firm of Drexel & Company, to take over the management of the property. After short negotiations, in which Mr. Stotesbury outlined the terms under which he would assume responsibility for the affairs of the company, a plan was evolved by which the desired end was achieved. A majority of the stock was placed in a voting trust for a period of five years, Mr. Stotesbury naming the voting trustees. At the same time a sufficient number of vacancies in the board of directors was made available to insure Mr. Stotesbury's being in a position to control thereafter the policy and the business of the company. Thomas E. Mitten, then president and operating head of the Chicago City Railway Company, was prevailed upon to come to Philadelphia as chairman of the executive committee. A well-defined program of improvement was inaugurated. This article is concerned with only one feature of the new policy, namely, the company's policy toward its employees.

THE CO-OPERATIVE PLAN

After a short investigation and the analysis of suggestions and complaints made by the men, the new management presented to its employees what has since come to be known as the "co-operative plan." The essential features of this plan are, first, the creation of a co-operative committee, composed of representatives of the men and of the company, which shall consider and pass upon all matters relating to working conditions, other than general questions of policy, and, second, the creation of a wage fund, out of which payments for wages shall be made. This plan was subsequently adopted and is still in force. It is responsible in large part for the present healthy condition of the labor situation.

The co-operative committee consists of the superin-

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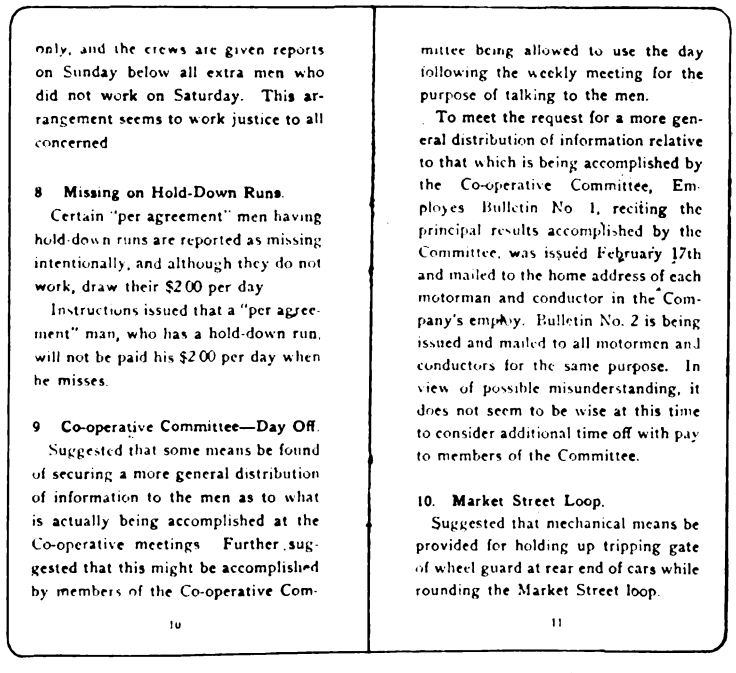
tendent of transportation, who acts as chairman, the division superintendents—at present there are fourteen divisions or car barns—and two representatives of the employees from each barn, elected by the men. The total membership in the committee, therefore, is forty-three. The election of barn representatives by motormen and conductors is conducted in the following manner: By the use of a voting machine each man writes in secret the name of a fellow employee for whom he desires to vote. The two men receiving the largest number of votes are elected. The reason for having two representatives from each barn is to give representation not only to a majority, but also to the larger part of the minority. The company, in its annual report for the year ending June 30, 1916, states that "over 97 per cent of the men able to vote have participated in the election of the present co-operative committee, the members of which represent the present choice of upwards of 73 per cent of all of the motormen and conductors."

In addition to the regular meetings of the co-operative committee the individual members of the committee are free to call upon the superintendent of transportation whenever they have matters they desire to discuss with him. At the beginning meetings were held as frequently as once a week, lasting from noon until late at night. At these meetings every committeeman is called upon to present the matters which have occurred to him or been brought to his attention by the men whom he represents. The matters thus brought up for discussion cover a wide range and relate to almost every portion of the service. In this fashion, the sources of dissatisfaction are called to the attention of the management and brought up for discussion and investigation. From the standpoint of the men, it furnishes an authoritative and direct means by which things can be brought to the attention of the company. There had always been, of course, the theoretical right of each motorman and conductor to go to the superintendent of transportation and present to him any matter connected with his employment. This right was more theoretical than practical, for the men felt that any such course of action would lead to the enmity of the division superintendents and would brand them as "kickers."



only, and the crews are given reports on Sunday below all extra men who did not work on Saturday. This arrangement seems to work justice to all concerned

8 Missing on Hold-Down Runs.

Certain "per agreement" men having hold-down runs are reported as missing intentionally, and although they do not work, draw their $2.00 per day

Instructions issued that a "per agreement" man, who has a hold-down run, will not be paid his $2.00 per day when he misses.

9 Co-operative Committee—Day Off.

Suggested that some means be found of securing a more general distribution of information to the men as to what is actually being accomplished at the Co-operative meetings. Further suggested that this might be accomplished by members of the Co-operative Committee being allowed to use the day following the weekly meeting for the purpose of talking to the men.

To meet the request for a more general distribution of information relative to that which is being accomplished by the Co-operative Committee, Employes Bulletin No. 1, reciting the principal results accomplished by the Committee, was issued February 17th and mailed to the home address of each motorman and conductor in the Company's employ. Bulletin No. 2 is being issued and mailed to all motormen and conductors for the same purpose. In view of possible misunderstanding, it does not seem to be wise at this time to consider additional time off with pay to members of the Committee.

10. Market Street Loop.

Suggested that mechanical means be provided for holding up tripping gate of wheel guard at rear end of cars while rounding the Market Street loop.

10 11

TYPICAL PAGES FROM A "CO-OPERATIVE BULLETIN" OF WHICH ONE WAS ISSUED ABOUT ONCE A MONTH UNTIL THE SUMMER OF 1914

There is also a co-operative beneficial association, which pays sick benefits of $1 per day for 100 days following the first week's illness and a death benefit of $150. The entrance fee is 50 cents, with monthly dues of 25 cents. The company contributes an amount equal to the entrance fees and dues paid in each month by the members and bears the expense of the management of the association.

In addition, the company maintains for the benefit of all employees who have been two years or over in the service, without any cost to them, an insurance benefit plan which includes a death benefit of $500, and for employees over sixty-five years of age who have been twenty-five years in the service a pension of $20 a month for the remainder of their lives. The administration of the benefit and pension plans has been in charge of M. R. Kline, president of the Co-operative Beneficial Association.

ADVANTAGES OF THE PLAN

The great advantage of the co-operative plan is that the men choose representatives who are known to them and with whom they come into daily contact. All matters of dissatisfaction are brought to the attention of these representatives, whose duty it is, if the grievance seems to be genuine, to bring it up before the co-operative committee. To the executive officials of the company many matters seem trivial which bulk large to the men who must deal with them each day. Perhaps the rest-room is not kept clean, or the roof over the passageway in a carhouse may leak, causing the men on rainy days to take an involuntary shower bath on the way to take out their cars. Time-table adjustments may be necessary to accommodate increased traffic. These are but typical instances of the questions which have come before the co-operative committee. Thus far, the committee has been a real committee and not a "kid glove" body. The committeemen do not hesitate to present forcefully matters looking to improved working conditions. The reason for having each division superintendent a member of the committee is that both sides of the matter may be heard at the same time. The committeeman presents the men's side, whereupon the chairman calls upon the division superintendent to state his view of the matter. In this way the other committeemen present hear both sides of the question. Time is saved, because frequently matters can be adjusted or decided without reference for investigation. It should be stated in passing that there is no record of a division in the vote between the men and the superintendents on a decision of the committee. Matters are threshed out until a substantial agreement is reached. Many of the matters occupying the attention of the co-operative committee might appear trivial to the outsider, but they are of real concern to the men who meet them every day. They breed constant irritation, dissatisfaction and discontent—the seed from which spring strikes and discord. The co-operative plan performs the great service of eliminating these sources of discontent before they become real grievances.

It is impossible for the operating officials of a company and the chosen representatives of its employees to sit in conference over questions such as come before the co-operative committee without creating a better mutual understanding of the position which each occupies. The

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officials learn, as they could not otherwise do, the viewpoint and thoughts of the men. They see the operations of the company through the men's eyes. On the other hand, the meetings of the committee teach the men the limitations governing the operation of the system. Proposals are continually made which are impracticable for financial and other reasons. Pains have always been taken to explain to the committeeman making the suggestion why it is impracticable. In this fashion, men get a good grasp of the principles of operation which inevitably filters down to the men whom they represent. It is significant that not a single member of the co-operative committee went out at the time of the recent strike, although there is and always has been a number of committeemen who are frank in their criticism of the company. Experience has demonstrated that such critics in the course of time are unconsciously educated to see the situation from a different standpoint.

ATTITUDE TOWARD ORGANIZED LABOR

One of the questions which complicated the institution of the co-operative plan was the relationship which it was to bear to organized labor. At the time the plan was announced, two labor organizations were largely represented among the car men—the Amalgamated Association of Street & Electric Railway Employees of America, and the United Car Men's Association of America. These two organizations were antagonistic to each other. The announcement of the co-operative plan stated that:

"This management does not take a position for or against either of the organizations having membership among its motormen and conductors, but is desirous of securing a lasting peace and the earnest co-operation of its motormen and conductors, and that by the path of least resistance. If, therefore, a large majority of the motormen and conductors (say two-thirds) desire that this management deal with its motormen and conductors as an organized body, no lasting peace or unity of effort can be expected until this demand has been properly met and fairly disposed of. This management cannot, upon the other hand, so interfere with the personal liberty of any man in its employ as to arbitrarily require him to become a member of a labor organization. It can, however. in all fairness, pay from the sum representing 22 per cent of the gross passenger earnings that amount which represents the dues of all motormen and conductors in a labor organization if that be the expressed desire of the large majority.

"The desire of two-thirds of the motormen and conductors expressed by secret ballot, under conditions which insure a fair count, may in all justice be considered as binding the minority to bear their share of such a tax.

"This management has, therefore, decided that upon a proper application being made by either or both of these organizations, a vote will be taken under such regulations as will insure a fair election; this management undertaking, upon a confirmative vote of two-thirds of its motormen and conductors, to enter into an agreement with the organization receiving such vote, which agreement shall conform both in substance and detail with the plan herein outlined.

"In the event of an agreement being entered into with the men as an organization, there would be no necessity for the wearing of union badges nor of the disturbing influence of organizers or collectors of dues, for the reason that the amount representing the dues of every motorman and conductor would then be paid directly by the company to the organization.

"Under these circumstances, the frequent contention that men were dismissed because of being affiliated with organized labor would be no longer tenable, as the company would under this arrangement be paying the dues of the new men when hired as well as those now in the service."

At various times three ballots have been taken to determine whether the company should deal with one or the other of the labor organizations. In no case have two-thirds of those voting indicated a preference for either of the labor organizations. The company has therefore dealt directly with the men without the intermediation of either organization. At the present time it is believed that only a small proportion of the men are affiliated with either union, although no definite information is available. The company has always taken the position that it makes absolutely no difference to it whether a man does or does not belong to a labor union.

It is essential, in order to maintain discipline, that the management of the company reserve the right of discharge and the final determination of all questions affecting discipline, but through his co-operative committeeman any man who feels that an injustice has been done in his case is entitled to a review of the facts. In case the employee so desires, one or both of the barn committeemen is privileged to accompany him on a visit to the superintendent of transportation when the man presents his side of the case. The superintendent of transportation makes it a practice to investigate carefully every case appealed to him, and he has not hesitated to reinstate men or modify the punishment for offenses when it seems warranted. The early "bulletins" issued to the men detailing the workings of the co-operative plan record many instances of this character. Instead of undermining discipline, this course of action has had a very salutory effect. Arbitrary discharges were discouraged, while the confidence of the men was won by the plain intention of the new management to "play fair."

EFFECTIVE WORK OF MR. TULLEY

The effectiveness of any plan is dependent upon the type of man who executes it. The co-operative plan has been unusually successful largely because of the high character of the superintendent of transportation.

Some Things Accomplished by Present Co-operative Committee

1. Less discharges than any other barn.
2. Smaller number of men being suspended.
3. Pay of runs compares with any in system.
4. Conductors and motormen are allowed their Sunday off, both early and late, as conditions permit.

Swing men work every third Sunday instead of every other Sunday as formerly.

Show Your Approval by Electing Them August 17, 1916

LEAFLET ISSUED BY MEMBERS OF CO-OPERATIVE COMMITTEE AT LAST ELECTION (AUG. 17, 1916)

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H. G. Tulley. Mr. Tulley was brought from Chicago by Mr. Mitten after the new management assumed control and has been an efficient lieutenant in carrying out Mr. Mitten's policy. The new superintendent of transportation has enjoyed unusual experience in handling men. He served some years as an army officer, and thus acquired the ability to maintain strict discipline and at the same time get along with all sorts of men under trying conditions. His experience was still further enlarged in Chicago. When the Philadelphia property was taken over, with its menacing labor situation, Mr. Mitten decided that some unusual remedy must be applied. To meet this need he evolved and inaugurated the co-operative plan and intrusted to Mr. Tulley much of the responsibility for the successful carrying out of the details, particularly those relating to discipline and working conditions.

There is no doubt that Mr. Tulley is exceedingly popular with his men. He has earned this popularity as the result of five years' association with them. They are loyal to him because he has been fair to them. He has worked on the principle that he must preserve each employee's self-respect if he is to have a desirable working force. When a man has been reported as delinquent and comes in to see him, he remembers that this man is probably the head of a family, with a wife and dependent children; an average American citizen. Instead of browbeating the man and villifying him, he is courteous and finds that the men appreciate being dealt with upon this basis. In his five years' experience he has discharged but few men who, at the end of the interview, would not shake hands with him. In the last two years he has personally talked with every man entering the company's employ, endeavoring to instil in the new recruit at the outset the spirit governing employment with the company. He wants his men at the beginning to look upon their work as permanent employment. The company has employed about 800 men in the last two years, of whom only thirty went out on the recent strike. As Mr. Tulley phrases it, the time spent in talking to his new men has been very profitable to the company, for he has "kept the stream pure at its source."

TRANSITION TO A PERMANENT LABOR FORCE

The effectiveness of the policy of the new administration in building up a permanent working force is clearly seen by comparing the record of the men leaving the service prior to 1910, as given above, with the record since the new management assumed control:

	Year Ending May 31					
	1911	1912	1913	1914	1915	1916
Resigned	1,390	913	956	337	175	275
Discharged	1,635	855	536	334	142	117
Deceased	41	49	55	53	42	59
	3,066	1,817	1,547	724	359	451

The progressive decrease in the number of men who have been discharged is very significant. It will be remembered that in the last year preceding the advent of the new management, the total number of changes was 85 per cent of the entire platform force, while the number of discharges was 2376, or almost 50 per cent of the total number of men employed as conductors and motormen. The marked reductions which have occurred in each year since that time is the best index of the working of the co-operative plan. In the year just closing, only 117 men were discharged. In the year 1909-10, almost 3800 men voluntarily left the employ of the company. In 1914-15, the number so leaving was only 175. The increase in resignations to 275 in the last year represents the attraction of the high wages paid by the munitions factories and other industrial establishments which play an important part in Philadelphia's industrial life.

THE TWENTY-TWO-PER-CENT FUND

The second important feature of the co-operative plan provided for the establishment of a wage fund from which wages should be paid and by which increases in wages should be governed. Investigation showed that the proportion which the wages paid to motormen and conductors in the year ending June 30, 1911, bore to the gross passenger earnings of that year was 21.81 per cent. The company took the position in its co-operative plan that the men should share in the hoped for prosperity of future years, and announced that it would "commencing as of July 1, 1911, pay to its trainmen that amount which, in total, will represent twenty-two cents out of every dollar collected out of the payment of fares. . . . The introduction of larger cars and better operating methods, together with proper co-operation between the men and the management should very materially improve the operating efficiency of the company, thereby making possible an increased scale of wages." The wages paid the men in April, 1911 were as follows:

New men, 22 cents per hour.

After one year's service, 23 cents per hour.

At the present time, the new men are receiving 27 cents per hour, the scale advancing 1 cent for each year of service, so that employees who have been with the company over five years are receiving 32 cents per hour. The motormen and conductors' wages have therefore been increased about 39 per cent in the last five years.

REASONS FOR WAGE INCREASE

Inasmuch as this increase was paid out of 22 per cent of the gross earnings of the company, it is obvious that the higher wages were the result of more economical operation, or to be exact, larger revenues per car-hour. The more important factors which have enabled the company to make this increase in car-hour earnings and in wages have been:

1. Adjustment of time-tables to eliminate wasted car-hours.
2. Introduction of cars of larger seating capacity.
3. An increase in the average rate of speed.
4. Rerouting of lines so as to increase the rush-hour capacity of the tracks in the downtown district and secure the most direct movement of traffic.
5. Improvement of discipline and of operating methods, which has resulted in a marked decrease in accidents.

The last named factor is contributorily rather than directly responsible for the increase in earnings and, hence, in the wage fund. It is significant as pointing to the fact that the establishment of cordial relations between the company and the men was not achieved at the expense of discipline and efficient operation.

In many ways the company was fortunate in so far as increasing wages was concerned in being able to institute so many important improvements. The compromise forced upon the company in the 1910 strike provided for straight runs. This uneconomical method of operation resulted in a large excess of car mileage during the middle of the day and in the early morning and evening, and a deficiency of service during the traffic peaks. The new management put it up to the men that if wages were to be increased, economical operating methods must be adopted. The wastefulness of unnecessary service was demonstrated, and the men were asked to co-operate in readjusting runs in order that facilities might be made to fit traffic needs. It was provided that wherever swing runs were to

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be inaugurated, the men should be able to complete nine hours of work in fourteen hours of time. The necessary number of swing runs were introduced without serious objections from the men. It might be said, in passing, that when a new time-table is put out, it is submitted to the committeemen of the divisions affected. They are told that the company is indifferent as to whether the men shall have a nine or a ten-hour day, and, so far as possible, the new schedules will be planned to fit their convenience. The committeemen will ascertain the sentiment of the majority of the men and report the results. After schedules have been prepared upon the basis of this investigation, the men are allowed to select their runs according to seniority, the oldest men in point of service having the first choice, and so on.

The elimination of unnecessary straight runs reduced to a considerable extent the number of car-hours and hence indirectly increased the percentage of the wage fund available for each employee, because increases in the number of men were not proportionate to the increase in the volume of business handled.

The reconstruction of the time-tables has been in charge of Leon Jewell, superintendent of time-tables, who had previously had many years' experience in making schedules in Chicago. Mr. Jewell, in arranging the time-tables in Philadelphia to provide the increased car capacity during the morning and evening rush hours, has found it possible so to divide the required hours of service into runs as to meet to a remarkable degree the preferences of the men, expressed through the co-operative committeemen.

One of the most important factors in bringing about higher wages was the purchase and introduction of 1500 "near side" cars, which replaced small cars of antiquated type previously operated. Through better schedules and larger cars, the earnings per car-hour have been steadily increased.

Gradually and almost imperceptibly, the scheduled running time was quickened with the introduction of new cars. At present it is safe to say that the scheduled speed is 2 m.p.h. faster than it was when the new management assumed control. That this is not accomplished by recklessness is proved by the fact that accidents have been materially reduced.

Routing of lines was very unscientific when the new management assumed control. The existing system of routes had been criticized by the expert engineers employed by the Pennsylvania State Railroad Commission in its investigation of the company made in 1910. The old routes were relics of the horse-car days, most of them having been instituted during the competitive régime of the fifties, sixties and seventies. Using as a starting point the recommendations of the expert engineers to the State Railroad Commission and after careful study of the changes in traffic occurring since that investigation was made, the company, by a series of successive steps, rerouted the car lines in every part of the city. Routes were shortened, decreasing the time required to travel from any part of the city to the central business district, and improvements in general traffic conditions effected as the result of these changes. In this manner the earnings which a car could make in a day, and consequently the earnings per car-hour were materially increased.

CO-OPERATION FOR OPERATING EFFICIENCY

It is significant to note that the importance of the improvement in operating conditions was never lost sight of by the employees of the company. They were anxious to increase as rapidly as possible the 22 per cent wage fund. Any change which would increase that fund was a matter of great interest to them. This 22 per cent fund probably did more to bring home to the men the essential elements of partnership between the employees and management of a street railway than any other feature of the co-operative plan.

The company looks forward to even more harmonious relations with its employees in the future. The strike has automatically cut off most of the dissatisfied employees. Their places have been taken by men who have had experience with the company and who desired to return to its service. At the present time the company believes that it has a body of satisfied employees, who desire to continue the co-operative plan and believe in its efficiency.

Steam Railroad Revenues in 1916

The revenues of steam railroads in 1916 amounted to $3,508,529,950, according to statistics compiled by the Bureau of Railway News and Statistics. These figures were compiled from the monthly returns to the Interstate Commerce Commission for an average of 258,988 miles of line operated during the year ended June 30, 1916. For this year the operating expenses and taxes totaled $2,452,022,700, thus giving a net operating income of $1,056,507,250. The ratio of expenses to revenues was 65.54 per cent, and the ratio of operating expenses and taxes to revenue was 69.88 per cent.

The bureau states that in the eight years from 1907 to 1915 the revenues of the steam railroads increased only 15 per cent or less than 2 per cent a year, whereas for the single year 1915-1916 they showed an abnormal growth of nearly 18 per cent. This result was mostly due to an increase of $438,000,000 in freight receipts. Such receipts constituted 70.93 per cent of the total operating revenues, the highest in the record of American railways. As a corollary to the phenomenal increase in freight revenues, the proportion of receipts from passengers was reduced far below the average. This, however, was partly due to an actual recession in passenger revenues from the figures of 1913 and 1914.

The amount paid by the steam railroads in taxes in 1916 was 103.08 per cent more than that paid ten years ago. The net operating income amounted to barely 6.05 per cent on a net capitalization of $67,400 per mile. This is the highest percentage since 1906, the amount then being 5.74 per cent. Four times in the last ten years the return was below 5 per cent.

An Appeal for Brickbats

Don Marquis, in his column in the New York *Evening Sun*, a few evenings ago had this comment on the appeal for financial support of the men still on strike in New York:

"The striking carmen have organ grinders stationed about the streets of New York City with signs begging financial help for the strikers from the general public.

"At the same time they or their sympathizers are stoning the cars in which the general public must ride.

"It is all beautifully simple. You give the strikers a nickel and they buy a brick with it and soak you with the brick.

"Any man who isn't willing to pay a little something toward having his skull fractured must be a d—d capitalist, a grinderofthefacesofthepoor, a tightwad, an enemy of the republic and a low-life.

"If you are a gentleman and a true sympathizer with the Down Trodden you will give them a quarter so they can buy enough bricks not only to maim yourself, but to shatter your wife's cranium and cripple your little girl as well."

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Specifications and Standard Definitions

Correct and Uniform Descriptions and Specifications of All Materials and Supplies Are of Great Importance to Purchasing Departments

BY H. B. TWYFORD
Formerly Purchasing Agent Underground Electric Railways of London, Ltd.

ONE of the fundamental principles of good purchasing is the proper selection of the sources from which supplies are obtained. The importance of this phase of the work of the purchasing department was dwelt upon in the ELECTRIC RAILWAY JOURNAL of June 10, 1916.

Another matter which is of equal importance, although it does not offer so much scope for imagination and creative work on the part of the purchasing agent, is the correct and uniform specifying of all materials and supplies. In fact, with these two features thoroughly and efficiently covered the purely mechanical and physical work of the department should proceed smoothly and quickly. Moreover, more than half the battle of getting the right price is won if these two essentials are properly secured. The knowledge that the companies asked to quote are positively the best to give the right articles and service insures the competition being sound, and this, combined with the fact that the material or article is properly specified and described, gives absolute assurance that all bidders are quoting on exactly the same grade, quality, finish, size, etc.

The average buyer is commercially rather than technically trained and it is not to be assumed that a man buying a wide variety of materials can be so well informed technically as to be able to accurately specify each one of his purchases. Nevertheless, he should have some superficial knowledge of technical and mechanical subjects and this in itself must be considered a definite accomplishment. In general, the man who buys a specific grade of material in large quantities at regular intervals will not suffer from a lack of knowledge concerning the technical characteristics of that material. He will from observation, if not sheer necessity, acquire all points of information required for the satisfactory and economic purchase of the commodity.

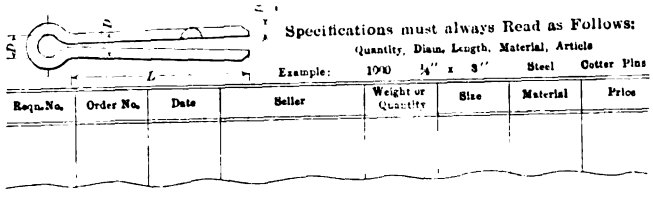
SPECIFICATIONS

The purchasing departments of railroads, public service corporations and many manufacturing plants depend on the engineering staff to furnish them with correct specifications for their heavy purchases, and also those which require description in detailed technical terms. To a large extent this means that the purchasing agent's work is a matter of specializing on price and delivery because the question of what to buy has been predetermined by exhaustive practical experiments, the results of which are contained in the standard specifications furnished to him and which he uses in canvassing the market and placing his orders. It must not be inferred from this that his work is merely clerical, for it is necessary for him to know something of the material he is buying and the antecedent manufacturing processes through which it has passed.

It is not the purpose of this article to discuss these specifications. They should be printed or typewritten in suitable quantities properly numbered and indexed and kept in the files of the purchasing department in readiness to send out with inquiries and orders.

STANDARD DEFINITIONS FOR SMALL ARTICLES AND MATERIAL

There are, however, a large number of small articles purchased which are frequently improperly described or for which there are no standard definitions. The foreman on some track work or the man in charge of an emergency or breakdown job needs something for which he applies to the storekeeper. The storekeeper may make a requisition on the purchasing agent, who places an order. It frequently happens that these three men will use varying methods or descriptions of the same article. This leads to confusion and reference back to each other, causing delay and expense. Moreover, how many persons in the purchasing department could give offhand the correct method of specifying the dimensions of a simple article such as a cotter-pin and tell whether the length should be given over all or under the head?



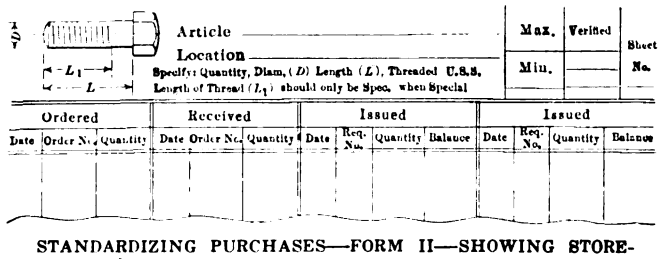
STANDARDIZING PURCHASES—FORM I—SHOWING PURCHASE-ORDER RECORD WITH SKETCH OF ARTICLE AND SPECIFICATIONS

Similar questions might be asked in regard to rivets, nuts, carbon brushes, mica washers and many other small articles.

The rectification of these conditions can be undertaken by the purchasing department and uniform descriptions of all small articles standardized and put into force throughout the organization. An excellent plan is to have sketches made which can be suitably reduced in size and printed with the specifications on the purchase-order record. An illustration (Form I) of these is presented herewith, from which it will be seen that when an article may be thus visualized, it becomes second nature always to use the same procedure in giving the dimensions or description.

Such a purchase-order record as that illustrated is valuable for reference purposes. From it can be obtained:

1. A complete index of all orders under the name of the material.
2. A list of all vendors from whom the material has been purchased.
3. A record of prices paid, the fluctuations being easily followed by glancing down the last column.



STANDARDIZING PURCHASES—FORM II—SHOWING STOREKEEPER'S STOCK RECORD WITH ILLUSTRATION OF ARTICLE

4. A compilation of the total quantity of material purchased over any period.
5. A standardization of specifications and definitions. Whenever possible a sketch should appear on the record, but with such things as sheet mica, sheet fiber, cotton waste, etc., the standard method of specifying should be printed across the top of the page, *e.g.*, "100 lb. clear North Carolina mica cut 1½ in. x 4 in.—standard for testing purposes must be submitted before order is placed."

Illustrations should also be placed on the forms used by the storekeeper in keeping his store records, because his descriptions will then harmonize with those of the purchasing department. Form II is an illustration of a storekeeper's stock record (card or loose-leaf sheet)

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showing the method of specifying hexagon-head cap screws. This, of course, should be uniform with the method of specifying shown on the purchase-order record for the same article. It may be possible also to furnish the superintendent and foremen with copies of the standard definitions, thereby securing uniformity throughout the organization.

The writer has had to handle large batches of requisitions as they came into the purchasing department daily, and many of these would have been unintelligible or would have needed explanation or better description if placed before vendors and suppliers. This meant that the purchasing department had to beat them into shape before any action could be taken either in getting quotations or in placing orders. It frequently happened that the requisition was too obscure to be correctly deciphered and had to be referred back to the maker. This was bad enough in its influence on the internal economic administration of the establishment, but in those cases where the material was needed for an emergency job it might have been very serious.

The prime considerations in specifying small articles and material are accuracy and brevity, but at the same time nothing essential should be omitted. Sometimes two or three words will suffice and the inclusion of an unnecessary word may lead to misconception and uncertainty.

TECHNICAL AND MECHANICAL TRAINING FOR PURCHASING DEPARTMENT EMPLOYEES

It is a practice with many large manufacturing corporations to give their salesmen a course in the shop, where familiarity with the manufacturing processes can be acquired as part of their education and training. It would be of great value to public service corporations if they offered facilities for all employees in their purchasing departments to become acquainted by practical experience with the requirements of their construction, operating and repair work. It would put them in close touch with the needs of the organization, which is a prime requisite in good buying.

Every purchasing agent has substitutes offered to him, and the natural tendency in such cases is to refuse to entertain any suggestions regarding these which would involve paying a higher price. A person, however, with an intimate knowledge of the use to which the material was to be put might see where a saving could be effected even if the actual price paid per unit was higher. This knowledge, too, is often valuable in the cases of emergency requisitions for repair work, when the actual material specified cannot be obtained promptly, but a substitute can be purchased for immediate delivery which will answer equally well.

ECONOMIC BENEFITS OF BETTER SERVICE

Inaccurate, inadequate or loosely worded descriptions of material are far too common. In many purchasing departments the straightening out of trouble caused by them is looked upon as a necessary evil, and as part of the routine work of the department. It has already been pointed out that where these conditions prevail the department and the organization are working at a serious economic disadvantage. An inordinate amount of time may be consumed in getting requisitions into intelligent shape. This means delay in placing orders with the contingent possibility of delaying emergency and repair work.

If correct definitions are not applied to all materials and articles as the requisitions arrive in the purchasing department, and inquiries and orders carrying an ambiguous meaning are sent out to suppliers and vendors, the trouble is sown broadcast among these, causing further losses and delays. Many business houses could testify to this result, for they come in contact with it daily. By better methods in the purchasing department a very large percentage of the trouble and loss can be prevented if it is not entirely eliminated.

Initial Resistance to Car Motion

Some Measurements of the Forces Necessary to Start Different Types of Cars Are Described in This Article

BY D. D. EWING

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IN connection with the attempts which many roads are making to reduce energy consumption and starting peaks, data on the forces which oppose car motion at the instant of starting should be of interest. The energy losses which can be traced directly to high initial train resistance are, of course, small. Since a car of high initial resistance will, other things being equal, accelerate at a lower rate than one of low initial resistance, however, certain indirect energy losses of more importance than the direct losses may result from high initial train resistance. These losses, combined with the fact that, by affecting the accelerating rate, the initial train resistance also affects the schedule speed, make the problem of investigating the initial resistance to car motion worth while.

In the ELECTRIC RAILWAY JOURNAL for Aug. 14, 1915, page 279, the writer discussed the results of some tests made on the Purdue test car. In these tests the initial friction was determined for several conditions of track by two independent methods, namely, the current-input method and the dynamometer method. As the values obtained were higher than those ordinarily assumed it was decided to continue the investigation by making tests on other cars, and within the last year tests on several different types of cars have been made. In these later tests the dynamometer method only was used.

TABLE I—DESCRIPTION OF CARS

CAR		WEIGHT		Gage of Wheels, Ft.-In.	Diameter of Wheels In.	CONDITION OF	
Name	Number	Light	Total			Wheels	Bearings
Ft. W. & N. I. T.	659	14,200	14,200	4-8½	33	Worn, rusty	Dry
Ft. W. & N. I. T.	146	23,500	23,500	4-8½	34	Worn	Well lubricated
Ft. W. & N. I. T.	227	25,500	25,500	4-8½	31	Worn	Well lubricated
Ft. W. & N. I. T.	251	40,400	40,400	4-8½	33	Fair	Well lubricated
Purdue	Test car	54,000	54,000	4-8½	33	Good	Well lubricated
Ft. W. & N. I. T.	303	70,700	70,700	4-8¾	36	Fair	Well lubricated
C. T. H. & S. E.	7,426	38,800	138,000	4-8	33	Good	Well lubricated
C. T. H. & S. E.	7,737	38,700	134,000	4-9	33	Worn	Well lubricated
C. T. H. & S. E.	7,173	38,700	137,500	4-8¾	33	Good	Well lubricated
C. T. H. & S. E.	7,218	38,800	137,500	4-8¾	33	Good	Well lubricated
L. & N.	69,569	35,600	111,200	4-8	33	Good	Well lubricated
C. T. H. & S. E.	7,589	38,800	38,800	4-8¾	33	Good	Well lubricated
Penn.	302,147	38,800	38,800	4-8½	33	Good	Well lubricated

Some of the main features of the cars tested are tabulated in Table I. The first three are single-truck motor cars, the second three, double-truck motor cars and the balance, steel coal cars selected at random from cars placed on the university power-house tracks. As indicated by the figures in the weight columns all of the motor cars and the last two coal cars were not loaded.

RESULTS OF TESTS

Table II is a summary of the test results. In the column headed, "Average Pull, Pounds," is given the av-

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erage force, applied at the drawbar, necessary to produce a perceptible movement of the car. This average force was determined by averaging the dynamometer readings for the number of observations listed in the next column. The average pounds pull per ton listed in the last column was obtained by dividing the average dynamometer reading by the weight of the car in tons. That some of the individual readings deviated from the average value is indicated by the figures for the maximum and minimum "Pounds Pull per Ton." As in the preceding tests, however, the majority of the observations gave results which were quite close to the average.

Car No. 659 had been standing in the barns for several months prior to the test. In order to limber it up, it was run back and forth over the test track for some time. Even with this preliminary limbering up its average initial train resistance was 72 lb. per ton. The second test made on the same car after the bearings had been carefully repacked and lubricated gave 67 lb. per ton. With the exception of the Purdue car all of the other motor cars were taken out of regular service for test. For the Purdue car the average pull of 1070 lb. checks very closely the average of 1060 lb. obtained with a different dynamometer the preceding year. Tests were attempted on two other motor cars, one of 40 tons weight and the other of 44 tons. Although the attempts to pull these cars were made immediately after the cars came in from a 115-mile run the forces necessary to start them were beyond the range of the dynamometer which had a capacity of 2500 lb. Apparently their initial train resistance exceeded 60 lb. per ton.

TABLE II—RESISTANCE DATA

Test Number	Car Number	Car Weight, Tons	Air Temp. Deg. Fahr.	Average Pull, Pound	Number Observations	Pounds Pull per Ton		
						Maximum	Minimum	Average
1	659	7.1	36	515	104	105	46	72
2	659	7.1	38	475	100	86	55	67
3	146	11.75	34	385	204	58	24	33
4	227	12.75	38	480	167	46	26	38
5	251	20.2	40	620	175	42	22	31
6	Test car	27.0	57	1,070	100	47	34	40
7	303	35.0	40	1,450	100	46	37	41
8	7,426	69.0	32	1,000	11	19	12	14
9	7,737	67.0	27	1,600	51	28	21	24
10	7,173	68.75	27	1,425	79	25	18	21
11	7,218	68.75	27	730	68	15	8	11
12	69,569	55.6	28	1,425	80	28	22	26
13	7,589	19.4	33	800	84	48	35	41
14	302,147	19.4	52	925	167	56	41	48

The freight cars were all moved a sufficient distance to turn the wheels over several times before the readings, which were averaged to give the results listed in the table, were taken. Pulls made after the cars had been standing a number of hours indicated that the pull necessary "to break a car loose" after it had been standing awhile was from one and one-half to two times that listed in the table. Other experiments showed that the force necessary to keep a car moving at approximately 1½ m.p.h. varied from 0.4 to 0.75 of the average given in the table. It was observed in all cases that the resistance to car motion decreased very rapidly with slight increases of speed.

The values given in the table are for straight level track. In taking the readings the pulling force was applied gradually so as to reduce the rate of acceleration and, therefore, the portion of the applied force necessary to accelerate the car mass to a minimum. While no really definite conclusions can be drawn from the above data regarding the relations between type or light weight of car and initial train resistance, the results taken as a whole seem to indicate that the values of initial train resistance usually assumed are too low.

The tests were carried out as thesis work by R. B. Nichols, R. F. Stuart and G. C. Waples. To them and to Jack Abbot, superintendent Fort Wayne & Northern Indiana Traction Company, who gave material assistance in making the tests, the writer desires to express his indebtedness.

Shop Lighting and Other Subjects Discussed by Railway Electrical Engineers

Importance of Monthly Cleanings for Lamps in Shop Lighting Costs—Data on Electrical Equipment for Steam Railroads—Electric Versus Pneumatic Tools

At the ninth annual convention of the American Railway Electrical Engineers' Association, which was held at the Hotel LaSalle, Chicago, Oct. 31-Nov. 3, a number of committee reports of interest in the electric railway field were presented, among them being one covering the subject of maintenance of illuminating equipment. This report applied especially to the illumination of railway shops, and attention was called to the fact that in modern industrial plants it is considered good practice for the cost of light range from 0.5 per cent to 1 per cent of the total wages paid to employees in the shop. This does not appear high when it is considered that only four minutes of the average workman's time costs the same amount as the illumination of his work for an eight-hour day, and that insufficient light may cause him to lose time far in excess of this amount.

MAINTENANCE OF SHOP-LIGHTING EQUIPMENT

The report submitted approximate data covering the total annual operating costs of a 1000-watt gas-filled lamp with porcelain reflector and a 750-watt quartz lamp by which it was shown that the total effective lumens of the two were 13,400 and 12,500, approximately the same in either case, while the first costs were respectively $10 and $60. The annual fixed charges, including 75 cents for cleaning, were respectively $1.71 and $8.64, while the maintenance costs per year of 4000 hours were assumed to be the same at $20 per year. Energy delivered to each lamp at 2 cents per kilowatt-hour amounted respectively to $80 and $60, making a total operating cost for the gas-filled lamp of $101.74 and for the quartz lamp of $88.64. Among these items the largest one is the cost of energy, and in general, this item averages about 75 per cent of the total annual operating cost. Hence efficiency of the unit is really of first importance.

However, with regard to the various lighting units that are competitors for railway shop lighting, the report favored the tungsten lamp on account of its reliability, low first cost, simplicity and ease of maintenance. With this lamp the influence of cleaning was stated to be of considerable importance, and a curve was submitted to show that the loss at the end of twelve months without cleaning in an average railway shop equipped with 1000-watt gas-filled lamps and porcelain reflectors approximates $22 per lamp, the loss during the last month being at the rate of $34 a year. From this it was deduced that money spent for cleaning once each month brings a return of more than 60 per cent.

The following materials were recommended for use in cleaning lamps: (1) Soap and water; (2) Gasoline or benzine; (3) Denatured alcohol; (4) Ammonia. For ordinary conditions soap and hot water will thoroughly clean lamps and reflectors, although in most railway shop buildings where smoke and oily fumes are present

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it is necessary to use some ammonia. Denatured alcohol will cut dirt much more quickly and better than gasoline and less of it is required per lamp. Hence, although alcohol costs approximately twice as much as gasoline it is cheaper in the end. One gallon of alcohol will clean ninety 750-watt units with 18-in. bowl reflectors, the process being to dampen a small piece of waste for wiping the lamp and reflector and to follow this with a handful of dry waste. Gasoline or alcohol should not be used on aluminized reflectors, for which the manufacturers recommend only soap and water or a very weak solution of ammonia. It has been found that approximately six minutes are required per unit to clean a 750-watt lamp and an 18-in. porcelain enameled steel reflector, amounting approximately to 75 cents per unit for monthly cleaning. Thus the cost of cleaning is a very small percentage of the total.

In many buildings it is a very good investment to keep the walls and ceilings white, since this increases the illumination by as much as 25 per cent. On this basis it becomes profitable to expend 0.2 per cent of the total annual wage in a shop for keeping up the white paint, assuming a benefit only to the artificial lighting. In modern shops white walls and ceiling are part of the illuminating system, and the maintenance of their color should be included as a part of the allowance for maintaining lighting equipment.

ELECTRICAL EQUIPMENT FOR RAILWAYS

Another interesting report that was presented at the convention was that of the committee on data and information, in which figures covering a large number of steam railroads of the country were submitted. It was shown that, in connection with the electric lighting of steam railroad cars, there had been a decrease during the past year in the use of lead battery cells, while there had been a remarkable increase in the use of nickel-iron storage batteries. The figures also displayed the fact that a large proportion of the axle-lighting generators used for steam railroad cars were now equipped with ball bearings, an increase from 1652 to 5417 having taken place during the year 1916. Also, in the growth of electrically-operated industrial trucks for baggage handling and in freight houses and shops there had been an increase of practically 50 per cent over the number in service in 1915.

A feature of the report was the statement that the number of direct-gasoline-driven, self-propelled cars in service on steam railroads had decreased from 197 in 1914 to 112 in 1916, and while the gas-electric cars in use in 1914 numbered thirty, the number in 1916 was only thirty-two. For electric headlights for steam locomotives the figures showed a slight decrease in use of the arc type and a very marked increase in the incandescent-lamp type, the totals for 1916 being 16,306 arc lamps and 3510 incandescent lamps, as against the 1915 totals of 16,446 and 1287.

The total number of arc lamps in use for shop and yard lighting showed a large increase, but the detailed figures displayed the fact that the number of flaming-arc and Cooper-Hewitt lamps had decreased to a marked degree. The data on incandescent lamps showed that although there had been a big increase in the number of 100-watt vacuum type Mazda lamps, there had been no increase in the larger sizes. The gas-filled type of incandescent lamp, on the other hand, showed a remarkable increase in all sizes.

Another feature of this report was the statement that a total of 192 equipments for electric-arc welding were in service on the steam railroads of the country at the present time. In fact, the widespread interest in this subject was displayed by an elaborate report on electric-arc welding that was made by a special committee. In this it was said that the application of the electric-arc welding process to repair work in locomotive shops was a very profitable proposition, and curves were shown which indicated that the cost of the electric arc was somewhat less than that of the oxy-acetylene flame, these being based on prices of 1 cent per cubic foot for acetylene, and 2 cents per cubic foot for oxygen, while electric power from a 75-volt line was assumed to cost 1 cent per kilowatt-hour.

ELECTRIC VERSUS PNEUMATIC TOOLS

A report on the application of compressed air in repair shops included an extended statement on the relative advantages of electric and pneumatic operation for portable tools. This divided portable tools into two classes, namely, rotating tools such as drills, and reciprocating tools such as riveting hammers. For the reciprocating class the electric tool in its present stage of development seems to have no advantages although there are such tools upon the market. In the case of rotating tools, however, there is a strong competition between the two types.

The pneumatic tool is considerably lighter and, consequently, is easier to handle than the electric machine, the increased weight of an electric drill over a pneumatic drill varying roughly from 10 per cent in the larger sizes to 25 per cent in the smaller. However, the electric tool has the advantage that a portable electric cord is much easier to handle than an air hose, and sometimes it develops that two men with an electric drill will accomplish more than twice as much work as one man with a pneumatic drill.

Efficient operation is the chief advantage that the electric tool has over the pneumatic tool. This is especially the case when the work varies from second to second, a portable pneumatic machine speeding up the instant when the load is removed and thus taking more power as the load is released. Even on continuous full load the efficiency of the electric drill varies from 30 per cent in the smaller sizes to as much as 80 per cent in the larger, whereas the efficiency of the pneumatic tool varies from 18 per cent to 35 per cent. The system of generation and transmission is usually more efficient in the case of electricity than in the case of air, and it should be noted that the instant when current is turned off of the electric tool the demand for energy ceases since there are, of course, no leaks.

In regard to first cost, the pneumatic tool is less expensive than the electric tool. The latter, however, is free from the annoyance that air tools often give by freezing up during the winter time. On the cost of maintenance no accurate figures were obtained by the committee, but it was stated that electric tools would not stand the abuse that could be applied to pneumatic tools. However, where the equipment was not abused, it was considered probable that the maintenance of the electric tool was considerably less costly than that of the pneumatic one.

BUSINESS MEETING

The registration was the largest in the history of the association, and there was an extensive exhibit of railway electrical supplies. The officers elected were: President, C. J. Causland, electrician Chicago Terminal Division, Pennsylvania Lines; vice-presidents, J. E. Gardner, electrical engineer Chicago, Burlington & Quincy Railroad, and L. S. Billau, assistant electrical engineer Baltimore & Ohio Railroad; secretary-treasurer, Joseph A. Andreucetti, Chicago & Northwestern Railroad. The meeting place of the next annual convention is to be Chicago at a date to be set by the executive committee.

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Mechanical Design of Electric Locomotives*

Action of High-Speed Steam and Electric Locomotives on Curves Analyzed—Simplicity in Design Vitally Important

BY A. F. BATCHELDER, SCHENECTADY, N. Y.
Member American Society of Mechanical Engineers

THE steam locomotive has what now seems to be natural characteristics to allow high-speed operation in one direction. These characteristics include a low center of gravity at the front end which is carried on the center pin of a two-axle guiding truck. This tends to prevent rolling over and has but little effect on the guiding. Also, there is a high center of gravity at the rear end which is provided with inside journal bearings, allowing the locomotive to roll and increasing the time element, which thus reduces and distributes the lateral pressure against the rail over a longer distance. This increases the vertical pressure on the rail, holding it more firmly in place. These same characteristics can be obtained in electric locomotives by the sacrifice of double-end operation.

However, the advantages gained in operating the electric locomotive in either direction are so important that means should be provided for satisfactory double-end operation. One way of doing this is by using a four-wheel guiding truck at each end of the locomotive. With the use of the extra truck, however, the importance of a high center of gravity largely disappears. The lateral pressure against the rail at the rear end now appears at the truck flanges rather than at the flanges of the driving wheels, and the high center of gravity no longer provides the same increased vertical pressure on the outer rail at the point of the maximum lateral pressure. The lateral stresses from guiding the main frame are taken at the center pins of the two guiding trucks, and the additional vertical pressure on the outer rail is dependent upon the height of their center pins rather than upon the height of the center of gravity of the main frame above the wheel hubs. Thus less advantage is left to be derived from a high center of gravity.

To demonstrate more clearly, it is well to consider what happens to a locomotive when entering a curve, which is also illustrative of its action on tangent track when oscillating from one side to the other inside of the normal clearance between gage line of track and the wheel flanges.

A locomotive with a high center of gravity which is equipped with two driving axles and a four-wheeled swivel truck will serve to illustrate the action. As the locomotive enters a curve, its tendency is to continue on in a straight line, but the flange of the leading wheel gradually comes in contact with the outer rail. This gives the guiding truck an angular motion about its outer rear wheel and exerts a lateral pressure against the center pin, thus giving the main frame an angular motion around its outer rear wheel.

The lateral pressure that tends to displace the rail at the leading wheel is the force required to slip the two inner truck wheels and to accelerate the truck around its outer rear wheel, plus one-half the force required to slip the two leading drivers and the rear inner driver and to accelerate the main frame around its rear driving wheel, plus a portion of the centrifugal force of the whole locomotive.

The lateral pressure that tends to displace the outer rail at the rear wheel of the leading truck is the amount of reaction that comes from slipping the two inner truck wheels and from the angular acceleration of the truck, plus one-half of the force required to slip the two leading drivers and the rear inner driver and to accelerate the main frame around its rear outer driving wheel, plus a portion of the centrifugal force of the whole locomotive.

The lateral pressure tending to displace the outer rail at the rear wheel of the main frame is the amount of reaction that comes from slipping the two leading drivers as well as the inner rear driver and from the angular acceleration of the main frame, plus a portion of the centrifugal force of the whole locomotive.

Because the greater part of the weight is concentrated at the drivers, and because the distance of the truck center pin from the main truck wheels is relatively great, and also because there is but one wheel to take the strain, it follows that the point of the greatest concentrated lateral pressure is at the rear outer driving wheel.

The above disregards the important factor of time in the accelerating and centrifugal forces due to the rolling. This is governed by the height of the center of gravity above the wheel hubs, which tends to reduce the lateral pressure at the rear outer driving wheel. With a high center of gravity the accelerating and centrifugal forces also tend to tip the locomotive up on the outer driving wheels, reducing the weight upon the inner wheels and lessening the force required to slip them. At the same time this action increases the adhesion between the outer rail and tie by the additional weight.

If this locomotive is operated in the opposite direction, the lateral stresses at the wheels are of the reverse order. In this case, the guiding force is applied at the driving-wheel flanges and the reaction taken through the center pin to the truck-wheel flanges. The swivel truck, now trailing, is free to oscillate from one side to the other, and it is possible that the reaction from the force of turning the main frame may be applied at the center pin at the instant when the truck-wheel flanges are tight against the inner rail, allowing the force to accelerate the truck as well as the main frame through the gage clearance to the outer rail. This will add momentum, the value of which depends upon the lateral distance through which the truck is moved, and since the vertical pressure on the rail is limited to the normal weight at the wheels, plus the vertical component of the force that is applied at the height of the center pin of the truck, the relation of the lateral pressure to the vertical pressure at the wheels of the truck may be greatly increased. A number of observations have appeared to confirm the fact that the action of the trailing truck above described is important in producing excessive lateral pressures against the rail in a symmetrically-built electric locomotive with similar trucks at both ends.

REPRODUCING THE ACTION OF HIGH CENTER-OF-GRAVITY SINGLE-END LOCOMOTIVES

It will be seen, therefore, that while the swivel truck is desirable as a guiding agent at the front end, it is not as desirable at the rear end. If it is used at the rear end of the locomotive, means must be provided to prevent oscillation of the truck and to accomplish the same results as the high center of gravity of a single-end locomotive. To accomplish these results, it is necessary to reduce the momentum effect and to reproduce the equivalent of the time-element factor, as well as the equivalent of the increase of vertical pressure on the outer rail.

The momentum effect at the truck can be reduced by providing resistance against swivelling, thus restricting the truck from oscillating from one side to the other of the track, and the amount of this resistance is

*Abstract of a paper written for presentation at the annual meeting, December, 1916, of The American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York.

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determined by the allowable force that can safely be applied to the truck when leading. To reproduce the time-element factor, lateral movement can be given to the truck center pin by any of the several methods for giving lateral movement to the leading-truck center pins on steam locomotives. However, the writer has obtained the best results with the method that is the nearest to constant pressure and dead beat, as this also tends to prevent oscillating.

To increase the vertical pressure on the outer rail, the center bearing of the truck can be made wide, thus allowing the vertical component of the lateral pressure at the center of gravity to be transferred through the bearing to the wheel. Also, with a narrow center bearing the height may be made such that the lateral pressure at that point will result in an increased vertical component independent of the height of the center of gravity.

It is the writer's opinion that the double-end locomotive, while its characteristics are different, can be designed for high speed with a degree of safety equal to that of the single-end locomotive, and this may be done regardless of the height of the center of gravity.

ADAPTABILITY TO SERVICE CONDITIONS

When the design is such that it is safe to operate at the required speeds and is proper for the curves and other service requirements, and liberal factor of safety is provided for the parts subjected to strain, there are still many other features to be considered in the mechanical details. Thus, reliability in service as affected by the mechanical part of the locomotive depends mainly upon the bearings, their lubrication, and the method of power transmission from the motors to the drivers. It is necessary, therefore, to provide effective lubrication with as few bearings and as simple driving mechanism as the design of the motors will allow.

The power efficiency as affected by the mechanical design is governed largely by the type of the traction-motor support, and the various types may be given the following order in this regard: The gearless motor mounted directly on the axle; the gearless motor mounted on a quill and driving through springs to the wheels; the single-reduction-geared motor; the single-reduction-geared motor driving through gears and side rods to the wheels; the gearless motor driving through side rods and jack shaft to the wheels.

The service time factor is dependent upon the ability of the locomotive to operate under all its service conditions and without undue strains which requires a liberal design of its wearing parts. In addition to this it depends on the simplicity of the design and the ease with which the parts can be inspected, adjusted, repaired or replaced.

The cost of maintenance of the permanent way is a very important item and can be increased or reduced by the design of the locomotive, and the lowest cost is obtained when the locomotive meets its service requirements without undue strains on track, and when the rotating parts are balanced, the weights per axle are suitable for the structures, a suitable equalizing system maintains the proper weight distribution and when provision is made to protect against flange wear.

The cost of maintenance of the locomotive is dependent upon its safety of operation, its adaptability to service conditions, its reliability, its convenience of arrangement, and the same items that enter into its service time factor. It is also governed by the same conditions that affect maintenance of the permanent way.

The first cost of a locomotive will depend largely upon the design chosen, but its importance, except at the time of purchase, becomes of little moment when taking into consideration the foregoing features. With two locomotives designed for the same service the cost of the difference in the efficiency and in the locomotive maintenance alone for one year may, when capitalized, amount to a sum representing a considerable proportion of the first cost of one of the locomotives. In fact, too much importance cannot be given to developing to the utmost the electric locomotive that is the simplest in design and is the highest in efficiency.

In conclusion it may be said that, from the present outlook, the locomotive types that lend themselves best to simplicity and low cost of maintenance are, for high-speed passenger service, the design providing for a gearless motor having an armature mounted directly on the axle, while for freight and switching service the preferred design is that with the single-reduction-geared motor mounted on and geared to the axle.

AMERICAN ASSOCIATION NEWS

Mid-Year Meeting and Dinner Committee

Secretary Burritt announces the full personnel of the committee which will have charge of the 1917 mid-year meeting and dinner at Boston. As stated last week, the date has been tentatively set for Feb. 2. The names of the members of the committee follow:

M. C. Brush, (chairman), Boston; Charles C. Peirce, Boston; Col. T. S. Williams, Brooklyn; E. L. Janes, New York; John J. Stanley, Cleveland; B. A. Hegeman, New York; Myles B. Lambert, Pittsburgh; C. Loomis Allen, Syracuse; C. R. Ellicott, New York; C. P. Dennett, Boston; H. E. Reynolds, Boston; Harlow C. Clark, New York; E. B. Burritt, New York.

Public Service Company Section

The Public Service Company Section has under way a membership contest at the end of which $20 in gold will be awarded by Martin Schreiber, engineer maintenance of way, Public Service Railway, to the man who obtains the largest number of new members between Oct. 30 and Dec. 15. The award will be made at the annual smoker to be held on Dec. 21.

The slogan of the section is "600 Members by Christmas."

Hampton Section Inaugurates Night School Work

The first regular meeting of the Newport News & Hampton Railway, Gas & Electric Company section was held in Newport News on Oct. 20. The committee on night school reported that twenty men had signified their desire to attend such a school and that the first class would be held at once. Reports were received from representatives who had attended the Atlantic City convention as to the exhibits and the company section activities at the convention.

The following officers were elected for the ensuing year: President, E. C. Kelly; vice-president, R. H. Lassiter; secretary, J. W. Howard; treasurer, W. J. Smith.

Denver Tramway Section

The thirty-eighth monthly meeting of the section was held in the company's auditorium on Oct. 19. There were thirty-five persons in attendance.

After the display of a "movie" entitled "Roping a Sweetheart," the annual election of officers for the ensuing year was conducted with the following results: President, W. H. McAloney, superintendent rolling of stock; vice-president, W. M. Casey, superintendent

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transportation; secretary-treasurer, H. G. Mundhenk, chief clerk, transportation department; director for two years, G. E. Ames, motorman East division; director for one more year, W. E. Casey, chief electrician; director ex-officio, F. W. Hild, general manager.

Following the election, a general discussion concerning the welfare of the section, together with ways and means which might be employed to add to the attractiveness of the meetings, was entered into, many good points and suggestions being offered.

COMMUNICATION

A Plea for Unification of Accounting Classifications

Oct. 28, 1916.

To the Editors:

I have read with interest the address of Homer A. Dunn before the recent convention of the American Electric Railway Accountants' Association, as well as the very able editorial in your issue of Oct. 14 and the comments of W. H. Forse, Jr., in the issue of Oct. 28.

Members of the Accountants' Association realize, more fully than anyone else, the able work done by their representatives in connection with the uniform classifications of accounts for electric railways. Any differences of opinion concerning the handling of certain accounts should not be taken as a criticism of the members of the classification committee, but should be seriously considered with a view of determining whether the suggestions are desirable from a modern accounting standpoint—not necessarily from the standpoint of electric railway accounting as heretofore practised, but from the standpoint of principles of general accounting for all utilities.

Mr. Dunn touches on some inconsistencies but does not, in his short paper, mention all differences between the electric and steam railway classifications. It is not expected that all accountants will agree with everything said by Mr. Dunn, but there are points brought out by him which should be discussed frankly and with all seriousness. A comparison of the electric railway classification adopted in 1908 with the classification adopted in 1914, shows many differences and improvements in the latter classification. Why should we not be willing to continue improving our classification by discussing all points in a free and open manner? If steam railway accountants have suceeded in handling certain items in a more correct manner than electric railway accountants, the latter should be willing to acknowledge the improvement and modify their methods accordingly. If electric railway accountants handle certain items more correctly, steam railway accountants should be willing to change their methods to conform to the better practice.

Steam railway accountants, I regret to say, have almost entirely ignored the existence of an Accountants' Association connected with the electric railway industry, notwithstanding the fact that the amount of capital invested in electric railways necessitates expert accounting, and some electric railway accountants are just as competent and able as accountants of steam railways. On the other hand, there has been a disposition on the part of some electric railway accountants, as soon as steam railway methods are suggested, to make objection to their adoption, apparently for the reason that the method is a steam railway method and was not originated by electric railways. I do not say that this is the case in all instances, but I have noticed this disposition a number of times.

It is understood that the Interstate Commerce Commission has desired for many years to make the steam and electric railway classifications as nearly uniform as possible, and the electrification of portions of many steam railways would seem to constitute an argument for uniformity, although it is asserted by some that the electrification is, after all, only a change in motive power. If this is granted to be the case, however, it would seem desirable that two companies operating the whole or a portion of their lines with the same motive power should keep their accounts in a uniform manner. I have never felt that a satisfactory classification for both steam and electric railways could not be devised. The large number of operating expense accounts necessary in a consolidated classification would be practically the only objection. This is not a valid one, because a number of accounts would not be used by electric railways because of the nature of their business, and a number of other accounts would not be used by steam railways. But this is a matter which depends on the wishes of the Interstate Commerce Commission and the wishes of the owners of electric and steam railways, who may or may not desire the information given them to be uniform.

A very serious question for accountants to consider, however, is the different classifications required by the various railroad and public service commissions of the several states. A number of states have adopted as standard the Interstate Commerce Classification, but others have their own views and insist upon practices which may or may not be more desirable than the Interstate methods. It would be a great advantage to all if it were possible for the American Electric Railway Accountants' Association to recommend a classification which could withstand the attacks of all accountants and prove satisfactory to all commissions.

What we accountants have to deal with is the present system of accounts, and we should all be willing to receive suggestions from every source, consider each carefully, and recommend and adopt such changes as may seem best, regardless of whether or not it necessitates a change in our former methods. The closing sentences of your editorial of Oct. 14, are so admirably expressed that I repeat them here:

"Whether the future may bring actual changes or not, however, it is vitally necessary that the members of the Accountants' Association continue to hold an open mind on the subject, and that in mutually felicitating themselves as to past accomplishments they do not neglect to consider with all seriousness the best in modern accounting, wherever developed or by whomsoever suggested. Blind worship of the past or a Pharisaic attitude of superiority would only dim the luster of past accomplishments."

"ACCOUNTANT."

Navy Yard Power Plant Inspector

The United States Civil Service Commission announces an open competitive examination for an electrical engineer to supervise the operation of all the navy-yard power plants. He should also be able to give expert advice upon, and be responsible for, the design of new projects for the economical distribution of power. Graduation with the degree of mechanical engineer or electrical engineer from a college of recognized standing and at least ten years' subsequent experience in responsible charge of a central electric power station are prerequisites for the position, which pays $12.48 per day. Applications should be filed with the commission by Nov. 14.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Convenient Gage for Cutting Rubber—Riveting and Welding Track Joints for $2.55 Each—Maintenance of Coasting Recorders—A Two-in-One Car—Recent Design of Underfeed Stoker—Other Items of Practical Interest

One Car Made from Two

At About $1,500 per Unit the United Traction Company Is Converting Pairs of Single-Truck Cars into Double-Truck Center Door Cars for Rush-Hour Service

High platform expense and greater liability of platform accidents have made the old-style car obsolete from the operating standpoint, no matter how sound its construction and equipment may be. Appreciating this fact, the United Traction Company, Albany, N. Y., has begun to convert pairs of its single-truck cars into center-door cars with modern safety and traffic accelerating features. This change has more than doubled the seating capacity per unit, thereby affording better service for the rush-hour conditions for which these cars will be used.

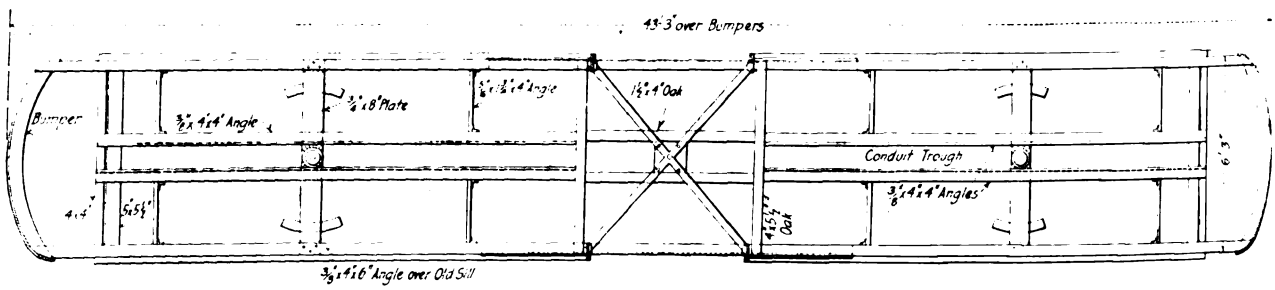
The first unit, completed during July, 1916, was made up of two 18-ft. cars. Fifty-seven 20-ft. cars and seventy-one cars 18 ft. long are also available for rebuilding. Each of these cars is of the single-truck type and has a seating capacity of twenty-four, whereas the center-entrance unit seats fifty-one on the same basis of 18 in. per passenger. All seats are longitudinal. The first of these rebuilt cars, now in use on the Pine Hills line, has the following general dimensions and weights which will be approximately the same in future cars of this type that are built.

Length	43 ft. 3 in.
Weight	35,000 lb.
Seats	51
Total passengers	100
Weight per passenger, seated load	686 lb.
Weight per passenger, total load	350 lb.

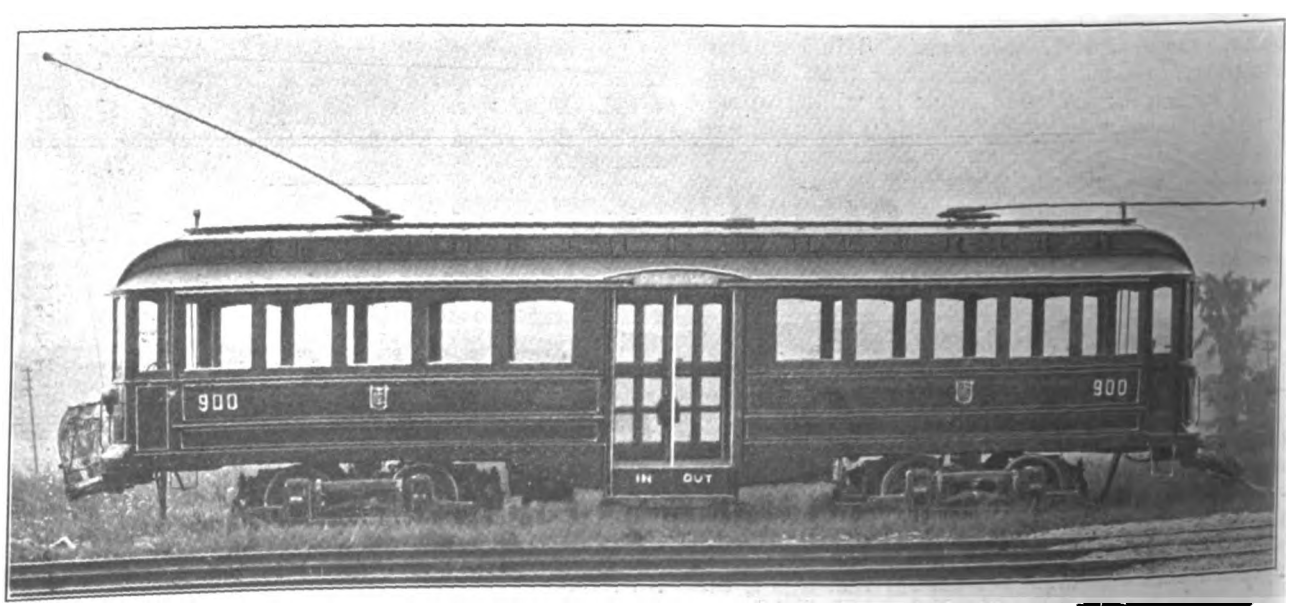
The first of these cars was constructed at a cost of $1,740. The cost of future units, however, will approximate only $1,500, the cost of the first having included patterns, experimenting with various details in the design and other items peculiar to any new construction.

THE RECONSTRUCTION

The original cars were stripped of their platforms and bulkheads, and each body was shortened one window by cutting through beyond the platform knees at the ends to be spliced. The roof, however, was not disturbed as it was left to be dovetailed over the well of the rebuilt car. While the roof and sides of the cars were salvaged, a new underframe was necessary. The principal



UNDERFRAMING OF REBUILT CAR SHOWING THE TWO SECTIONS SPLICED TOGETHER



ALBANY (N. Y.) REBUILT CAR MADE OF TWO SINGLE-TRUCK UNITS

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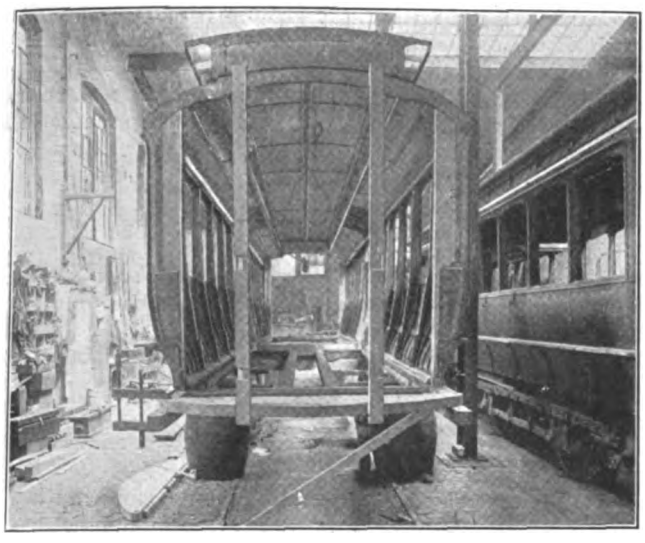
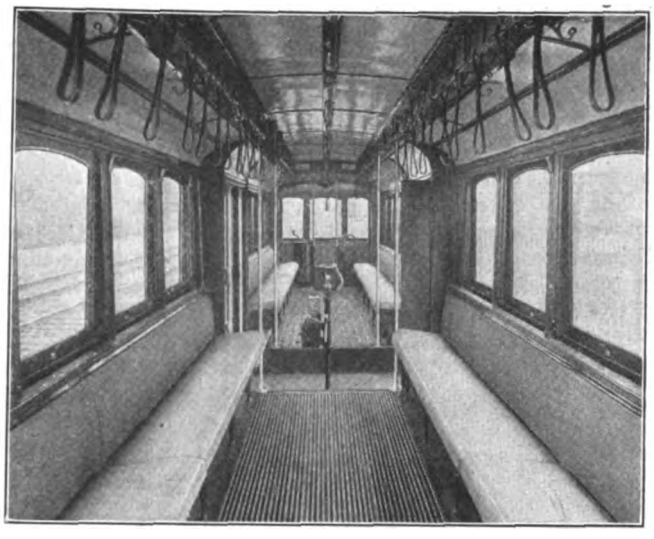


CAR BODIES READY FOR RECONSTRUCTION



INTERIOR VIEW OF CAR

BILL OF MATERIAL AND LABOR FOR REMODELLING CARS

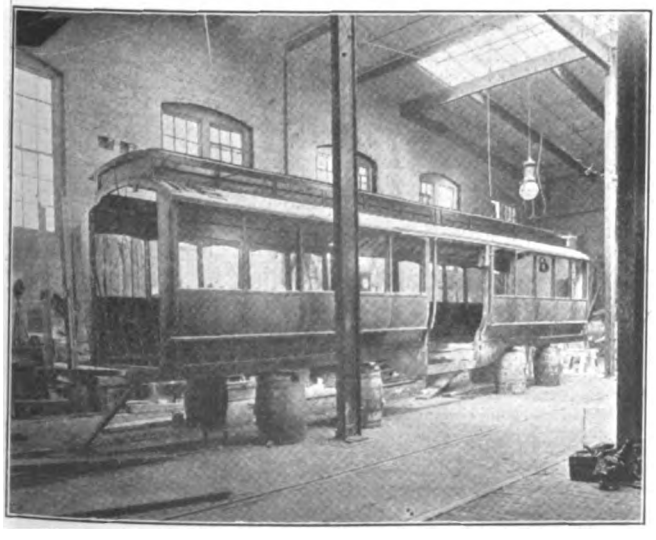
234 ft. ⅝-in. whitewood
172 ft. 1-in. oak
128 ft. 1-in. white pine
282 ft. 4-in. ash
63 ft. 2-in. ash
240 ft. 1½ in. ash
80 ft. 3-in. oak
61 ft. 1-in. ash
25 ft. 3-in. ash
262 ft. 4-in. oak
152 ft. 2-in. oak
44 ft. 1¼-in. ash
53 ft. 2-in. spruce
120 ft. 1½ in. cherry
13 ft. 1-in. cherry
688 ft. 13/16 in. yellow pine flooring
408 ft. 13/16 in. corrugated maple flooring
140 ft. 1-in. maple flooring
750 ft. ⅜-in. basswood roofing
Six ½-in. x 2-in. step irons
15 yd. 54-in. canvas
15 yd. 72-in. canvas
3 lb. tacks
4 gross 1½-in. No. 10 flat head, bright screws
3 gross 1-in. No. 14 flat head, bright screws
1 gross 1¼-in. No. 14 flat head, bright screws
1 gross 1½-in. No. 14 flat head, bright screws
1 gross ⅝-in. No. 10 flat head, bright screws
1 gross 1-in. No. 10 flat head, bright screws
1 gross 1½-in. No. 10 flathead, bright screws
1 gross 1¼-in. No. 10 oval head, brass screws
4 gross 1-in. No. 9 flat head, bright screws
1 gross 2½-in. No. 20 flat head, bright screws
1 gross 1-in. No. 10 oval head, brass screws
1 gross ¾-in. No. 9 oval head, brass screws
3 gross 1-in. No. 14 round head, blue screws
1 gross 1¼-in. No. 14 round head, blue screws
1 gross 1½ in. No. 14 round head, blue screws
24 ft. ¾-in. round iron
8 ft. ½-in. x 2-in. iron
42 ft. 1-in. black iron pipe
56 ft. ¾-in. black iron pipe
70 ft. 4-in. x 4-in. angle iron
42 ft. 1½-in. x 4-in. channel iron
100 ft. f-in. x 6-in. angle iron
56 ft. 2½-in. x 2½-in. angle iron
60 lb. 3½-in. safety treads
4 sheets ¼-in. x 19-in. x 3-ft. 6-in. sheet steel
11 sheets No. 18, 36-in. x 96-in. sheet steel
2 sheets No. 14, 24-in. x 84-in. sheet steel
16 ft. 1½-in. band iron
68 ft. ⅞-in. half-oval iron
Four brass transom catches
Six 2-in. x 2½-in. brass butts
Twelve 3-in. x 2½-in. brass butts
8 lb. ⅜-in. x 4½-in. coach screws
10 lb. 13/16-in. flat washers
12 lb. No. 6 wire nails
4 lb. 1-in. flat head, wire nails
1 lb. 1¼-in. flat head, wire nails
Seventy ⅞-in. x 5½-in. machine bolts
Sixty ⅝-in. x 5-in. machine bolts
Thirty-two ½-in. x 6½-in. machine bolts
Twenty ¾-in. x 2-in. machine bolts
Eight ⅝-in. x 1½-in. machine bolts
Eight ¾-in. x 11-in. machine bolts
Twelve ½-in. x 1½-in. machine bolts
Twelve ⅝-in. x 10½-in. machine bolts
Four ⅝-in. x 11-in. machine bolts
Thirty-two ¾-in. x 3½-in. machine bolts
Twelve 1½-in. x 8-in. machine bolts
Eight ⅝-in. x 2-in. machine bolts
Eight ¾-in. x 8-in. machine bolts
Fifty 5/16-in. x 2-in. carriage bolts
Twenty 5/16-in. x 4½-in. carriage bolts
Twelve 5/16-in. x 3-in. carriage bolts
Eight ½-in. x 7-in. carriage bolts
100 ¼-in. x 2½-in. stove bolts

Labor on Each Car

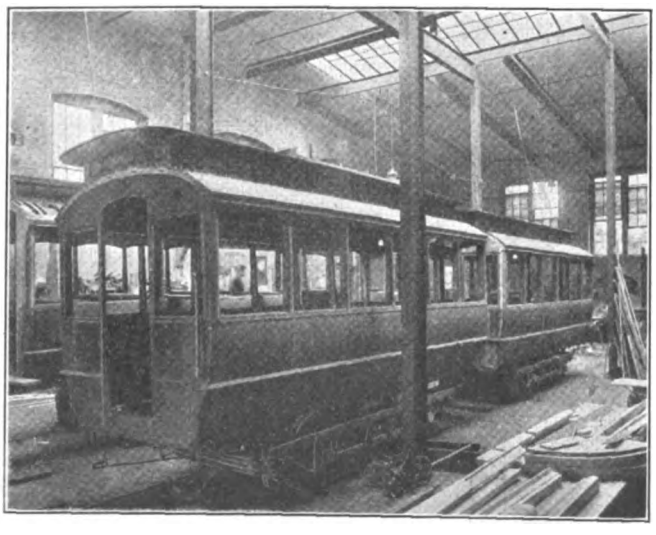
Carpenters	1,350 hours
Machinist	100 hours
Blacksmith and helpers	150 hours
	1,600 hours

members are a pair of ⅜-in. x 4-in. x 4-in. angles which form a pair of center sills running up to the sides of the well. These angles with the aid of nailing strips form a trough 11 in. wide to carry the rubber-lined canvas hose which is used for conduit. Although the monitor roof was retained, it was modernized from the ventilation standpoint by installing twelve automatic ventilators. The interior was thoroughly renovated to dispel the gloomy aspect of the old cars.

These cars are unusually narrow, and the desire to use the available trucks and motors made it impossible to adapt stepless construction. However, by using 30-in. wheels the entrance steps were kept within 15 in. The well has a riser of 11 in. The folding doors and steps



TWO CAR BODIES SPLICED TOGETHER



TWO SINGLE-TRUCK CARS WITH PLATFORMS STRIPPED OFF

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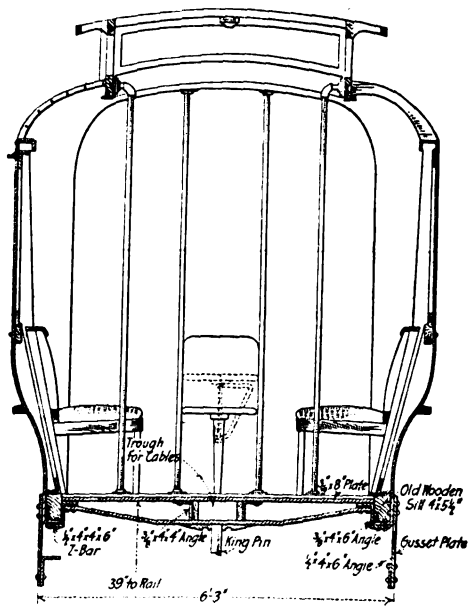
are operated in unison by hand from an unusual stanchion made by the United Traction Company. This stanchion has but one stem for the handles used to operate the doors on both sides of the car. Furthermore, the stanchion has a swiveling feature by which the Dayton fare box can be swung around to the operating side with but half a turn.

The use of original longitudinal seats for this narrow car permits high speed in passenger handling. Additional bench seats are let down alongside of the idle center doors, and there is a seat for one passenger back of the motorman's seat. The National Pneumatic Company's interlocking safety door control is to be installed



SECTION VIEW OF REBUILT CAR

on these cars at an early date. This control, through reducing standing time, has cut the running time on the Albany line where it is already in use 8 per cent.

The first unit is mounted on available Brill 27-G trucks; the four next units will be mounted on available Taylor trucks. These trucks are of 4 ft. 6 in. wheelbase. Each unit is fitted also with four Westinghouse 12-A motors and two K-35 controllers. Only the General Electric air brakes with CP-27 compressors are new.

Before going back into service the cars will be finished off neatly by painting them with the company's standard colors according to the five coat, six to eight-day system.

The accompanying illustrations show the cross-section and the underframing of the car and the different steps in its construction. The material required in this work is shown in the tables on page 981.

A Riveted and Welded Track Joint of Low Cost

The Cost of This Joint Is About $2.55 Complete for 7-in., T-Rail

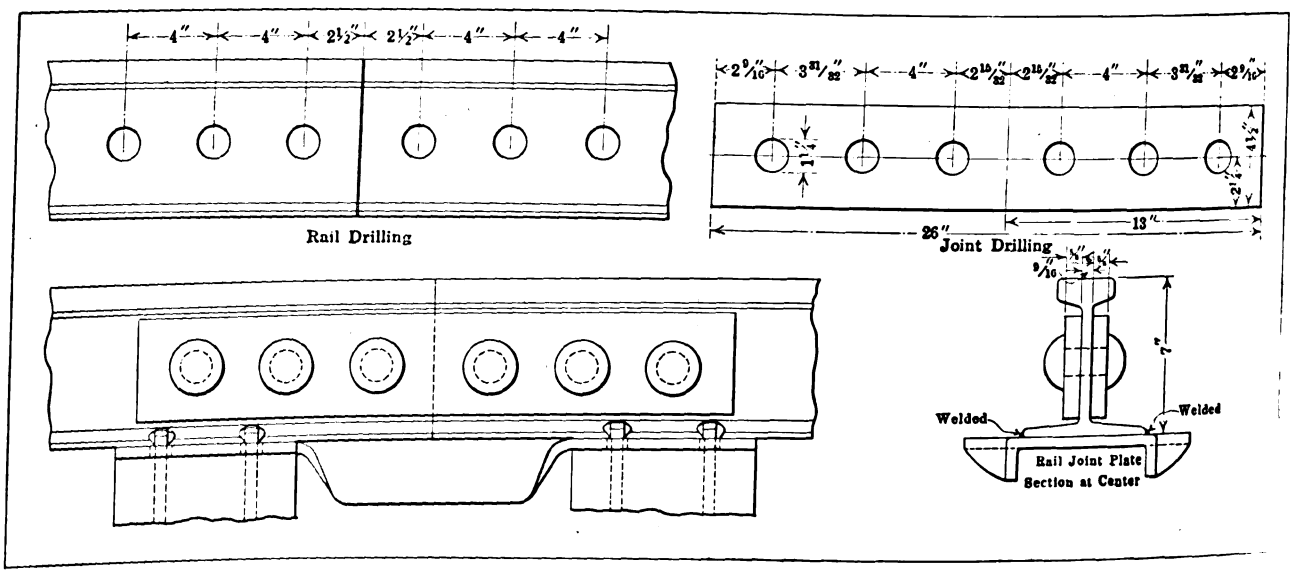
BY D. P. FALCONER
Engineer Maintenance of Way New York State Railways, Rochester Lines

For the last two years or more this company has been using a type of riveted and welded joint that has proved both smooth riding and durable, while at the same time it is quite inexpensive. Its construction is shown in the accompanying illustration.

Briefly, the joint consists of a pair of plates riveted when hot to the web of the rail, and a joint plate placed under the base of the rail and welded to it. The holes in the plates are drilled on shorter centers than those in the rail, the difference being about ⅛ in. between extreme holes. Before application the plates are heated so that the holes register with those in the rail and they are then riveted in place with 1⅛-in. rivets, six in all. In Rochester the riveting is done with a pneumatic riveter or "air gun."

The purpose of the application of the plates in a heated condition is to produce, on cooling, a powerful force drawing the ends of the rails together. If the ends are in contact before the application of the plates they are drawn together with a powerful force after the joint has cooled and this keeps the plates in tension. If there is an initial opening between the rail ends, shims are inserted to insure this tension. The plates used are of mild steel which has been found to be amply strong both for this purpose and for the rivets.

To support the joint the Abbot joint plate is used with wood ties, while with steel ties the ties themselves are utilized for this purpose. The illustration shows how the Abbot plate is employed. When the joint is cold the base of the rail is first spot welded to the plate at the ends and the middle for the pur-



ELEVATIONS AND DETAILS OF RIVETED AND WELDED JOINT USED BY NEW YORK STATE RAILWAYS, ROCHESTER LINES

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pose of preventing the setting up of internal stresses which would result from the heating of the metal if the attempt were made to join the base of the rail continuously to the joint plate all at once. After spot welding the edge of the rail base is welded to the plate from end to end of the latter. The electric arc is used for this purpose.

From our experience we find that the cost of applying this joint in lots of fifty to Lorain section 91-375 7-in. T-rail is practically as follows:

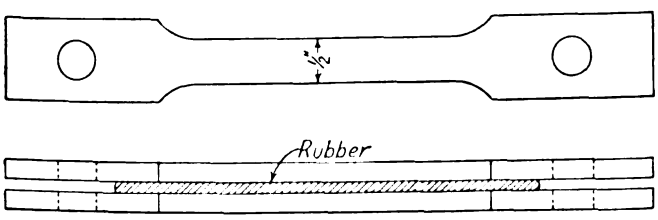
Abbot plate	$0.77
Welding steel	.10
Two bars	.60
Six rivets	.21
Rivetting	.51
Welding	.26
Moving equipment to job	.10
Total	$2.55

In addition to the advantages of this joint already enumerated a point that appeals to us is that this joint carries the wheel load across the joint with a base support, a fact which gives it smooth riding qualities. The ends of the rail are pulled together so tightly that the writer has at times had difficulty in locating the joints. The original feature of this joint by which the joint plates are held in tension were made the basis of letters patent which have been granted to E. J. Cook and the writer. The Lackawanna Steel Company showed an example of the joint at the Atlantic City convention. As the track men in attendance seemed interested in it the above description has been prepared at the suggestion of the editors of the ELECTRIC RAILWAY JOURNAL.

Easily-Made Gage for Cutting Rubber Accurately

BY G. H. MCKELWAY
Line Engineer, Brooklyn Rapid Transit Company

While many of the specifications for rubber insulated wire call for a tensile test on the rubber of perhaps 800 lb. per square inch, yet this test, as generally made, is only an approximate one. The reason for the failure to obtain accurate information as to the strength of the rubber is due not to the instruments used in making the tests, but to the difficulty in cutting the rubber to



GAGE MADE OF TWO THIN METAL STRIPS FOR CUTTING RUBBER ACCURATELY

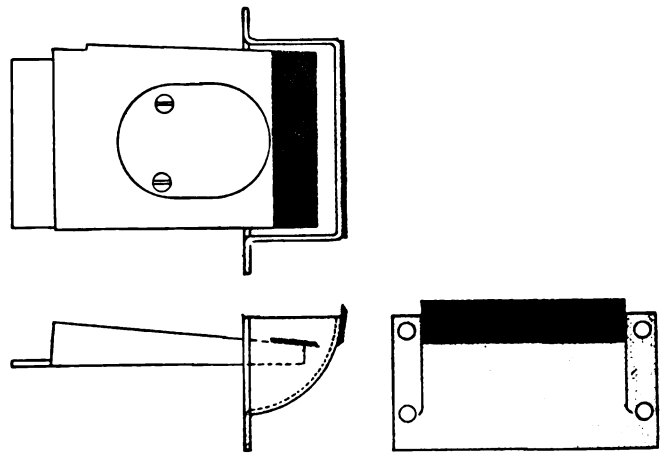
the exact width at its narrowest point. This, of course, is the point at which it almost always fails.

In order to overcome this difficulty one of the large rubber companies is now using the gage shown in the accompanying illustration. As may be seen, this is a simple and easily-made gage, consisting of but two small thin strips of metal with holes at the ends through which the bolts pass for clamping the strips tightly over the sample of rubber. As the width of the narrowest portion of the gage is just ½ in., the rubber, when placed between the two portions of the gage, can be cut easily to the exact width with a sharp knife, and it is then ready for test.

Maintaining Coasting Recorders on the Long Island Railroad

BY GEORGE H. BLACKWEDEL
Inspector Long Island Railroad, Morris Park, L. I.

As the cost of power is one of the largest items included under operating expense, the Long Island Railroad, in order to determine carefully the amount of energy saving possible with coasting recorders, placed in service ten Rico coasting recorders in 1910, twenty-five more in 1912, and an additional twenty in 1915, all of which have proved satisfactory. Of these fifty-five coasting recorders, fifty are in service in combination passenger and baggage cars, and five in the smaller equipments. As most of the trains are equipped with



PIECES OF HACKSAW BLADE INSTALLED ON THE EDGES OF THE PAPER GUARD AND PAPER CHUTE

the combination passenger and baggage cars, this number of recorders practically covers a large percentage of the mileage of the entire road.

One inspector does all the maintenance work required on the recorders in addition to his regular work, the tape renewals and the making of minor repairs being taken care of at the different inspection points. All records, percentages and clerical work are handled by the operating department.

In cases where records show a recorder to be out of order the mechanical department is notified through the department handling the records. The recorders are inspected periodically, approximately monthly. The adjustment of the magnets is checked by means of a voltmeter, an adjustable resistance and two dry cells. The magnets are set to pick up the operating lever at 1.2 volts, and to drop it at 0.4 volt. The clock mechanism is checked by means of an ordinary stop watch. Through the adjustment made on the magnets, the recorders are made to cut in at the speed of 4 m.p.h. or more. Little if any difficulty, however, is experienced in keeping the machines in adjustment.

The coasting recorders as originally received from the makers were equipped with 2-amp. fuses. It was found that these blew frequently, due to the peculiarities of the motors, and 10-amp. fuses were accordingly adopted as a standard. These seldom blow, but when they do it is usually the result of the motors having been reversed, or of trouble with them.

For a long time trouble was experienced with the paper tape sticking, and when this occurred the paper chute became clogged. As many as fifty-nine cases of this kind were reported in one month. This trouble was remedied by installing pieces of hacksaw blades, with sharp edges, on the edges of both the paper guard and the paper chute as shown in the above sketch. These

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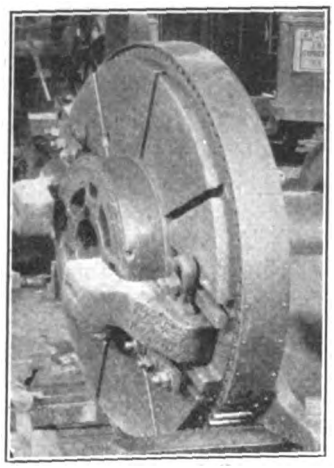
are so arranged that no matter how the paper is torn in removing it from the recorder, it will always tear clean and keep the chute from being clogged. By this method the number of paper troubles for the last few months has been reduced to four. All recorders are equipped with this improvement.

The relays are overhauled every six months, new residual pieces being fastened to the armature, the contacts filed and renewed where necessary, the air cylinders cleaned and oiled, and all contacts, terminals, etc., are examined and tightened. It is found that this inspection is ample to keep the relays in first-class condition. All defective recorders have a small copper tag, marked "out of order," inserted between the cover and the clock movement, in such manner that the stamping key cannot be inserted.

Wheel Turning Operation Improved

Time Required to Set Up the Work and Turn the Wheels Is Reduced by Use of Lugs of Special Design

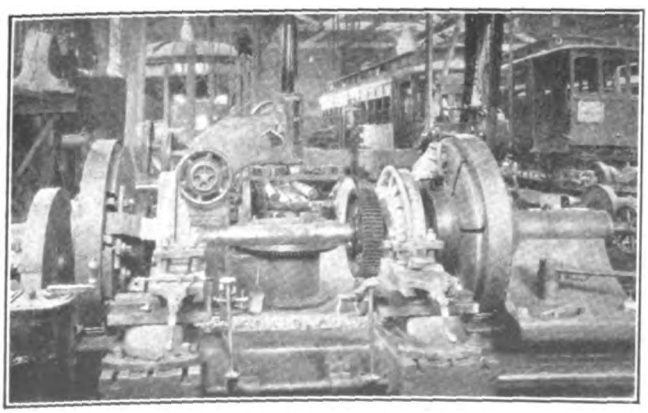
There are many different methods of holding car wheels in a lathe while they are being turned, and each method no doubt has its advantages. The accompanying illustrations show the heavy lugs which have been designed for this purpose and a pair of wheels set up in the lathe ready to be turned. The pictures were taken in the Madison Street shops of the Lehigh Valley Transit Company. Harry Branson, superintendent of equipment of the company, is responsible for the design of the lugs and the method of turning the wheels.



LATHE FACE-PLATE SHOWING LUGS FOR HOLDING WHEELS

In operation two lugs are securely bolted to each face-plate. The axle on which the wheels are mounted is set into the lathe and accurately aligned by the lathe centers. The wheels fit over the outside of the lugs to which they are fastened by ¾-in. bolts. The tightening of these bolts clamps the wheels firmly against the lugs, thus stiffening the axle and at the same time providing a means of driving the pair of wheels. The arrangement is so rigid that the two wheels can be turned at the same time and all chattering is eliminated.

Before these lugs were devised it was a difficult matter to hold the wheels in the lathe firmly while the turning operation was being performed, and it required two days to turn one and one-half pairs of wheels. By the use of the lugs six pairs of wheels can be turned out in a day.



PAIR OF WHEELS SET UP IN LATHE READY TO BE TURNED

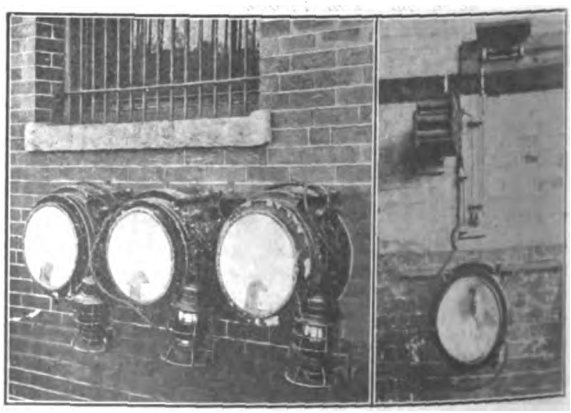
Home-Made Armature-Banding Tensioner

A home-made device which provides about 250-lb. tension in the armature-banding wire, has been constructed by the mechanical department of the Galesburg Railway, Lighting & Power Company, Galesburg, Ill. This tensioner consists of sixteen steel spools, 1 in. in diameter, mounted on bearings set on a steel bar at 1½-in. centers. As shown in the accompanying illustration, this bar is bent to form a clamp around a pipe standard. The wire is threaded through the spools in the usual manner, and thirteen spools are used to obtain 250-lb. tension in the banding wire. The supply of banding wire is contained on a reel mounted on the pipe standard above the tensioner. In order to obviate the slack wire between the reel and the tension spools, a bell cord is placed in a groove cut in the periphery of one of the sides of the reel and attached by a spring to the standard.

HOME-MADE ARMATURE-BANDING TENSIONER

Sand-Blasting and Testing Headlights

On the Portland (Me.) city and suburban lines of the Cumberland County Power & Light Company the glare of headlights is being virtually eliminated by sand-blasting the glass fronts, as shown in the accompanying illustration. The headlights are of Crouse-Hinds design, and are combination arc and incandescent units. The glass fronts are 12 in. in diameter. At the bottom of the glass a clear area of parabolic shape, about



SAND-BLASTED HEADLIGHTS ON RACK AT CARHOUSE; HEADLIGHT TEST SET INSTALLED ON WALL OF CARHOUSE

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4¼ in. high and 4½ in. wide is left to provide an unobstructed outlet for the light from the incandescent unit used in downtown service. The headlights in the illustration are supported on a 3/16-in. x 1-in. x 6-ft. strap-iron rack attached to the outside brick wall of the carhouse by strap-iron braces, the location enabling trainmen to obtain them with minimum loss of time when the late afternoon runs begin.

A permanent test circuit for electric headlights is installed in this property, as shown in the accompanying illustration. The headlights are hung on a narrow bar of strap-iron which is grounded. The positive line from the shop trolley is brought down to about 6 ft. above the floor and wired to a terminal, an inclosed fuse, snap switch and resistance being included in the feed.

Horizontal-Retort Underfeed Stoker with Novel Features

While the general principle of using horizontal-top retorts fed by horizontal rams, as is done in the new Moloch underfeed stoker, represents no innovation, this make of stoker embodies some details of construction which are rather ingenious. Among them are the use of rotary grinders parallel to each retort for disposing of the ashes and stirring up the fire; arrangements for minimizing the strains in parts subjected to excessive mechanical stresses and intense temperatures, and provisions for economically controlling the fuel feed.

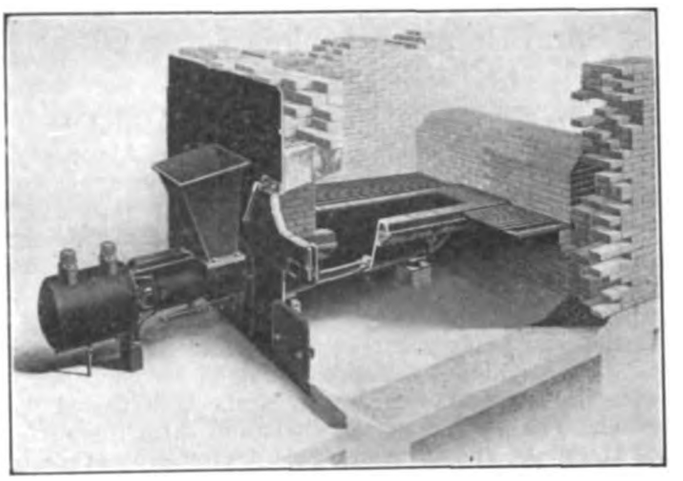
As shown by the accompanying sectional views, the stoker is made up of units, each consisting of a horizontal-top, V-shaped retort, along the upper edges of which are mounted tuyere blocks, through which air is supplied under pressure. Fuel is fed into the retort by a steam-operated ram, which is supplied with coal from a hopper attached to the ram case outside the furnace. Between each retort and along each side wall, where the products of combustion are deposited, are rotary grinders which are operated intermittently in the same manner as the fuel-feeding mechanism. The frequency of operation, as well as the relative amounts of rotation of each grinder can be varied as conditions require.

Two methods of stoker control may be employed: One is to actuate the steam-cylinder valves by steam and the other is to control them by solenoids. In either case the master control is attached either directly or indirectly to the fan prime-mover, so that fuel is fed into the furnace at a rate proportional to the air supply. When steam control of the fuel feed is employed the fan mechanism operates a pilot valve controlling the steam inlet and exhaust parts. With electrical operation the fan actuates a contactor, which in turn performs the previous-mentioned operations by means of solenoids. The master control shuts off the steam supplied to the ram cylinders after a certain portion of the piston stroke is completed, so economical steam consumption is assured. Main steam and exhaust headers are placed in a trench beneath the stoker cylinders to simplify piping and reduce radiation therefrom.

On account of the intense heat and severe expansion and contraction stresses to which the retort walls are subjected, they are made in sections, thus eliminating the necessity of replacing large parts when defects occur. The lower section of the retort is divided into a large front and rear section, and the upper part into sections 20 in. long. All parts are closely fitted and the sections firmly bolted together and well ribbed to prevent cracking. Any section which becomes cracked will remain in position for service, and can be replaced without disturbing any other section.

The retorts are supported on each side throughout their entire length to allow for expansion without injury. The air boxes which are made of cast-iron plates are attached to and hung from the retort supports, and are built in sections with removable bottoms.

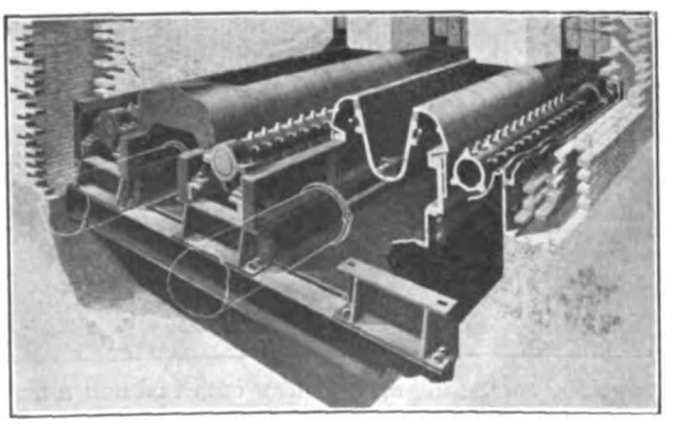
The tuyere blocks consist of heavy castings which are locked in place, the surface which is in contact with the fire being provided with fins on the under side. These serve the double purpose of absorbing heat from the



CYLINDER OPERATING FUEL RAM AND INTERIOR OF FURNACE

fire and dissipating it to the incoming air. The lower edges of the stokers are attached to an angle iron which extends across the entire furnace, thus preventing the stoker movement from bulging the boiler front, and allowing for expansion and contraction. The fire doors are equipped with cast-in-place fire-brick linings, to avoid the trouble sometimes caused by brick becoming loose and falling out.

The one-ended cylinders with steam ports cast in the walls are employed to permit the use of short and simple steam connections. By removing the cap screws fastening the cylinder to the ram case the entire coal-feeding portion of the stoker may be dismantled. Upon the cylinder being removed, the piston, stuffing box,



PERSPECTIVE SECTION RETORT AND ASH REMOVER

gland, piston rod and ram can be withdrawn and the stoker exposed for inspection or renewals. All valve bodies are interchangeable.

For small installations the Moloch stoker is made in the manually-cleaned type. With this or the self-cleaning type as many stokers can be combined under one boiler as the space and conditions require. Their installation is not confined to new boiler equipment, as no special brick work or fire arches are required. Where a basement exists for the storage of refuse or ash, the design can be readily altered to receive the stokers. Where

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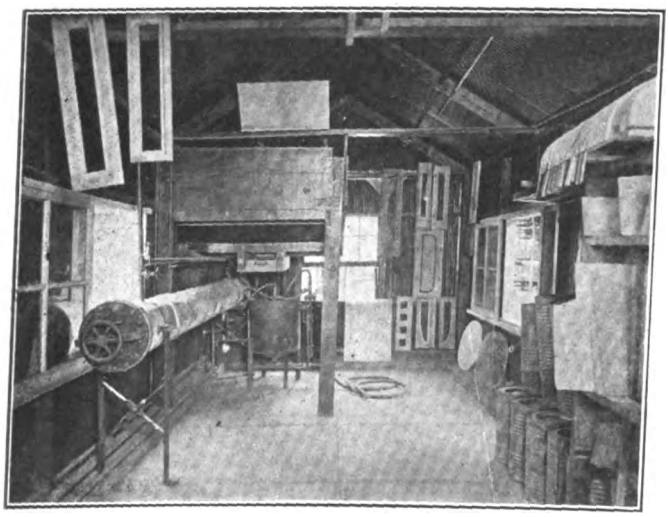
a basement or ash tunnel does not exist, a pit directly under the boiler furnace can usually be arranged. On account of the fuel bed being horizontal the boiler does not have to be set as high as with an inclined fuel bed. Where possible, however, a relatively high setting is recommended by the manufacturer.

This stoker is manufactured by the Moloch Stoker Company, Chicago, Ill.

Sand Blasting Makes Scrap Glass Usable

The portable sand blasting plant installed by the Northern Ohio Traction & Light Company, Akron, Ohio, in addition to performing its usual functions, has been found to be useful for making clear scrap glass usable. Both clear and Florentine glass are used in this company's cars, the latter serving exclusively in the deck sashes and door panels. Since both of these are of small dimensions, it frequently occurs that there is clear scrap glass which could be used at these points if it were chipped. The chipping is accomplished by applying one coat of cheap glue to the sand-blasted clear glass. The glue in drying curls and chips the surface of the glass, and to hasten this drying process electric heaters are frequently used. The margins of this chipped glass are left sanded and, in some instances, as in the case of the door panels, the lettering is sand blasted on the glass. This sand-blast equipment is also used for lettering clear glass, for such signs as "Have Your Fare Ready," "No Smoking," "Passengers Must Not Talk to Motormen," or any others which may be readily displayed on the sashes and glass door panels.

At first a home-made sand-blasting outfit was provided, but so many useful things could be accomplished by sand blasting that a special outfit was purchased from

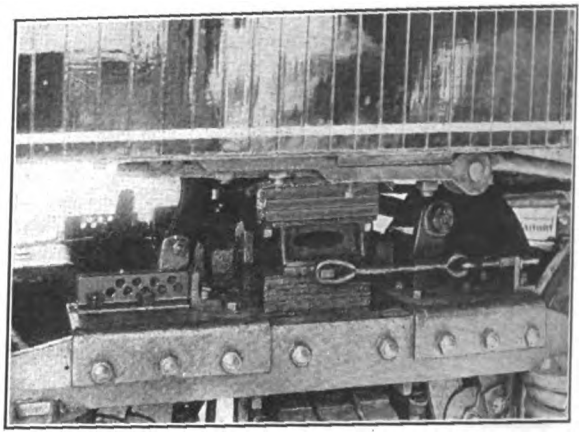


SAND-BLASTING PLANT OF NORTHERN OHIO TRACTION & LIGHT COMPANY

the American Foundry & Equipment Company. As a general proposition the sand-blasting is done in a building especially provided for that purpose, which is shown in the accompanying illustration. All work that can be brought to the sand-blasting plant is handled in this building, but when it is necessary to sand-blast cars in the paint shop the outfit is moved to that point. The operation of the sand-blasting equipment is in charge of the upholsterer, as it is only required two or three days a month. Whenever the stock of sand-blasted or Florentine glass becomes low, he replenishes it, and as occasion demands, performs other sand-blasting operations.

Overhauling of Old-Style M.C.B. Trucks

Better operation has been obtained at a reduced maintenance cost by embodying several improvements in overhauling a number of Brill-27 M. C. B. trucks used by the Northern Ohio Traction & Light Company, Akron, Ohio. One of these changes included cutting out the radius bar and substituting a bar between the upright brake levers or at a point much closer to the bolster. The brake pull-rod was extended to connect to this new bar with a clevis and 1¼-in. pin bearing. This



NORTHERN OHIO TRACTION TRUCK IMPROVEMENTS—VIEW OF TRUCK SHOWING MOTOR LEADS, DAMPENER AND CHANGED BRAKE RIGGING

type of connection was substituted for the old-style wheel and clevis attachment to the radius bar. This change permits more flexibility in rounding curves and obviates the worn pull-rod wheels. Moreover, the brake rigging is now clear of the trucks and does not become damaged when a switch is split accidentally. At the same time, this arrangement reduces the friction in these working parts of the brake rigging, eliminates the release springs and thereby obviates their maintenance. The old brake levers were used in making this change which also permitted a 300-lb. reduction in the weight of the truck. These features may be observed in the accompanying illustration.

A dampener attached to the truck and bolster of single-end cars was another improvement provided at this time. This fixes the relative position of the bolster and the truck, eliminates wear on the chafing plates and improves the riding qualities. It is also shown in the illustration. The arrangement of the motor leads were changed by bringing them out at the top No. 1 and No. 4 motors and placing them in ¾-in. rubber hose for protection against chafing and the weather. The leads from No. 2 and No. 3 motors were carried down under the bolster instead of over or through it, and they are brought up between the motor and the bolster at a point near the king bolt. This arrangement permitted the cable leads to be drawn up tightly, no slack being required because the leads are so close to the king bolt.

A standardized system of piping all the cars of the Northern Ohio Traction & Light Company greatly facilitates making repairs and thereby reduces the cost of doing this work. All cars of the same type are piped in a standard way and to a standard dimension. In case of a break in any portion of the pipe system, it is possible to cut a new section of pipe at the general shop and send it to a running repair shop anywhere on the system for replacing. Furthermore, those sections needed in replacements frequently can be carried in stock at the different carhouses.

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NEWS OF ELECTRIC RAILWAYS

SUPREME COURT UPHOLDS RAILWAYS

Illinois Body Reverses Arbitrary Commission Order Requiring Companies to Suspend Rates Increased Before Utility Law Went Into Effect

A peculiar case arising under the terms of the Illinois Public Utilities Commission law has been decided by the State Supreme Court in favor of the railways involved, the court holding that the commission had no power to suspend without investigation and formal finding rates first filed with it, even if these rates did include an increase made before the utilities law went into effect. The case arose as follows:

On Dec. 30, 1913, the Chicago & West Towns Railway and the Suburban Railroad, operating under the same management, made an increase in their rates which became effective on Dec. 31, 1913, and in January, 1914. they filed with the commission their schedules showing all the rates then in force. The public utilities act went into effect on Jan. 1, 1914. On March 27, 1914, the commission issued a general order stating that any increase in rates after July 1, 1913, were illegal unless they had been consented to by the commission, and that any utility so increasing its rates must return to the old rates and continue them in force until the commission had given its consent to the proposed changes. In the cases in point, however, the increased rates were continued in force by the two companies until October, 1914, when the commission directed them to return to the fares in effect on July 1, 1913, until the commission could fix just and reasonable rates. A petition for rehearing was overruled by the commission. The companies then appealed to the Circuit Court of Sangamon County, and the order of the commission was affirmed. The companies then prosecuted an appeal to the Supreme Court of Illinois.

The Supreme Court, in its reversal of the judgment of the Circuit Court, says that it was the first duty of the commission to determine what were reasonable and just rates to be charged passengers riding on the cars on the appellants' lines. The commission in its order in the case clearly set forth that it could not determine, under the evidence offered, what was a just and reasonable rate until further evidence was introduced, and it continued the case for further evidence without finally disposing of it. This order it had the right and power to make, but it did not have the right or power to make the order requiring the appellants to return to the schedules of rates of July 1, 1913, before or pending the determining of the issues in the case. The commission was without authority to make such an order except upon a full hearing and a finding upon the evidence that the old rate of July 1, 1913, was a just and reasonable rate.

The decision of the court on this point is based on the fact that the public utilities act did not take effect until Jan. 1, 1914, and the commission had no legal existence before this date. Therefore it had no authority to prevent the placing into effect of increased rates made previous to this date. It could, of course, proceed to determine whether or not such rates were just and reasonable and order reparation if necessary, but it had no power to nullify these rates until it was established that they were not just and reasonable. After the law became operative no change in rates could be made without good cause shown and a finding of justification by the commission, and pending this finding the proposed change could not be put into effect, but the law did not contemplate that the original schedules should not go into effect pending a hearing.

In answer to a charge of violation of Section 4 of Article II of the State constitution by the public utilities act the court holds that that provision is simply a limitation of the general powers of the Legislature, and in one particular only. This provides, in substance, that the Legislature may not grant the right to construct and operate a street railroad within a municipality without requiring the consent of the local authorities having control of the streets or highways proposed to be occupied. This section of the constitution does not, by implication or otherwise, attempt to divest the State of its paramount authority and control of streets and highways. It is equally clear that this section of the constitution does not deprive the Legislature of its power to fix rates for such companies. The power of the State to regulate the rates that may be charged by railroads and other carriers cannot be successfully questioned, and this regulation may be carried on by means of a commission.

PREPARING FOR STRAW VOTE IN DALLAS

Consolidation of Railways and Reorganization of Lighting Company Hinge on Vote to Be Taken During Week of No. 6

Only two points remain to be settled before the straw vote is taken in which the voters of the city of Dallas, Tex., are expected to settle the traction and electric lighting problems of the city. The proposed consolidation of the street railways of Dallas and the reorganization of the lighting company hinge upon the result of this straw vote. If the voters approve a valuation of $8,500 000, as asked by the street railway companies, instead of the valuation of $7,100,000 as fixed by E. W. Bemis, utility expert, the proposed consolidation is expected to be put into effect at once.

Two points remain to be settled before this straw vote is taken. They are the fixing of the valuation of the new interurban terminal building in Dallas, which is said by the owners to be worth $1,500,000, and the examination of the lease executed by the Northern Texas Traction Company, by which the consolidated street railway company, headed by J. F. Strickland and C. W. Hobson, and backed by the General Electric Company, will take over the Oak Cliff lines and operate them under one management with the lines in the city of Dallas proper. Both these matters, however, are in a fair way to being cleared up at once. The City Commission has appointed Commissioners Otto H. Lang and A. C. Cason to make a survey of the terminal building and fix its valuation. Under the proposed franchise the terminal building is to be taken over and operated by the Strickland-Hobson interests, but entry to the terminal is not to be denied any other interurban that may build into Dallas.

The terms of the lease by which the Strickland-Hobson interests will take over the Oak Cliff lines from the Northern Texas Traction Company have not been made public and will not be made known until the form of the lease has been examined by the legal department of the city and approved. The lease gives to the Strickland-Hobson interests control over all street car lines in Oak Cliff, both within and without the city limits. The Dallas-Fort Worth Interurban is not leased, but remains under the operation and control of the Northern Texas Traction Company. The Strickland-Hobson interests, however, will control the ingress and egress of the cars on this line to and from the city of Dallas.

The city legal department is drafting franchises covering the new features of the traction and lighting situation as disclosed in the agreement recently reached between Mayor Lindsley and representatives of the Strickland-Hobson interests and Stone & Webster in the conferences at New York and Boston and explained in the statement given to the public by Mayor Lindsley on his return. Several material changes in the franchises, as adopted in the city election last April, will be made. The cumulative interest feature will be removed. Under the former franchise a rate of 8 per cent on the investment was proposed for the lighting system and 7 per cent for the railways, and if in any one year either property failed to earn this maximum rate then an added return would be allowed in succeeding years at the rate of 1 per cent a year until the deficit was overcome. Under the new franchises if a property fails to earn the stipulated rate of 7 per cent in any one year it may all be made up in the next succeeding year, provided the gross earnings are large enough. The straw vote on the valuation proposition will be taken during the week beginning Nov. 6.

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REVIEW OF SPRINGFIELD STRIKE INJUNCTION

Men Reject Arbitration After It Is Advised by the Court as a Means of Disclosing Reasons for Discharge of Accused Employee

The case of the Springfield (Mo.) Traction Company against its employees to prevent them from going on strike was reviewed briefly in the ELECTRIC RAILWAY JOURNAL of Oct. 28, page 946. The developments in connection with the matter are interesting. The company originally obtained from Judge Van Valkenburgh on Sept. 27 a writ of restraint to prevent the union employees from carrying out their threat of going on strike in retaliation for what they claimed was an unjust discharge of a conductor. The company's contract with the union stipulated that the company had the right to discharge any employee for the violation of its rules and regulations. The man in question had been accused and admitted his guilt. The grievance committee also admitted that the man violated the rules. As both the discharged employee and the grievance committee admitted the violation of the rules the company refused to arbitrate. The union then threatened to call a strike. In consequence the company endeavored to prevent this by enjoining the men from striking. The original writ of restraint was heard before Judge Woodrough at Omaha, Neb. His opinion was to the effect that the guilt or innocence of the discharged conductor should be arbitrated, not because it was not an acknowledged fact, but so as to disclose to the remaining members of the union why the man was discharged.

Immediately after this decision, the company offered to arbitrate. The attorney for the union is understood to have advised the men to arbitrate, but they did not follow his advice, due, it is generally believed, to the fact that Judge Woodrough stated if there was any evidence of fraud in the conduct of the arbitration committee his court was open to either party. Moreover, the discharged employee had acknowledged his guilt and the arbitration board under Judge Woodrough's decision could only determine his guilt or innocence. The purpose of the union was in short to secure the reinstatement of the discharged employee without respect to the merits of the case. Joseph C. Colgan, of the general executive board of the Amalgamated Association, called on the management of the company shortly after its offer to arbitrate and demanded the immediate reinstatement of the discharged employee. This meant that the men expected that the company would pay the discharged employee for the entire time lost since the date of his discharge. The management of the company endeavored to go into the merits of the case with Mr. Colgan, but he is said to have made the statement that he was not present to discuss the merits of the case and left the conference after the management had refused to reinstate the discharged employee without arbitration.

The next day sixty-two of the ninety-four union employees of the company struck, the remaining thirty-two casting their lot with the company. The first cars were operated at 1 p. m. the day on which the strike was declared. The company has continued adding cars since that date, and on Oct. 24 was operating from 6 a. m. until 10 p. m. and had men to furnish 75 per cent of the regular service.

On Oct. 10, Judge Pollock of the Federal Court granted a writ of restraint preventing interference on the part of the strikers or their sympathizers with the operation of the cars of the company. This temporary writ of restraint was returnable in ten days in accordance with the Clayton Amendment to the Sherman Anti-Trust Law, and this hearing was held before Judge Van Valkenburgh of the Federal Court at Kansas City, Mo., on Oct. 20. The company's side of the case was presented by T. J. Delaney, counsel, and was supported by affidavits from seventy-five citizens of Springfield, among them lawyers, bankers, doctors, dentists, school teachers and clerks. On Oct. 23, Judge Van Valkenburgh granted a temporary writ of injunction as prayed for. This action on the part of the court has met with general approval, except from the labor element. The Judge said in his decision that it was evident that some of the members of the Police Department were in sympathy with the striking employees of the company, but that the disciplining of these men was a matter for the city authorities.

AMALGAMATED SEEKS CONTRACT IN INDIANAPOLIS

Although 80 Per Cent of Employees Have Signed New Individual Contracts Amalgamated Advances Contract of Its Own

A committee representing those employees of the Indianapolis Traction & Terminal Company who are members of the Amalgamated Association has presented to Robert I. Todd, president of the company, a form of contract which it is seeking to enter into with the company, as the award contract of the Public Service Commission under which the men have been working since the settlement of the strike in 1913 expires on Nov. 7. The majority of the car service men have already accepted the new wage scale offered by the company last June and reported in the ELECTRIC RAILWAY JOURNAL for July 15, page 114, which provided a scale of 22 cents to 30 cents an hour, an increase of approximately 8 per cent, and a continuation of the working conditions provided by the company's form of individual contract. These rates of pay become effective on Jan. 1, 1917, but all men signing the new wage agreement before that time received a bonus equal to the difference between their present rate of wages and the new scale from the date of signing the agreement to Jan. 1, 1917. About 80 per cent of the car service men have signed the new individual working contracts.

The tentative contract presented by the organized employees asks for a closed shop agreement with the Amalgamated Association, a wage scale for trainmen of 30 cents an hour the first year and 35 cents thereafter. The contract is proposed for a period to April 30, 1918, and may be renewed from year to year thereafter. It asks for the usual "three-men" board of arbitration; provides for a nine-hour day, the establishment of all regular runs as "straight earlies" and "straight lates," with twenty minutes for meal time with pay; a layover of three minutes at the end of each trip on all lines; tripper runs making less than five hours to be paid five hours' time, and runs of more than five and less than eight to be paid eight hours' time; extra men to be paid from reporting time until relieved; ten minutes to be given for reporting time; time for checking in and making out accident reports; allowance for running time from relief points to barns; carhouse seniority rights and runs opened for choice every four months; privilege of posting all association notices and collecting dues at carhouses.

The committee presenting the proposed agreement, which also covers large wage increases for shop men and power-station employees, acknowledged that it represented only a portion of the employees of the company, but refused to state its method of procedure in arriving at the basis for wage increases which it asked, or how many employees had been consulted or were represented by it. Mr. Todd advised the committee that he would take the matter under consideration and appoint a time for another meeting to discuss the demands which have been presented by the organization.

The form of individual contract in force in Indianapolis was discussed in an article in the ELECTRIC RAILWAY JOURNAL of Sept. 30, page 679, in which the form of working agreement was published in full.

ST. LOUIS COMPANY ASKING FOR A CONFERENCE

H. S. Priest, general counsel for the United Railways, St. Louis, Mo., has asked the city for a conference between committees representing the city and the company to take up the question of adjustment of the mill tax and of the duration of franchises under which the company operates. By judgment affirmed by the United States Supreme Court the company has been compelled to pay the back mill tax and there yet remains about $1,500,000 unadjudicated. Mr. Priest stated that unless adjustment of these differences is made the United Railways will be forced into receivership. In urging the conference he stated that with bonds of underlying companies maturing, lack of surplus earnings would prevent their being paid out of income and thus they could be provided for only by an issue of new bonds which under present conditions surrounding the company cannot be made to investors at any fair price to the company.

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PORTLAND APPOINTS COMMITTEE TO INVESTIGATE TRACTION COMPANY

The appointment of a special committee to investigate the plight of the Portland Railway, Light & Power Company, with reference to jitney competition, was announced on Oct. 18, by E. L. Thompson, chairman of the members' council of the Chamber of Commerce of Portland, Ore. This committee was authorized at a luncheon called by the members' council, following the speech made by C. M. Clark, chairman of the executive committee of the company, reported on page 944, of the ELECTRIC RAILWAY JOURNAL for Oct. 28.

Other evidences that the statements made by Mr. Clark have set the city to thinking is furnished by the editorial comment in the daily newspapers. The Portland *Oregonian* said in part:

"It ought not to be necessary to say one word in support of the representations of C. M. Clark, of the Portland Railway, Light & Power Company. They reflect the most elementary justice imaginable. The enterprise which he represents has made its investments in Portland on a contractual basis. It has agreed in return for certain privileges to provide certain service for the public, to pay certain taxes, to do certain paving, to submit to certain other exactions upon its revenues.

"The failure of Portland to regulate the jitneys—to tax them on the same basis as the street railway is taxed, to require them to bear a portion of paving costs as does the street railway, to collect from them a bridge toll, to compel them to give transfers, to give service where service is needed, to insist that they be bonded for protection of their patrons—this failure has been termed an exhibition of bad faith, as one of unfairness toward invested capital. It is worse. It is downright dishonesty."

The Portland *Telegram* said in part:

"C. M. Clark, chairman of the board of directors of the Portland Railway, Light & Power Company, puts the case of the jitney versus the trolley squarely before the public. There is no good reason to doubt the seriousness of the situation as Mr. Clark presents it. The conditions are not those which insure the square deal, and for that reason they should be amended. It is not right, and it does not appeal to the public sense of justice that we should play favorites in this matter of the public service. If the jitney is to serve we should make it serve as reliably as the street car. Within reasonable consideration of all the conditions involved we should insist upon a jitney service that is definite, reliable, and backed by adequate and tangible responsibility. Those are the elements of free and fair competition as between the jitney and the trolley."

DECISION IN TORONTO DEVIATION CASE

The Imperial Privy Council, sitting at London, England, has allowed the appeal of the Toronto & York Radial Railway in connection with the proposed deviation of a portion of the railway track on Yonge Street, Toronto.

Some three years ago the Toronto & York Radial Railway applied to the Ontario Railway & Municipal Board at Toronto for permission to deviate its railway from Yonge Street at Farnham Avenue, on to private right-of-way west of Yonge Street. The application was opposed by the city of Toronto, which has since obtained control of the franchise on Yonge Street, and running south from Farnham Avenue. The matter subsequently reached the High Courts of Ontario, which decided in favor of the contention of the city corporation. The company then appealed to the Imperial Privy Council, which has allowed the appeal in favor of the company.

The judgment of the Privy Council, delivered on Oct. 23, finds that the company, for the purpose of operating its line, has the franchise which it claimed in respect to Yonge Street and adjoining the lands proposed to be used. On the second point, concerning the matter of obtaining the consent of the City Council of Toronto before the Ontario Railway Board could approve the plans, the judgment says it is clear that before construction is commenced the plans setting forth the proposed location of the tracks must be approved by the committee appointed by the Council, and the location cannot subsequently be altered without the consent of the committee.

INDETERMINATE FRANCHISE VOTES

Mayor Samuel C. Irving and Commissioners Robson, Gompertz, Harms and Hoff have provided for the submission to the electors of Berkeley, Cal., of resettlement franchise amendments to the Berkeley Charter, identical in substance with those proposed to the citizens of Oakland through initiative petition.

The Board of Supervisors of the county has made provision for the placing of these amendments, both of Oakland and Berkeley, on the November ballot. Thus an expression of public opinion upon these important transportation matters will be secured at the election to be held on Nov. 7.

It is anticipated that the Boards of Freeholders who are now considering new charters for Alameda and Richmond will insert in their new organic laws provisions covering the same subject.

The railway company, under the short-term franchises which it now holds on some of the principal portions of its lines has found it impossible to procure the needed money with which to meet the demands of improved service, and more particularly of extension and street reconstruction, which are constantly presenting themselves in the growing and prosperous communities through which it operates. It is confidently believed, however, that means will be available, and that people will lend their money through the purchase of railway securities, when the proposed resettlement franchise plan has been carried out.

Under the new grants the railways will have the privilege of operating the road until such time as the community desires to purchase it; the right to purchase being reserved, and to be exercised by the communities granting the resettlement franchise only with the approval of the electors.

CINCINNATI LOOP QUESTIONS CONSIDERED

In a conference with the Rapid Transit Commission of Cincinnati, Ohio, on Oct. 25, Walter A. Draper, vice-president of the Cincinnati Traction Company, told the members that 13 per cent of the gross earnings of the company were now being paid in taxes. Mr. Draper intimated that at some time in the future the city will have to waive at least a portion of the 6 per cent on the gross earnings which it is now receiving as a franchise tax, or devise some other means of lifting the burden from the company, especially if it assumes the responsibility of the rapid transit loop.

The meeting was called to discuss plans by which the company may lease and operate the loop in connection with its own lines. Mr. Draper repeated a former statement to the effect that the company regards the leasing of the loop as an untried venture, the entire risk of which it is unwilling to assume. With the increasing cost of labor and materials, the lease may become an added burden and expense.

J. P. Orr, chairman of the transportation committee of the Business Men's Club, told the commission that he regarded the lease of the loop to the company as the logical plan of operation, but that the city should retain control of the operation so that no interurban road could be kept out of the city. Mr. Draper said that the traction company was now receiving revenue from all the interurban lines using its tracks and that this would perhaps cause another complication.

E. W. Edwards, chairman of the commission, is opposed to any plan that will increase the rate of fare. He said that a 5-cent fare should be the rule, with universal transfers. Councilman Michael Mullen suggested that the city establish a fund to enable it to share the losses of the company for the first few years of the operation of the loop. Mr. Draper replied that this might be worked out in the pending revision of the franchise ordinance.

W. L. Woodward, chairman of the transportation committee of the Federated Improvement Association, took the ground that the operation of the loop would tend to decrease the operating expenses of the company, since a large proportion of the passengers could be handled much more quickly and at less cost for labor. Chairman Edwards coincided with this view.

A. P. Birnbaum contractor, began making borings on Walnut Street on Oct. 26, to determine the nature of the subsurface for the proposed loop.

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NEW TOLEDO FRANCHISE DRAFT PRESENTED

An entirely new draft of the proposed street railway franchise for Toledo, Ohio, was presented to the Street Railway Commission and Henry L. Doherty by President Johnson Thurston and Judge Emery on Oct. 26. Judge Bailey appeared as counsel for Mr. Doherty. This and the succeeding day were spent in discussing the ordinance.

Mr. Doherty said that extreme care should be taken to guard the company from the payment of excessive damage claims. Such claims against the company amount to about $200,000 annually, and not more than 20 per cent of them were legitimate. Mr. Doherty said that in some cities 1 cent of every fare went to the settlement of damage claims. The amount for such claims in Toledo was probably not more than three-fourths of a cent. Mr. Doherty objected to the provision requiring the company to keep pavements between the tracks in smooth and uniform condition. This he feared would lay the company open to damage claims, as the slightest irregularity would be clear evidence of negligence, with the requirement standing as it was written.

Another clause provides that after thirty days' notice from the city of a violation of any part of the franchise, in case of failure to correct, the franchise was automatically forfeited. Mr. Doherty characterized this as too drastic. He also advised that the prohibition of steam cars from the tracks be eliminated. A steam motor for street cars was now being perfected and the time might come when it would be desirable to use such power on the cars in Toledo.

Mr. Doherty told the commission that his criticisms were not made for selfish reasons, but because he desired to see the plan mapped out be made successful. He said that if the plan went through the present management would have no part in the ownership, as it would be to the advantage of everybody to have Ohio people own the 6 per cent guaranteed stock of the company. Should any one now connected with the company have any part in the ownership or management, it would be for sentimental and not business reasons.

At the conference held on Oct. 30 Mr. Doherty objected to the clause providing that the city may lease the line by agreeing to purchase, and paying a rental amounting to 6 per cent on the par value of the stock and an additional 2 per cent to go toward the purchase price. Mr. Doherty said that there should be a cash payment. President Thurston suggested 15 per cent, but Mr. Doherty thought it should be 25 per cent. Member N. D. Cochran was inclined to agree with Mr. Doherty, as was Nat C. Wright. The matter was left open.

Mr. Doherty objected to a maximum 5-cent fare on the ground that extensions beyond the city limits might make a higher fare desirable there. He also suggested that the city might want to adopt the zone system at some time, as the tendency seemed to be toward the idea of making the charge in proportion to the distance. He also thought that a higher charge would probably be made for "owl" cars. They have never paid at the regular rate of fare.

On the following day the discussion related to interurban lines which use the local tracks. Representatives of the interurban roads present were D. D. Schenck, president of the Toledo & Indiana Railroad; Edward E. Burrill, general manager of the Northwestern Ohio, and F. W. Coen, general manager of the Lake Shore Electric Railway. Nothing definite was decided, but the interurban men expressed satisfaction in a measure with the arrangements now in effect with the Toledo Railways & Light Company. They now pay the company 3 cents for each passenger brought into Toledo.

Another Increase in Taxes in Ohio.—The Tax Commission of Ohio announced on Oct. 20 that the valuation of street and interurban railway properties in the State had been increased $5,445,360 over the figures used last year.

Increase for Southern Public Utilities Men.—Z. V. Taylor, president of the Southern Public Utilities Company, Charlotte, N. C., has announced an increase of 1 cent an hour in the rate of pay for all conductors and motormen in the service.

Special Election on Utility Purchase.—An ordinance has been passed at Hoquiam, Wash., providing for a special election to be held at the time of the November general election on the project to bond the city for $175,000 for purchasing or condemning the power distributing plant of the Grays Harbor Railway & Light Company or to construct a municipal system. As the measure carried an emergency clause it went into effect as soon as it passed, instead of being laid on the table subject to the referendum vote of the people for a period of thirty days.

Home Rule Measure for Washington.—An initiative measure which proposes to give incorporated municipalities the right to grant and revoke franchises and regulate vehicles within the city limits was filed recently in the office of Secretary of State I. M. Howell by W. J. Dowling of Seattle. In effect, the measure would make the State jitney bond law inoperative and place the power of regulation of the jitneys, as well as street railway systems, in the hands of the cities. The bill will go before the State Legislature at its next session. It is known as initiative measure No. 27.

Chicago Terminal Plans Do Not Include Electrification.—The proposals for the new Illinois Central terminal, which were expected to be presented in ordinance form to the Council committee on terminals on Nov. 1, do not include plans for electrifying any part of the service. Alderman Geiger, chairman of the committee, has declared that unless electrification is included he will not present the measure to the committee for consideration. He is quoted as saying: "The members of the committee favor electrification, and to submit a measure with that element eliminated would be a waste of their time."

Buffalo & Wellsville Road Abandoned.—After ten months of unsuccessful operation, the Buffalo & Wellsville Railroad, formerly the Buffalo & Susquehanna Railway, plans to discontinue its freight and passenger service. Rolling stock, rails and other equipment will be scrapped and the right-of-way sold. In the ten months the line has been operated under the new ownership, C. A. Finnegan, president, Buffalo, says it has lost $45,000. The line connects Buffalo and Wellsville by way of Blasdell, Springville and Arcade. For some time before it was sold the road was operated at a loss by receivers and there was some talk of electrifying the line in an effort to make it pay.

Extension of Three-Cent Fare Privilege.—Robert S. Sloan, president of the Manhattan & Queens Traction Corporation, Long Island City, N. Y., has advised the Chamber of Commerce of the Borough of Queens that its request to have the 3-cent service of the company extended across Diagonal Street viaduct, Long Island City, has been presented to his board of directors, who have taken favorable action thereon. The corporation has announced that immediate application will be made to the Public Service Commission for the necessary permission for the change of fare, and that it will begin service as soon as such permission is obtained and the required physical changes are made.

Why Brooklyn Transit Employees Are Loyal.—The magazine supplement of the New York *Times* for Oct. 15 contained a long illustrated article, "Why Brooklyn's Transit Employees Are Loyal," giving the reasons why the strike missionaries had no success in Brooklyn. Among other things the article reviewed the welfare work in the interest of the men, referred to from time to time in the ELECTRIC RAILWAY JOURNAL as the activities of the company in this respect have been broadened. The article was graced with portraits of William Siebert, superintendent of surface lines, and John J. Dempsey, superintendent of elevated lines, both of whom are mentioned as being in very close personal touch with the employees and with the public.

Conference on Railway Problems in Spokane Proposed.—Members of the City Council of Spokane, Wash., and officials of the Washington Water Power Company and the Spokane Traction Company will confer soon for the purpose of considering ways of eliminating the parallel railway lines in the city. It has been stated that the companies are losing $1.000 daily at the present time, owing to the duplication of lines. It is also stated that 17 per cent of the mileage covered by the systems is practically in duplicate. At the conference the City Commissioners plan

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to ask for universal transfers, and a physical connection of the competing systems. It is understood that the railways are ready to consider proposals for affiliation, but will demand stricter regulation of jitney buses and a new franchise, with stipulations with respect to street-improvement and up-keep requirements different from those contained in the present grants.

Changes in Detroit Operating Department.—A number of appointments and changes have been made in the operating department of the Detroit (Mich.) United Railway. Richard Dawson becomes superintendent of the Fourteenth and Crosstown divisions, succeeding Albert Bath, transferred to the car accountant's department. D. A. Smith, formerly assistant superintendent of the Mack, Michigan, Brush and Davison lines, succeeds Mr. Dawson as night superintendent. J. H. Hobbs and C. W. Knight, respectively carhouse foremen at Baker & Kercheval carhouses, become assistant superintendents of the Mack, Michigan, Brush and Davison lines. J. E. Spurgeon is appointed inspector of service of the same divisions. G. H. Gehling, G. H. Williams and E. T. Cain are appointed carhouse foremen at Baker, Kercheval and Woodward carhouses.

Plea for Double-Tracking in Vancouver Rejected.—George Kidd, general manager of the British Columbia Electric Railway, Vancouver, B. C., has made definite declaration to the City Council that his company does not intend to make any further expenditures for extensions or developments of the existing street railway system until such time as the city shall place the jitneys under the regulations similar to those that govern the street railway. The company, accordingly, rejected the request of the City Council that the line on Hastings Street, from Renfrew Street to Boundary Road, be double-tracked. Mr. Kidd states that the attitude adopted by the municipal authorities in refusing adequately to control the jitney in the same way as the company is controlled under acts passed by the Provincial Legislature and under agreements with the city and surrounding municipalities has prejudiced the company's credit to such an extent that it is now impossible to make further expenditure on the local railway system.

PROGRAMS OF ASSOCIATION MEETINGS

Railway Business Association

It is announced that the annual meeting of the Railway Business Association will be held at the Waldorf-Astoria Hotel, New York, on Jan. 16, 1917. The sessions will be a business meeting at 11 a. m., election of officers 1.30 p. m. and dinner at 7 p. m. promptly. The program of speakers will be announced later.

National Association of Railway Commissioners

The twenty-eighth annual convention of the National Association of Railway Commissioners will meet in the hearing room of the Interstate Commerce Commission in Washington, D. C., on Tuesday, Nov. 14, at 10 o'clock a. m. Sessions will continue up to and including Friday, Nov. 17.

According to a change adopted at the convention last year, the committees of the association are now divided as follows: executive, one; steam railroads, seven; other public utilities, four, and general, four. Outside of the committee on statistics and accounts of public utilities, which supersedes the former similar committee for electric railways, the public utility committees are all new and their reports should be of interest.

The committees most closely associated with the electric railway field are as follows:

(a) Public Utility Rates, Thomas W. D. Worthen of New Hampshire, chairman; (b) Service of Public Utility Companies, Richard Yates of Illinois, chairman; (c) Safety of Operation of Public Utility Companies, James O. Carr of New York, Second District, chairman; (d) Statistics and Accounts of Public Utility Companies, A. F. Weber, chief statistician of New York, First District, chairman; (e) General Valuation, Charles E. Elmquist of Minnesota, chairman; (f) Capitalization and Intercorporate Relations, Edwin C. Edgerton of California, chairman; (g) State and Federal Legislation, Laurence B. Finn of Kentucky, chairman.

Financial and Corporate

ANNUAL REPORTS

Kentucky Securities Corporation

The combined comparative income statement of the Kentucky Traction & Terminal Company and the Lexington Utilities Company, the operating companies owned by the Kentucky Securities Corporation, for the years ended June 30, 1915 and 1916, is as follows with inter-company charges omitted:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Operating revenue	$850,685	100.0	$811,628	100.0
Operating expenses	438,163	51.5	432,402	53.3
Net operating revenue	$412,522	48.5	$379,226	46.7
Miscellaneous income	29,206	3.3	28,288	3.4
Gross income	$441,728	51.8	$407,514	50.1
Fixed charges, etc.	245,576	28.8	237,230	29.2
Net income	$196,152	23.0	$170,284	20.9

The combined operating revenues of all the departments showed an increase of $39,057 or 4.8 per cent during the year. Operating expenses showed only a slight increase, so that the net operating revenue increased $33,296 or 8.7 per cent. Miscellaneous income gained slightly, and fixed charges rose $8,346 or 3.5 per cent, with the result that the net income for the period showed a gain of $25,868 or 15.2 per cent.

The railway gross earnings reflected the improved business conditions which prevailed during the year, and the receipts showed an increase of 5.4 per cent. The gains were the largest on the interurban lines. The number of passengers carried, including transfers, etc., were as follows: Lexington city lines, 1916, 4,389,905; 1915, 4,277,241: interurban lines, 1916, 1,482,881; 1915, 1,341,452, and other cities, 1916, 497,054; 1915, 466,017. This improvement was shown without materially increasing the number of car-hours or car-miles run. The appropriations for maintenance in the railway department were equivalent to 16.5 per cent of the gross earnings.

In the city of Lexington, where the company supplies all retail electric service, there was shown a substantial increase in the number of customers and connected load. The new-business department gave close attention to procuring new customers and to increasing both the sales and service rendered to those already on the books. Power is being supplied at wholesale, under satisfactory long-term contracts, to other lighting companies in the central Kentucky district. The results for the year showed a small gain in receipts from these sources. The ice department had a generally satisfactory year.

During the year just ended the companies spent $94,217 on additions and betterments,. Among the largest items were: poles and fixtures, $15,658; gas department, $13,548; meters and transformers, $12,225; paving, $11,906; transmission system, $10,611, and ice department, $2,962. These expenditures were in accordance with the construction program approved early in the year, and comprised the necessary additions which were required by the increased business of the system. There is now under construction an addition to the power plant building, in which are being installed two additional boilers. It will shortly be necessary to add an additional turbine to the power equipment, to take care of the increased business.

BOSTON ELEVATED HEARINGS RESUMED

Hearings in the Boston Elevated inquiry, relative to the company's financial condition, were resumed at Boston, Mass., on Oct. 27. Following the presentation of the company's brief at previous sessions, the officers of the road held themselves in readiness to meet any further inquiries by the special legislative commission sitting in the case or by others interested in the proceedings. At the annual banquet of the Boston Chamber of Commerce in the Copley-Plaza Hotel on Oct. 26, attended by nearly 700 members, Charles F. Weed, president of the chamber, in his inaugural

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address pointed out the importance to all citizens of Greater Boston of the financial condition of the company, stating that if the Boston Elevated Railway substantiates its claims it will be clearly in the public interest to grant such relief as will enable it to raise new capital. The chamber has undertaken to study the question, but has not yet made its report.

STATISTICS OF OPERATION IN NEW JERSEY

The Board of Public Utility Commissioners of New Jersey has just issued a report containing statistics of the operation of public utilities in the State for the year ended Dec. 31, 1914. Included in the 450 reporting utilities are twenty-nine operating and thirty-nine non-operating electric railways. The gross revenues of the various groups, the net revenues (the amount remaining after deducting operating expenses, taxes and uncollectible bills), the ratio of net to gross and the ratio of net to capitalization are shown in the following table:

Class of Utility	Gross Revenue	Net Revenue	Per Cent of Net Revenue to Gross Revenue	Per Cent of Net Revenue to Capitalization
Gas	$13,070,000	$5,380,000	41.2	5.79
Electric	11,410,000	5,400,000	47.3	6.30
Municipal electric	170,000	39,000	23.1	....
Water	4,870,000	2,480,000	51.1	6.27
Municipal water	5,120,000	2,985,000	58.3	....
Sewer	250,000	95,000	38.0	5.11
Telephone	9,000,000	2,525,000	28.1	6.81
Street railways	19,040,000	6,410,000	33.7	3.86
All utilities	$62,930,000	$25,314,000	40.2	5.2*

*Average.

On account of the interstate character of their business, the revenues of both the Hudson & Manhattan Railroad and the American Telephone & Telegraph Company have been excluded from the preceding tabulation. Moreover, for the New York Telephone Company there is included only the revenues pertaining solely to New Jersey.

The total 1914 capitalization of the utilities in the State was $422,950,000, made up of $210,060,000 of funded debt and $212,890,000 of capital stock. For electric railways the total capitalization was $165,830,000—$92,720,000 for funded debt and $73,110,000 for stock. The per cent of total dividends to the par value of all capital stock in 1914 was 5.5 for all utilities and 2.4 for electric railways. The per cent of total dividends to the par value of dividend-paying stocks was 5.9 for all companies and 2.06 for electric railways. A total of 44.09 per cent of all utilities paid dividends, but only 34 per cent of the electric railways did so. Of these companies nine paid less than 5 per cent, ten between 5 per cent and 10 per cent, and two more than 10 per cent.

The report of the commission contains organization data for all electric railways, with capitalization figures for non-operating companies and, in addition to these, income figures for the operating lines. Detailed revenue and expense figures per car-mile are also given for each operating railway, and other mileage, traffic and miscellaneous statistics as shown in the accompanying table.

Birmingham, Ensley & Bessemer Railway, Birmingham, Ala.—The Alabama Public Service Commission has authorized the substitution of the Birmingham-Tidewater Railway, the entire capital stock of which is owned by the Birmingham Railway, Light & Power Company, for J. D. Kirkpatrick as purchaser of the Birmingham, Ensley & Bessemer Railroad at the foreclosure sale. The bondholders were not in a position to refinance the road. It is understood that the property of the Birmingham, Ensley & Bessemer Railway was taken over for approximately $1,500,000, which is much less than the original cost of the system. References to the sale of the property under foreclosure and to the subsequent negotiations for turning it over to the Birmingham Railway, Light & Power Company were contained in the ELECTRIC RAILWAY JOURNAL for Jan. 15, April 1 and 8, and Sept. 9.

Brazilian Traction, Light & Power Company, Toronto, Ontario.—William A. Read & Company, New York, N. Y., are offering $7,500,000 of three-year 6 per cent gold notes of the Brazilian Traction, Light & Power Company at 99, yielding about 6⅜ per cent to the investor. The notes are the only funded debt of the company and are secured by the pledge of $15,000,000 of bonds of subsidiary companies. The new notes precede $10,000,000 of 6 per cent cumulative preferred stock and $106,289,000 of common stock which has paid dividends since issued. The collateral to secure the notes, which will be deposited in New York, includes about $5,000,000 of Rio de Janeiro Tramway, Light & Power Company general mortgage 5 per cent bonds, about $2,500,000 of Sao Paulo Tramway, Light & Power Company general mortgage 5 per cent bonds and $7,500,000 Rio de Janeiro & Sao Paulo Telephone Company first mortgage collateral trust 6 per cent bonds. The company was incorporated in Canada in 1912. The banking house announced on Nov. 2 that all the $7,500,000 of notes of the Brazilian Traction, Light & Power Company had been sold. The Read group of bankers, it is said, expects to put out other issues of South American public utility securities, but they are not yet prepared to make any announcement concerning the next flotation.

MILEAGE, TRAFFIC AND MISCELLANEOUS STATISTICS OF NEW JERSEY STREET RAILWAYS FOR 1914

	Miles of Track Owned	Capitalization Per Mile of Track	Miles of Road Operated	Operating Revenues Per Mile of Road	Revenue Car-Miles Per Mile of Road	Revenue Car-Miles Per Car-Hour	Average Fare Per Revenue Passenger (Cents)	Transportation Revenue Per Car-Mile (Cents)	Transportation Revenue Per Car-Hour (Cents)	Total Railway Revenues Per Car-Mile (Cents)	Operating Expenses Per Car-Mile (Cents)	Operating Ratio (Per Cent)
Atlantic & Suburban Railway	17.0	$49,476	16.0	$5,302	29,974	11.8	4.76	17.6	$2.07	17.7	13.2	74.7
Atlantic City & Shore Railroad	7.7	253,247	24.5	25,495	71,567	11.2	4.75	35.4	3.95	35.9	22.3	62.1
Atlantic Coast Electric Railway	36.1	77,562	20.3	21,080	65,998	9.4	5.00	24.6	2.32	31.9	18.6	58.1
Bridgeton & Millville Traction Company	37.9	26,385	36.3	3,564	16,375	9.5	4.31	21.5	2.04	21.8	16.7	76.6
Burlington County Transit Company	14.8	8,108	15.8	4,454	23,277	9.5	5.00	18.2	1.74	19.1	18.6	97.4
Cape May, Delaware Bay & Sewell's Point Railroad	13.7	21,898	15.1	1,856	12,324	...	5.00	13.6	...	15.0	16.4	108.6
Central Passenger Railway	2.8	103,571	4.0	14,416	53,781	6.0	2.17	20.0	1.19	26.8	23.0	85.9
Five Mile Beach Electric Railway	5.7	44,859	4.9	11,143	64,390	8.9	5.00	16.9	1.51	17.3	10.4	59.9
Jersey Central Traction Company	41.2	72,815	36.8	6,231	25,072	11.6	4.90	23.2	2.68	24.9	14.4	57.8
Millville Traction Company	12.5	30,640	12.5	4,106	25,858	9.1	4.85	15.2	1.38	15.9	17.5	110.1
Monmouth County Electric Company	17.7	46,610	15.0	6,143	34,136	10.1	5.00	17.4	1.76	18.0	14.9	83.1
Morris County Traction Company	66.6	67,784	50.6	6,124	25,085	10.1	5.02	24.2	2.46	24.4	16.7	68.5
New Jersey & Pennsylvania Traction Company	14.9	107,382	13.3	5,729	23,767	14.9	4.95	23.8	3.55	24.1	16.0	66.3
New Jersey Rapid Transit Company	6.0	53,333	6.0	523	7,362	12.0	5.00	7.1	0.85	7.1	11.3	159.0
Northampton-Easton & Washington Traction Company	18.0	112,431	18.0	3,288	11,846	16.6	5.00	27.2	4.51	27.8	15.7	56.5
North Jersey Rapid Transit Company	14.5	110,345	15.2	4,117	19,427	15.1	9.16	20.7	3.12	21.2	14.7	69.2
Ocean City Electric Railroad	10.0	17,500	10.0	2,555	19,547	9.2	4.98	13.0	1.20	13.1	12.3	94.0
Phillipsburg Horse Car Railroad	7.1	4,225	6.9	13,987	72,511	8.0	5.00	19.1	1.53	19.3	14.5	75.1
Point Pleasant Traction Company	3.2	125,000	3.1	2,686	12,964	6.7	5.00	20.3	1.35	20.7	15.1	72.7
Public Service Railroad	*43.7	†47,749	38.4	3,394	15,444	21.7	20.40	21.8	4.73	22.0	18.9	86.1
Public Service Railway	*832.2	†162,095	492.1	31,838	102,023	8.9	4.98	30.9	2.75	31.2	17.9	57.5
Trenton & Mercer County Traction Corporation	*74.1	†67,312	53.2	14,551	62,089	8.7	4.32	23.1	2.00	23.4	13.5	57.7

*Miles of track operated.
†Capitalization per mile of track operated, including capitalization of lessor companies.

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Chicago (Ill.) Railways.—Chauncey B. Borland and Wallace Heckman have been elected to the board of directors of the Chicago Railways to succeed R. C. Chandler and Arthur B. Jones, resigned. The other directors of the company were re-elected.

Chicago, Milwaukee & St. Paul Railway, Chicago, Ill.—The annual report of the Chicago, Milwaukee & St. Paul Railway for the fiscal year ended June 30, 1916, states that during the last year the company added to its equipment twenty electric locomotives at a cost of $2,286,962. Other additions and betterments included the expenditure of $3,870,411 for power stations, transmission systems, etc. It is said also that authority has been given for the purchase or building of additional equipment, including twenty-three electric locomotives. Electrical operation of the Rocky Mountain division between Deer Lodge and Three Forks, Mont., a distance of 112.2 miles, was started in December, 1915, and between Three Forks and Harlowton, Mont., a distance of 114.2 miles, in April, 1916. Work on the Missoula division between Avery, Idaho, and Deer Lodge, Mont., is progressing at a rate which indicates the completion of the electrical construction work on this division by the end of the present calendar year. During the last year the company expended for maintenance $2,612 on power-plant buildings, $425 on power substation buildings, $144 on power transmission systems, $18,764 on power distribution systems and $1,147 on power line poles and fixtures. The repairs to other than steam locomotives cost $36,754 during the year, while the depreciation covering the same items amounted to $9,460.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—Benton S. Oppenheimer, receiver of the Cincinnati, Dayton & Toledo Traction Company, has made application to the Common Pleas Court of Hamilton County for authority to pay the interest due on Nov. 1, 1915, on $1,350,000 of bonds of the Southern Ohio Traction Company, a subsidiary of the Cincinnati, Dayton & Toledo Traction Company. This is part of the property included in an order of sale issued by Judge Geoghegan. The interest is payable at the office of the Cleveland Trust Company, Cleveland, Ohio.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Elmira Water, Light & Railroad Company has applied to the Public Service Commission for the Second District of New York for authority to issue $222,000 of 5 per cent fifty-year gold bonds under the first consolidated mortgage of the company.

Federal Light & Traction Company, New York, N. Y.—At a special meeting of the Federal Light & Traction Company, Anson W. Burchard, vice-president of the General Electric Company, Harrison Williams, F. L. Dame and R. E. Breed resigned from the board and Guy E. Tripp, chairman of the Westinghouse Electric & Manufacturing Company, Calvert Townley and Samuel Insull were elected directors, leaving one vacancy to be filled. Mr. Breed, one of the retiring directors, is president of the American Gas & Electric Company, with which the name of General Electric Company has been associated, while Mr. Dame is associated with Harrison Williams. Samuel Insull is president of the Commonwealth Edison Company, Chicago, Ill., and an officer of many railways and other utilities.

Mexico (Mex.) Tramways.—At meetings of the bondholders of the Mexico Tramways and its associate companies held in London in October, the resolutions referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 16, page 511, concerning the conduct of the system pending the return of conditions in Mexico favorable to reorganization were approved. The report of Messrs. Phippen and Trowbridge, who visited the Mexican properties in the interest of the trustee for the bonds, was reviewed at length in the ELECTRIC RAILWAY JOURNAL for July 15, page 118.

Municipal Railway, San Francisco, Cal.—The bookkeeping bureau of the Department of Public Works has just issued a statement giving the receipts, actual disbursements, and cash transfers for the municipal lines from the beginning of operation, Dec. 28, 1912, to Aug. 31, 1916. According to this statement, the actual receipts during this period amounted to $4,851,754, while the disbursements and transfers totaled $4,669,100, thus giving excess receipts of $182,654. The gross revenues of the lines for the period were $4,830,769, while the operating expenditures (audited) amounted to $2,728,308. The statement also reports the conditions of the reserve funds, showing that the depreciation fund has $547,643 invested in bonds, a cash balance of $180,713 and a balance of $22,913 for interest on bonds owned, making a cash total of $203,626. The injury insurance fund has a cash balance of $53,250, and the investment fund a cash balance of $200,000, thus giving a total of $456,876 for cash in all the funds and $547,643 for bonds invested in the funds.

Muscatine & Iowa City Railway, Muscatine, Iowa.—The Muscatine & Iowa City Railway, which passed into the hands of John A. Bartemeier as receiver on July 1 and suspended operation on Aug. 11, has been turned over to the Chicago, Rock Island & Pacific Railway, which is now operating the line.

Republic Railway & Light Company, Youngstown, Ohio.—The Republic Railway & Light Company has drawn for redemption on Dec. 1, at par and accrued interest, payment to be made by the Fidelity Trust Company, Philadelphia, $184,000 of its three-year 5 per cent secured gold notes. Under the trust agreement, holders of these notes have the right to convert them, par for par, into the 7 per cent preferred stock of the Mahoning & Shenango Railway & Light Company, the operating subsidiary of the Republic Railway & Light.

Southern New York Power & Railway Company, Cooperstown, N. Y.—The Public Service Commission for the Second District of New York has approved the plan for refinancing the Southern New York Power & Railway Company, formerly the Otsego & Herkimer Railroad. In the readjustment control is acquired of the Colliers Light, Heat & Power Company, and through the latter corporation control of the Deposit Electric Company, the Hartwick Power Company, and Southern New York Power Company. The company has been authorized to issue $200,000 of stock and $500,000 of bonds with which to take up the securities of the smaller companies, and, in addition, is authorized to issue $1,200,000 of 5 per cent first mortgage bonds with which to refund, if it desires to do so, an equal amount of bonds now outstanding of the Otsego & Herkimer Railroad.

Tidewater Southern Railway, Stockton, Cal.—The Tidewater Southern Railway has filed with the California Railroad Commission applications for authority to extend its line from Hatch, Stanislaus County, to Irwin City, Merced County, 8 miles, and to issue securities to pay for this extension, for freight terminals in Modesto and for other improvements of its system. The company wants to issue $600,000 of its common stock now in its treasury, to net $480,000 cash. It operates a standard gage railroad between Stockton and Turlock, 50 miles, with a number of branches. The extension, equipped, will cost $109,700. The remainder of the $480,000 will be devoted to procuring freight terminals in Modesto, and additional terminals at Turlock, changing its entrance and route into Stockton, the construction of interchange tracks at Ortega, electrifying the present lines from Modesto to Turlock, installing an interlocking crossing of the Southern Pacific Company tracks south of Modesto, purchase of three additional freight motors, two passenger cars and other equipment, and the paying off $88,717 of the company's notes.

United Light & Railways Company, Grand Rapids, Mich.—Announcement has been made of the sale by United Light & Railways Company to William P. Bonbright & Company, Inc., New York, N. Y., of $1,000 000 first and refunding 5 per cent bonds and $1,500,000 of 6 per cent ten-year debentures. The price at which the securities will be sold has not yet been made public. They are to be offered about Nov. 10. The proceeds of the sale will be used to retire $750,000 of short-time notes now outstanding and to provide funds for liquidation of all floating debt of the company and will give in addition substantially $1,000,000 for additions and extensions to operated properties.

United Railways, St. Louis, Mo.—Kentucky stockholders of the United Railways have been asked to send proxies to a committee composed of John W. Barr, J. A. Cheek and George W. Norton in an effort to obtain concerted action among the stockholders.

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DIVIDENDS DECLARED

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Illinois Traction Company, Peoria, Ill., quarterly, three-quarters of 1 per cent, common.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1⅜ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1¼ per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept.,		'16	$74,833	*$38,244	$36,589	$18,164	$18,425
1 "	"	'15	71,400	*35,960	35,440	17,450	17,990
12 "	"	'16	810,403	*440,681	369,722	212,565	157,157
12 "	"	'15	783,707	*387,671	396,036	211,970	184,066

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Aug.,		'16	$35,264	*$19,185	$16,079	$6,568	$9,511
1 "	"	'15	33,225	*18,160	15,066	6,603	8,463
12 "	"	'16	385,278	*225,932	159,346	78,532	80,814
12 "	"	'15	338,506	*206,903	131,603	78,999	52,604

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Sept.,		'16	$105,056	*$72,995	$32,061	$29,528	$2,533
1 "	"	'15	94,588	*61,079	33,509	30,121	3,388
12 "	"	'16	1,214,613	*766,421	488,192	356,152	92,040
12 "	"	'15	1,047,202	*719,406	327,796	355,230	†27,434

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m., Sept.,		'16	$722,054	$21,531	$700,523	$340	$700,183
1 "	"	'15	349,456	14,302	335,154	40,833	294,321
12 "	"	'16	7,522,547	226,667	7,295,880	380,510	6,915,370
12 "	"	'15	4,121,621	159,571	3,962,050	490,000	3,472,050

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Sept.,		'16	$289,975	*$177,917	$112,058	$42,862	$69,196
1 "	"	'15	266,435	*154,383	112,052	40,200	71,852
12 "	"	'16	3,426,016	*2,007,953	1,418,063	509,659	908,404
12 "	"	'15	3,066,603	*1,819,624	1,246,979	471,860	775,119

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Sept.,		'16	$1,434,201	*$799,304	$634,897	$421,048	$213,849
1 "	"	'15	1,211,588	*660,915	550,673	372,360	178,313
12 "	"	'16	16,340,522	*8,746,988	7,593,534	4,961,774	2,631,760
12 "	"	'15	14,116,576	*7,527,018	6,589,558	4,336,950	2,222,608

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Sept.,		'16	$260,888	*$152,922	$107,966	$63,150	$44,816
1 "	"	'15	206,405	*122,453	83,952	62,904	21,048
12 "	"	'16	2,862,052	*1,701,587	1,160,465	752,969	407,496
12 "	"	'15	2,424,763	*1,441,513	983,250	759,927	223,323

EL PASO (TEX.) ELECTRIC COMPANY

1m., Aug.,		'16	$84,156	*$78,121	$6,035	$4,920	$1,115
1 "	"	'15	75,111	*42,680	32,431	4,204	28,227
12 "	"	'16	1,504,363	*603,227	451,136	54,883	396,253
12 "	"	'15	979,877	*527,608	452,269	50,361	401,908

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m., Sept.,		'16	$475,988	*$218,846	$257,142	$214,390	$42,752
1 "	"	'15	435,789	*185,768	250,021	211,295	38,726
3 "	"	'16	1,370,638	*629,238	741,400	643,739	97,661
3 "	"	'15	1,290,898	*566,812	724,086	634,533	89,553

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., Aug.,		'16	$26,157	*$17,627	$8,530	$7,163	$1,367
1 "	"	'15	23,550	*14,253	9,297	7,535	1,762
12 "	"	'16	307,276	*198,215	109,061	87,692	21,369
12 "	"	'15	290,205	*182,704	107,501	91,837	15,664

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Aug.,		'16	$24,398	*$13,379	$11,019	$7,712	$3,307
1 "	"	'15	22,075	*12,511	9,564	7,090	2,474
12 "	"	'16	278,596	*154,295	124,301	89,934	34,367
12 "	"	'15	245,485	*148,256	97,229	86,849	10,380

TAMPA (FLA.) ELECTRIC COMPANY

1m., Aug.,		'16	$74,194	*$43,219	$30,975	$4,398	$26,577
1 "	"	'15	78,924	*40,365	38,559	4,352	34,207
12 "	"	'16	966,114	*522,216	443,928	52,334	391,594
12 "	"	'15	978,209	*502,026	476,183	52,639	423,544

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m., Sept.,		'16	$854,747	$504,810	$349,937	$149,828	$200,109
1 "	"	'15	817,922	502,569	315,353	140,418	174,935
9 "	"	'16	7,594,988	4,692,777	2,902,211	1,292,995	1,609,216
9 "	"	'15	7,014,857	4,531,392	2,483,465	1,272,247	1,211,218

*Includes taxes. †Deficit.

Traffic and Transportation

1,898,735,615 CARRIED IN NEW YORK IN YEAR

Public Service Commission Reports This Total for Greater New York Lines

There was an increase of 91,000,000 passengers carried on the surface, subway and elevated lines of Greater New York for the year ended June 30, 1916, over the preceding year. This increase was bigger than that of any other year except 1906 and 1910, when the increases were 120,000,000 and 128,000,000 respectively. A pamphlet soon to be published by the Public Service Commission of the First District of New York will contain some tables, of which the most interesting will show the number of passengers carried every year by all of the city lines and the increases since 1900, and the per capita fares since 1860. The latter table is presented to prove that street railway passenger travel within the city increases at a very much more rapid rate than the population. Here are the figures:

Year Ended June 30	Number of Passengers	Annual Increase
1900	846,353,058	.....
1901	881,344,801	34,991,743
1902	938,989,964	57,645,163
1903	1,000,767,483	61,777,519
1904	1,065,984,910	65,217,427
1905	1,130,982,696	64,997,786
1906	1,251,841,175	120,858,479
1907	1,315,381,388	63,540,213
1908	1,358,000,407	42,619,019
1909	1,402,417,642	44,417,235
1910	1,531,262,914	128,845,272
1911	1,603,901,397	72,638,483
1912	1,680,913,935	77,012,538
1913	1,769,876,508	88,962,573
1914	1,813,204,356	43,327,848
1915	1,807,632,726	*5,571,630
1916	1,898,735,615	91,102,889

*Decrease.

Year	Fares Per Capita	Year	Fares Per Capita
1860	43	1900	246
1870	103	1905	283
1880	152	1910	321
1890	218	1916	356

The commission says:

"The increase for the year 1915-16 serves in a measure as a thermometer of the conditions of business in New York City, inasmuch as the year 1914-15, which reflected the worst business conditions seen in the city in a great many years, showed a decrease in passenger travel of more than 5,000,000 for the year. Eliminating the decrease of 1914-15, the year 1915-16 shows a net increase over 1913-14 of about 85,000,000. The year 1914-15 is the first year to show a decrease since the consolidation of the greater city.

"Passenger traffic, by the methods mentioned, has increased in the city more than 1,000,000,000 in sixteen years. The total number of passengers carried on all the lines for the year 1915-16 was 1,898,735,615. In the year 1900 traffic was only 846,353,058. The first increase after that date in the figures of travel appears in the figures of 1905-06, when there is a sudden increase of traffic of 120,858,000 for the year, reflecting the first year of full reports from the operation of the subway."

The statement of the commission contains some analyses and explanations. For instance, during the Hudson-Fulton celebration in 1909 there was a big increase in traffic, for which the celebration received credit. Then the statement says that the new subways, with the old elevated lines operated by the New York Consolidated Railroad of Brooklyn and the first subway operated by the Interborough Rapid Transit Company, contributed almost equally to the year's increase in passenger travel. This increase, including elevated and subway lines, was 26,667,600 according to one report and 25,919,569 according to another. Then the commission's statement says:

"The Interborough's elevated division reports an increase of 10,454,279 passengers, due undoubtedly to the new third tracks which were placed in operation on Jan. 17, 1916, and which have since carried big crowds.

"The surface lines operated by the New York Railways carried 8,454,084 more cash passengers than in the year

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preceding. The increase on the Brooklyn Rapid Transit Company's surface lines amounted to 6,174,408, and that on the lines of the Third Avenue Railway, including the Bronx and North River line, but excluding the Yonkers line, amounted to 6,587,738. The Second Avenue line in Manhattan was one of the few railroads to show a decrease, reporting for the year 186,157 fewer fares than in the year previous.

"The Hudson & Manhattan Railroad reported an increase of 4,327,120 passengers, and there was an increase of 1,481,295 on the lines of the New York & Queens County Railway, operating in the Borough of Queens, excepting lines of the Brooklyn Rapid Transit Company."

The following table shows the increases by boroughs in street surface railway travel as distinguished from passenger travel on the elevated and in the subway lines:

	Revenue Passengers, 1916	Increase Over 1915
Borough of Manhattan	427,373,847	11,822,731
Borough of the Bronx	84,535,737	3,032,934
Borough of Brooklyn	363,568,755	8,868,642
Borough of Queens (excluding B. R. T.)	54,167,403	1,481,295
Borough of Richmond	14,884,534	572,525
Total	944,530,276	25,778,127

I. T. S. ST. LOUIS FARE CASE ARGUED

Interstate Commerce Commission Hears Argument in Case Involving Fare Increase from 5 Cents to 10 Cents

The Interstate Commerce Commission resumed work on Oct. 4 after the summer vacation. Among the first matters heard was the argument in the Illinois Traction System fare case at St. Louis, referred to previously in the ELECTRIC RAILWAY JOURNAL of April 29, page 840, in which is involved the right of the company to increase its passenger fares between St. Louis, Mo., and Granite City, Madison and Venice, Ill., from 5 cents to 10 cents. Henry I. Green, attorney for the company, appeared for it, and Charles H. Daus, city counsel, and C. E. Smith, civil engineer, appeared for the city.

The company operates in St. Louis under an ordinance granted by the city of St. Louis, which limits the fare to be charged between St. Louis and Granite City, or to intermediate points, to 5 cents a trip. The haul is 7½ miles and includes passage over the McKinley Bridge. The investment in the bridge and railway properties amounts to about $6 000,000.

The city takes the position that the ordinance constitutes a contract, binding upon the Interstate Commerce Commission, and that the fare cannot be increased except by agreement with the city. The city also claims on one hand that the company has no right to do a freight business in St. Louis, and on the other hand urges that the company increase its freight business so as to make up for the deficit in the passenger business.

Mr. Green argued before the Interstate Commerce Commission that there was abundant precedent in the previous action of the commission in other cases, and also in the decisions of the United States Supreme Court, to the effect that any attempt to fix interstate fares by an ordinance passed by the City Council was invalid as against an order of the Interstate Commerce Commission fixing the reasonable tariffs and charges.

Mr. Green in his brief last May explained that by the new tariffs filed no change is made in the fare between any point in St. Louis and the east end of the McKinley Bridge in Illinois, which is designated as the Main Street station in Venice. The new tariffs, suspended by order of the commission until December, provide for a cash fare of 5 cents between any point in St. Louis and the Main Street station in Venice and an additional 5-cent fare to any point east of the Main Street station in Venice. Mr. Green urged that the important inquiry in the case was whether or not necessity existed for the increase in passenger fares sought by the tariffs under investigation. He said that it was proved conclusively that the St. Louis Electric Terminal Railway had failed each year since the operation of its line to earn sufficient to meet its fixed charges, and that the amount of the deficit at present was more than $1 000,000, or approximately a net loss in operation of $200 000 annually. It was to remedy in part this growing deficit that the company sought approval of the new tariff.

In presenting and discussing the evidence in the case Mr. Green took up in turn the questions of the character and the value and investment of the properties, the earnings, the competitive traffic conditions and the anticipated results from the proposed increase in fares. He said that the decision in the case rested primarily upon the questions whether the Interstate Commerce Commission has jurisdiction to hear and determine the case, whether the city has the power to preclude by ordinance the determination of the case by its attempt to fix rates for interstate commerce in and out of St. Louis, and whether the proposed increases as stated in the tariffs under suspension were justified under the existing facts and conditions. Mr. Green contended that the Steubenville Tri-State Railway case, the Covington & Cincinnati bridge case, the South Covington & Cincinnati Street Railway case, the Washington-Virginia case and the New York-Jersey City ferry case established conclusively that the commission had jurisdiction in the present proceeding, which involved interstate fares over an interstate bridge. With respect to the power of the city of St. Louis to fix rates he said that the provisions of the ordinance of the city in attempting to limit the fare were illegal and void and not binding upon the commission. With respect to the proposed increase in passenger fares in St. Louis and Granite City he said that there was abundant evidence to justify them.

Mr. Daus, for St. Louis, challenged the jurisdiction of the commission on the authority of the Omaha-Council Bluffs Street Railroad case. Mr. Green in his reply briefly characterized this as ingenious and peculiar. He said that the language of the Supreme Court in the Omaha case was clearly in support of the jurisdiction of the commission in the present case. The quotation from the Omaha case in the brief of the protestant, Mr. Green said, was directly antagonistic in its effect to the conclusion stated by counsel for the city, predicated thereon.

HEARING ON BOSTON FREIGHT SERVICE PLANS

The Public Service Commission of Massachusetts held a hearing on Oct. 16 upon plans of the Boston Elevated Railway for handling bulk freight on its system both locally and in conjunction with the Bay State Street Railway and the Boston & Worcester Street Railway. H. B. Potter, assistant to the president, outlined the company's plans. These, in the main, include the operation of freight service on an off-peak basis, carload hauls being the basis of the work. Mr. Potter said that the company preferred to do a bulk freight business to handling pick-up and delivery business and that it desired to utilize the existing investment in rolling stock and tracks to the utmost so as to keep down the overhead charges and avoid interference with its existing passenger traffic. Thus, it is intended to utilize motor-driven snow plows as locomotives in winter and motor-driven dump cars in summer. The elevated company does not wish to invest in additional locomotive units for this business under present conditions.

Both the Boston Elevated Railway and the Bay State Street Railway are asking the commission for authority to operate freight trailers. One of the problems discussed was the projected handling of Boston garbage and ashes by the former company. Conferences have been held with the Boston Sanitary Disposal Company relative to the transportation of ashes and garbage in special trailer cars from collecting bins in various parts of the city to the wharf or sorting station. It is estimated that with this system in operation about $20.000 a year could be saved the city of Boston, and the streets would be relieved of many of the garbage and ash teams now hauled through the highways. Mr. Potter also suggested that the company could effect economies in the handling of crushed stone and rock for the city.

In the near future the Boston Elevated Railway will begin to haul molasses cars between Copps Hill Wharf and the plant of the Purity Distilling Company in East Cambridge, about two miles, by surface line route. Six cars will accomplish the work of about thirty-five teams. The molasses will be loaded from a 2,500,000-gal. tank on the waterfront and the road will haul tank cars owned by the Distilling company, using its own motive power. Plans are also under consideration for hauling fish in carload lots from the Commonwealth Fish Pier in South Boston to interior points in eastern Massachusetts.

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ALBANY FARE INCREASE ALLOWED

The Public Service Commission for the Second District of New York has rendered a decision favorable to the company in connection with the application of the United Traction Company, Albany, for permission to increase its fares between Albany and Troy from 10 cents to 15 cents. Arguments before the commission were closed on May 17. The proposed tariff, effective on Nov. 25, operates to increase the cost to each passenger 5 cents for travel as follows: Between points in the local zone (a) Albany-Rensselaer, or (b) Troy-Watervliet-Cohoes-Waterford-Green Island not reached by the through zone car lines and points in the town of Colonie between Albany (north city line) and Watervliet (south city line); between points in local zone Albany-Rensselaer not reached by the through zone car lines and the termini of through zone car lines in Troy or Cohoes; between points in local zone Troy-Watervliet-Cohoes-Waterford-Green Island not reached by the through zone car lines and the terminal of through zone car lines in Albany; between points in local zone Albany-Rensselaer not reached by the through zone car lines and points in local zone Troy-Watervliet-Cohoes-Waterford-Green Island not reached by the through zone car lines.

The new tariff proposes to divide the territory served by the company into two local zones and one through zone. The local zones are (a) Albany-Rensselaer, which covers territory reached by local car lines operating wholly within the corporate limits of the cities of Albany or Rensselaer, and also through car lines operating from and to points in Albany to and from points in Rensselaer, and (b) Troy-Watervliet-Cohoes-Waterford-Green Island, which covers territory reached by the local car lines operating wholly within the corporate limits of the cities of Troy, Watervliet and Cohoes and the villages of Waterford and Green Island, and through car lines operating wholly within this zone. The through zone terminal points are the Plaza in Albany, Broadway and Third Streets in Troy, and Mohawk and Remsen Streets in Cohoes, the territory covered being that reached by through car lines operating wholly between such terminals.

Points in the town of Colonie between Albany (north city line) and Watervliet (south city line) are taken from the present Albany and Troy local zones and placed in the proposed through zone. The through zone car lines are not to carry local passengers between points in the cities of Albany, Troy or Cohoes, and no transfers will be given to passengers traveling from points in the through zone to points in either of the local zones, or vice versa.

Endless Chain Revived in Kansas City.—A company operating an endless chain coupon selling plan, involving the distribution of street car tickets, has started in Kansas City, and is under investigation. The plan is worked along the old line. The company sells a book of coupons for $1. The purchaser sells the three coupons it contains for 25 cents each, thus getting back 75 cents of his investment. When each of the three on any one coupon book has purchased a book, the original holder may exchange his coupon book cover for twenty-five tickets worth $1.25.

Shop Early Campaign in Washington.—For the purpose of starting a "shop early for Christmas" campaign, the Washington Railway & Electric Company, Washington, D. C., has placed its new private parlor car "Columbia" at the disposal of the board of governors of the Retail Merchants' Association for trips to nearby points on the company's lines and those of the Washington-Virginia Railway. The first trip, a journey to Alexandria, Va., is planned for Nov. 13.

Railway Man Appointed to Traffic Committee.—Thomas Penney, vice-president and general counsel of the International Railway, Buffalo, N. Y., has been appointed a member of the special committee named by Mayor Louis P. Fuhrmann to study traffic conditions in the congested business centers with a view of establishing safety zones, and enacting new traffic ordinances. Others on the committee represent taxi-cab companies, trucking associations and the automobile club. The Mayor has returned from a tour of cities in the middle west, where he made a study of safety zones and traffic ordinances.

Company Must Publish Transfer Regulations.—Although rules and regulations governing the use of transfers have been printed by the International Railway, Buffalo, N. Y., on the reverse side of its transfers for many years, Justice Wheeler in the Supreme Court of Erie County, has reversed the decision of a city court judge and holds that the company must publish its transfer rules and regulations before enforcing them. The case is that of an action brought against the company by a passenger who was ejected from a car while trying to make a round trip on a transfer. The company's regulation printed on the reverse side of all transfers says passengers must take the most direct route to their destination, while the passenger who brought the action against the company was taking a long indirect route which would bring him back to the starting point. The city court dismissed the action, but an appeal was taken to the Supreme Court and the decision of the lower court is reversed and the company is ordered to publish its transfer regulations. The company will probably take an appeal from this decision.

Springfield Passes Strict Jitney Ordinance.—After extended deliberation and much public discussion, the City Council of Springfield, Mass., on Oct. 23 passed an ordinance regulating jitney traffic. The ordinance took effect on Nov. 1. In addition to strict requirements as to the routing of jitneys, age of operators, obtaining of certificates from the city; etc., it contains a provision that every motor vehicle so licensed shall be operated for six or more hours a day in every day during the term of its license; that no such vehicle shall be operated by any person more than twelve hours a day; and that no solicitation of passengers by outcry or noise shall be permitted. No motor-vehicle in the jitney class is allowed to take on passengers on any street within 35 ft. of any white post or other designated street railway stopping place; no passenger with a child in arms or seated on the lap is permitted to ride on any front seat of the vehicle, and no person is permitted to stand upon any running board, fender or step, or to sit upon any fender, dash, top or door. No passenger can be charged more than 5 cents for being carried in a motor vehicle so licensed between any two points in the city within the circle having a radius of 2.5 miles from Court Square. A $1,000 bond is required and strict police supervision of routes and standing places is specified. License fees are $15 for every motor vehicle licensed to carry seven passengers or less and $5 additional for passengers authorized in excess of seven.

Model Jitney Ordinance for Portland Explained.—Commissioner Dieck of Portland, Ore., is working on a model jitney franchise ordinance along the lines adopted by a majority of the Council recently. This measure will provide that jitneys shall not operate along street railway lines, except where absolutely necessary to reach the congested districts, but shall operate over streets to districts not now served by other transportation facilities; that jitney franchise-holders shall be required to file substantial bonds to indemnify the city or the public against damage and as a guaranty of the faithful performance of the terms of the grant; that they shall be required to make payments commensurate with those now being made by the Portland Railway, Light & Power Company to the city for the privilege of operating. Commissioner Daly, alone of the five members of the Council, held out for more liberal handling of the problem from the jitney standpoint. Undismayed by the decision of the Council to place jitneys under adequate franchise restrictions, L. B. Jones, et al, has filed a petition with the Council for a franchise to operate a line of jitneys between Portland and Linnton. The petitioners ask for a franchise for five years, and agree to operate cars every fifteen minutes from 6 a. m. until midnight, and give bond of $500 as a guarantee of the faithful performance. They request the right to charge a 10-cent fare. "Jitney Regulation" was the principal topic discussed at a recent meeting of the Oregon Civic League. F. I. Fuller of the Portland Railway, Light & Power Company, presented the side of the street railway. Arthur I. Moulton, attorney for Chauffeurs' Union, presented the side of the jitney drivers. Commissioners Dieck and Daly of the Portland City Council, explained the view that the Council now takes of the matter.

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Personal Mention

George Bullock has resigned as president of the United Gas & Electric Corporation, New York, N. Y., and has been elected chairman of the board of the company. Mr. Bullock is succeeded as president of the company by Edward G. Connette, as noted elsewhere in this column.

Thomas Ahearn, president of the Ottawa (Ont.) Electric Railway, motored from Ottawa to New York to see the Harkness trophy contest at Sheepshead Bay on Oct. 28. Mr. Ahearn holds the record for the fastest run between New York and Ottawa—458 miles in thirteen hours twenty minutes.

Arthur H. Sarvis has resigned from the Detroit (Mich.) United Railway and severs his connection with *Electric Railway Service*, published by that company, with which he has been connected as associate editor since the beginning of the the publication more than three years ago. Mr. Sarvis goes to Flint, Mich., as one of the executive staff of the Flint Varnish & Color Works.

Joseph O. Gauthier, superintendent of rolling stock and shops of the Middlesex & Boston Street Railway, Newtonville, Mass., was tendered a reception recently by the employees of the mechanical department, on the occasion of the completion of his twenty-fifth year in the employ of the company. The affair was planned while Mr. Gauthier was in attendance at the convention of the American Electric Railway Association in Atlantic City. On his return home from that meeting Mr. Gauthier was surprised at his son's house by the employees, headed by George M. Cox, vice-president and general manager of the company. Mr. Cox complimented Mr. Gauthier on his length of service with the company, and in behalf of the men he presented to Mr. Gauthier a Waltham watch and $25 in gold from the directors of the company. Mr. Gauthier started to work twenty-five years ago for the Newton Street Railway at the West Newton carhouse. In a short time he was made foreman, and when the Newton roads were consolidated in 1902, he took charge of repairs at the Waltham station. This station was made the central repair shop a few years ago, and Mr. Gauthier was appointed superintendent of rolling stock and shops in charge of the car repairs for the whole system.

Edward G. Connette, president of the International Railway, Buffalo, N. Y., vice-president of the International Traction Company, and since January a vice-president of the United Gas & Electric Corporation, New York, N. Y., was elected president of the United Gas & Electric Corporation on Oct. 26 to succeed George Bullock, who becomes chairman of the board. Mr. Connette will remain as president of the International Railway. Mr. Connette was born in Austin, Ind., on Dec. 29, 1863. He obtained his early education in the public schools. In 1879 he secured his first employment, this being in the capacity of telegraph operator on the Louisville Division of the Pennsylvania Railroad. Later he accepted an appointment as telegraph operator at the general offices of the Louisville, Cincinnati & Lexington Railroad at Louisville, Ky. He was subsequently transferred to the office of the general superintendent of the company. Shortly afterward the Louisville, Cincinnati & Lexington Railroad was purchased by the Louisville & Nashville Railroad and Mr. Connette was transferred to the engineering department of the company. Two years later Mr. Connette was made chief clerk of the Henderson Division of the company with headquarters at Henderson, Ky. He was next appointed assistant to the superintendent of the company at Nashville, Tenn., and when the street railways in that city were consolidated in 1890, Mr. Connette accepted the position of superintendent of the consolidated company. In 1891 he was made general manager of the company and in 1897 became chief engineer of the Cumberland Electric Light & Power Company, which position he held in addition to that of general manager of the street railway company. On April 1, 1900, Mr. Connette accepted the appointment of vice-president of the Syracuse (N. Y.) Rapid Transit Company, in which position he continued until 1905, when he was appointed general manager of the Worcester (Mass.) Consolidated Street Railway. In 1909 he accepted the position of transportation engineer of the Public Service Commission, First District, New York State. Mr. Connette on May 1, 1912, was elected vice-president of the International Railway, continuing in this capacity until Jan. 1, 1913, when he was made president of the company. Besides holding the office of president, he is also a director and member of the executive committee of the International Railway. He is also vice-president, a director and member of the executive committee of the International Traction Company. The United Gas & Electric Corporation, of which Mr. Connette has been made president, is one of the largest public utility holding companies in the United States. The properties which it controls include in addition to the International Railway electric railways, gas and fuel companies and light, heat and power companies located mostly in the East, the Middle West and the South.

E. G. CONNETTE

OBITUARY

George H. Hart, at one time superintendent of the Pawcatuck Street Railway, Westerly, R. I., died at New London, Conn., recently.

James Grady, who was connected with the Columbia Machine Works & Malleable Iron Company, Brooklyn, N. Y., for twenty-two years and was for many years vice-president and general manager of the company, died at his home in Brooklyn on Oct. 28. Mr. Grady had not been well for some time and more than a year ago disposed of his interest in the company and retired from the management. He was born in New York City on Sept. 6, 1857. He is survived by his widow and nine children.

William C. Cuntz, managing director of the Goldschmidt Thermit Company of New York, died Nov. 2 at Auburndale, Mass., in his forty-fifth year. He had not been well for several weeks and about a year ago had an operation for appendicitis. Mr. Cuntz was born and educated in Hoboken and started his business career with the Pennsylvania Steel Company of Steelton, Pa., first with the bridge and construction department. Later he entered the sales department, which he represented in Boston, Philadelphia, and London, England. He became connected with the Goldschmidt Thermit Company in 1910. Mr. Cuntz was as large of heart as he was of frame and well known in electric railway circles. He is survived by a widow and two sons. He was a member of the American Society of Civil Engineers, the American Iron & Steel Institute, the Engineers' Club of New York and many other organizations.

Charles Wilcox Hotchkiss, president and director of the Richmond Light & Railroad Company, Staten Island, New York, died on Oct. 29 at Battle Creek, Mich., from organic heart disease. He was in his fifty-fourth year. Mr. Hotchkiss was born in Unadilla Forks, N. Y. He entered railroading in 1881, when he became a rodman on the New York, West Shore & Buffalo Railroad. In 1886 he became assistant engineer of the Michigan Central Railroad and in 1895 was appointed chief engineer of the Chicago Junction Railway, where he remained until 1899, when he became president of the Indiana Harbor Railroad. Mr. Hotchkiss later became general manager of the Chicago, Indiana & Southern Railroad and of the Indiana Harbor Railroad. On May 1, 1912, he was chosen president of the Chicago Tunnel Company, which office he held at the time of his death. He was also president and a director of the Chicago Utilities Company, president and a director of the Staten Island Midland Railway, and chairman of the board of directors and of the executive committee of the Virginian Railway. In 1913 Mr. Hotchkiss was elected president of the Rail Joint Company of America and of the Staten Island properties.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Rumford Falls & Bethel Street Railway, Rumford, Me.**—This company has been granted a charter by the Legislature to construct an electric railway. It is proposed to issue $200,000 in stock and bonds, the proceeds to build and equip the line, and $50,000 to pay for organization services, surveys, right-of-way, and financing.

***Amityville-Stowe Electric Railway, Amityville, Pa.**—Chartered to operate an electric railway between Amityville and Stowe. Capital stock $50,000. Peoples Brothers, Inc., Philadelphia, are reported interested.

FRANCHISES

Peoria Heights, Ill.—The Peoria & Chillicothe Electric Railway has asked the Council for a franchise in Peoria Heights.

What Cheer, Iowa.—The Burlington Railway & Light Company has received a twenty-five year franchise from the Council to supply electricity in What Cheer. A street-lighting system, to cost about $5,000, will be installed.

Galena, Kan.—The Southwest Missouri Railroad will soon ask the Councils of Galena and Baxter Springs for franchises to construct its proposed extensions in those cities.

***Ashland, Ky.**—Dr. L. M. Hunter, Owensboro, who plans the construction of a line between Ashland and Russell, will ask the City Council of Ashland for a franchise.

Henderson, Ky.—No bids were received for the franchise recently advertised for sale in Henderson. A new franchise was drawn up some time ago which it was proposed the Henderson Traction Company should purchase to take the place of the franchise that expired on Oct. 22. The City Council has approved a suggestion that cars be permitted to continue operating without the franchise, and a meeting has been called to consider the situation.

Springfield, Mass.—The Springfield Street Railway has completed plans for the Carew Street extension and a petition for a franchise is being drawn up and will soon be submitted to the City Council.

Buffalo, N. Y.—The Frontier Electric Railway, which will operate an express service between Buffalo and Niagara Falls, has filed an aceptance of a city franchise with the City Clerk which will permit the construction of a short stretch of track in North Main Street.

Walla Walla, Wash.—The proposition of granting a franchise to the Walla Walla Valley Railway for construction and maintenance of an electric line on South Ninth Street, from Orchard Street to Main Street, will be placed before the voters of Walla Walla at the November election. The Walla Walla Valley Railway petitioned for the franchise last summer.

TRACK AND ROADWAY

***Clarksville, Ark.**—It is reported that the construction of an electric railway from Clarksville to Hagarville, Silex and other points is proposed. Address Railroad Committee, Clarksville.

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company is reconstructing its tracks on Grand Avenue, laying heavier rails on a concrete base. The improvements are being made by the company prior to paving by the city.

Visalia Electric Company, Exeter, Cal.—Construction work will soon be begun on an extension of this company's line from Exeter in a general southeasterly and southerly direction to Ducor, Tulare County, a distance of approximately 33 miles.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will construct a double-track extension on Fourth Street between Ross and Minter Streets. The cost is estimated at $20,990.

Municipal Railways of San Francisco, San Francisco, Cal.—Bids were recently opened by the Board of Works for the construction of an extension of the Potrero Avenue car-line, the lowest bidder being Eaton & Smith, San Francisco, at $6,380.

Tidewater Southern Company, Stockton, Cal.—This company has filed with the Railroad Commission of California applications for authority to extend its line from Hatch to Irwin City, 8 miles, and to issue securities to pay for this extension, for freight terminals in Modesto and for other improvements of its system. The company wants to issue $600,000 of its common stock now in its treasury, to net $480,000 cash. The extension will cost $109,700. The remainder of the $480,000 will be devoted to procuring additional terminals.

Gainesville Railway & Power Company, Gainesville, Ga.—This company reports that it has just completed a 1-mile addition to its lines.

Savannah (Ga.) Electric Company.—It is reported that this company contemplates the construction of a 4-mile extension of its Millhaven line to Port Wentworth.

Chicago, Fox Lake & Northern Electric Railway, Chicago, Ill.—This company, which proposes to construct a line from Evanston to Palatine, has filed a petition with the Public Utilities Commission of Illinois asking for authority to issue capital stock to the amount of $362,700, to execute a mortgage for $2 000,000 and to issue bonds under the mortgage to the amount of $750,000. [Aug. 19, '16.]

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—This company will rehabilitate all of its tracks in Waukegan. Work has already been begun on the County Street line.

Union Traction Company, Anderson, Ind.—This company has begun work on a new switch to be laid on South Meridian Street between Sixteenth and Seventeenth Streets. The switch will be permanent and will cost $2,000.

***Richmond, Ind.**—Plans are being proposed for the construction of an electric railway between Richmond and Fort Wayne, via Union City, Winchester, Portland and Decatur. E. J. Skehan, formerly general manager of the Muncie & Portland Traction Company, now leased by the Union Traction Company of Indiana, and D. C. Moore of Richmond are interested.

Iowa Railway & Light Company, Cedar Rapids, Iowa.—This company contemplates the construction of about 2 miles of track extensions to its present lines in Boone.

Bay State Street Railway, Boston, Mass.—This company will construct an extension to the Country Club at Nashua, N. H.

St. Paul Southern Electric Railway, St. Paul, Minn.—It is reported that this company will construct an extension to Cresco, Iowa.

Kansas City, Mo.—The W. K. Palmer Company, 919 Baltimore Avenue, Kansas City, Mo., announces that it is in the market for about 35 miles of interurban railway, including rails, ties, all track and overhead material, cars and substation equipment. The W. K. Palmer Company, consulting engineers, are in charge of the engineering and business matters connected with the Oklahoma & Northern Traction Company which proposes to construct a line from Bartlesville east to Miami and thence to Joplin, with a branch from Miami to Columbus, Kan., and another to Baxter Springs, from 130 to 135 miles.

Southwest Missouri Railroad, Webb City, Mo.—Work will be begun at once by the Southwest Missouri Railroad on the construction of an extension from Galena to Baxter Springs, Kan., and it is expected that the line will be in operation within eight months.

Salem & Pennsgrove Traction Company, Salem, N. J.—Plans are being contemplated by the Salem & Pennsgrove Traction Company to construct an extension from Salem to Quinton. Carl N. Martin, Philadelphia, secretary.

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International Railway, Buffalo, N. Y.—So eager are officials of the International Railway to complete the new Buffalo-Niagara Falls express line and have it in operation early in 1917, that construction work through Tonawanda and North Tonawanda is now being rushed twenty-four hours a day. Most of the fill has been completed through these two cities and concrete abutments for most of the bridges are ready for the structural steel. Rails have been laid for part of the distance between Buffalo and Tonawanda and ties are now being laid between North Tonawanda and Niagara Falls. It is expected that one track will be laid before Dec. 31.

Panama Traction Company, Jamestown, N. Y.—It is reported that operation of gasoline cars has been begun by this company between Youngsville and Sugar Grove, 11 miles. Last spring rights-of-way were secured from Sugar Grove to Busti and surveys were made for two spurs from Busti, one extending to Jamestown and the other connecting with the Erie Railroad at Ashville. Rights-of-way have been secured from Ashville to Panama Rocks and construction work will be begun at once. This line will be extended to Erie, Pa. Several months ago the Panama Traction Company secured an option on Panama Rock and plans to develop it into a summer resort. R. L. Davis, Jamestown, is general manager. [April 22, '16.]

Toronto (Ont.) Suburban Railway.—The Ontario Railway Board is considering the advisability of constructing an extension of the Toronto Suburban Railway on Pape Avenue from Gerard Street.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa.—It is reported that this company plans to construct an extension to Tamaqua.

South Fork-Portage Railway, Johnstown, Pa.—This company reports that it will place in operation the latter part of this month one-half of its proposed line between South Fork and Portage and the rest of the road will be rushed to completion. Robert Pearce, Portage, president. [March 25, '16.]

Citizens Traction Company, Oil City, Pa.—Work has been begun by this company reconstructing its track on Pearl Avenue from Seeley Street to the junction of the Hoffman and Pearl Avenue lines at Stout Street and Harriott Avenue.

Three Rivers (Que.) Traction Company.—This company reports that operation will soon be begun on its extension to Cap de la Madeleine. The total mileage, including the Wyagamack branch, is 4.2 miles, the trackage comprising 7500 ft. of 60-lb. rail and 14,750 ft. of 75-lb. rail. All special work is of flange bearing manganese insert construction. The overhead construction is the usual cross span, direct suspension system with No. 000 trolley and aluminum feeders. Derail protection, with light signals, has been provided at two steam railroad crossings.

Saskatoon (Sask.) Municipal Railway.—The City Council of Saskatoon is considering the connection of the Clarence Avenue line with the Second Avenue line via the new Twenty-fifth Street bridge. The estimated cost is $10,000.

Charleston & Summerville Interurban Railway, Charleston, S. C.—It is reported that the Charleston & Summerville Interurban Railway has filed deeds to right-of-way preliminary to resuming work on its proposed line between Charleston and Summerville, about 22 miles. J. L. David, Charleston, president. [April 11, '14.]

Chattanooga Railway & Light Company, Chattanooga, Tenn.—A report from this company states that it has just completed the construction of 9.5 miles of track.

Fort Worth & Denton Traction Company, Fort Worth, Tex.—A certificate of dissolution has been filed at Austin by the Fort Worth & Denton Traction Company. This company was organized several years ago to promote the construction of an electric interurban line from Fort Worth to Denton. The project has now been abandoned, and a movement has been set on foot for a line from Dallas to Denton. [Nov. 20, '15.]

Tarrant County Traction Company, Ft. Worth, Tex.—The proposition of an extension of the Tarrant County Traction Company to Hillsboro via Grandview and Itasca, has been taken up by the Cleburne Commercial Club. The matter is being favorably considered by the company.

SHOPS AND BUILDINGS

Kankakee & Urbana Traction Company, Urbana, Ill.—A contract has been awarded by this company for the construction of a small carhouse at Paxton.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded a contract to Snare & Triest Company, New York, at $52,654, for the construction of concrete track floors and platforms over the mezzanines of eleven stations on the Culver line now under construction in Brooklyn.

Sand Springs Interurban Railway, Tulsa, Okla.—Announcement is made that work will be begun at once by the Sand Springs Interurban Railway on the construction of a four-story fireproof building at Main and Archer Streets for its general offices and terminal passenger station. The company will also erect a passenger station at the crossing on Third Street. The improvement will cost $150,000.

Johnstown (Pa.) Traction Company.—This company is rebuilding its office and shop building to give new locker and rest rooms for its trainmen.

San Antonio, Gonzales & Houston Interurban Railway, Houston, Tex.—This company, which proposes to construct a line from Houston to San Antonio, contemplates the erection of a number of small stations. Steeve Holmes, Leesville, president.

West Virginia Traction & Electric Company, Wheeling, W. Va.—This company will construct a new station at Atkinson's crossing near Reed's Mills.

POWER HOUSES AND SUBSTATIONS

San Diego (Cal.) Electric Railway.—This company contemplates the construction of a substation at Chula Vista.

United Railways & Electric Company, Baltimore, Md.—Work is under way by the United Railways & Electric Company on its new Belvedere Avenue substation. The West Construction Company, Baltimore, has the contract for the building and the Westinghouse Electric & Manufacturing Company has the contract for the complete electrical equipment, consisting of three 1500-kw., 375-r.p.m. rotary converters, nine 550-kva., 13,000-volt air-blast transformers, two blower sets, an air compressor and a small motor-generator set, necessary switchboards and switching equipment. The electrical apparatus will be installed early next year.

Interborough Rapid Transit Company, New York, N. Y.—A substation will be constructed by the Interborough Rapid Transit Company at 139th Street near Alexander Avenue. The structure will be 60 ft. x 100 ft., one story high, and will cost about $40,000.

Tidewater Power Company, Wilmington, N. C.—A report from this company states that it is constructing an extension to its boiler room and is installing a new boiler.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The capacity of the Lowellville power house of the Mahoning & Shenango Railway & Light Company will be increased at once. The capacity of the generating station was doubled last spring, when a 20,000-hp. turbo-generator was installed, making the capacity of the powerhouse 40,000 hp. Another General Electric turbo-generator will now be installed, bringing the total capacity up to 60,000 hp. The contract for the addition has been let to the Stone & Webster Engineering Corporation, which erected the addition completed only a few months ago. In all, considerably more than $1,000,000 will be spent on the improvement, which will include the new 20,000-hp. unit, batteries of Wilcox & Babcock boilers, even more extensive than those placed last spring; automatic stokers, a new big concrete stack, coal carrying and crushing equipment, and all other accessory equipment. All will be virtually duplicates of the equipment now in use. All will be housed in an addition to the powerhouse which will be approximately half the size of the present structure.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.—It is reported that this company has purchased a tract of land at Neenah for the construction of an electric light and power plant.

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Manufactures and Supplies

EDWARD N. HURLEY ON THE INDUSTRIAL SITUATION

American Industries Should Prepare Now for Stiff Competition After the War—Function of the Trade Journals

In an address before the Associated Business Papers at New York on Oct. 27, Edward N. Hurley, chairman of the Federal Trade Commission, discussed the need for business efficiency and industrial improvement after the war. He said that we think of Europe as a continent engulfed in war, devastated and disordered, but actually, under the stress of a life and death struggle, every effort is being made to obtain the highest efficiency in the production, distribution and use of commodities of all kinds. Conservatism in industrial ideas and methods has been blasted and shattered to pieces in the shock of war. New processes are being discovered, new inventions are being made and new forms of organization are being created. Books on efficiency and scientific management are being bought by the hundreds and studied. Great Britain has made thirty years of industrial progress in thirty months, and in Germany, which before the war was probably the most highly organized and efficient manufacturing country in the world, organization and efficiency have been still further developed. All this calls for greater manufacturing and merchandising efficiency in this country.

Mr. Hurley spoke of various methods by which this efficiency could be obtained. One is by the prompt publication in the trade journals of any industry of the improvements in that industry and the utilization of this information by the business men in that industry. Another is by a more exact cost accounting system, particularly among the smaller manufacturers. Another is by co-operation in trade associations. Another is by more close association between government and business. If government and business could once understand each other, one-half of the problem of successful co-operation among American business men for legitimate and necessary ends will be solved. The members of Congress wish to do the right thing by the people of the country, but they cannot be expected to be familiar with business problems unless an active effort is made to bring the facts of business to their attention.

In conclusion Mr. Hurley discussed the functions of the trade paper in improving industrial efficiency and said, in part:

"In the last analysis success in business depends upon the intelligence of the individual manufacturer. If he does not understand both the details and the broad aspects of the industry of which he is a part, he cannot expect to be successful. Our foreign competitors read most every article published upon their business with great care and thoroughness. Many of them have duplicate copies of their favorite trade paper sent to their homes so that they may read them away from their business without being disturbed. Many foreign manufacturers contribute articles to these journals on phases of the business with which they are most familiar. Such articles are bound to be helpful and give a constructive effect. Our trade journals and technical papers are the best in the world. These papers are preaching the gospel of sound business on practical lines and are helpful not only to business, but to the country as a whole."

FOREHANDEDNESS IN ORDERING CARS BENEFITS PURCHASER AND MANUFACTURER

Referring to the article on "Forehandedness Desirable in Buying," which appeared on page 915 of this paper for Oct. 21, a prominent car builder in a letter just received confirms some of the arguments made and states that the subject should excite interest and action.

He points out that up to the present year there had not been more than half a dozen car orders placed by the railway companies sufficiently in advance of their requirements to enable the manufacturers properly to schedule the various shop operations so that the cars could be built at a minimum cost. This year, however, the situation has been different. It has been next to impossible for the car builder to get his raw materials, particularly metals, in anything like the regular period, so that of a necessity an opportunity has been accorded in several instances to lay out properly the schedule and run the cars through the shops for a minimum cost.

Another typical reason for delay in ordering has been the desire on the part of the railway company to avail itself of the very latest ideas in construction. This state of mind has operated against the purchasing at an early time in the hopes of obtaining results from later developments.

The car builder also cited the fact that market conditions with the possibilities of rising and falling markets, always influence the buyer to delay ordering until the very last minute. If the market is high he hopes that it will drop and if it is low invariably he hopes that it will go lower. The only condition that really gives impetus to buying is a rising market, and everybody buys more rapidly and more favorably on a rising market than on a falling market.

INCREASE IN CAR WHEEL WEIGHTS DESIRABLE

Recommendations of Association of Manufacturers of Chilled Car Wheels Call for Increased Weight in Wheels and Increase in Metal of Flange at Gaging Point

The following are extracts from the annual address of President George W. Lyndon, delivered at the annual meeting of the Association of Manufacturers of Chilled Car Wheels:

"The work of our association during the past year has been based largely upon the recommendations made to the Master Car Builders' wheel committee during the year of 1914. At this time we not only outlined a plan of procedure for the improvement of the chilled iron car wheel by which the safety element stood out prominently, but accompanied our recommendation with full data pointing out the weaknesses of the present M. C. B. standards. We also gave our reasons for recommended changes based upon the knowledge acquired from service records and the lifelong experience of the manufacture and service of the chilled iron wheel. Our recommendations were substantially as follows:

"1. An increase in the weights of the 625 and 725-lb. M. C. B. wheel;

"2. An 850-lb. wheel for cars of 140,000 lb. capacity;

"3. A flange for the 850-lb. wheel for use under the 70-ton cars with as much of an increase as would be acceptable to the American Railway Engineering Association.

"Since our organization in the year 1909, we have steadfastly maintained that the varied service in the 60,000-lb. class of cars made it imperative that the weight of the wheel should either be increased to meet the maximum conditions of service, or that we should have two standards in this class. The variation in service arises from the variations in the light weight of the car in the 60,000 lb. capacity class, and as the standard of operation is to brake the cars 60 per cent of their light weight, it must follow that any class of cars in which there is 100 per cent variation in light weight (which is common in the 60,000-lb. class) cannot with safety carry the same weight of wheel, and this is what the manufacturers have been required to do.

"The standard wheel specified for the 60,000-lb. class weighs 625 lb. and the light weights of the cars vary from 20,000 lb. to 53,000 lb. Our association recommended that the weight of the wheel be increased to 675 lb., which would provide a standard wheel which would meet the maximum conditions of service as to load and brake. In asking for an increase in weight of the two standards 625 and 725 M. C. B. wheels, we were not actuated by commercial considerations, but purely from the standpoint of safety.

"It is estimated that there are 2,500,000 chilled iron wheel renewals annually. If the weights should be increased 50 lb. each the additional metal to be purchased would approximate 62,500 tons, providing all the renewals required an increase, which is by no means the case. Many of the

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prominent railroads in the country representing more than a fourth of all the cars in use, are already introducing advanced standards and are using wheels much heavier than the present M. C. B. standards. The heaviest 725-lb. M. C. B. standard chilled iron wheel for 50-ton cars is lighter than the rolled steel wheel. Hence there is no good reason why the chilled iron wheel should be so limited in weight, particularly when the increase involves the nominal expenditure of $10 per ton, this being the difference between the scrap value of the old wheel, which is accepted in part payment for the new. The reduction in accident hazards would more than absorb the increased expense due to the nominal increase in weight.

"Ever since the introduction of the 50-ton car, our association has recommended an increase in the metal of the flange at the gaging point. A committee of the American Railway Engineering Association appointed for the purpose has reported that the manufacturers could increase this flange width 3/16 in. without any change in the present flangeways of track. The Master Car Builders' wheel committee has reported in convention that there be no changes in the dimensions and contour of flanges of car wheels as adopted in the year 1909. This flange was an improvement over the M. C. B. design and through the recommendation of our association we succeeded in reducing its height from 1⅛ in. to 1 in., which gave it greater strength and we know that we can make further improvements. It needs no argument to prove that a stronger flange is required for the 70-ton cars than for the 30-ton cars.

"Our association has made a very satisfactory arrangement with the University of Illinois through Dean W. F. N. Goss, in which it is agreed that the university experiment station will undertake an investigation concerning the stresses and behavior of chilled iron car wheels.

"In submitting a draft of this arrangement to the President of the University of Illinois, Dean Goss called attention to the fact that there are now in operation in the country approximately 20,000,000 freight car wheels, and the demand for renewals alone involves the manufacture of 2,500,000 chilled iron car wheels per year.

"No other type of wheel has ever made serious inroads on the chilled iron wheel and never will, providing we are all alive to the increased demands of service, and for two-thirds of a century the chilled iron car wheel has remained the standard for the nation's commerce."

The officers elected for the ensuing year are the following: George W. Lyndon, president-treasurer; E. F. Carry and J. A. Kilpatrick, vice-presidents; George F. Griffin, secretary; F. K Vial, consulting engineer. The board of directors is as follows: E. F. Carry, president Haskell & Barker Car Company; W. S. Atwood, chief engineer, Canadian Car & Foundry Company; Charles A. Lindstrom, assistant to president Central Carwheel Company; F. K. Vial, chief engineer Griffin Wheel Company; A. G. Wellington, president Maryland Carwheel Works; W. C. Arthurs, president Mount Vernon Car Manufacturing Company; J. D. Rhodes, president National Carwheel Company; F. B. Cooley, president New York Carwheel Company; A. J. Miller, general manager Ramapo Foundry & Wheel Works; William F. Cutler, vice-president Southern Wheel Company, and J. A. Kilpatrick, president Albany Carwheel Company.

F. O. GRAYSON PREDICTS BETTER BUSINESS IN THE SOUTHWEST

General Business Conditions Are Improving, Traffic Reviving, One-Man Cars Popular

"Practically no new railway work has lately been started in the Southwestern states, but general conditions are such that the railway supply people may look for good business from there before long." This statement was made recently by F. O. Grayson, president Grayson Railway Supply Company, St. Louis, Mo. Mr. Grayson for years has enjoyed intimate sales contact with the electric railways of the South and Southwest, particularly in the states of Missouri, Oklahoma, Texas, Arkansas and Louisiana.

Speaking of conditions in Texas, Mr. Grayson said that the electric roads had recently been buying only operating necessities. Revenues and expenses were such that no other course could be followed. For example, the jitney competition in many other parts of the country had largely become an unimportant factor, but in most parts of Texas the jitneys were still doing 75 per cent as much business as they ever did. Street railway traffic, however, Mr. Grayson said, was showing a steady growth and even with the jitneys as persistent as they are some roads were beginning to show increases over earlier days.

The underlying conditions in the cotton states warrant the statement that railway supply business will be much better within a year. The cotton growers last year were but slowly recovering from the previous year's loss on the cotton crop. Now cotton is priced around 18 cents a pound—more than twice the prices of 1914. By the end of this year the former will have received their money for this year's crop and they will then commence local buying. This means better business at once for the trolley lines and, in turn, more orders for the material manufacturers.

In Mr. Grayson's opinion the small, light, safety type of car, which can be operated by one man, will be largely bought by the Southwestern roads when the traffic requires additional equipment.

COMMERCE BUREAU REQUESTS CATALOGS FOR VALPARAISO, CHILE

The Bureau of Foreign and Domestic Commerce through Norman L. Anderson, commercial agent of the Chicago office, 504 Federal Building, advises that the National City Bank of New York will soon open a branch in Valparaiso, Chile, and that it will be glad to receive catalogs of American manufacturers to be placed on file for the use of interested parties. Copies of catalogs should be sent postpaid to the National City Bank of New York, Box 1508, Valparaiso, Chile.

ROLLING STOCK

Central Illinois Public Service Company, Mattoon, Ill., is reported to be considering the purchase of nine small cars.

Jackson Railway & Light Company, Jackson, Tenn., noted in the ELECTRIC RAILWAY JOURNAL of Sept. 9, 1916, as being in the market for two one-man car bodies, has purchased this equipment from the Southern Car Company, High Point, N. C.

Oklahoma & Northern Traction Company, Bartlesville, Okla., through its consulting engineers, the W. K. Palmer Company, Kansas City, Mo., is receiving bids on four interurban cars, three city cars, two baggage cars and two electric locomotives.

TRADE NOTES

Charles N. Wood Company, Boston, Mass., has recently moved from 79 Milk Street to 14 Federal Street.

U. S. Metal & Manufacturing Company, New York, N. Y., has received an order from the United Traction Company of Albany, N. Y., for twenty Johnson fare boxes.

Perry Ventilator Company, New Bedford, Mass., has received an order to equip with ventilators the forty-two cars recently ordered by the Boston Elevated Company from the Pressed Steel Car Company.

Barnes & Kobert Manufacturing Company, New Britain, Conn., announce that the corporate name of the firm has been changed to the B & K Manufacturing Company. The executive and general offices of the company are now located at the New Britain factory.

George O. Smalley has been promoted to first vice-president and general manager of the Bound Brook Oil-less Bearing Company, Bound Brook, N. J., succeeding the late Leigh S. Bache. Mr. Smalley has been connected with this company for the last ten years, for the last four years in the capacity of assistant general manager and assistant treasurer. He is therefore thoroughly conversant with the methods of both the sales and production departments of this rapidly growing business.

Westinghouse Air Brake Company, Wilmerding, Pa., at the annual meeting of stockholders held on Oct. 17, re-elected the president and board of directors for the coming year. Under a new arrangement the ranking officer of the company, H. H. Westinghouse, will be the chairman of the board. The other officers elected to complete the organiza-

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tion are: John F. Miller, president; A. L. Humphrey, vice-president and general manager; S. C. McConahey, acting vice-president; R. F. Emery, secretary and treasurer, and Charles A. Rowan, controller.

T. C. White & Company, St. Louis, Mo., report that the overhead line material manufacturers have been forced to raise their prices in accordance with the increases in the costs to them of copper, tin, zinc and malleable castings. Thus the prices for the ordinary styles of insulated trolley hangers have so increased that the porcelain insulated trolley hangers may now be sold on a more equal price basis. The porcelain insulated hanger manufactured and sold by this company consists of but three parts: a hanger bolt, a porcelain spool through which the bolt passes, and a malleable-iron yoke surrounding the spool and hooking over the span wire for support. For several years it has been necessary to base the claims for the sale of this type of hanger on its long life due to non-deterioration of the insulation and on the high insulating qualities gained from the use of porcelain rather than composition. Now the increase in the price of bronze has brought the cost of ordinary hangers up to such a point that it comes within the selling range of the porcelain insulated hanger. This evening of prices is bringing about an increase in the number of porcelain insulated hangers sold. The white type F porcelain trolley hanger has been regularly used since March, 1914, when it was first installed in actual service on the lines of the East St. Louis & Suburban Railway. Samples have been under test for three and one-half years. Mr. White states that his company has a generously large reserve supply of malleable yokes on hand and that the porcelains, which are made by the dry process, can be obtained readily, so that deliveries on porcelain insulated hangers can be made within a week. In addition to an increased number of inquiries from local roads, Mr. White reports an exceptional number of foreign inquiries.

ADVERTISING LITERATURE

E. C. Atkins & Co., Indianapolis, Ind., has issued a pamphlet on the Atkins "Kwik-Kut" power hack saw machine.

American Cotter Pin Company, Pittsburgh, Pa., has issued a bulletin on its Kelkoter self-spreading cotter pin.

Ohmer Fare Register Company, Dayton, Ohio, has issued a catalog of parts for fare registers and equipments.

McQuay-Norris Manufacturing Company, St. Louis, Mo., has issued a pamphlet on its leakproof piston rings.

U. S. Metal & Manufacturing Company, New York, N. Y., has issued a pamphlet on Clapp's fire resisting paints.

Eclipse Railway Supply Company, Cleveland, Ohio, has issued a folder describing and illustrating its Acme fender, Eclipse wheel guards and Eclipse life guards.

Sangamo Electric Company, Springfield, Ill., has just issued an illustrated pamphlet describing its type D5 two-wire and three-wire direct-current watt-hour meters.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued circular No. 1571 describing and illustrating its drum-type controllers for railway service.

Joseph Dixon Crucible Company, Jersey City, N. J., has issued a little booklet on "Paint for Roofs" containing testimonials from a number of users of its silica-graphite paint.

Anglo-American Varnish Company through its agent, the U. S. Metal & Manufacturing Company, has issued a bulletin on the AA shop cleaner for scouring and cleaning coaches.

Wasson Engineering & Supply Company, Milwaukee, Wis., through its agents, Holden & White, has issued a pamphlet on the Wasson type NR. non-retrieving trolley base for city cars.

Reliance Ball-Bearing Door-Hanger Company, New York, N. Y., which is represented by the Ellcon Company, has issued an illustrated catalog describing its door hangers and appliances.

Electric Service Supplies Company, Philadelphia, Pa., has issued a pamphlet on a wear-proof mat. This mat is constructed from units composed of felt and metal strips. The mat rolls up like a rug and can be conveniently stored.

The Ellcon Company, New York, N. Y., has issued a pamphlet showing the installation of its white porcelain enameled stanchions with special metal fittings installed in one of the new cars of the New York Municipal Railway Corporation.

Indianapolis Switch & Frog Company, Springfield, Ohio, has issued a pamphlet giving a partial list of users of Indianapolis electric welders and welded joints. This pamphlet also shows the different types of Apex and Simplex joints for girder and high T-rails.

Peter Smith Heater Company, Detroit, Mich., has issued bulletin No. 8 on thermostats for electric car heaters. This bulletin shows schematic diagrams of the electric car heater thermostat control along with descriptions and illustrations of the automatic switch, interlock knife switch and of a thermometer.

Nachod Signal Company, Louisville, Ky., has issued a booklet describing signal systems which includes a number of types. In this pamphlet are illustrated a few representative illustrations of this company's equipment showing their application to both city and interurban requirements.

C. D. Pruden Company, Baltimore, Md., has issued a catalog on its Prudential portable fireproof steel buildings and garages. One of the garages which is described and illustrated is that owned by the Rapid Transit Subway Construction Company and is installed at Madison Avenue and Forty-second Street, New York, N. Y.

Railway Improvement Company, New York, N. Y., has issued an operating and engineering data book on its Rico coasting recorder. This twenty-four-page publication contains descriptions and illustrations of coasting time recorders and terminal clocks installed on several large city railways and also shows graphically the entire operation of the coasting recorder system.

Gurney Ball-Bearing Company, Jamestown, N. Y., has just issued Catalog H2 on Gurney ball-bearing hangers. This forty-page catalog describes and illustrates drop hangers, post hangers, adapter bearings, floor stands, rigid pillow blocks and loose pulley adapters. Six pages of this catalog are devoted to pulley and belt data, horsepower of shafting, size of keys, etc. In addition application of some of these above-named devices are illustrated.

Goldschmidt Thermit Company, New York, has just issued pamphlet No. 12 on the thermit process of rail welding. The method of inserting the weld, preheating the rails and completing the weld with thermit by which a liquid steel is created at 5000 deg. Fahr. and poured around the rail is fully described and illustrated. The welding of a compromise rail joint between the "T" rail and groove rail and also the modification of the "Clark" joint is given in considerable detail.

General Electric Company, Schenectady, N. Y., has just issued bulletin No. 44,419 on railway motor gears and pinions. This bulletin describes and illustrates forged gears, solid cast-steel gears, split cast-steel gears, composite gears and spring gears. It also shows types of popular wheel-press jigs and a pinion pulley. A section of the bulletin containing ten pages is devoted to gear formulas, classification and principal dimensions of General Electric and Westinghouse gears and comparative sizes of gear and pinion teeth.

NEW PUBLICATIONS

Reasonableness and Legal Right of Minimum Charge in Public Utility Service. By Samuel S. Wyer, Columbus, Ohio. Reprinted by American Gas Institute, 29 West Thirty-ninth Street, New York, N. Y. Eighty-two pages. Paper, $1.

The necessity of the minimum charge to prevent discrimination and compel each class of consumer to pay for the service received, is demonstrated in this book, as well as the fact that there are ample precedents for making the minimum charge proportional to the size of the consumer's demand for service. The various decisions underlying these principles are quoted, and two alphabetical tables of adjudicated and non-adjudicated monetary allowances for such charges in existing rate schedules are presented. Extra copies of the book can be secured from the secretary of the American Gas Institute, George G. Ramsdell, at the following prices: Twenty-five copies, $20; 100 copies, $50, and 500 copies, $200.

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Electric Railway Journal

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DO YOUR SNOW-EQUIPMENT OVERHAULING EARLY

The perennial advice to do Christmas shopping early that usually begins to be spread broadcast by everybody to everybody at about this time might well be applied in the case of snow-fighting equipment on electric railways. Indeed, there is even greater necessity for forehandedness in the case of snow-equipment repairs than in Christmas shopping, because the date set aside for the annual exchange of gifts is unalterably a calendar fixture, while the date of the first heavy snowstorm may be almost any time. It is not unreasonable to expect snow on any day after election day, Northern New York having already had a 2-in. fall. Yet a recent trip along the shores of the Great Lakes has disclosed place after place unprepared, sweepers and snowplows being stowed away at the ends of long lines of summer equipment, sadly in need of inspection and at least some repairs. If the same situation exists in the stores department, and there is only an insufficient supply of salt, brooms and shovels, it is safe to say that the first snow-storm will be in the nature of a disaster in disorganizing the service and in direct loss of revenue—the price paid not only by those lacking in foresight, but by those too busy with other things to exercise it.

MAKING FARE ZONES UNIFORM

A favorable answer to the Massachusetts Northeastern Street Railway's petition to the New Hampshire Public Service Commission for the right to establish a 6-cent fare unit on its lines within the Granite State was in a measure expected, in view of the fact that the Massachusetts board had allowed the 6-cent rate for lines of the company operating under its jurisdiction over a much more populous territory. The two commissions sat jointly during a part of the hearings on the new tariff, and their similar though separate conclusions are welcome. One point of special interest in the New Hampshire case has to do with the length of fare zones. To the disadvantage of the company, a single fare has previously prevailed over the Hudson-Pelham Center line, which is 6.22 miles in length, as compared with an average zone length of about 3 miles on the system. The commission logically held that the maintenance of so long a zone was an unjustified discrimination, and it approved the subdivision of the long zone into two virtually equal sections. By this action, the company will secure a much fairer return for its service over the section in question, and the public over the entire system will receive uniform treatment as to rates. The case illustrates the point that rates may sometimes be discriminating and at the same time most unprofitable to the operating utility, and that local increases may offer the most equitable solution from the dual standpoints of the company and its patrons.

FINANCING THE BOMB SQUAD

"It is all beautifully simple. You give the strikers a nickel and they buy a brick with it and soak you with the brick." Thus spoke Don Marquis recently in his column in the New York *Evening Sun*, in satirically commenting upon the fact that striking carmen in New York City were stationing organ grinders along the streets to beg financial aid from the general public. When we published Don Marquis's remarks in last week's issue, however, their truth had not been fully brought home to the public. Last Saturday four officials of the union local, a striking subway guard and a chauffeur were arrested and charged with complicity in a plot that had resulted in the dynamiting of the 110th Street and Lenox Avenue subway station on Oct. 25. Probably the most striking revelation made by the police was that the money used to buy the dynamite and carry out the plot came from the nickels and dimes taken in by the strikers' hand-organ collectors. The folly of lending financial aid in a haphazard manner to an uninvestigated, and, on its face, questionable cause, was never better illustrated. It is to be hoped that the public has learned its lesson. The Amalgamated Association officials promptly disclaimed any knowledge of the plot, but it would have been very much more to their credit if they had been responsible for its detection rather than the police, especially as they should have known what the local treasurer was doing with the money collected. The least thing which these officials can now do is to make plain to both public and police that they are co-operating to the fullest extent with the authorities in running down all who had anything to do with this dastardly outrage.

CAR SHORTAGE AFFECTING POWER PRODUCERS

Reports from western Pennsylvania and Ohio indicate an unprecedented situation in that power producers are unable to obtain deliveries of steam coal under their contracts, the reason being the inability of coal producers to supply fuel according to agreement because of a severe and apparently growing shortage of cars. In the absence of extended storage supplies of coal, this places before the power station operators the sole alternative of going out in the open market and purchasing fuel at prices two or three times greater than those normally obtaining under long-time contracts, and

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where the demand is for 100 tons or more daily the added expense becomes staggering. The situation seems to have become acute only within the past couple of weeks, and it is, of course, possible that it is sufficiently local in character to be short-lived. Nevertheless, under present conditions, wherein the regulation-hampered transportation systems of the country are glutted with freight that their arbitrarily-restricted facilities cannot handle, it becomes quite possible for such a coal-car shortage as exists in Ohio to spread over a considerable area, and it behooves every electric railway that produces its own power to be prepared to meet the condition. Stored coal is, perhaps, the most obvious safeguard, but another is the purchase of private cars by the power producer for use only in his coal service, and at least one of the companies affected by the present situation is considering this plan. However, whether this would be more desirable than the costlier plan of coal storage is incidental. The immediate necessity is preparedness in some form in case the coal-car shortage spreads.

AXLE-MOUNTED MOTORS ON FLEXIBLE TRACK

In connection with our comment of three weeks ago on the absence of damage to the track on the Chicago, Milwaukee & St. Paul Railway's electrified divisions there has been raised the question of cause and effect, reference being made to the fact that direct-mounted motors of very much less weight than those on the Milwaukee invariably make trouble with rails laid in city streets.

Admitting this to be absolutely true, however, does not render unreasonable the results that have been obtained with the Milwaukee's axle-mounted motors. On a track that is laid according to steam railroad standards, vertical flexibility is invariably present. Each tie "pumps" through a goodly fraction of an inch as heavily loaded wheels pass over it, and the rail, during the passage of a train, moves in a clearly-defined series of waves. In consequence of this freedom from rigidity, joint trouble such as that which occurs on city systems, where the rails are held rigidly in the plane of the street pavement, is absolutely unknown. Although the use of plain joint plates having only four small bolts might appear to be an invitation to joint trouble from the viewpoint of a city railway's maintenance engineer, such a construction has been in use for years under heavy electric locomotives without any evidences of distortion.

Flexibility of roadway is, no doubt, dependent to some extent upon climatic conditions, as exemplified by the fact that rail breakages on steam roads are more frequent in winter than in summer, one frequently advanced reason being that the frozen ground acts like a solid anvil upon which the rail is pounded. Yet the assumption of a hard-frozen track involves also the assumption of insufficient or imperfect drainage, and where ballasting of desirable materials and ample depth is provided it is difficult to see wherein general track conditions could be greatly affected by the existence of low temperatures.

In brief, the electrically operated railway, heretofore, has been almost invariably compelled to provide extreme rigidity of track, and with this has developed a conception of the phenomena of rolling loads that is based primarily upon this condition. Now that electric equipment is coming to be used upon the non-rigid roadbed common to steam railroad practice, a revision of ideas seems to have become necessary.

RAIL CORRUGATION STUDIES IN CHICAGO

The further testimony on the subject of rail corrugation, presented this week as a result of the studies made in Chicago, throws interesting light on the subject, although it does not conclusively prove or disprove any of the theories which have been advanced to account for this most mysterious phenomenon. Chicago is peculiarly well suited for a study of this kind, because much of the rail there was laid at about the same time, and also because two distinct types of track sub-construction were employed, namely, concrete and ballast. As steam railroad track which is laid on ballast is much less subject to corrugation than electric railway track, it has been hoped that the use of ballast in city track would reduce the trouble, but practically no difference was found in Chicago between the two types of sub-construction used. The natural conclusion is that where heavy girder rails are held tightly in the pavement and the sub-grade and ballast are thoroughly rolled, the conditions are as favorable to the development of corrugation—if corrugation is caused by rigidity—as if the track was laid on concrete.

The relation of the contour of the wheel to that of the rail was also considered in the Chicago analysis, and the conclusions reached were the same there as elsewhere, namely, that where the bearing of the wheels on the rail is only along the gage line, the steel in the rail becomes cold rolled and corrugation begins. As observations in the field showed slightly greater signs of cold rolling on rails having considerable corrugation than was found on rails where the wear appeared only along the gage line, the Chicago engineers believe there is some connection between the amount of cold rolling and the amount of corrugation, although they take care to explain that the cold rolling may have been effected by many other causes than merely by a difference in contour between wheel and rail.

Those in charge of the analysis do not advance any theory as to the cause of rail corrugation as a result of their observations. This is a wise policy, because while we believe the ultimate cause or causes will be determined and that progress is being made in this direction, we do not believe that the solution will be found from a study of the conditions on any one property. If it was otherwise, the cause would have been determined long ago. Nevertheless, it is only by such studies as have been made in Chicago and conducted with equal care that the problem will be solved. The answer is elusive, but that fact should not discourage investigation. Rather it should make the solution all the more eagerly sought.

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Cure the Sores in Time

The Early Use of Publicity Ointment Would Have Saved This Doctor's Visit

UNLESS your road is the Millennium Rapid Transit Company there are sore spots in your relations with the public.

These may be caused by things that you have done or left undone; in either case they are dangerous if neglected.

The only way to cure these sores before they become dangerous and require the services of a doctor (or perhaps of an undertaker) is by applying THE OINTMENT OF PUBLICITY.

Publicity means an attempt to bring about an understanding with the public even if it involves a frank confession that for once the railroad was wrong but won't do it again.

Some publicity campaigns are principally noteworthy for the ingenious presentation of subjects that the railroad wants the public to think about; there is always, and properly, more or less matter of this kind.

But the KIND OF PUBLICITY THAT STICKS ITS HEAD IN THE SAND never accomplishes very much; the successful publicity campaign must concern itself with things about which the public is clamoring for information.

Why can't I get a seat? Why can't we have more transfers? My taxes have gone up, why shouldn't yours? These are the kind of questions that car riders want answered.

To ignore these and more serious questions only leads to the formation of convictions almost invariably hostile to the utility corporation.

If explained as they arose there would be few serious controversies between corporations and the public they serve.

Very often a thing can be explained BEFORE IT OCCURS; a new type of car or a change in service or a franchise extension can be prepared for in a way to make it popular.

These things don't "happen." They are premeditated. Practically everything which the railway does is premeditated. Changes such as those mentioned should be bulletined to the public long in advance.

Or the railroad can stand mute until some newspaper springs the story in such a way as to put the corporation in wrong from the start.

In the latter case the corporation has an uphill fight on its hands—a fight which A SIMPLE REMEDY or A LITTLE FORESIGHT would have avoided.

If there is not a conscious policy of "taking the public into your confidence," the question,—What will people say?—is not likely to be asked with sufficient frequency or seriousness.

The safest way is to have a man on the staff whose particular and only business is to ask that very question, WHAT WILL PEOPLE SAY?

And to do everything humanly possible to avoid the thinking and saying of things that are untrue, unfair or unpleasant.

Yes, you have guessed it. Such an individual is known as a PUBLICITY MAN.

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An Interurban Freight Line in the Farthest Northeast

Two-Thirds of the Revenue of the 32-Mile Aroostook Valley Railroad of Northern Maine Is Obtained by Handling Lumber and Farm Products in Twenty-Car Trains That Are Hauled by 1200-Volt Locomotive Equipment

WITHIN a few miles of the international line that bounds the State of Maine on the East, and in the extreme northeastern corner of the country, is an interurban property, the Aroostook Valley Railroad, that may justly lay claim to distinction upon grounds other than its geographical location. Since the completion, some four years ago, of the 32-mile route now in service, a freight business amounting to upwards of $60,000 per annum has been developed, so that this field of revenue actually brings to the company about double the returns that are obtained from passenger service.

The original section of the road to be constructed extended between the towns of Washburn and Presque Isle with a spur to make a connection with the Canadian Pacific Railway at Washburn Junction, the latter being a town of 800 inhabitants, while Washburn and Presque Isle have populations respectively of 1600 and 3000. This section of the line, which was built in 1910, was about 10 miles in length, passing through several small villages en route. In 1912 the road was extended north and east from the terminal at Washburn to West Caribou, this being a village across the Aroostook River from the town of Caribou which has a population of 5500 and is the largest community in the district, and an 8-mile branch was built northward to Sweden, a town of 1000 population.

AROOSTOOK VALLEY RAILROAD—CONCRETE ARCH BRIDGE OVER PRESQUE ISLE STREAM

All of these towns are located in the midst of an extensive farming and lumbering district in Aroostook County, famous almost the world over for its potatoes since the county alone contributes the major portion of the annual yield of potatoes for the State of Maine, approximating 24,000,000 bushels. In addition, large quantities of hay and other produce are raised for shipment, and there is an extensive lumber trade throughout the district, as it is on the edge of the still unexploited sections of the Maine woods whose supplies of timber once made the shipbuilding industry of the United States a dominating influence in the world's commerce.

Because of the relatively small population of the communities within the district and the extensive farming and lumbering industries the freight business of the railway has been developed with greatest rapidity. For the year ending July 1, 1915, the freight that was handled amounted to 75,580 gross tons. Included in this traffic, outward bound, were more than 1,000,000 bushels of potatoes and large quantities of lumber, starch and hay. In addition there was an inward-bound traffic of fertilizer, grain, flour and other supplies. A considerable portion of the traffic is interchange freight with the Canadian Pacific Railway, physical connection between the two roads being made at the previously-mentioned town of Washburn Junction. An extensive package and light express business also is carried on by utilizing the baggage compartments of the regular passenger cars, since the small villages through which the line passes have no means of communication with the outside world other than wagons that have to be hauled over bad roads through a heavily wooded and rough country.

As remarked above, the railway operates 32 miles of route, providing 37.7 miles of single track, and 1200-volt equipment is used. Train service is conducted strictly in accordance with steam railroad standards for both passenger and freight movements, a chief dispatcher being located at Presque Isle from which office telephone connections are maintained with the various sidings and terminals. At the present time the passenger service consists of six trains per day in each direction, four between Presque Isle and Caribou and two between Presque Isle and Sweden. The freight traffic is handled by a single train that makes a round trip over the entire line each week day. Trains of more than twenty cars are frequently hauled during the winter season when traffic is heavy, advantage being taken of the fact that grades are generally in favor of the heaviest shipments.

TRACK AND OVERHEAD

The entire road is laid with light grades and curves and is thus adapted to handling an extensive freight traffic. With a few exceptions the grades are limited to 1 per cent, generally in favor of the outward-bound

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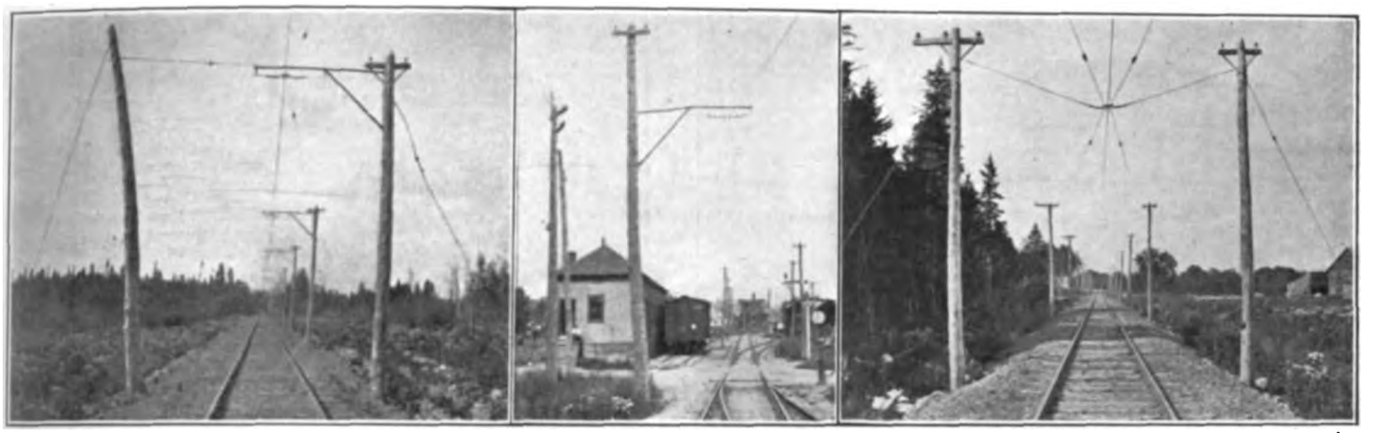
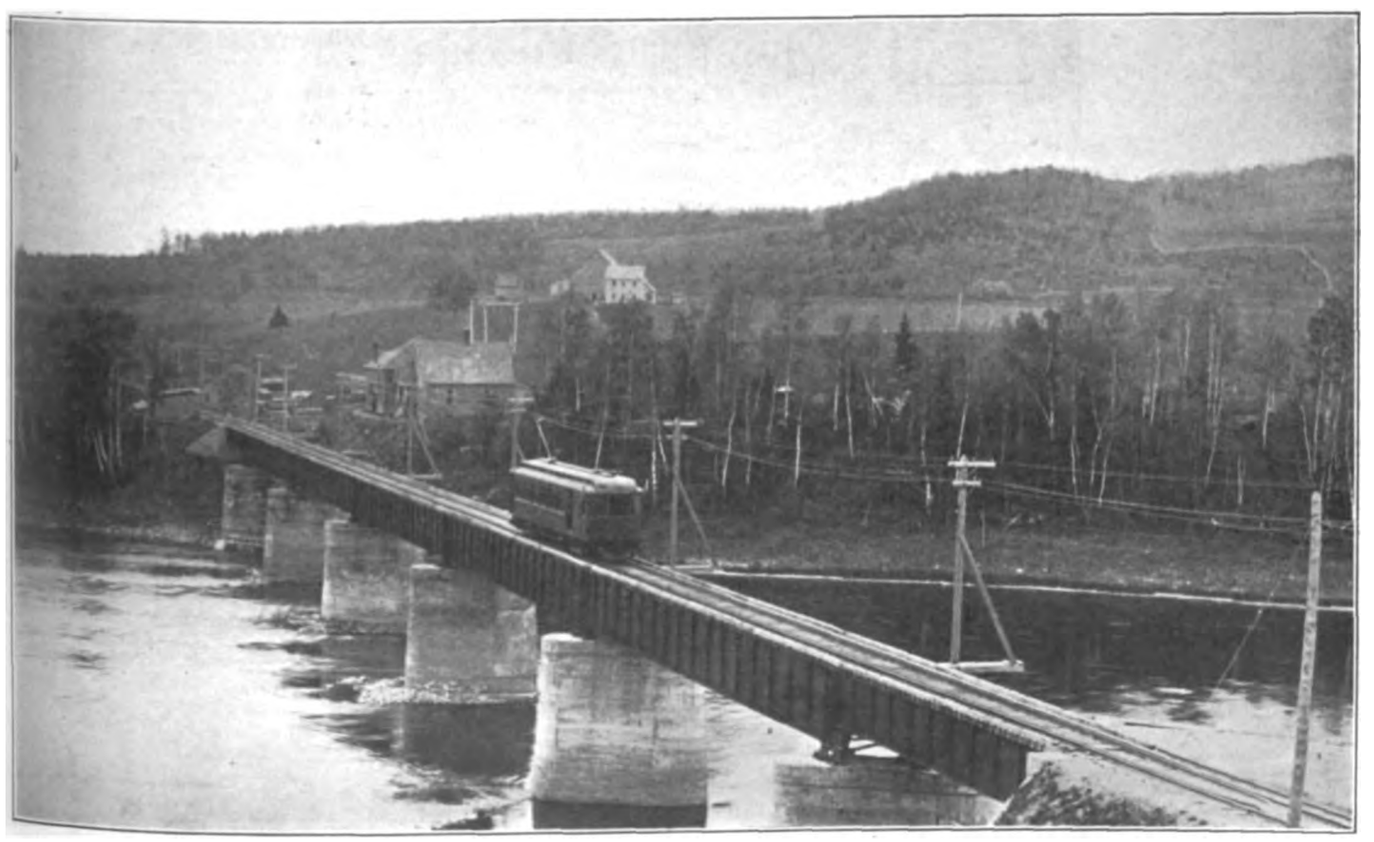


AROOSTOOK VALLEY RAILROAD—TYPICAL BRACKET CONSTRUCTION FOR 1200-VOLT CONTACT SYSTEM; OVERHEAD CONSTRUCTION AT SIDING, SHOWING ABSENCE OF FROGS; SPAN CONSTRUCTION FOR 1200-VOLT CONTACT SYSTEM

traffic, and surveys have recently been made with the idea of reducing still further the maximum grades. The road is single track throughout and is constructed over a private right-of-way with the exception of about 2 miles east of the town of Washburn, where the tracks follow a highway. For the overhead contact system both bracket and span construction are used with 30-ft. wood poles and a direct-suspended No. 0000 trolley wire. The only feeder copper that is installed in addition to the trolley wire is a single No. 0000 wire extending from the substation at West Caribou for a distance of 12 miles along the outlying branch to Sweden. Of course, the track is of standard gage, and it consists of 70-lb. steel rails with No. 0000 concealed bonds. At the sidings and spurs the use of frogs has been avoided altogether. To this end the trolley wire from each siding is brought out parallel to the main line for a suitable distance and there is no connection between the two contact wires. While this necessitates changing the trolley pole when a siding is entered, a train which is about to be sidetracked is usually approaching at a low speed, while trains that are moving along the main line are usually running at full speed. In any case it is considered that, with a trolley frog in the wire, it would be necessary for the conductor to look after the trolley pole to a certain extent, and therefore the shifting of the trolley pole involves but little additional effort.

Two bridges of interest from a civil engineering standpoint are used on this road. One of them, which crosses the Aroostook River between Washburn and Presque Isle, consists of steel girders mounted on a series of solid concrete piers. The other is located on the freight line that makes connection with the Canadian Pacific Railway at Washburn Junction and crosses a tributary to the Aroostook River called the Presque Isle Stream. This bridge, 100 ft. in length, is constructed of reinforced concrete and it replaces a pile trestle which was removed to effect a reduction in grade.

Numerous spurs and sidings have been constructed at various points along the line to reach the storage warehouses that have been constructed by the company for holding potatoes and also for incoming freight. The



AROOSTOOK VALLEY RAILROAD—STEEL BRIDGE OVER AROOSTOOK RIVER

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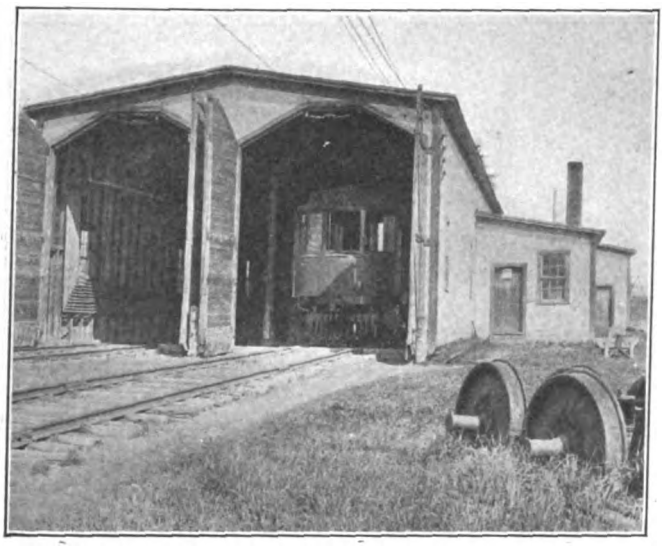
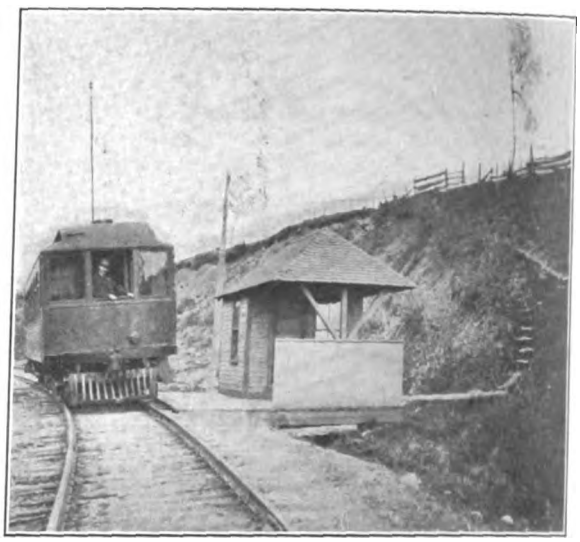


AROOSTOOK VALLEY RAILROAD—CARHOUSE AT PRESQUE ISLE



AROOSTOOK VALLEY RAILROAD—TYPICAL WAY SHELTER

use of storage warehouses is almost essential to the handling of freight traffic in this locality, since large quantities of potatoes and hay must be stored for winter shipment in accordance with market conditions, while many carloads of fertilizer and other supplies must be held until road conditions will allow heavy teaming to farms that are located at some little distance from the railway line. Altogether the Aroostook Valley Railroad has the equivalent of sixty-three 50-ft. storehouses which are reached by the company's tracks.

POWER SUPPLY AND SUBSTATIONS

All electric power required for operating the railway as well as for the local power and lighting in the various towns along the route, is supplied by the Maine & New Brunswick Electric Power Company, Ltd., from a hydroelectric plant located on the Aroostook River about 2 miles across the international boundary in the province of New Brunswick. This power station contains one 1500-kw. and two 500-kw. horizontal units operating under a 78-ft. head. The dam is about ½ mile above the power house and water is conducted to the fore bay through a canal cut out of solid rock. The water supply is ample at all seasons and no steam or other reserve power is required for the system. Sixty-cycle power is generated at 11,000 volts and is transmitted to substations at this voltage. In addition to the railway load the power company supplies electricity for a large number of towns in this section of the State of Maine, the entire system including 115 miles of transmission lines operating at 11,000 volts and 45 miles operating at 33,000 volts.

One of the railway company's substations, which is located at the town of Munson Hill on the

AROOSTOOK VALLEY RAILROAD—FREIGHT TRAIN HAULED BY 40-TON 1200-VOLT ELECTRIC LOCOMOTIVE

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Aroostook River midway between Presque Isle and Washburn, is supplied over an independent line usually operated from a separate generating unit, while the other railway substation, located at Caribou, takes care of a combination railway and power load.

These two 1200-volt direct-current substations, which supply all current for operating the railway, contain similar converting equipment. In each is installed two General Electric 200-kw., 600-volt synchronous converters operating in series to give 1200 volts. The transformers are of the single-phase oil-cooled type rated at 110-kw. each and wound for 11,000 volts primary with 370-volt double secondaries. Thus the total transformer capacity is 330 kw., or approximately 80 per cent of the normal rating of the converters. This capacity is ample, however, since the railway load is intermittent and the peaks are of short duration. In addition to the railway equipment each substation contains an 11,000-2300-volt transformer for supplying both local lighting and power service.

The switchboards include the usual machine and feeder panels of standard 1200-volt type, and have the circuit breakers and switches mounted at the top of the board, operation being effected by a control handle placed in the middle section of the panel. Each of the substations is operated on a single twelve-hour shift, this lasting in one case from 7 a. m. to 7 p. m. and at the other substation from 6 a. m. to 6 p. m. Any additional service that may be required is obtained by calling upon the operator to work overtime.

ROLLING STOCK

The passenger equipment includes four interurban cars, each having a compartment for baggage and express. Each car is equipped with four General Electric No. 217, 600-1200-volt, 50-hp. motors geared for a speed of 35 m.p.h. Two of the cars have Type-K control and the other two Type-M control. Control current at 600 volts is obtained from a dynamotor, which furnishes also the current for lighting and for operating the CP-24-cu. ft. air compressor on each car. General Electric straight-air brakes are used for all cars. Electric heaters are used and these are fed directly from the 1200-volt trolley.

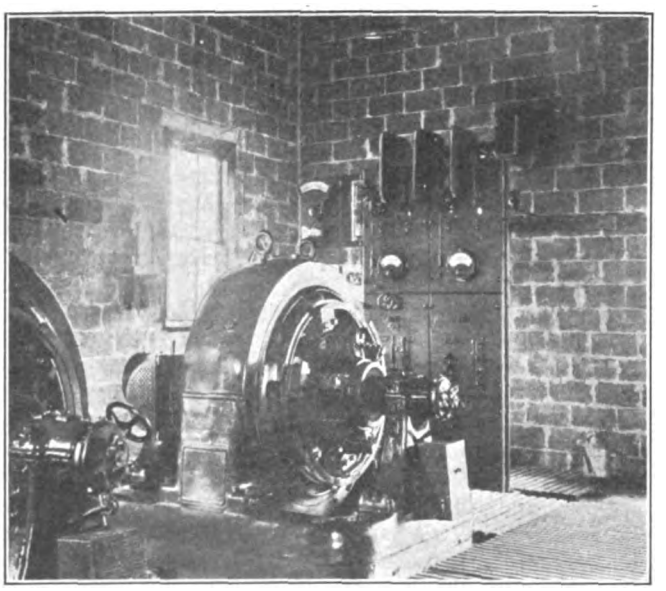
The equipment for handling freight service includes one 40-ton locomotive and an express car weighing about 30 tons which can be used also for hauling the trains when this is necessary. The locomotive is of the center-cab type with sloping end cabs for housing the equipment, the center section containing the controller, air compressor, etc., and suitable accommodations for the operator. The locomotive is built for straight 1200-volt operation and is equipped with four General Electric No. 206, 600-1200-volt motors and Type-M multiple-unit control. Compressed air is furnished by two CP-29 1200-volt air compressors and a dynamotor furnishes 600-volt control current, the air brake being of the combined straight-air and automatic type suitable for handling standard freight cars. The heavy locomotive-type express car is equipped with four General Electric No. 205, 600-1200-volt, 75-hp. motors and Type-M multiple-unit control.

All repairs and inspections of rolling equipment are made in a two-track repair shop located at Presque Isle and supervised by one competent repair man who is also an armature winder. As required, a helper is called in for making heavy repairs, but as a rule the one repair man is able to handle all maintenance work. A regular inspection of the equipment is made twice each month and light inspections are made daily. Two of the cars which have seen the most service have made 158,000 miles and 138,000 miles, respectively, without the removal of an armature, and the electric locomotive has made 100,000 miles to date without any delays due to electrical equipment. The average cost of power for moving trains is given as 4.27 cents per passenger car-mile and 3.3 cents per freight car-mile.

AROOSTOOK VALLEY RAILROAD—SUBSTATION AT CARIBOU

PLANS FOR EXTENSION

An important addition to the existing system is definitely projected at the present time, and all surveys and preliminary work for the construction have been completed. This new line will be known as the Quebec Extension Railway and it will extend westward from the town of Washburn for more than 100 miles across the northern portion of the State of Maine to the Quebec border. This project is intended primarily as an electric freight road connecting with the Quebec Central Railway in Quebec and with the Canadian Pacific Lines in New Brunswick, and it will constitute a direct route cutting more than 100 miles from the present haul through the provinces. The profile of the new line is distinctly suited to the hauling of heavy freight, the maximum grade being 1 per cent. Present plans contemplate the use of direct current at a voltage of 1200 or more for the contact line. Traffic will be handled with locomotives for the freight service and multiple-unit trains for the passenger service, according to the ideas of the officers of the company, who are A. R. Gould, president; L. E. Gould, vice-president; M. S. W. Dingwall, general superintendent, and H. N. Crandall, treasurer.



AROOSTOOK VALLEY RAILROAD—INTERIOR OF MUNSON HILL SUBSTATION

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Determining Reasonable Rates Under Municipal Ownership

Rates Should Be Fixed in Same Manner as Those for a Utility Privately Owned, Surplus Going to Credit of General Tax Fund

A PAPER that hits directly at a fundamental injustice toward privately-owned utilities on the part of cities which are inclined toward municipal ownership, was presented on Oct. 18 by J. B. Lippincott before the American Society of Civil Engineers. This paper, which was entitled "A Method of Determining a Reasonable Service Rate for Municipally-Owned Public Utilities," was published in the September issue of the *Proceedings* of the society.

To show the necessity of a more sound understanding of the fundamental basis of proper rate regulation, Mr. Lippincott states that for California, with the steam railroads excluded, the value of municipally-owned utilities is only 5.1 per cent of those privately owned. A new and undeveloped state, such as this one, manifestly cannot publicly build all its utilities, but of late and at present voluntary investment in privately-owned utilities in California is awaiting the determination of public policy in regard to protection of private investments. Heretofore the fixing of rates for municipally-owned utilities in California has often been looked upon as a political rather than as an economic question, it being a popular and easy road to public favor to advocate the reduction of any rate. To Mr. Lippincott's mind, however, the rate for utility service should be based on the fair value of the property used and useful, irrespective of whether the plant is privately or municipally owned. The municipal plant should be viewed as an investment of public funds by the city, and it should be operated with the view of obtaining a profit on the investment.

PRIVATE UTILITIES SHOULD BE PROTECTED AGAINST UNJUST COMPETITION

If the rates for the service of publicly-owned utilities are too low and deficits are made up from the general tax fund, such administration is unfair to privately-owned utilities and will tend to discourage the investment of private funds therein. Although the public should be able to enjoy the profit and security of its own service, there is a broad equity involved that requires the protection of the privately-owned plant which has been built in good faith and is being operated under public regulation so that its rates are just and its service adequate. It would be a public misfortune to confirm the impression that private investments are to be overridden unfairly and in such a way as to injure legitimate investment. If unfairness is practiced in the larger centers of population, having substantial bonding resources, it is likely to delay the development of the back country, where public credit for large enterprise is lacking.

In short, therefore, Mr. Lippincott believes that capital invested in private utilities should be protected against unjust competition by publicly-owned utilities. If this is to be accomplished, greater attention must be given to the rates of the publicly-owned utilities. Private rates should be sufficient to provide, first, for the expenses of operation and maintenance; second, for depreciations, and, third, for a return on the fair value of the property. This last item will provide interest on the bonded debt and any profit accruing to the owner. The same rate elements would apply in a case of a publicly-owned utility, but there would be an additional expense for a bond redemption fund. This has no counterpart in a privately-owned plant, as the bonds of the latter are seldom retired, but on maturity are taken care of by a refunding process.

BEARING THE COST OF MUNICIPAL OWNERSHIP

There are four classes of people, Mr. Lippincott states, who should assist in bearing the cost of a municipally-owned public utility: (1) The city as a whole, or the government; (2) the consumer; (3) the owner of vacant lots, and (4) the real estate promoter who desires extensions made to new subdivisions.

1. *The city's share of the expense:*

In Mr. Lippincott's opinion, the city should provide from the general tax budget the annual contributions to the bond redemption fund for the municipally-owned utility. If the municipality's credit has been used in the issuance of bonds for the purchase or reconstruction of the utility plant, then the refunding of these bonds from the general tax budget is virtually repayment for the plant by the city as a whole.

2. *The consumers' share of the expense:*

The consumer should pay for the operation and maintenance of the system and, if the municipally-owned utility is to be treated on the same plane with one privately owned, depreciation and interest on the fair value of the property should also be charged to the consumer. To deduct depreciation and interest from the rates would put such a handicap on competing privately-owned utilities that they probably could not live. Any profit should be expended in the ordinary extensions and betterments to the system, so as to avoid the necessity for frequent bond issues to make these improvements. If any surplus accrued over and above such expenditures for improvements and betterments, it should be turned into the general funds of the city for the purpose of reducing taxes rather than rates.

There are two classes of consumers for a municipally-owned plant, those who are not taxpayers in the community and those who are. The consumer who does not contribute taxes is paying a fair price for the service received, and he is not entitled to have the cost of this service reduced simply because he happens to be temporarily a resident of the community. On the other hand, property owners have guaranteed the payment of the public debts. If the bond redemption fund is provided for from the general tax levy, all taxpayers are proportionate owners of the utility. A share of the profits accruing from this ownership should revert to the taxpayers through the general fund, so that the consumer who is a taxpayer will receive an indirect benefit from the ownership of the utility.

3. *The vacant-lot owner's share of the expense:*

Unless a charge is assessed against owners of vacant lots, they secure benefits without adequate contributions to cover the expense of the utility plant. Some system of assessment on such vacant property on a frontage basis should be developed to cover this element, as is often done in street paving and sewer work. Moreover, there are many vacant lots in the old and established portions of the city where the plant has long been built, and lot owners here cannot be assessed as in the case of extension to a new division. Possibly they should be charged an assessment each year, which should go into a fund for ordinary betterments of the system or into the public treasury.

4. *The real estate promoter's share of the expense:*

The real estate promoter, Mr. Lippincott says, is continually making new subdivisions and petitioning the utilities, whether publicly or privately owned, to make extensions therefor. With publicly-owned utilities it

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is usually demanded that the promoter shall pay for the cost of extensions. This policy has been followed by many of the publicly-owned utilities, but it has resulted in political agitation and has been vigorously resisted by the interests who are active in their efforts to speculate on the community. It would be equitable, however, to require the owner to pay a frontage tax to cover the cost of the utility system fronting the property in question, this contribution is to be returned when this part of the plant is on an earning basis. As regards main plants built for the distant future, which may equitably be assumed to involve the promoters' lands, a portion of the cost of the excess capacity should justly be charged to the promoter.

In conclusion, Mr. Lippincott states that this whole problem of establishing municipal utilities on the proper rate basis cannot be solved with a rule that will apply to all cases. A general theory on which all muncipalities should proceed, however, should be adopted. The cities of the country should be managed fairly and scientifically, not only for the interests of the citizens therein, but also for those who have financed in one way or another their utilities and early development.

Reading of Technical Journals Necessary

Those Who Keep Their Knowledge and Practices Up to Date by Such Reading Show It by the Condition of Their Properties

THE last issue of the *Southwestern Electrician* contains a letter from H. S. Cooper, secretary Southwestern Electrical & Gas Association, on the reading of technical journals. Some extracts follow:

"In recent trips among the members of this association I have been impressed with the great differences in practice in certain matters where it would seem that there could be no two opinions on the subject. One of these matters was in the use of the technical journal; in some offices I found them carefully opened, piled and filed convenient to the hand of the manager or other head of department, or of their clerk or stenographer. From such a good operative arrangement the practice 'ran down' until in some offices the journals were flung unopened into a corner or on the end of some table or desk, there to lie in dust and disgrace until the janitor gathered them into the trash barrel.

"Now, apart from the fact that such a practice as the latter is a direct waste of the subscription money, lies the farther fact that the officer or official who so neglects valuable and timely sources of information on subjects that are of direct importance to his employer is not properly earning his salary! That may seem a strong way of putting it, but it is nothing but the truth, and I have found it almost an invariable rule that the officer, official or head of department that was 'slack' in the reading, saving and filing of the technical journals pertaining to his business was only one degree removed from the one who did not take them at all 'because they cost so much.'

"One of the duties of my official position is to keep acquainted with the contents of the various technical and trade journals and publications that apply to the various kinds of public utilities that are members of this association. These publications grade from 'good' through 'better' to 'best.' There is none of them that I could conscientiously say is useless or poor. In every one of them I find something that I know to be of value to some of the members—either directly at once or to be filed for future use and emergencies. And to those capable and conscientious operatives who properly use their journals there is the same result; a hint here, a suggestion there, here a little information of instant value, there something to be remembered and filed against some future condition.

"This applies not only to the 'literary' portion of these publications, and he who thinks that this is their only value is badly mistaken. Not only to the purchasing agent but to every head of department does the 'advertising section' appeal. The manager, superintendent or foreman who does not keep up with what is new in the materials, machinery, appliances and apparatus of his particular line or department is only performing a portion of his duty, he is out of date, behind the times —a 'has been'!

"The technical or trade journal of to-day is the livest, most 'up-to-now' assistant that the public utility man has. It is carefully edited, well printed, fully illustrated, thoroughly indexed both as to literary matter and advertisements. It is the Always Ready Reference of the minute, and the officer, official, head of department, or even workman, who does not use it is neglecting one of his best friends!

"And that leads me to another matter; that is, that I have been surprised to find how many of the larger utilities are actually stingy when it comes to paying out money for subscriptions to their trade and technical journals. They talk about the one, two or three dollars per year as if it were that many hundreds; they look at the expenditure as if it were an expense instead of an investment which, properly handled, will bring them good returns. Of course, if the journals when received are treated like stepchildren or poor relatives, left unopened, thrown into corners, unread, unhonored and unused, then they are a very costly expense, for such treatment of a most useful adjunct of the business soon transmits its influence to other portions.

"Now, I am not soliciting subscriptions for any trade or technical publication, I am not interested financially in any of them, my only interest in their use is that I have not only found them of immense value in all the businesses which I have managed, but I have yet to find a real up-to-date, hustling, successful manager or head of department who does not promptly and fully read his technical and trade publications, note and file the matter that interested him or was or would be of use to him in his business. * * * And in no other way can any operative, no matter how high or low his position, keep so fully abreast of the times in his business as by early and careful perusal of his trade and technical periodical from its front to its back cover. And from no other source can he obtain the 'immediately useful' as he can from a well-filled and indexed present volume of those same publications.

"Those who have tried this know that the above is the truth. Let those who have not tried it give it a trial for six months or a year and they will thank me for calling their attention to this matter!"

New Traffic Ordinance in Portland, Ore.

The new traffic ordinance in Portland, Ore., held in abeyance since Oct. 1, has been amended and placed in effect. In accordance with a general request from automobile owners, vehicles of all sorts will be permitted to pass to the left of standing street cars. As originally framed, vehicles were prohibited from passing either to the right or left of street cars standing to take on or discharge passengers. Children less than seventeen years old will not be permitted to drive machines on the streets unless accompanied by a parent or guardian, and then only after they have taken an examination to determine their fitness to operate a machine.

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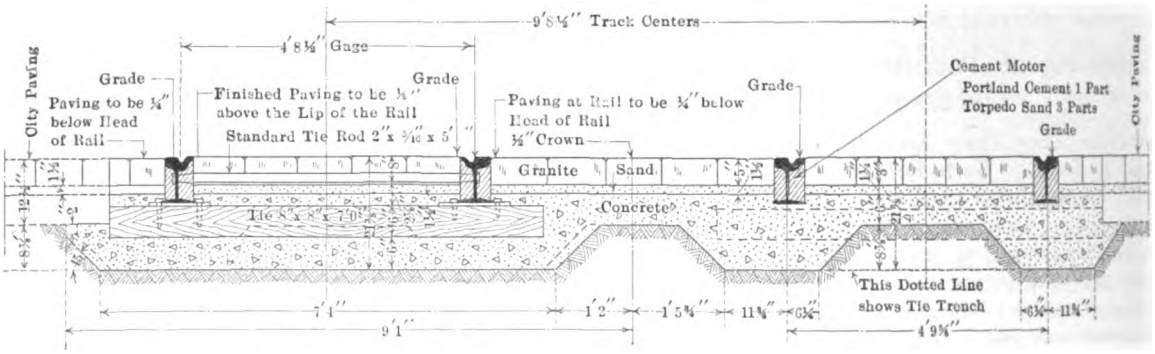
Rail Corrugation Studied in Chicago

Investigation of 72 Miles of Single Track Reveals Corrugations to Be as Prevalent on Ballast Foundations as on Concrete—Study Also Leads to the Conclusion That Curved-Head Rails Would Greatly Reduce the Rate and Amount of Corrugation

INNUMERABLE theories have been advanced setting forth the causes and remedies for rail corrugation, but so far instances have always been found which did not coincide with these theories. An article in the ELECTRIC RAILWAY JOURNAL of July 8, 1916, contributed by T. Norman Jones, Jr., chief engineer of the Virginia Railway & Power Company, Richmond, Va., indicated that corrugation was not as prevalent on a ballasted track foundation as on track laid on a concrete foundation. Since practically all of the track laid in Chicago since 1907 is about equally divided between these two types of construction, it offered a particularly fine opportunity to determine the merits of ballast and concrete foundations in their relation to rail corrugation. Accordingly, George Weston, engineer for the Board of Supervising Engineers Chicago Traction, had a survey made of 36 miles of street, or approximately 72 miles of single track, which was about equally divided between that laid on solid concrete and that laid on crushed-stone ballast. The results of this survey, which was made by C. S. Holcomb, assistant engineer, indicate that there is no particular advantage between these two types of construction in so far as providing a remedy for rail corrugation is concerned, and that corrugation is about as prevalent on one as on the other.

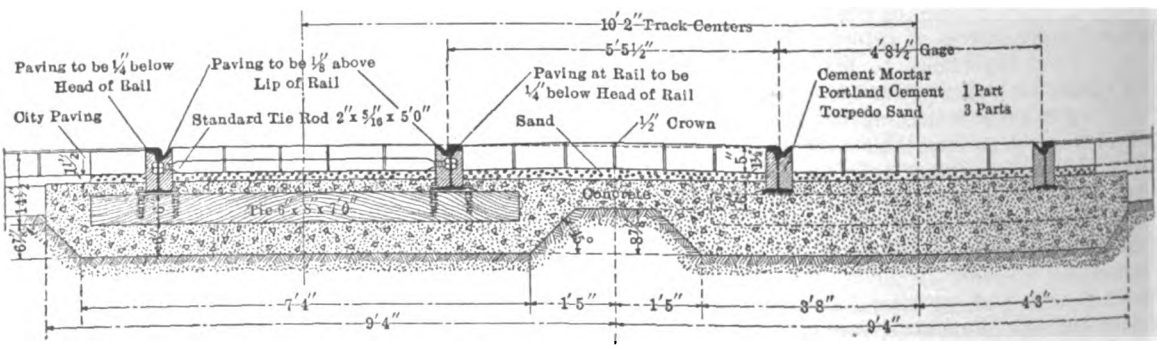
Two routes were selected in making this investigation, one over tracks of solid concrete foundation and the other over tracks with a crushed-stone foundation. Each route covered about 18 miles of street and contained track laid in all years from 1908 up to the present time. The location and the amount of corrugation were observed from the front platform of a car, a record being compiled en route. In selecting the two routes, every effort was made to have them as near comparable as possible, both as regards the average age and the amount of traffic. This was practically impossible, however, and, as indicated in the tabulations, the track on concrete foundations averages about one-half year older than that on the ballasted foundation, and the average traffic over the concreted track was somewhat heavier than that over the track laid on crushed stone. In other words, the conditions under which the survey was made were more favorable for the ballasted construction than for the concrete.



CHICAGO TRACK STUDIES—TYPE 2, CONSTRUCTION WITH CONCRETE IN STRINGERS UNDER RAILS

DISCUSSION OF DATA

It will be observed in the tabulations on page 1013 that the amount and character of corrugation was indicated in three ways in the column under the head "Conditions," namely, by the terms "None," "Trace," "Slight" and "Corrugated." The term "None" indicates that the rail either had no corrugations or they were so few and of such slight depth as to be unimportant. The term "Trace" indicates that the rail had few corrugations, usually in small stretches but of no great depth and covering not more than 3 per cent of the whole distance inspected. The term "Slight" indicates rail having corrugations usually of no great depth



CHICAGO TRACK STUDIES—TYPE 2A, CONSTRUCTION WITH CONCRETE FOUNDATION OF UNIFORM WIDTH AND DEPTH

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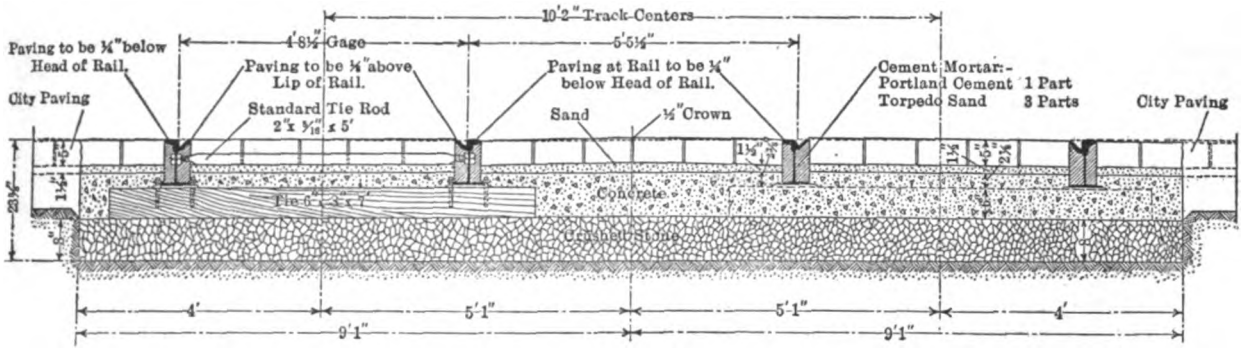
but covering from 3 per cent to 20 per cent of the whole distance inspected. The term "Corrugated" indicates rail having corrugations usually deep enough to be felt by the vibration of the cars running over them and extending for more than 20 per cent of the whole distance inspected.

Under the heading "Type of Track" it will be noted that two kinds of concrete track construction and one kind of ballasted construction were inspected. These three types are shown in the accompanying illustrations. Type No. 2 track construction was one of the original types adopted by the Board of Supervising Engineers, as a substitute for Type No. 1, in which steel ties were employed. In laying this type of track a trench was excavated to a depth of 19½ in. below the surface of the street and beneath the ties and the rails. Before the concrete foundation was put in place the track was lined and surfaced on blocks and wedges. From the cross-section of this track it will be observed that the concrete forms a continuous stringer beneath the rails 18 in. wide at the top and 32 in. wide at the bottom. The quantity of concrete was also reduced by simply pressing the subgrade under the ties. After two years' experience with this type of construction it was found too expensive to prepare the subgrade and the 4-ft. tie spacing did not afford sufficient bearing for the rails. Type No. 2-A, also shown in an accompanying illustration, was then developed to remedy these difficulties. In this type of construction the tie spacing was reduced to 3 ft. and the subgrade was made of a uniform width and depth, thus permitting the use of a 10-ton roller to prepare a stable subgrade to receive the concrete foundation.



CHICAGO TRACK STUDIES—TYPE 3, CONSTRUCTION WITH TIES RESTING ON BALLAST ON A ROLLED SUBGRADE

Type No. 3 track construction includes a ballast foundation, as shown in one of the accompanying illustrations. This is laid in a 24-in. trench and provides 8 in. of crushed-stone ballast beneath the ties. After the subgrade has been thoroughly rolled with a 10-ton roller, the crushed stone is put in place and rolled, following which the ties are placed at 2-ft. centers and the rails laid on them. When the rail has been spiked in place the track is hand-surfaced on the ballast. All the rail used is of the Chicago standard 129-lb. grooved girder section. It rests on 6-in. x 9½-in. tie plates and

RECORD OF RAIL CONSTRUCTION ON COCRETE FOUNDATION

Street	From	To	Miles of Street	Type of Track, No.	Year Laid	Condition
12th St	Halsted St	Paulina St	1.1	2-A	1909	Trace
Ashland Ave.	51st St	39th St	1.5	2	1908	Slight
Belmont Ave.	Lincoln Ave.	Robey St	0.5	2-A	1910	Corrugated
Belmont Ave.	Robey St	Western Ave	0.5	2-A	1911	Slight
Center St	Clark St	Lincoln Ave.	0.1	2	1908	None
Clark St	Grand Ave	Center St	1.8	2	1908	Corrugated
Fullerton Ave.	Western Ave	Chicago River	0.7	2-A	1910 1911	Trace
Fullerton Ave.	Chicago River	Clybourn Ave	0.3	2-A	1913	None
Fullerton Ave.	Clybourn Ave	Southport Ave	0.3	2-A	1914	Trace
Fullerton Ave.	Southport Ave	C., M. & St. P. R. R.	0.1	2-A	1914	Trace
Fullerton Ave.	C., M. & St. P. R. R.	Sheffield Ave	0.3	2-A	1911	Trace
Halsted St.	Fullerton Ave.	North Ave	1.0	2-A	1911	Slight
Halsted St.	North Ave	Division St	0.5	2-A	1912	Trace
Halsted St.	Division St	N. Bridge	0.2	2-A	1909	None
Halsted St.	Chicago Ave.	Grand Ave	0.3	2-A	1909	Trace
Halsted St.	Lake St.	VanBuren St.	0.5	2	1908	Trace
Halsted St.	Van Buren St.	12th St	0.7	2-A	1909	None
Lincoln Ave.	Center St	Sheffield Ave	1.2	2-A	1908	Trace
Madison St.	Paulina St.	Clinton St	1.6	2	1908	Trace
Paulina St.	12th St	Madison St	1.0	2-A	1915	Corrugated
State St.	35th St	18th St	1.9	2	1908	Slight
Wentworth Ave.	Archer Ave.	26th St	0.4	2	1908	Trace
Wentworth Ave.	55th St	59th St	0.5	2-A	1908	Slight
Western Ave.	Belmont Ave.	Fullerton Ave.	1.0	2-A	1910 1913	None
Average age.					1910.5	

SUMMARY

Miles of Street	Condition	Per Cent
2.3	None	12.8
7.0	Trace	38.9
5.4	Either continuous or in spots Slight	30.0
3.3	Corrugated	18.3
Total. 18.0		100.0

RECORD OF RAIL CORRUGATION ON BALLAST FOUNDATION

Street	From	To	Miles of Street	Type of Track, No.	Year Laid	Condition
26th St	Wentworth Ave.	Indiana Ave	0.5	3	1908	None
35th St	Ashland Ave	W. App. to Bridge	0.4	3	1910	None
35th St	E. App. to Bridge	Parnell Ave	0.8	3	1909	None
35th St	Parnell Ave	Wentworth Ave.	0.4	3	1911	None
35th St	Wentworth Ave.	State St	0.3	3	1914	None
39th St	Indiana Ave	Wentworth Ave.	0.5	3	1913	None
51st St	Racine Ave.	Ashland Ave	0.5	3	1911	Slight
59th St	Western Ave	Halsted St	1.0	3	1912	None
69th St	Halsted St	Racine Ave.	0.5	3	1911	Trace
Ashland Ave.	39th St	35th St	0.5	3	1913	Trace
Clark St	Monroe St	Archer Ave.	1.8	3	1909	Slight
Fullerton Ave.	Sheffield Ave.	Halsted St	0.3	T.V.C.		None
Halsted St.	N. Bridge	S. Bridge	0.2	3	1909	None
Halsted St.	Grand Ave.	Lake St.	0.4	3	1912	Trace
Halsted St.	59th St	63rd Pl	0.6	3	1912	None
Halsted St.	63rd Pl	69th St	0.7	3	1913	Slight
Indiana Ave.	26th St	39th St	1.5	3	1911	Corrugated
Racine Ave.	69th St	67th St	0.3	T.V.C.		Slight
Racine Ave.	67th St	63rd St	0.5	3	1910	Trace
Racine Ave.	63rd St	55th St	1.0	3	1914	Corrugated
Racine Ave.	55th St	51st St	0.5	3	1913	None
State St.	18th St	12th St	0.6	3 Spec.	1908	None
State St.	12th St	Monroe St	0.9	3	1909	Trace
Wentworth Ave.	Archer Ave.	26th St	0.5	2	1908	Trace
Wentworth Ave.	39th St	Root St	0.3	3	1908	Slight
Wentworth Ave	Root St	55th St	1.7	3	1907	Slight
Average age.					1911	

SUMMARY

Miles of Street	Condition	Per Cent
6.1	None	35.5
3.3	Trace	19.2
5.3	Either continuous or in spots Slight	30.8
2.5	Corrugated	14.5
Total. 17.2		100.0

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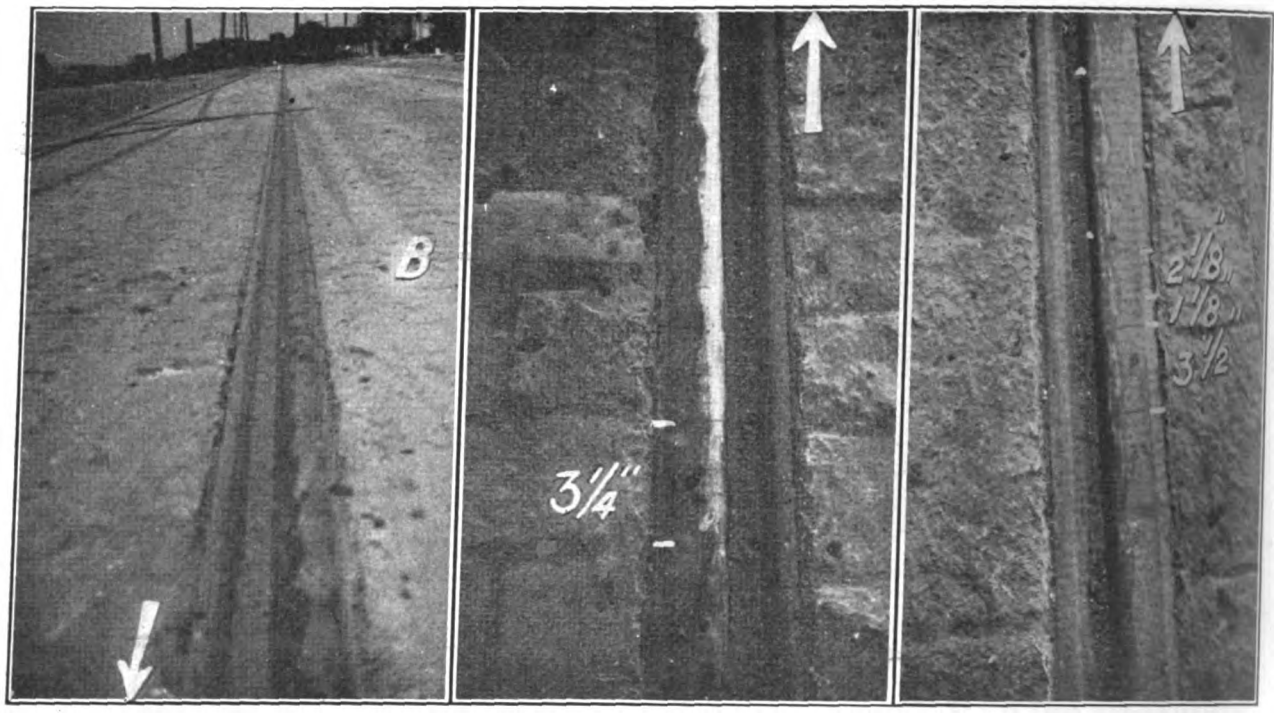

CHICAGO TRACK STUDIES—FIGS. 1, 2 AND 3, CORRUGATED RAILS

is held in place by screw spikes. The Chicago rail is a 9-in. section which is laid in 60-ft. lengths with Lorain electrically-welded joints. Tie rods, 2 in. x 5/16 in. x 5 ft. in size, spaced at 6-ft. intervals and inserted 5⅛ in. above the rail base, hold the rail to gage.

An examination of the data given as a result of this investigation for the amount and character of rail corrugation also reveals the fact that this phenomenon is not a respecter of age or conditions. For instance, much of the oldest track shows no indication of corrugation, whereas on some of that constructed much later corrugations of a maximum wave length and depth have appeared. It will also be noted that while there is more track of the ballasted type of construction having no corrugation than there is of track laid on concrete foundation, yet there is only 19.2 per cent of the ballasted track showing a trace of corrugation, whereas there is practically 40 per cent of corrugations in this stage on the track laid on the concrete foundation. Corrugations termed as "slight" and "corrugated" are in about the same amounts for both types of construction, although possibly there is slight balance in favor of the ballasted track. However, when one considers the fact that the average age of the concreted track is one-half year less than the ballasted track, and that the concreted track carries a lighter traffic, the results indicate that one type of track has very little advantage over the other in so far as corrugations are concerned.

CORRUGATIONS APPEARED IN ONE MONTH

A further study of this phenomenon with particular reference to its appearance on rail which had been in service but a short time was made by the engineers of the Board of Supervising Engineers. One particularly aggravated case in which pronounced corrugations appeared after the track had been in service only one month was examined in great detail. This track is Type 2-A, or the concrete foundation with yellow pine ties, and it was built in April, May and June of the present year. The pavement is of granite block grouted in place, and the investigation of its condition which follows was made on Aug. 25, 1916. An inspection of this track shortly after it was placed in operation showed unusually strong indications of rail corrugation, and because of its early occurrence it was made the subject of an investigation. The track was placed in operation about July 1, so that the conditions which are described were the result of about two months of wear of 50,000-lb. double-truck cars operating on an average headway of seven minutes.

CHICAGO TRACK STUDIES—FIG. 4, CORRUGATED RAILS

Fig. 1, shown in the accompanying illustration, is a general view of the inside rail of the eastbound track looking west. The small arrow parallel to the rail and near the border of this and other halftone illustrations indicates the direction of traffic. In this view it will be noted that just to the right of the point where the gage line meets the border of the illustration there are a number of dark areas on the head of the rail. These extend some distance back in the view. They are pronounced corrugations and are typical of those occurring on most of the rail along this street. Fig. 2 shows a short portion of this same rail on which the corrugations, due to the angle of the reflected light, show as bright areas on the head. In this illustration it will be noted that the corrugated areas are

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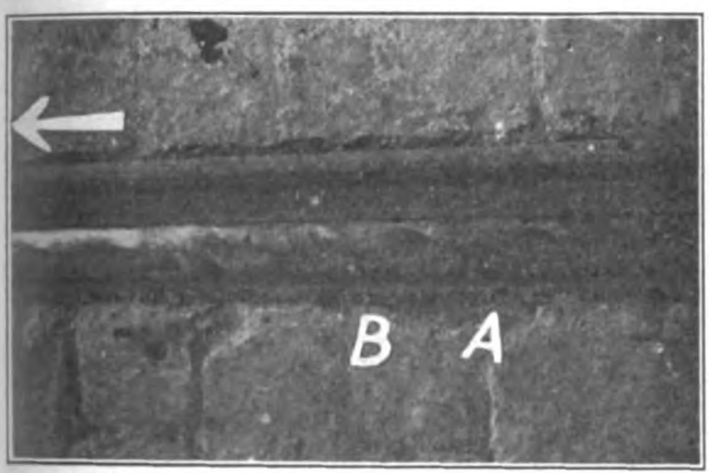
irregular in outline and consist of a series of small areas, each of which starts near the gage line and widens out on the head in wave-like form, returning again approximately to the gage line. Two lines were drawn across the rail at the points indicated before the view was taken. These lines were drawn at the trough or neck in the corrugated area to show the wave length,



CHICAGO TRACK STUDIES—FIG. 5, CORRUGATED RAIL

which is 3¼ in., or about the average length of the corrugations on the rail at this point.

Fig. 3 illustrates a condition quite similar to that shown in Fig. 2, except that the dimensions of the corrugations are indicated in more detail. Thus the length of the lower corrugation is 3½ in., while that of the upper one is 3¼ in. It will also be noted that the distance from the trough to the crest of the upper corrugation is 1⅛ in., and that the greatest width of corrugation is not equally distant from the troughs. The distance from the crest to the trough is longer in the direction of traffic.

Fig. 4 shows a more pronounced case of corrugation than the other views. On the side of the rail head away from the gage line slight worn areas are perceptible. Lines drawn on the paving block to the right of the rail head indicate these points of wear. The length of one of these worn areas on the opposite side of the rail is 2¼ in., and the distance between the areas averages 1¾ in. This makes the average distance between

CHICAGO TRACK STUDIES—FIG. 6, CORRUGATED RAIL

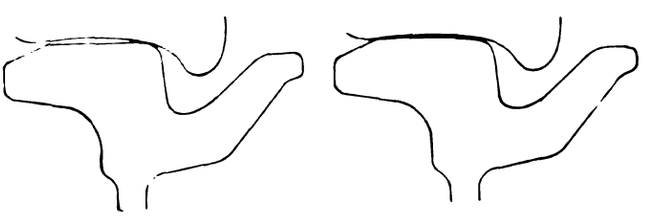
the waves about 4 in. It will also be noticed that the crest of the corrugation beside the gage line is the same as the crest of the corrugation or worn area on the side of the head away from the gage line. This area of wear along the outside of the head is also perceptible in Fig. 3.

Fig. 5 shows a further development in the corrugation. The crests of the corrugations on the gage side and on the outside of the head, at points marked "A" and "B," have become so pronounced that they practically meet in the center of the rail head. The small oval areas affected by corrugation appear not to receive the wheel treads as they pass over them. Fig. 5 was taken at about the point marked "B" in Fig. 1.

Fig. 6 is a view looking at the gage line and into the groove. This rail is corrugated, as may be observed by the darker portion along the gage side of the head. Just below the gage line are strips of extruded metal which appear to have been sheared off the head of the rail by the wheels. It will also be noted that there is practically no flange wear on the gage side of the throatway, and the strips that have been sheared off the head are from portions that project inside the gage line.

CONCLUSIONS DRAWN

After assembling and analyzing the foregoing data and conditions, certain conclusions were drawn regarding such pronounced rail corrugations appearing in such a short time. It is believed that the first point of bearing of the wheels on the new rails was only along the gage line. The area of contact between the rail and the wheel was such that the steel in the rail could not support the strain but was cold rolled and extruded into the groove. This cold rolling or extruding process



CHICAGO TRACK STUDIES—FIG. 7, CONTOURS OF AVERAGE WORN WHEEL AND RAIL—FIG. 8, SAME WHEEL ON RAIL, PROVIDING FULL CONTACT BETWEEN WHEEL AND RAIL

continued until sufficient metal was removed from the gage line and its immediate vicinity to allow the outer edge of the wheel tread to come in contact with the back of the rail head. This is the condition that brought about the results shown in Figs. 4 and 5, where worn areas were observed opposite the crests of the waves in the corrugations along the gage line. The fact that as the new rail wore, two points of contact between the wheel and the rail appeared, indicated that most of the wheels passing over this track were average-worn wheels and had concave treads.

Fig. 7 is an average-worn wheel section placed on a standard rail-head section. The wheel section shown represents the average of twenty-four worn wheels, twelve of which had thick flanges and twelve had thin flanges. Since these twenty-four wheels were badly worn, it is possible that the section shown in Fig. 7 is rather an exaggerated condition, but in a general way it represents the average of the wheels that were operated over this track. If the section shown is accepted as representing the average-worn wheel, the two points of contact which were observed where the corrugations became pronounced can readily be explained.

EFFECT OF CURVED RAIL HEAD ON WEAR

Another point brought out in the analysis of these conditions was that the rapid rate of uniform wear or development of corrugations on this new rail represented an extreme case of the effect of operating wheels of one contour over rail of an entirely different contour. It also

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indicates an advantage in having a rail contour and a wheel contour which would provide a full contact which remain approximately the same throughout the life of the rail and the wheels. In the particular case cited if the rail-head contour had been a curve of long radius inclining slightly toward the gage-line side of the head, it is believed that the rate of wear would have been greatly reduced and the conditions observed perhaps much delayed. The line of contact between a rail of this kind and an average-worn wheel is shown in Fig. 8.

UNIFORM WEAR AND CORRUGATIONS ON SAME TRACK

While the conditions described in the foregoing paragraphs represent the general condition of this section of track, there were some stretches of rail, which while showing considerable wear, some along the gage line and some along the back of the rail, did not develop corrugations. Where the wear was uniform it extended back from the gage line from ½ in. to ¾ in. Wear of this kind, as well as that along the gage line and the back of the rail where it is corrugated, may be readily explained, but nothing in this investigation tends to show why the wear should be uniform along some stretches of track and corrugated in waves of from 3¼ in. to 4 in. in length in others. Observations in the field showed slightly greater signs of cold rolling on rails having considerable corrugation than was found on rails where wear appeared only along the gage line. Therefore, it appeared that the conclusion should be drawn that the greater the amount of cold rolling the greater would be the amount of corrugation.. Whether this variation in the amount of cold rolling, however, is due to the differences in the composition of the rail metal, to variations in the relation of the rail heads to the wheels, to differences in the rails themselves and in the method of placing them or to some other cause was not indicated by these observations. It is also too early in the life of this rail to tell with any degree of certainty whether these corrugations will increase to such an extent as to require grinding or whether they will gradually disappear and leave a smooth running rail. In any event the conditions described as a result of this investigation may add something to the information on the subject of rail corrugation which may prove of value to others.

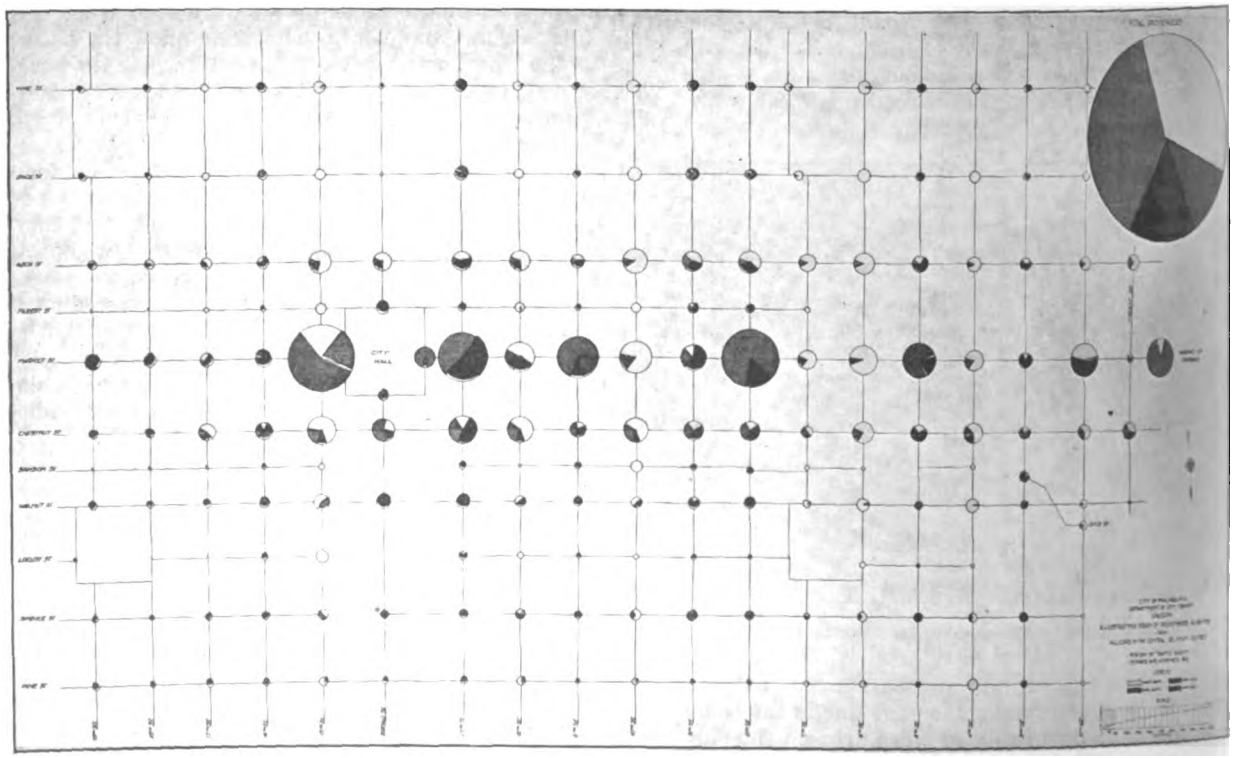
Rapid Transit Progress in Philadelphia

Department of City Transit Describes Construction Work in 1915—Deficits from Rapid Transit Operation Will Disappear About 1940

THE report of the department of city transit of Philadelphia for the year ended Dec. 31, 1915, in reviewing the rapid transit situation in that city, states that since the appointment of the transit commissioners of 1912 a definite program for the construction of new lines has been evolved. The constitution and laws of the state have been amended as recommended, giving the city legal authority, financial ability and executive machinery necessary to establish a complete high-speed railway system. The city's borrowing capacity has been increased by more than $100,000,000, applicable to transit development upon most advantageous plans. The department of city transit has been organized and detailed plans for the entire system are well under way. Two of the more important lines are now under construction.

The report states that the department has discussed at length and actually reached a tentative agreement with officials of the Philadelphia Rapid Transit Company for the equipment and operation of any and all rapid transit lines which may be built by the city. Forms drawn in detail and embodying the provisions of this arrangement have been prepared by the department, although the agreement for equipment and operation has not yet been closed. It now remains only to push the construction work to completion in as rapid and efficient a manner as possible, and to close, preferably with the Philadelphia Rapid Transit Company or with an independent company, a contract or lease for the equipment and operation of the lines as constructed.

In regard to the specific work accomplished during the



TRANSIT REPORT—SPECIMEN DIAGRAM, SHOWING PASSENGER ORIGINS AND DESTINATIONS, ACCORDING TO CARDINAL POINTS OF COMPASS, AT EACH STREET CORNER IN PHILADELPHIA'S CENTRAL BUSINESS DISTRICT

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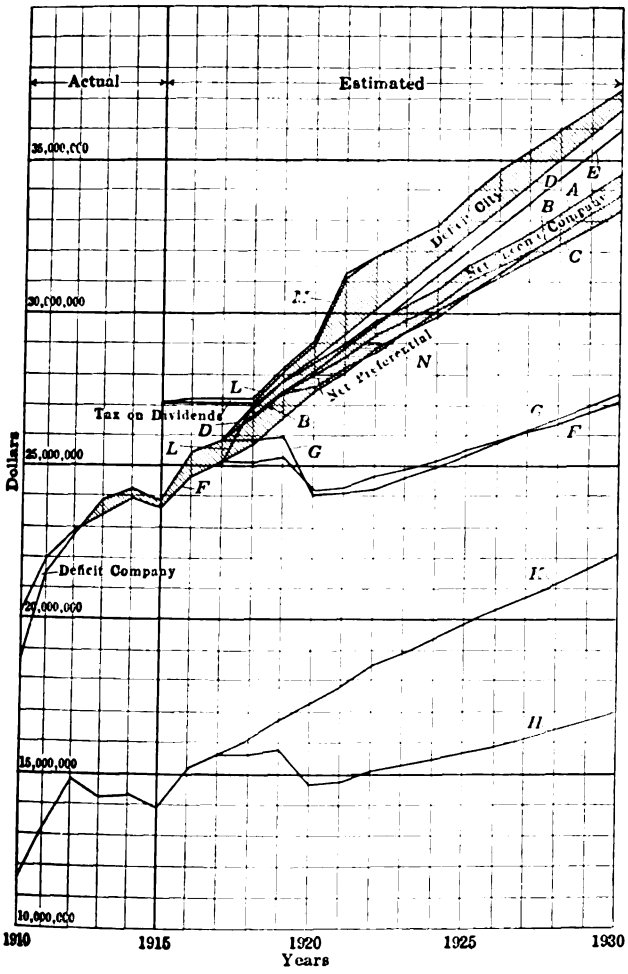
last calendar year, the report says that this year saw the adoption by Councils of the project of transit development and the beginning of actual work on the subway and elevated system. On Jan. 25, $500,000 was appropriated for reconstruction and relocation of sewers in and near the central business district, all but a small portion of which work was completed within the year. In March Councils called an election for the purpose of authorizing an increase in the city's debt in the amount of $6,000,000, to be devoted to the construction of the Broad Street subway and the Frankford elevated railway. The vote being affirmative, $3,000,000 was appropriated for each of these lines, contracts were let and work was begun on certain sections during the remainder of the year.



OPERATION BY AGREEMENT WITH THE PHILADELPHIA RAPID TRANSIT COMPANY, WITH FREE TRANSFERS

A—Gross income (P. R. T. Co.) plus net income from Camden Tube.
B—Gross income (P. R. T. Co.).
C—Total expenditures (P. R. T. Co.).
D—Total gross revenue (P. R. T. Co.) plus net income from Camden Tube.
E—Total gross revenue (P. R. T. Co.).
F—Total cash requirements, surface and Market only.
G—Gross revenue, surface and Market only.
H—Operating expenses and taxes, surface and Market only.
K—Total operating expenses and taxes—all lines except Camden Tube.
L—Total cash requirements.
M—Total cash requirements plus sums returned to P. R. T. Co.
N—Gross income (P. R. T. Co.) less net income from Camden Tube and net preferential.

TRANSIT REPORT—DIAGRAM, SHOWING FINANCIAL RESULTS OF OPERATION UNDER SUGGESTED PROGRAM IN PHILADELPHIA

As various plans of construction and lease have been discussed and developed thus far, estimates of the traffic, service and financial results of each to the city and the operating companies have been prepared in complete detail. In all, sixteen principal plans were under consideration during the last year, each of which is described in detail in the report of the department. Plans 1-3 embrace the system recommended by the department of city transit in its special report to Councils on Feb. 11, 1916. Plans 4-7 refer to the system authorized by Councils on June 30, 1916, under various conditions of lease. Plans 8-11 embrace the system as authorized by Councils, but including the delivery loop in the central district. Plans 12 and 13 give the estimated results of the Broad Street line alone. Plans 14-16 contemplate operation by the Philadelphia Rapid Transit Company under a suggested modification of the original program, this modification involving a recognition by the city of cash actually paid in by the Philadelphia Rapid Transit Company and the Union Traction Company.

The estimated financial results of operation to the city of the rapid transit lines authorized by the ordinance, incorporated under the suggested plan, are fully set forth in the report. In this connection the report presents an interesting diagram, shown in the accompanying illustration, giving the financial outcome up to 1930. It is stated that the city's deficit for one year, including tax abatements for the elimination of exchange tickets, which is a maximum of $1,818,200, will disappear in about 1940. This would leave thirty profit-earning years before the expiration of the contract, after which time the city would own the entire property and equipment practically free of debt by reason of the operation of the sinking fund. As estimated on the basis of the present and past statements of the company, the minimum surplus or net income of the company applicable to the stock of the Philadelphia Rapid Transit Company is $796,790 in 1922. Under the preferential clause of the proposed plan, a surplus is to be maintained at not less than approximately $630,000. It is said, therefore, that under present expectations the abatements and credits allowed the company will be sufficient to offset the preferential payment which would otherwise be due the company.

In discussing the various plans, the report remarks that the maximum yearly deficit does not vary widely as between the various proposals, except in the case of the last three, which differ materially from all others in terms of lease and program of construction. The total deficits for the period from the beginning of operation to and including 1930 appear formidable. They are much more than offset, however, by real collateral benefits which the city receives in the way of taxes on abnormal increases in assessed valuation due to rapid transit development, from time-saving afforded by the high-speed system or from the abolition of the 3-cent exchange tickets. Moreover, the deficits represent nearly the full amount of accumulated loss from operation, as the deficits after 1930 are smaller and in most cases disappear within a few years. Thereafter in perpetuity the system should be profitable to the city in itself.

The report also includes a series of diagrams, one of which appears on page 1016, showing the results of a special study of the traffic in the central business district in Philadelphia. From the general passenger survey, made in 1912, the number of passengers boarding and alighting from cars at each street corner was compiled and plotted in graphical form. Different colors were used to indicate the proportion of passengers for travel east, west, north and south at each street corner. This information was used primarily for estimating the traffic at the stations on the recommended delivery loop. The diagrams, it is said, show conclusively that the locations recommended for the north, east and west sides of the loop will serve the greatest number of people with the greatest convenience.

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Freight Locomotives for the South Shore Lines

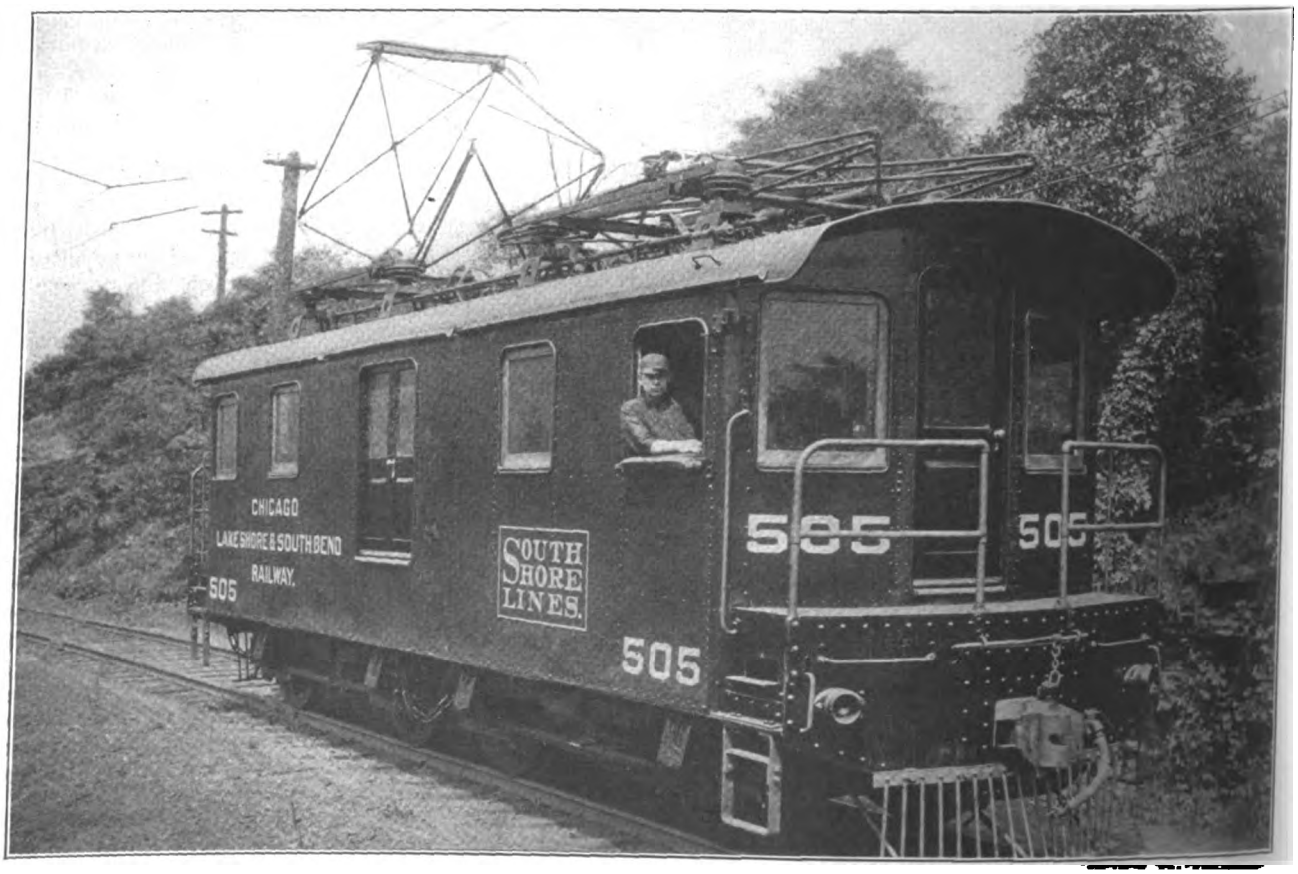
The Chicago, Lake Shore & South Bend Railway Has Recently Entered the Business of Handling Freight on a Steam Railroad Basis by Placing in Operation Two Single-Phase Locomotives Designed Especially for the Service

WITH a keen perception of the possibilities of increasing the revenue of the railroad through the handling of freight, the Chicago, Lake Shore & South Bend Railway Company has laid plans and begun activities toward the moving of this class of traffic on a large scale. The opportunities presented are most promising, considering the route of the road through the rapidly-growing district around the south shore of Lake Michigan, where construction work of interesting proportions is in progress. This involves the handling of large quantities of building material, to say nothing of the present and later possibilities for transporting the products of the industries that have been established in the vicinity.

Interchange arrangements have already been completed with the Illinois Central Railroad and the Chicago, Joliet & Eastern Railroad, and negotiations are well under way for interchange with a number of other lines. Joint tariffs have been established with some ninety steam roads, and application has been made for membership in the American Railway Association. Inasmuch as all construction and equipment on the South Shore Lines comply with standard steam railroad practice throughout, it is expected that this membership will be promptly granted. The company has already joined the Master Car Builders' Association.

No less-than-carload freight is being handled at present, but the company has purchased real estate in all the towns along its line for the location of freight houses to be built next spring, and as soon as these are ready all classes of freight will be solicited.

An entry into the freight business on so elaborate a plan naturally gave rise to the necessity for suitable motive equipment to handle heavy trains. The service was, therefore, not begun in earnest until the arrival, thirty days ago, of two new 72-ton locomotives built by the Westinghouse Electric & Manufacturing Company, and designed especially for the requirements of the road and the service. In general, these are eight-wheel, swivel-truck, 6600-volt, single-phase, four-motor locomotives, capable of exerting continuously with forced ventilation a tractive effort of 13,600 lb. at a speed of 15.8 m.p.h. with 220 volts at each motor. They will exert a tractive effort of 20,800 lb. for one hour at approximately 12.4 m.p.h., and with clean dry rails will give a momentary maximum tractive effort of 36,000 lb. A feature of the design is the mounting of all equipment, piping and conduit within the cab in easily ac-



SOUTH SHORE LOCOMOTIVES—VIEW OF LOCOMOTIVE SHOWING BOX CAB WITH SIDE DOORS

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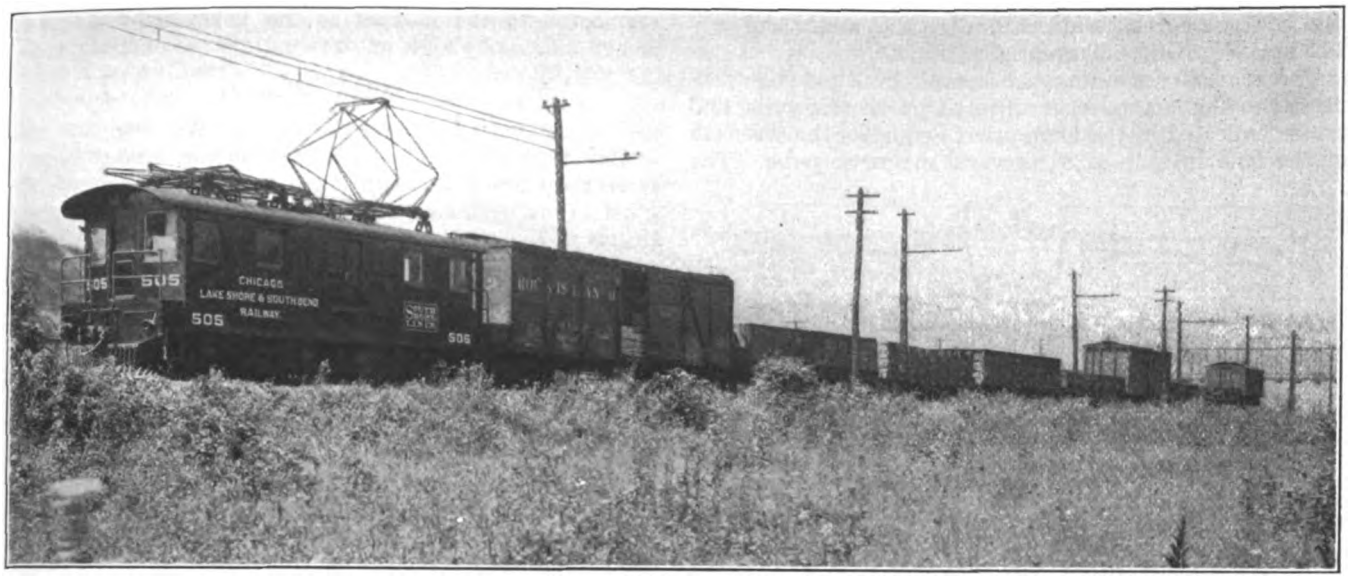


SOUTH SHORE LOCOMOTIVES—LOCOMOTIVE AND TYPICAL FREIGHT TRAIN

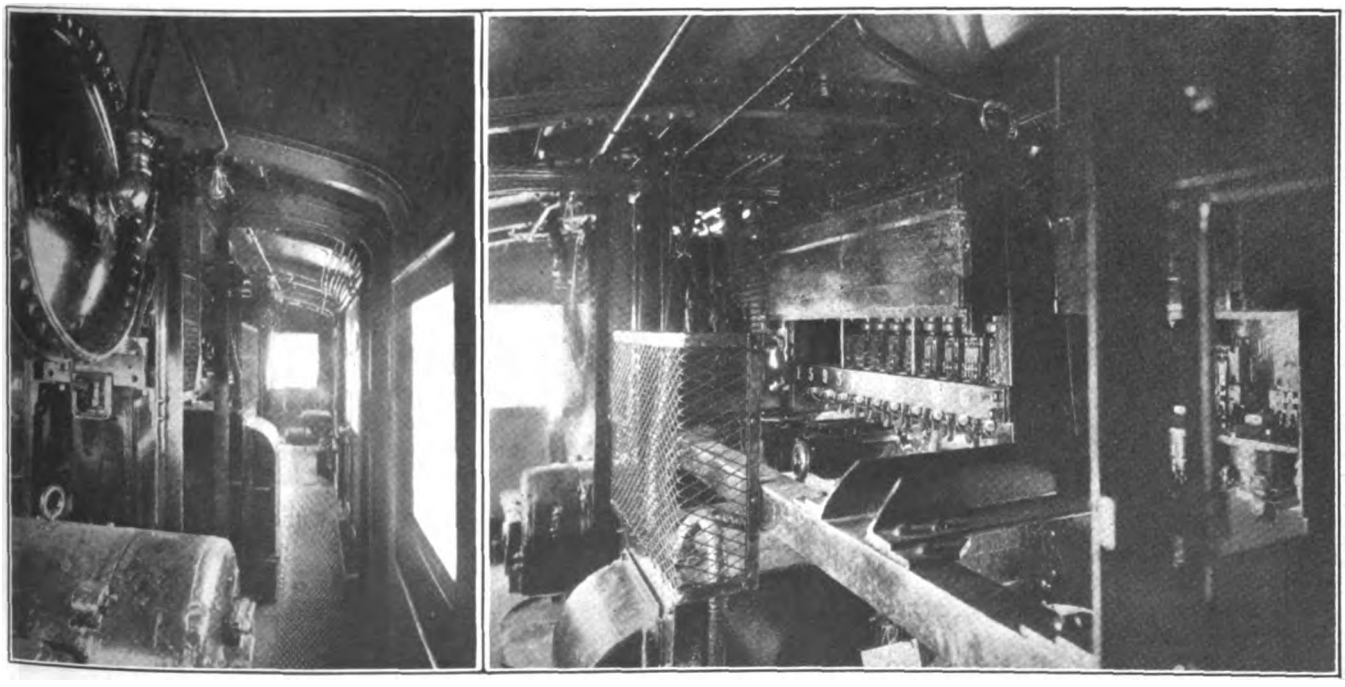
cessible positions, the cab having both side and end doors and being so arranged that all items of equipment can be removed without any difficulty through the doors and windows.

LOCOMOTIVE TRUCK AND MOTOR EQUIPMENT

The locomotives are mounted on Baldwin locomotive-type trucks equipped with 50-in. wheels. The trucks are of the equalized, pedestal type with cast-metal side frames placed outside the wheels. These frames are similar in general design to those used in steam locomotive practice, and they are braced transversely, at each end, by a wrought-iron cross-tie, lipped over the frame and strengthened by angle irons. The springs are of the half-elliptic pattern, and are mounted directly over the journal boxes, the two springs on each side being connected by an equalizer that is fulcrumed at its middle point. Both equalizers are provided near the outer ends with coiled springs which bear against the side frames. This construction tends to reduce the severity of the shocks transmitted to the frames when passing over rough tracks. The frame pedestals are fitted with shoes and adjustable wedges, so that wear at this point can be readily taken up.

The trucks have rigid centers, and side bearings are applied to one truck only to give a three-point suspension. The rigid wheelbase is 9 ft. 6 in. and the total wheelbase of the locomotive is 24 ft. 10 in. Between truck centers the distance is 15 ft. 4 in. The motors are inside hung from two spring supports on the truck bolsters and the two axle bearings, and connected to the axles through tool steel gears and pinions, with seventy-eight and eighteen teeth respectively. The truck bolsters, like the body bolsters, are the built-up type with one-piece top and bottom members 22 in. wide.

Four type Westinghouse No. 151, single-phase, 25-cycle, series motors are provided and each is capable of developing on the stand, when supplied with an air blast of 1000 cu. ft. of air per minute, 170 hp. for one hour with a temperature rise in any of the windings not to exceed 75 deg. C. above that of the entering cooling air. This rating requires 830 amp. at 220 volts. When operated continuously as above without exceed-



SOUTH SHORE LOCOMOTIVES—INTERIOR VIEWS SHOWING SIDE AISLE IN CAB AND SWITCH GROUPS MOUNTED ABOVE TRANSFORMER

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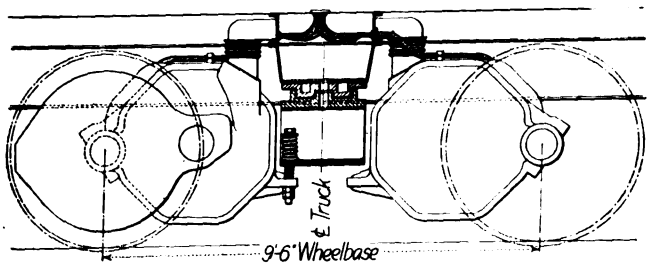
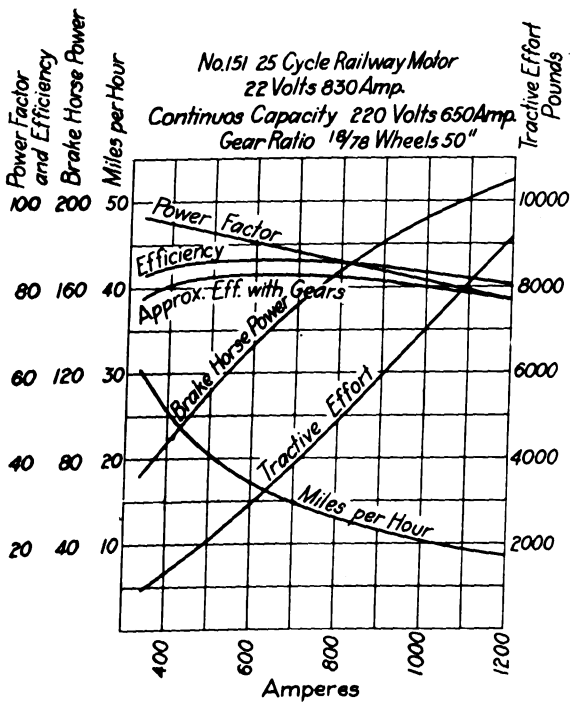
ing the same temperature limits, the motor delivers 142 hp., requiring 650 amp. at 220 volts.

The armature windings are simple multiple coils connected to the commutator through preventive coils, and cross-connected in the armature to equalize the strength of the field in each of the several magnetic poles. The



SOUTH SHORE LOCOMOTIVES—CROSS SECTION OF TRUCK SHOWING ARRANGEMENT FOR MOTOR SUSPENSION AND VENTILATION

motor frames are the box type made of cast steel and as light as possible to provide the necessary mechanical strength, since they form no part of the magnetic field, which is entirely laminated. Two entirely separate sets of coils make up the field windings; one, the main field circuit for producing the effective magnetic field, and the other, an auxiliary or compensating winding which balances the armature reactance in the field. The main field windings are made up of coils of several turns of strap copper, and in general are very similar in construction to those used on the common large direct-current motors. They are held in place by clamps in such a manner that it is possible to remove them for repair without disturbing the auxiliary windings. The auxiliary windings are carried in slots in the pole faces



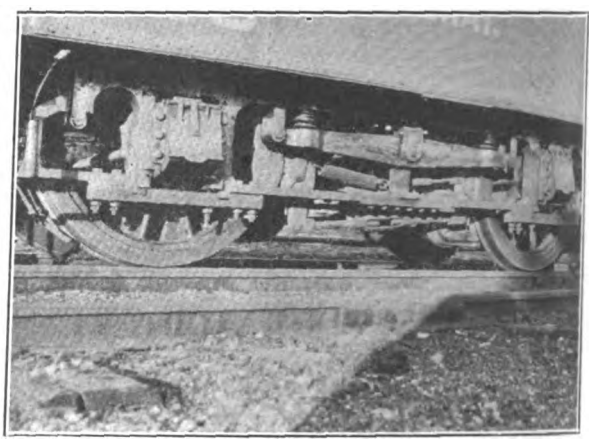
SOUTH SHORE LOCOMOTIVES—CHARACTERISTIC CURVES OF MOTORS

and are short-circuited on themselves to operate inductively. This connection reduces the voltage to ground on the winding to such a low value that no grounding trouble is likely.

Ventilation of the motors is supplied by an independent auxiliary motor and rotary fan which force the air through a duct built into the locomotive frame and connected to the motors at the bolsters by means of heavy canvas bellows of the customary construction.

CONTROL SYSTEM

The locomotives are equipped with Westinghouse unit switch type HB control. The 6600-volt trolley current is stepped down through a two-circuit railway type air blast transformer to a suitable potential for operating the No. 151 motors. Several taps on the secondary winding of the transformer conduct the low-voltage current to a unit switch group, from which it is conducted through a system of three preventive coils and then to the motors. These preventive coils between the various taps on the low-tension side of the transformer are provided so that the voltage may be raised or lowered on the main motors without opening the circuit. The low-tension circuits are not grounded, thus there is no short circuit in case of a ground on a motor, two grounds being required to establish a short circuit. As a precaution, the middle point of the low-tension side of the transformer is grounded through an incandescent lamp. As soon as there is a ground on the secondary side, this will cause the lamp to light. This serves as



SOUTH SHORE LOCOMOTIVES—VIEW SHOWING SPRING-CONTROLLED MAIN EQUALIZER ON LOCOMOTIVE TRUCK

a warning to the operator to bring the locomotive to a stop and locate and remove the ground.

The motors are connected permanently two in series and the pairs are connected permanently in parallel. The transformer switches as well as all other unit switches in the locomotive are operated by a 20-volt control circuit taken from the ten-cell storage battery and the small motor-generator set which floats on the line, both mounted on the upper level of the framing in the center of the cab. The control circuit to the transformer switches is governed from the main drum of either master controller, located one at each end of the locomotive. These controllers are provided with ten notches, and any of the last six may be used for continuous running.

The unit switch group for the control is made up of twelve unit switches of the electro-pneumatic type, each individual switch being provided with a strong magnetic blowout to extinguish the arc whenever the switch is opened. The reversers are drum-type switches, electro-pneumatically operated by a separate lever on either master controller. The location of these various switch units in the cab is on the upper level of the steel framing in the center, where it is particularly convenient for inspection and repair. A main line switch is placed at one end of the steel framing and inserted in the short length of cable between the pantograph and transformer. This is an oil immersed switch which is hand operated and provided with an overload trip to open

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the switch whenever a predetermined limit in current is exceeded. It also serves to isolate completely the locomotive equipment from the trolley current, for the protection of workmen when it is necessary to work on any live part, and as an additional safeguard against the pantograph being accidentally raised.

The motorman's position is placed at the right-hand corner of the cab at both ends, looking forward, and the brake and control levers so arranged as to be within easy reach when he is hanging out the side window for switching and observing signals. The two-button block controlling the raising and lowering of the pantograph is placed just to the left of the controller, while the sander control is placed between the controller and air valve, and the bell and whistle valve at the right of the brake valves. The ammeter and air gage are mounted just to the left of the front window, and give the motorman exact knowledge of the load being placed upon the motors and the condition of the air system. A small equalizing tank in the air brake system is placed just in front of the motorman's seat, where it serves as a footrest for him. The control system also includes receptacles at each end of the cab, with circuits from the switch group leading to them through conduit for multiple-unit control, should occasion require such operation.

Both Westinghouse straight air and automatic air brake equipment is provided, and these are operated from separate control valves, one above the other, the straight air system being used in switching and handling the locomotive by itself. Air for the brakes and control system is supplied by two motor-driven geared compressors, located one at each end of the cab and controlled from the same governor. The two pumps are operated in parallel, so that both are cut in at the same time and bring up the air pressure that much faster. This arrangement equalizes the wear on the two units, although either pump will take care of the requirements in case the other is out of order. Their capacity is 50 cu. ft. of free air per minute each. As the locomotives are arranged for multiple-unit operation, a synchronizing connection is utilized in order that the load on the compressor of both locomotives will be equally distributed. The two brake cylinders are mounted, one at each end of the car underneath the pilot platforms, diagonally opposite.

MISCELLANEOUS EQUIPMENT

Two double-shoe electro-pneumatically operated pantograph trolleys are mounted on the roof of the locomotive cab. These are insulated for 6600 volts and are connected by a 6600-volt cable, which is carried in the open on porcelain insulators to eliminate the possibility of any grounds. In order that the pantograph may be raised when there is no air pressure available, a small hand pump is installed in the cab, and by setting the valve to cut off the automatic air control a few strokes of the pump handle raise the pantograph. Located between the two pantographs is a standard locomotive bell, air operated, which is controlled by a valve in the engineer's cab. The two air whistles and headlights complete the equipment on the roof of the locomotive. These headlights are a combination of a Crouse-Hinds headlight switch located within the cab over the end doors, a General Electric Company 98-volt/6-volt transformer, and Esterline Golden Glow headlight, fitted with a 500-watt lamp. The switch has a neutral, a 6-volt and a 3-volt position, the latter being used to give a dim headlight while going through cities. The headlights are equipped with an adjustable socket for readily focusing the lamp in the reflector.

The locomotives are equipped also with Sharon M.C.B. automatic couplers with slotted knuckles mounted with Westinghouse friction draft gear at each end of the locomotive, and the bumpers at both ends are fitted with poling sockets. The sand boxes at each end of the cab are equipped with Leach sanders electro-pneumatically operated and serving four spouts. A bracket mounted on the framework in the cab is located just behind the motorman's position near the top of the cab, and serves to carry all the signal and marker equipment. The locomotives are painted black outside and green inside, with brown iron colored roof and red iron color inside the hoods. A weight analysis of the various parts of the equipment is given in the accompanying table.

	Pounds
Motor	8,933
Armature	3,500
Gear case	144
Axle bearing	108
Pinion, eighteen teeth	73.5
Gear, seventy-eight teeth	911
Line switch, type 310	328
Switch group, type 267	1,120
Switch group, type 268	326
Reverser, type 284	202
Main air blast transformer	5,070
Preventive coil, 550 amp.	411
Preventive coil, 355 amp.	406
Controller, type 189-C	74
Storage battery	93
Motor-generator set	115
Pantograph trolley complete	1,100
Blower motor housing	122
Blower motor, type X-B-45	1,180
Blower fan	75
Air compressor, type XD-4 K, complete	2,500
Total weight locomotive, complete	144,000

Chicago Traction Report

The seventh annual report of the Board of Supervising Engineers, Chicago Traction, as of Jan. 31, 1914, has been issued. The report is very largely statistical in nature, with numerous charts and exhibits included which show the financial and operating statistics for the year 1913 and summarize the progress made in rehabilitating the street railway properties under the supervision of the board since the work began, Feb. 1, 1907. This period of seven years ended the divisional operations of the street railways by separate companies, and the report, therefore, sums up the results of the work of rehabilitation. The total cost of rehabilitating and extending the original property by actual construction or by purchase from Feb. 1, 1907, to Feb. 1, 1914, was $91,316,136 of which $84,141,583 was charged to capital account and $7,174,553 to renewal account. If this capital expenditure is added to the Traction Valuation Commission's valuation of 1906, precedent to the 1907 ordinances, the total "agreed purchase price" of the four companies under the supervision of the board is placed as of the above date, at $139,916,583. As the plans for the unified operation of the Chicago Surface Lines were consummated during the year 1913, the report also contains the full text of the unification ordinance and operating agreement. The full text of the operating agreement between the Chicago Railways and the County Traction Company is likewise included.

According to the Bureau of Railway Economics, an analysis of steam railroad statistics as of June 30, 1915, shows a total of $6,004,496,162 of capital stock in the hands of 607,630 stockholders, who comprise what may be termed the general public. This figure, it may be said, was reached after deducting 688 railways by or for whom the stock of other railways is held, and the $2,519,956,813 of stock so held. The average holding per stockholder for the United States as a whole was $9,882. The average was $7,158 in the East, $15,928 in the South, and $12,365 in the West.

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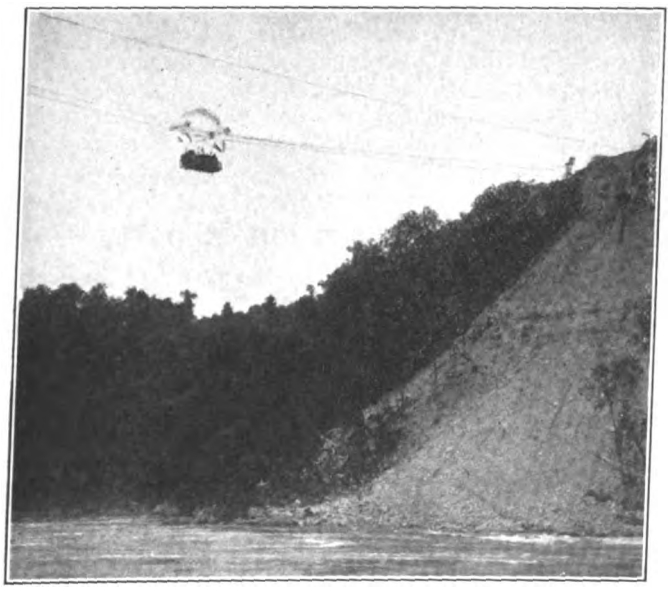
Aerial Tramway at Niagara Falls

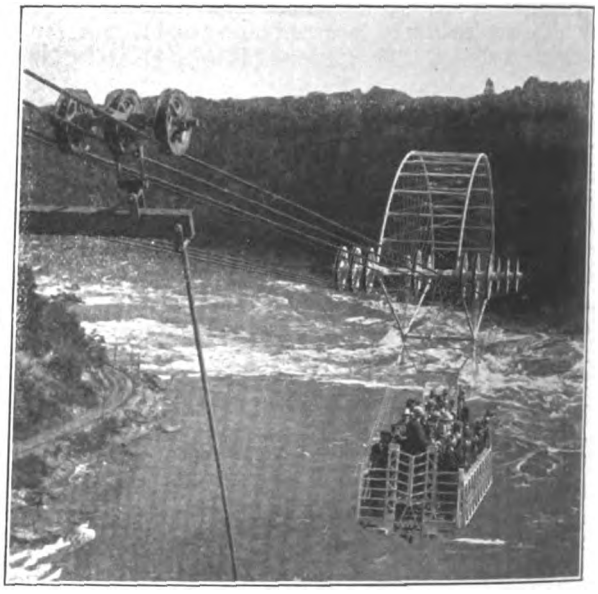
During Three Months of Operation This Novel Cableway Has Taken Its Place as a Permanent Addition to the Facilities for Viewing the Whirlpool and Rapids

THE newest attraction for tourists visiting Niagara Falls is the aerial cableway spanning the gorge in which the Whirlpool is located. Although the International Railway, Buffalo, N. Y., is in no way financially interested in the enterprise the railway is making quite a feature of advertising the attraction because the cableway is most readily reached by its lines. In fact, the cableway connects two points on the company's Belt Line on the Canadian side of the Niagara River.

The cableway permits its passengers to obtain a new view of the Whirlpool and of the river above and below the sharp bend which occurs at this point. It has been in operation since the late summer and while still comparatively unknown is already attracting a fair business. After the public has gained greater confidence in the stability of the construction the cableway cannot but become popular with tourists.



WHIRLPOOL GORGE WITH AERIAL TRAMWAY ABOVE



CAR USED ON THE AERIAL TRAMWAY, NIAGARA FALLS, ONT.

During the construction period the installation was described somewhat in the technical press. Now that it is practically complete and has been in commercial operation for some weeks a general survey of the completed installation may prove of interest, particularly in view of its relation to the local electric railway traffic.

The elements of the cableway are as follows: The 1800-ft. span of six track cables with their anchorage and tension-regulating devices; the forty-five passenger car; the traction apparatus comprising the driving motor, the traction cable and the slack-adjusting counterweight; the safety and emergency devices; the loading platforms, and the terminal stations. These elements will be described briefly in the order given.

The track cables are six in number, of crucible steel and 1 in. in diameter. The core consists of seven round strands, a smooth surface being obtained by surrounding these with a layer of locked strands. The tensile strength of each of these cables is stated to be about 92,000 lb. At one end of the cableway where the cables pass over sheaves to a tension-regulating device, a section of more flexible cable takes the place of the stiffer track cable. The working tension in each track cable is 20,000 lb.

At the Colt's Point end of the span, which may be considered the main terminal, the track cables are substantially anchored, through 2-in. steel anchor rods, in a concrete block weighing nearly 750 tons. This is embedded in the face of the cliff and is so formed that the final anchorage of the rods is in a vertical direction, the rods being bent through 90 deg. over a curved surface of large radius and separated therefrom by closely spaced I-beam supports. The rods are in chambers in which their condition can readily be inspected.

At first the track cables were connected directly to the anchor rods by means of swivel sockets. Later, to avoid any possible danger, in years to come, of crystallization of the cables at the entrance to the sockets, heavy double steel bars were inserted between the cable ends and the rod ends. This insures the concentration of angular movement, which is very slight, at the shore end of the steel bars.

At the Thompson's Point end of the span each track cable is held in tension by a 10-ton counterweight. The cable passes over a 5-ft. sheave mounted on a steel tower anchored in concrete. This device insures constant tension in the cable regardless of temperature changes and loading, the sag in the span automatically adjusting itself to maintain equilibrium of forces.

The car, which has a capacity of about forty-five passengers, is designed for lightness, grace and novelty, consistent with ample strength. It is of steel and weighs, empty, about 3½ tons. Its foreign appearance is due to the fact that it was designed and constructed in Spain. It hangs from two axles each supported on the cables by six deeply-grooved wheels 2½ ft. in diameter, the axles being spaced by means of a gracefully arched, trussed frame. Guys connect the ends of the car and the axles to prevent teetering.

The motor for driving the car is located in a chamber at Thompson's Point. It is a three-phase, 25-cycle induction motor of 75-hp. capacity. It drives the traction drum through a 30 to 1 worm gear. The ⅞-in. steel traction cable is continuous from one end of the car to the other by the following route. From one end of the car it passes over a sheave at Colt's Point and across the gorge, over a supporting sheave at the entrance to the Thompson's Point station to the driving drum. Next it passes through a tension and slack-regulating device consisting of three sheaves, to one of which a 10-ton counterweight is attached, thence back to the car.

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At each end of the span is a substantial and attractive station and series of stationary platforms. The restrictions imposed by the Canadian authorities made it necessary to keep all structures below the level of the adjoining banks. Hence the terminals had to be constructed in the solid rock. Leading to the stationary platforms are light ones suspended from the track cables, so that the car actually discharges its passengers some distance out from the bank. This construction insures the proper relation of levels of car floor and landing platform.

The control of the car is in the hands of the motor operator at Thompson's Point. He operates in accordance with signals from the conductor on the car. Detailed instructions can also be given from the car by means of a telephone connection. To supplement the manual control there are several safety devices necessitated by the danger of breakage of the traction cable, the possibility of the occurrence of a gap between the car and a landing platform, etc. As the grade at the termini is about 16 per cent, substantial locking devices are essential. However, this installation has the advantage over a railway in the fact that even if the traction cable breaks the car will merely oscillate backward and forward until friction brings it to rest.

To lock the car at the end of its travel there is a clutch on the traction cable which engages with a piston in a hydraulic cylinder, furnishing also an automatic stop. This clutch is interlocked with the car gate control. At each end there are also two limit switches one of which is normally operated by the car floor, the other acting in emergency.

The aerial tramway at Niagara Falls has been erected by the Niagara Spanish Aerocar Company, Ltd., under patents of a company in Bilbao, Spain. The latter has had a smaller cableway in operation at St. Sebastian, Spain, for several years so that the new installation is in no way an experiment. The scheme of tension regulation and other features, known as the Torres system, is the invention of a well-known Spanish engineer; and the whole plant has been installed in accordance with first-class engineering practice.

AMERICAN ASSOCIATION NEWS

Mid-Year Conference Committee Meets in Boston

At the meeting of the committee on the mid-year conference held in Boston on Nov. 9 the plans for the dinner program were discussed and a number of sub-committees were appointed. Those in attendance were: C. Loomis Allen, Syracuse, N. Y.; M. C. Brush, Boston, Mass.; H. C. Clark, New York; C. P. Dennett, Boston; E. L. Janes, Boston; Myles B. Lambert, Pittsburgh, Pa.; C. C. Peirce, Boston; H. E. Reynolds, Boston; Col. T. S. Williams, Brooklyn, N. Y.

The sub-committees appointed were as follows: To secure speakers—Messrs. Brush, Williams, Dennett and Peirce; on hotel arrangements—Messrs. Dennett, Peirce and C. V. Wood, Springfield, Mass.; on seating arrangements—Messrs. Janes, Lambert, Reynolds and Clark. C. Loomis Allen was appointed chairman of the reception committee with power to name his associates. L. S. Storrs, president of the association, was named as toastmaster.

The date for the Boston dinner was definitely settled as Friday, Feb. 2, 1917, and the names of a number of speakers of national reputation were canvassed with a view to securing at least two to appear on the dinner program.

Committee on United States Mail

Henry S. Lyons, secretary Boston Elevated Railway, has been appointed chairman of the committee on compensation for carrying United States mail of the American Electric Railway Association. This appointment is of particular interest, owing to the fact that the Interstate Commerce Commission has recently announced that it would investigate the general subject of compensation for carrying United States mail.

Chicago Elevated Section Elects Officers

At the meeting of the Chicago Elevated Railroad Company section held on Oct. 24, J. H. Mallon, safety engineer, section delegate to the Atlantic City convention, gave an interesting and amusing account of his visit to Atlantic City. His talk was illustrated with slides especially prepared for the purpose by A. F. Scholz, chief claim adjuster. Charles H. Jones, general foreman electrical department, also gave a lecture on "Electrolysis," which was highly appreciated.

The secretary's report showed that there are about 200 section members in good standing.

The result of the election was as follows: President, E. J. Blair, electrical engineer; vice-president, J. A. Jarvis, superintendent Metropolitan West Side Elevated Railway; secretary and treasurer, M. Bridges, chief clerk to master mechanic; librarian, P. V. Lyon; director two-year term, J. R. McDonald, general foreman Chicago & Oak Park Elevated Railroad; director one-year term, F. Artman, service inspector Northwestern Elevated Railroad.

Connecticut Company Section

A special meeting of the section was held on Oct. 19, preceded as usual by a dinner. Seventy-two members and guests were present. The purpose of the meeting was to furnish an opportunity for the members of the section to hear reports from representatives who had attended the Atlantic City convention.

In addition to the special order, a paper on "First Aid Work, Practical Application and Scope" was read by Dr. S. L. Spier, and P. Ney Wilson, roadmaster at New Haven, read the report of the committee on snow fighting. Dr. Spier, who has conducted courses of lectures on first-aid work in co-operation with a number of utility companies, discussed treatment in the case of accidents and the results of first-aid work. The report of the snow fighting committee elicited congratulations as to its quality. Abstracts of the report are to be distributed to the several division managers and superintendents.

Manila Section

The twentieth meeting of Company Section No. 5 was held in Manila on Sept. 12, forty-seven of the 110 members being present. The secretary stated that of the 1076 employees of the railway department of the company fifty-four are members of the American Electric Railway Association.

The speaker of the evening was D. S. Cairns, assistant general manager, his subject being "Experiences and Observations on a Seven Months' Absence from Manila." He described his trip made this year through China, Korea, Japan and the United States, most of his time being spent in the last-named country. In Shanghai and Tientsin he noted particularly the popularity of the street railway service as indicated by very heavy travel. In Vancouver, B. C., his attention was attracted by the roofless cars, which were described in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 2, 1916,

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page 401. These, he said, seemed very popular as the climate was conducive to outdoor traveling. In his address Mr. Cairns mentioned his visits in Chicago, where he attended the N. E. L. A. convention, Minneapolis, New York and Norfolk, and elsewhere.

COMMUNICATIONS

The Jitney Bus Situation in California

CALIFORNIA ELECTRIC RAILWAY ASSOCIATION
SAN FRANCISCO, CAL., Nov. 1, 1916.

To the Editors:

In California there are now 217,000 licensed automobiles, which gives this state more cars per capita than any other state in the Union. This condition is largely responsible for the fact that there are thousands of second-hand automobiles on the market available at prices within the reach of almost anyone who desires to purchase for cash or on credit. In the absence of any effective regulation in many of the cities, with the excellent condition of highways outside the limits of incorporated cities, which are open to jitney or interurban buses, and with absolutely no restriction or taxation, it is easy to see how the jitneys have gained so strong a foothold.

However, the public as a whole is beginning to realize that for their own protection something must be done, and the present jitney situation is gradually improving. Wherever the issue has been clearly drawn, that is, where the public has been called upon to decide whether the electric street car or the jitney is to have exclusive rights, the preference has always been expressed for the electric railway.

The regulation of jitney buses by local bodies has been a failure. The jitney drivers have adopted the plea of "Let the poor man earn a living," and this, as compared to the sound logic advanced by the electric railways has had its effect upon city councils and other municipal bodies—there has been a fear of being called "corporation men" which has prevented officials from carrying out regulation on a strictly fair and proper basis.

There have been a number of exceptions to this rule, and some cities are now preventing jitneys from paralleling electric lines. Long Beach, for example, has passed three separate ordinances in two years attempting to regulate jitneys. The city is now advertising an exclusive jitney franchise on streets other than those traversed by electric cars. In that city several electric lines have been abandoned because of jitney competition, but the abandoned service has not been replaced by the jitneys.

In nearly every case where a regulatory ordinance has been passed jitney men have resorted to the referendum and initiative. Doubtless this law was never intended for such a purpose, but it has lent itself well to the jitney drivers' purpose, and the result has been rather expensive to the cities in the cost of special elections.

After eight months of debate and experiment in Los Angeles, during which time jitney interests resorted to every conceivable trick to delay the ordinance, jitneys are now under the jurisdiction of the Board of Public Utilities—as are all other public utilities. This is considered a move in the right direction and fair to all concerned. In southern California generally, the public has become much more interested in fair play; legislation is being demanded, and particularly since the rainy season commenced the jitney is losing its popularity with the public.

The jitney as it exists to-day must in time disappear. The autobus is here to take its place somewhere, more than likely as a feeder to existing electric lines. Several companies are experimenting with various types of cars, and it is very likely that after the experimental stages have passed a design will develop which will be generally suitable.

Meantime—so long as independent jitneys are operated—it is essential that proper regulation and taxation of the jitney should determine just what its position as a public carrier should be. It must pay its proportion of taxation just as other public utilities do, and the public will demand this in the end. This is a question that should be adjudicated by the Railroad Commission, for it has been demonstrated that the situation cannot be adequately handled by local bodies. The rules and regulations must be uniform, and when established must be enforced.

W. V. HILL, Manager.

Accounting Co-operation Desired

AMERICAN ELECTRIC RAILWAY ACCOUNTANTS' ASSOCIATION

BOSTON, MASS., Nov. 9, 1916.

To the Editors:

I trust you will permit me to add a word or two to the discussion started by your editorial of Oct. 14 and continued by the comments of Mr. Forse and "Accountant" in your issues of Oct. 28 and Nov. 4. On the general subject of the opinions of the certified public accountant in electric railway accounting matters, it may be stated that it is not always what is said by the outside expert that stirs a feeling of antagonism but quite often it is the way a thing is said. Moreover, it is very easy for the outside expert to assume that he knows why an account is wrong, when if he were familiar with all of the facts that may have led up to the adoption of the account he would be convinced of its correctness.

The Accountants' Committee is always willing to listen to any suggestions tending to improve the accounts and has invited criticism whenever a new system or an extended revision of an existing system has been contemplated. Before the present standard system was adopted the tentative text was sent out to all electric carriers with the request that it be carefully considered by all interested and that all who had any criticisms to make or suggestions to offer do so. It was promised that they would all be carefully considered before the final text was published. Many replies were received and every communication was gone over with great care and changes made if in the opinion of the representatives of the Interstate Commerce Commission and the members of the Accountants' Committee they would improve or clarify the system.

Wonderful strides have been made in improving the construction, equipment and operation of electric railways, all tending to make them more perfect, and it would be strange if the accounts as well could not be improved. Undoubtedly this will be done from time to time, and we hope and ask for assistance from all interested in this phase of the business.

The electric railway accountants have twice attempted to get the active co-operation of the steam railroad accountants in an endeavor to make, if possible, a system of accounts that might be used by both kinds of carriers, but I regret to say that those who represented the steam railroads gave very little consideration to the ideas of those representing the electric railways, and unless a different spirit is shown the chances of getting together are rather remote.

H. L. WILSON, Chairman of Committee,
Standard Classification of Accounts.

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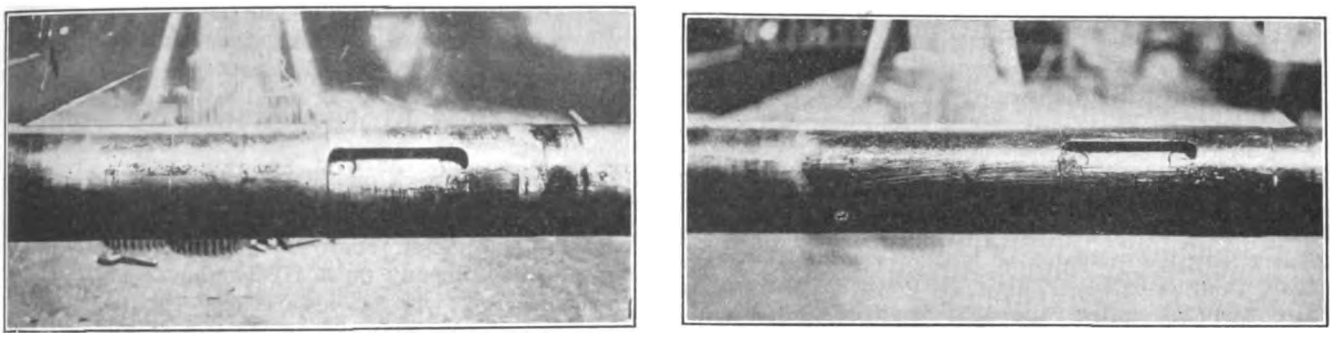
Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Tilting Rails Increases Bearing Surface—$1,800 Spent Per Car Gives Topeka (Kan.) Railway an Up-to-Date One-Man Car Equipment—Lampblack and Paint Are Effective Materials in Axle Testing



BEFORE TESTING CLEAN THE AXLE WITH GASOLINE AND PAINT IT THOROUGHLY WITH LAMPBLACK

Finding the Defects in Car Axles

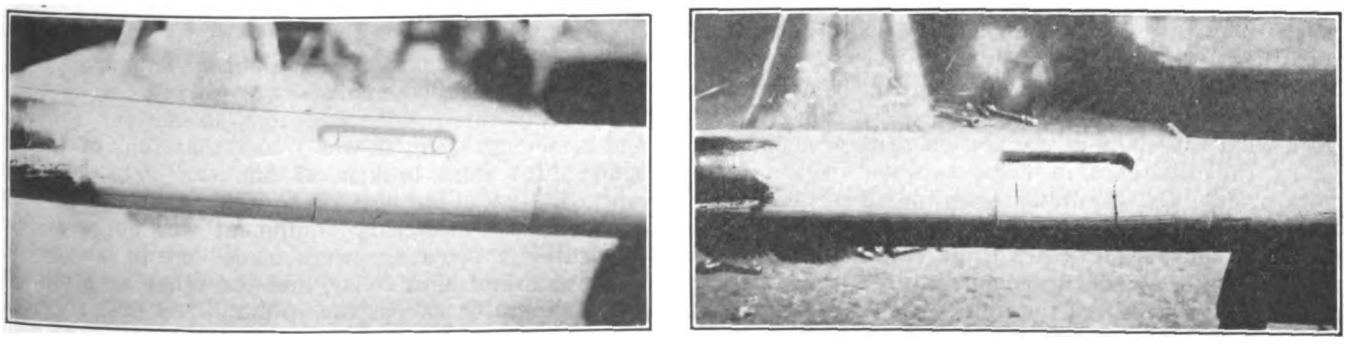
The Author Describes a Simple Method of Testing and Demonstrates the Importance of Tests for Defects When Axles Are Returned for Lighter Duty

BY R. N. HEMMING
Superintendent of Motive Power, Union Traction Company of Indiana, Anderson, Ind.

A crack, flaw or fracture in a car axle cannot be detected by sound on account of its being a solid mass. It is quite unlike a hollow pipe, a kettle, a plate or a glass drinking tumbler, which gives a flat or planky sound on being struck, if a crack exists, instead of a ring. It is also useless to attempt to find defects by sledging an axle mounted on trusses or on blocks, because the vibrations made by the hammer blow are for some peculiar reason absorbed by the supports. Trusting to this method of support during the test may result in the passing of a very defective axle as safe for service, only to be followed by a serious accident. Judging from the number of inquiries we have received in regard to safe mileage for axles, when they should be scrapped and whether or not it is possible to detect minute flaws, etc., it seems that information along this line is somewhat lacking. The following is offered as a contribution to this information. The method described has been in use for some time, and we have found it very satisfactory. The accompanying pictures illustrate the several steps in the testing process.

The axle is stripped of wheels and gears and cleaned all over with gasoline, including the keyway if there is one, in order to remove all grease and foreign substance. It is then painted with lampblack or plumbago of a medium to thin consistency. This is necessary and important as these materials will find their way into the smallest fracture. The third operation is to wipe off the lampblack or plumbago with dry waste until the axle is thoroughly cleaned all over, including the keyway. The fourth step is to paint the axle with white lead or white paint. After this it is suspended about 3 ft. above the floor by means of a rope sling attached at the balancing center. This places the axle at a convenient height for sledging and leaves both ends free. A fairly hard blow is then struck near the center of the axle, using a 10-lb. or 15-lb. sledge, the weight depending somewhat upon the size of the axle. Practice soon teaches one the size of sledge and force of blow to use, to produce the best results. With the axle suspended free to vibrate, the sledging renders visible any flaws and fractures which exist no matter how small, because the lampblack or plumbago which has been retained in the cracks or flaws shows through the white lead. The axles are carefully scrutinized all over and especially at the points adjacent to the keyway and fillets, and at that portion concealed under the wheel and gear seats.

In the last of the accompanying illustrations, there were three fractures visible, one above the keyway and two below. On the other side of the axle and opposite



WIPE OFF LAMPBLACK WITH DRY WASTE, PAINT WITH WHITE LEAD, SUSPEND FROM CENTER, STRIKE BLOW WITH SLEDGE, AND DEFECTS WILL APPEAR THROUGH WHITE PAINT

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these two fractures, there was another small fracture about ¼ in. long at the right side of the keyway. Fractures due to service crystallization travel around the axle and not directly through it, but their depth may vary. Five axles with defects of this type were recently discovered in a period of ten days, and practically all of the defects originated at the keyway. This is evidence that keyways should be dispensed with and that solid gears should be used in place of split gears. It also suggests the importance of considering increases in the diameters of axles at the wheel and gear seats.

A large number of our city car axles are made from worn-out interurban axles, that is, those on which the journals have become undersized and unsafe for further interurban use. These axles have generally been in use for a long period and subject to heavy stress due to the high-speed, heavy-duty service and may, therefore, be somewhat crystallized, and may contain defects which will be inherited by the city service. Turning down one of these old axles, which we may assume to have been heat treated or otherwise specially forged, gives a city axle capable of long service and effects a considerable economy. This may, however, prove to be false economy unless the axle has been thoroughly tested before turning down, and even then it should be again tested before the wheels or gears are mounted upon it. The first test should be made to avoid the expense of turning if the fracture is evident, and the second absolutely to insure its reliability before it is placed in service.

It is quite possible that these old interurban axles may be the source of some of the city car axle failures regardless of keyway or size of axle. We have had few interurban car axles break, and those which have broken have usually failed between the gear and the axle, adjacent to one or the other. The writer has no recollection or record of any axle breaking on the outside of the gear-side wheel, or on either side of the off wheel. From this it is evident that the greatest torsion of the axle is between the center of the gear and the center of the wheel next to it.

The life of an axle on the mileage basis is practically incalculable, since it is governed by the class of service, the size of the axle, the presence or absence of a keyway, the track conditions, the speed, the gear ratio, the rate of acceleration and the climatic conditions in sections of the country where extremely heavy frosts or extremely low temperatures are experienced.

Reusing Worn Trolley Wire

BY G. H. MCKELWAY,
Line Engineer Brooklyn Rapid Transit Company

In the ELECTRIC RAILWAY JOURNAL of Aug. 26, 1916, page 367, an article appeared describing some of the methods used by the line department of the city of Havana. It was stated that when the trolley wire on any of the company's lines needed repairs because of weak spots the wire was removed, carefully inspected, and those portions not badly worn were cut out and were reinstalled on lines having light traffic or in yards.

While this practice is better than throwing away good wire, especially at the present price of copper, and losing the difference in value between the scrap and new prices, yet it would seem possible to improve upon it.

A method which appears to be better is one that is now used by a number of companies of gaging the wire while it is in place and taking down only those sections which have become badly worn or burnt. This makes it unnecessary to take down any wire and later to run it again, as all wire is left in place until it is worn out. The inspection and gaging can be done as cheaply by a man on a tower wagon using a micrometer as it could be done in the yard after the wire has been taken down. It will also permit of cutting the wire to be removed into short lengths instead of taking off the ears. This will cheapen the work still further.

A few bad spots may be overlooked by this method of gaging, yet nearly all of them can be found if an occasional ear be taken off and the wire gaged at this point as well as beyond the ends of the ears.

A further advantage is that the gaging permits of locating the thin places on the ground and makes easier the determination of the cause of the wear and its remedy by lining up wire, making repairs to tracks, etc.

Repair of a Motor Armature Spider

BY W. A. ERNST
Armature Winder, St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

A small emergency repair job was done recently in the shop of this company on a Westinghouse 112-B motor armature spider. It was noticed that the insulation on the armature coils was cut at the end of the slots and that a number of coil supports and coil guards were broken at the pinion end. Extensive end play had caused the coil guard to strike against the pinion end bearing housing, and these repeated blows broke off

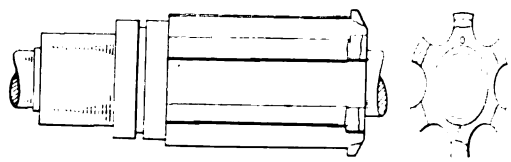

Fig. 1

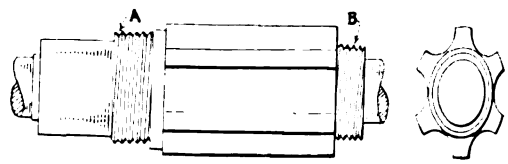

Fig. 2

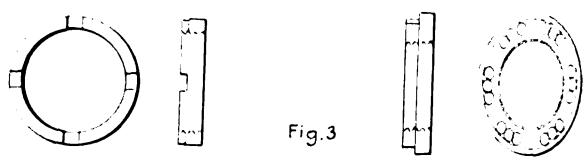

Fig. 3

METHOD OF REPAIRING MOTOR-ARMATURE SPIDER IN AN EMERGENCY

Fig. 1—Approximate shape of motor-armature spider before machining, showing broken lugs and original contour.
Fig. 2—Approximate shape after machining, *A* and *B* each having 8 U. S. threads per inch.
Fig. 3—Forged steel nut for *A*, forged steel collar for *B*; holes drilled in collar for ventilation.

some of the lugs on the pinion end of the spider so that the laminations became loosened. This made it impossible to replace the coils.

On temporarily clamping the laminations together and removing them, it was found that four of the six spider lugs were broken off and the other two lugs cracked. It was not possible to weld these lugs onto the spider, as the necessary equipment was not available. Accordingly, two rings were made, one to be used on the pinion end as a collar, and the other as a nut for the commutator end of the spider. The first ring was 2 in. wide with a radial thickness of 1½ in. and an inside diameter of 1 in. smaller than the outside diameter of the spider. The other ring was 2 in. wide with a

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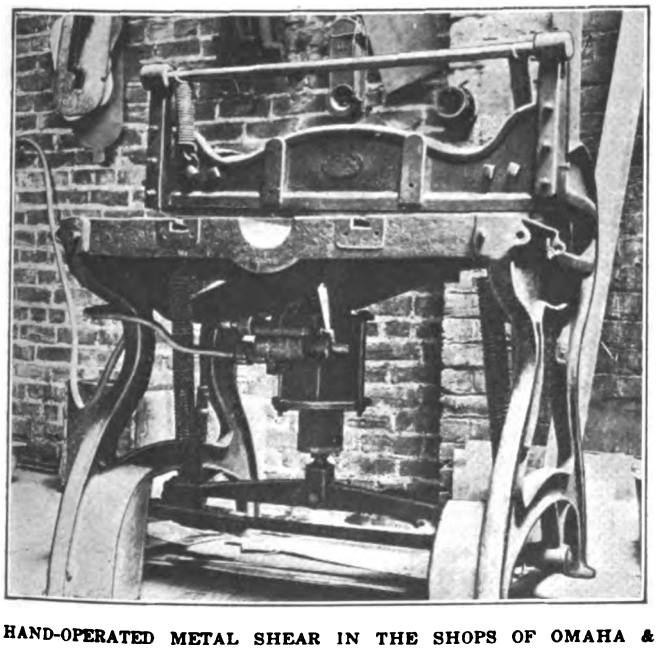
radial thickness of 1¼ in., and it was ¾ in. smaller in diameter than the armature spider. Both rings were made of mild steel. Each end of the spider was turned off and threads cut in order to take the two rings. Holes ½ in. in diameter were then drilled into the rings at each rib of the spider and a plug put in to help hold the rings. One was slightly chamfered on the end, while the other was notched for a spanner wrench, as shown. The key was then extended to its former length.

The laminations were white-leaded, and a new coil support was put on. This had been cast at a local foundry and machined at the shop. After replacing the laminations the commutator end coil support was placed in the wheel press and pressed into its former position, care being taken to have it pass over the key in the spider, a force of 40 tons being applied. The nut was screwed up tight, the pressure was released and the bolts were removed from the coil slots. The laminations were now tight, having no free movement at the bottom of coil slots as before. Five-eighth inch holes were drilled in the commutator end coil support on opposite sides, and a 7/16-in. hole through the nut into the spider. This was tapped out and a ½-in. set screw inserted. The commutator was then pressed into place, the thrust collars were replaced, the core was reinsulated, the armature was rewound and put back in service. That this was a successful method of repair is evident from the fact that at the end of six months the armature showed no signs of failure.

Air Cylinder Increases Metal Shear Capacity

In order to increase its capacity a hand-operated metal shear has been equipped with an air cylinder and engineer's valve in the shops of the Omaha & Council Bluffs Street Railway, Omaha, Neb. As shown in the accompanying illustration, the 6-in. air cylinder has been applied on the underside of the lower blade of

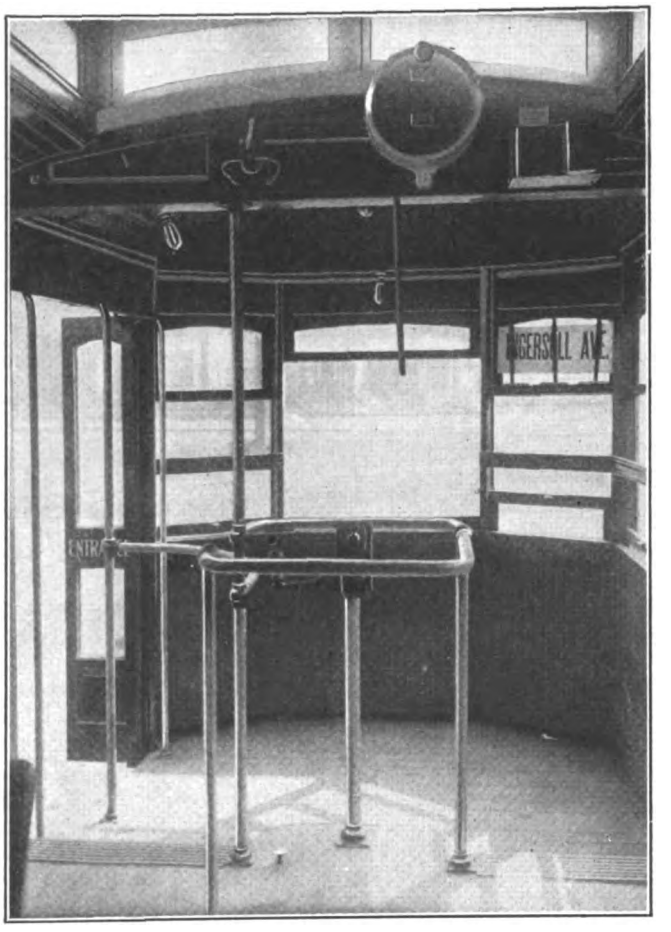


HAND-OPERATED METAL SHEAR IN THE SHOPS OF OMAHA & COUNCIL BLUFFS STREET RAILWAY

a Niagara Stamping & Tool Company's metal shear. Where this machine required two men to cut 18-gage metal before applying the air cylinder, one man is now able to cut 16-gage metal without difficulty and the capacity of the machine is not overtaxed.

Rebuilding Forty Old-Type Cars in Des Moines

Early this year the Des Moines (Iowa) City Railway's repair shops began remodeling forty of its old-type cars. The rebuilding of these cars, which was described and illustrated in the ELECTRIC RAILWAY JOURNAL of May 20, 1916, page 948, included removing the bulkheads, rebuilding the platforms by making them



REAR PLATFORM ARRANGEMENT OF REBUILT DES MOINES CAR

all of standard dimensions and providing a sanitary interior finish throughout the car body to facilitate cleaning.

In addition to the repairs made to the car bodies, they were all repainted inside and out. The trucks were overhauled and new brake rigging provided. The worn 5-in. axles were turned down for 4¼-in. x 8-in. journals, and the motors on all the overhauled cars were geared to the second and fourth axles instead of the third and fourth.

Experience had indicated to the head of the mechanical department that the tractive effort was increased when the motors were geared to axles No. 2 and No. 4, and much of the bolster play was also obviated. In the new positions the front wheels of each truck serve as idlers and clear the rails for the motor wheels. As a part of the overhauling program the following specialties were purchased and installed: Consolidated Car Heating Company's single-stroke bells for conductors' and motormen's signals, Golden Glow headlights, National Pneumatic Company's door engine arranged for manual operation, Peacock staffless brakes and Tomlinson radial drawbars. A view of the arrangement of the rear platform of one of these rebuilt cars is shown in the accompanying illustration.

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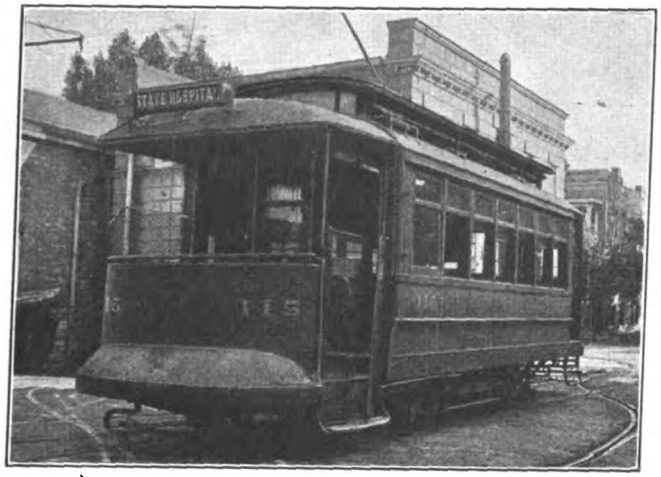
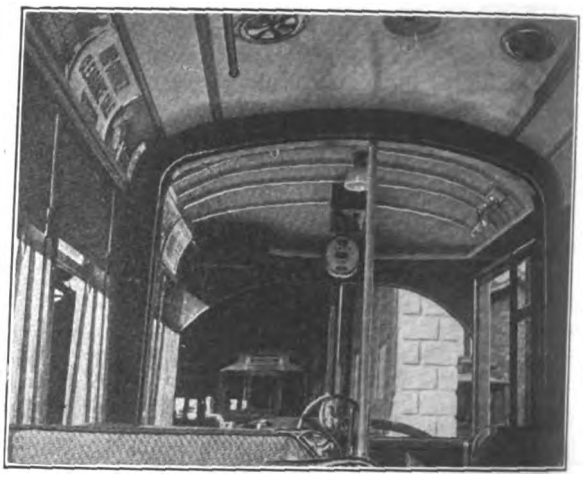
One-Man Cars Giving Unrestricted View Forward

Topeka (Kan.) Railway Is Remodeling Thirty 30-ft. Single-Truck Cars for One-Man Operation

At a cost of about $1800 per car, the Topeka (Kan.) Railway is remodeling thirty single-truck, 30-ft., double-end cars, some of which have been in use for thirteen years, for one-man operation, incorporating some of the latest ideas in the design of cars of this type. The result is an increase in seating capacity from twenty-eight to forty passengers and a reduction in weight from 22,500 lb. to 22,000 lb., the latter weight including added air-brake and air-operated door equipment.

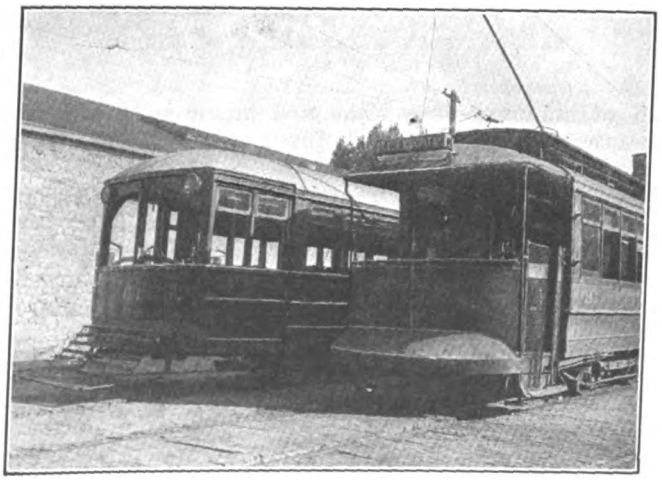


EXTERIOR OF REBUILT ONE-MAN CAR, TOPEKA (KAN.) RAILWAY



INTERIOR OF FRONT OF REBUILT TOPEKA CARS

As far as appearance is concerned, one of the most radical alterations was in the roof, formerly of the monitor type. The upper deck roof was dropped by sawing off the posts supporting it and wooden blocks were filled in to give a smooth contour for the canvas covering. Steel stay rods were inserted to strengthen the roof crosswise, a steel ceiling was mounted underneath, and ventilators were placed along the sides of the roof.



AT RIGHT, REAR END OF OLD SINGLE-TRUCK CAR, TOPEKA RAILWAY; AT LEFT, SAME END OF CAR MADE THE FRONT IN REBUILDING

The interior of the car was opened up by removing the bulkheads and substituting steel channels for them. The platforms were vestibuled as shown in the illustrations, the sash being arranged to afford as unobstructed a view from the car as possible. The rear platform was brought up to the level of the car-body floor, and curved seats were installed at the rear. In front a seat for one passenger was set just inside the door and a longitudinal seat for three passengers on the platform opposite the door. The lines of the body were extended with sheet steel across the sides of the former front vestibule (now the rear of the car) and on the left-hand side of the present platform.

Thirty-inch wheels were installed in place of the former 33-in. wheels, and the trucks were set further ahead to balance the weight of the controller. Two headlamps were used, one on each side under the roof, where they are out of danger of breakage and where they throw light onto the sides of the track. With the lamps in this position the light is not blinding to automobilists and it will be convenicnt, if desired, to color the upper third of the lamps in such a way as to indicate routing.

Those who have seen the cars are struck by the automobile effect of the exterior, this effect being accentuated on entering the car and looking forward. The absence of bulkheads and the low dash permit an excellent view ahead. The Topeka Railway has only one stub line, so that the operation of single-end cars is comparatively simple. A few double-end cars for this stub line are under construction.

Use of Slag-Coated Electrodes and Polarity Reversal in Electric Welding

In the discussion following the report of the committee on electric welding at the recent Chicago convention of the Association of Railway Electrical Engineers, the question arose as to the advantages of using slag-coated electrodes, and also the advantages of polarity reversal. In answer it was stated that when a slag-coated electrode is used, it is economically feasible to use a larger electrode, thereby getting excess heat and melting the metal away faster.

In this connection reference was made to a particular coated electrode on sale in this country which has an asbestos slag taped around the electrode itself. Such an electrode was described in the issue of the ELECTRIC RAILWAY JOURNAL for June 17, 1916, page 1144. The asbestos, and the clay with which it is impregnated, melt down and form a sort of glaze, covering over the electrode and protecting it against oxidation. The slag is of such a nature that the metal is absolutely clean and bright, as if it had been cut through, and there is no darkening, even on the surface of the metal.

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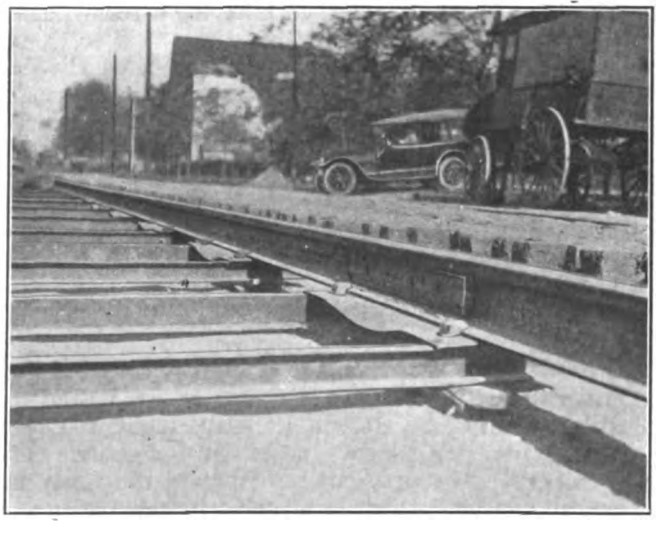
An electrode of this kind may be used as the positive terminal. In general, however, for ordinary metal electrode work on fairly heavy sections, it was considered that better heat distribution was secured by using the electrode as the negative pole.

Tilting Rails on Steel Ties Provides Full Wheel and Rail Contact

An editorial on "Reconciling Wheel and Rail Contours" in the ELECTRIC RAILWAY JOURNAL for Sept. 2 mentioned the tilting of steel rails in Cleveland for the purpose of obtaining a full line of contact between the wheel and the plain girder rail.

The accompanying halftone of a view on Broadway, Cleveland, Ohio, shows an example of this construction with the twin steel ties of the International Steel Tie Company. The total mileage installed or on order with these ties is 10 miles. As stated in the editorial, the axis of the rail is tilted inward at a slope of 1 in 25, so that the web is at right angles to the wheel-tread slope. In order to obtain this effect it is necessary to bend the channels at a point about 15 in. from the ends. The bending points, of course, will vary with the gage and type of rail. These channels are bent in a press especially adapted for bending both ends of a pair of channels at one time.

VIEW ON BROADWAY, SHOWING TEMPORARY TRACK AND CONCRETING GANG AT WORK



VIEW OF NEW TRACK BLOCKED UP READY FOR CONCRETING

Another feature in connection with the track construction on Broadway is the large saving made possible by the use of the steel ties. This section of track was only ten years old and it was originally built with white oak ties in a solid concrete foundation. Both the ties and the foundation were in an excellent state of preservation, but the rail had worn out. To put new rail on these wooden ties, while practical, was not deemed advisable because they would not last as long as the rail. It was therefore decided to leave the old ties incased in the concrete and lay entirely new track. Permission was obtained from the city to raise the crown of the street paving ½ in. This permitted the use of International twin-steel ties, which are 3½ in. over all in depth, and 100 lb. A. S. C. E. rail which is 5¾ in. high. The saving thus effected included the complete concrete foundation and the labor necessary to remove the old ties. In one of the accompanying illustrations this type of track construction is shown blocked up ready for concreting.

In addition to the order from the Cleveland Railway, this company is furnishing twin ties for tilted rails to the Connecticut Company for use in 1 mile of reconstruction at New Haven and also for 1 mile by the Union Traction Company of Indiana. It is curious to note that the Cleveland Railway and the Connecticut Company arrived independently at the conclusion to use a tilted rail. In fact, the Connecticut Company had been experimenting with the use of beveled Lundie tie-plates on wooden ties for some time past.

Furthermore, while the tilted rail is a novelty in American street railway practice, it is not uncommon in the bullhead rail construction with cast-iron chairs used in England. For example, the North-Eastern Railway uses a tilt of 1 to 20 in an intersection with the Hull Tramways.

The general advantages of tilted-rail track construction are decreased wheel-flange and rail-tread wear, and the possibility of using standard plain girder or A. S. C. E. rail sections. The specific advantage of the twin type of steel tie for tilted-rail construction is that the warped plate and bent-channel combination acts like the abutments of an arch, so that a thrusting resistance is afforded against the spreading of the rails. The warped edges of the plate serve to retain the concrete absolutely and also give the plate greater vertical strength. The great bearing surface at the ends of the twin ties also give assurance that the tilted construction will not lead to a center-bound or rocking track.

Washington Railway Spends $2,000 in Remodeling the "Columbia"

The Washington (D. C.) Railway & Electric Company has completely remodeled its private car "Columbia," and now boasts of one of the most elaborately equipped trolley cars to be found in service. The work, which was done under the direction of J. H. Stephens, superintendent, and G. E. Haar, Jr., master mechanic, was recently completed at a cost of $2,000. The car is designed for the use of the company's officials in making inspection trips over the system. It is to be utilized also by local civic organizations, who will entertain committees coming to the city for the purpose of arranging details for conventions to be held in the national capital.

The changes made consist of replacing the old-style vestibules with ones of recent design, installing new

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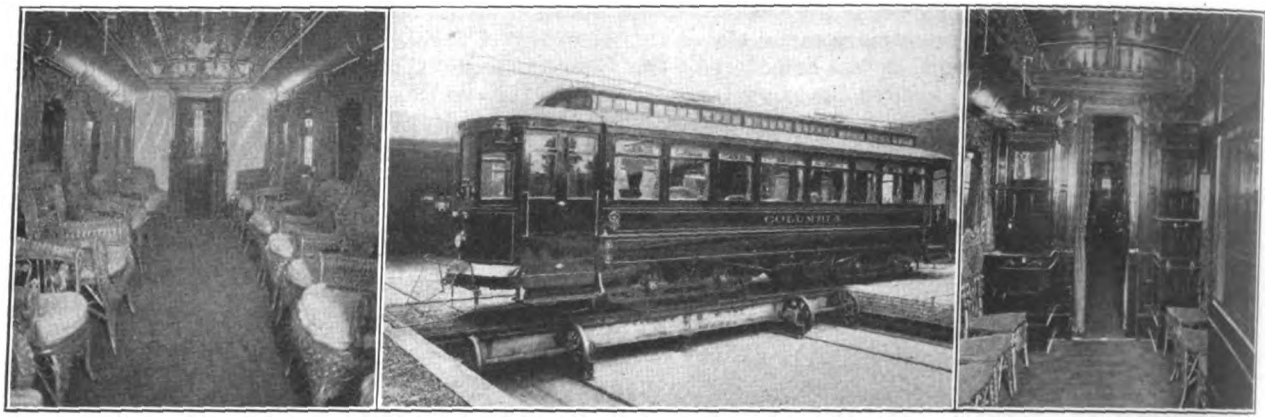


OBSERVATION PARLOR OF PRIVATE CAR IN WASHINGTON, D. C., SHOWING ELABORATE FURNISHINGS; EXTERIOR VIEW; INTERIOR VIEW OF CAR, SHOWING BUFFET EQUIPMENT

carpet throughout, and renovating draperies, cushions and chairs. All fixtures have been finished in nickel, and the car has been repainted inside and out. A convenience room, built of mahogany to harmonize with the inside of the car, has been installed for use while the car is on suburban runs. The equipment of the car includes a water cooler, washbasin, icebox, luncheon tables and other appurtenances. Seating arrangements are provided for twenty persons, each having a roomy, comfortable willow chair.

In addition to the improvements made in the body several changes were made in the motors and trucks, the latter having new 4½-in. axles and new 34-in. steel-tired wheels. In addition new controllers and new air-brake equipment were installed. The car has also been equipped with air-operated sanders, and in addition to many changes in brake rigging, the old-type staff hand brakes have been replaced by modern staffless Peacock hand-wheel brakes.

Design for Increasing Car Capacity

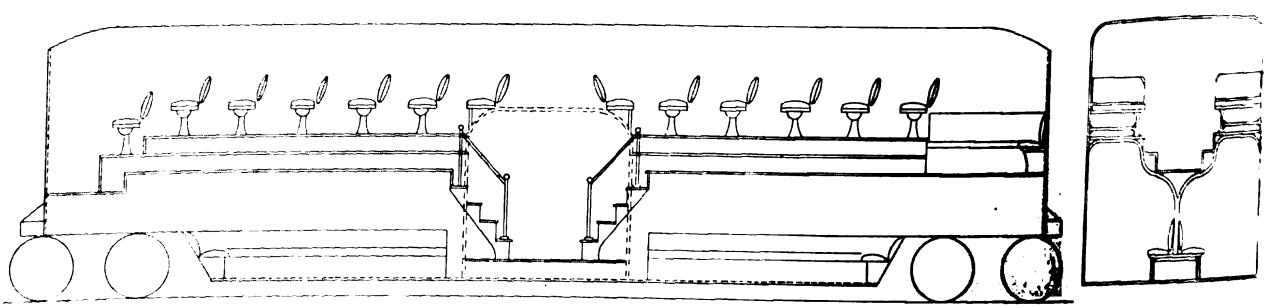
Patents have recently been issued to Fred Steffens, master mechanic, St. Joseph Railway, Light & Power Company, covering a new type of car for electric railway service. The prominent feature is the great increase in capacity which is attained by making use of a modified form of double-deck arrangement, although the design provides for galleries rather than an upper deck for the support of the elevated tier of seats. This arrangement is practically a reversal of the scheme adopted in the New York and Pittsburgh double-deck cars of three years ago, the seats on the lower deck being longitudinal and located along the center line of the car, while the upper tier of seats makes use of cross-seats located along the car sides. Access to the upper tier is attained by longitudinal steps along a central passageway, this passageway being reached by a stairway with five steps rising from a slightly elevated platform at the center portion of the lower deck.

The design calls for a length of 45 ft. over all and the total seating capacity is estimated to be ninety-eight, forty seats being provided on the lower deck while the galleries seat fifty-eight, the estimated weight per seated passenger being 400 lb. The height from top of rail to top of entrance floor is 12 in. and the height from rail to the top of the trolley board is 12 ft. 10 in., this over-all vertical dimension giving a clear height above the lower-deck aisles of 6 ft. 4 in., and a clear height of 6 ft. 8 in., above the floor of the gallery aisle.

Simple Transformer-Oil Moisture Test

While the only thorough test for suitability of oil for transformers and oil switches can be made with high-tension testing apparatus, very good indications of the presence of moisture have been obtained by J. K. Mackie, superintendent of the Connecticut Power Company, as follows: A sample of the oil to be tested is drawn from the bottom of the transformer, oil switch or storage tank. (Samples from the upper parts of the tank are not considered as suitable for the test as water is heavier than oil and usually collects at the bottom.) In the sample thus taken is placed powdered anhydrous copper sulphate. If moisture is present the copper sulphate will be dissolved, producing a blue color that will diffuse through the oil if moisture is in suspension. Since enough copper sulphate is added to insure a saturated solution, the intensity of the blue tint will be a measure of the amount of moisture present. As small percentages of moisture have a very deleterious effect on the dielectric strength of oil, however, the lightest shade of blue is sufficient indication that the oil should be dried by filtering.

It may be pointed out that other substances giving a deeper tint than copper sulphate may be used, the only requirement being that they dissolve quickly in water but not in oil.



DESIGN FOR CAR OF LARGE CAPACITY

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LONDON LETTER

Review of Municipal Tramways Conference—8433 Women Conductors and 176 Women Drivers on Municipal Lines —Glasgow to Improve Car Lighting

(From Our Regular Correspondent)

In his presidential address to the annual conference of the Municipal Tramways Association, Peter Fisher, general manager of the Dundee Corporation Tramways, said that although some authorities had been considering the matter of decreasing fares, present conditions provided ample justification for suggesting that the existing low fares should be so adjusted that the increased costs would be fully met. There were 8609 women employed on tramways, 8433 as conductors and 176 as drivers. The development of tramways for good traffic was a question demanding consideration, and it was doubtful if the Government realized the assistance which the tramways could render in carrying munitions and general merchandise. The splendid manner in which women had taken up work on the tramways and the facility with which they had adapted themselves to this new employment had earned for them the approbation of the tramway authorities and the tramway patrons. The municipal tramway employees who had joined His Majesty's forces since the outbreak of the war numbered 20,905, 1893 had left tramway employment to join munition factories, £854,649 had been paid to dependents of employees serving with the forces, £43,800 had been collected on cars for national and other objects, and £36,070 had been contributed by tramway employees to various relief funds.

At the general business meeting of the Municipal Tramways Association, following the conference, the recommendation of the sub-committee of the advisory committee of the Board of Trade, that after the war all Government departments, local authorities, and statutory bodies entrusted with the control of moneys raised by taxes or rates should be under legal obligation to purchase, so far as possible, only goods produced within the Empire was discussed. The executive council of the association agreed with the principle enunciated in a resolution submitted by the council of the Incorporated Municipal Electrical Association, viewing with "deep concern" the recommendation. It was pointed out that there was no mention of Germany in the recommendation. C. J. Spencer, the secretary, asked why local authorities and similar bodies should have to buy in a restricted market if other people could buy where they liked. The executive council viewed with very grave concern any attempt to restrict the business activities of municipal tramways. An amendment to delete the paragraph from the report was lost, and the council's report was adopted. Henry Mozley, general manager of the Burnley Tramways, was elected president for the ensuing year, and J. Miles, Bolton, vice-president.

C. J. Spencer, general manager of the Bradford Tramways and honorary secretary of the Municipal Tramways Association, has compiled some statistics showing how the war has affected municipal tramway undertakings. Mr. Spencer's figures are based on returns he has obtained from eighty-eight towns throughout the country. They show, among other things, that out of a total number of employees of these eighty-eight undertakings in normal times of 55,208 no fewer than 20,805, or 38 per cent, have joined the forces of the Crown. Besides that, 1893 men have gone to munition factories. The amount paid by the local authorities concerned to dependents of tramway employees is £854,649, equal to an average allowance per man per week of 10*s.* 7½*d.* There has been collected on the cars for national and other objects a sum of £43,800, while £36,070 has been contributed by employees to relief funds. There are no fewer than 8433 women conductors. In some places, Glasgow being one of them, a few women are employed as drivers. The total number of women drivers for all the undertakings reporting is 176.

During the twelve months just ended the Birmingham Corporation tramway service has been interrupted on three or four occasions in consequence of the failure of the electric current. As it is necessary to mix poor quality coal with that of a higher standard in order to eke out the coal supply, boilers frequently fail to produce sufficient steam, and therefore it is impossible to maintain full pressure. On these occasions the officials at the power station have become aware of the low steam pressure, and there has been no alternative but to cut off the supply of electricity to the tramcars. Munition works, however, have not been interfered with, it being recognized that they have the first call upon the resources of the department.

Richmond and Kew are brought ten minutes nearer to the city of London by the new service of electric trains now running to Broad Street. The trains consist of six coaches, but three coach trains can be run in the midday hours when traffic is light. Current is supplied from the new power house at Stonebridge Park, which was built primarily for the Watford service, and will supply eventually the whole of the power required for these two branches.

The electrified portion of the London & South-Western Railway, between Waterloo and Claygate, on the new Guildford section of the line, is open for traffic. This is the last section of the line to be completed. The other sections, which have been in operation for some months past, have resulted in a considerable increase in the suburban traffic.

At a recent meeting of the Poplar Borough Council the minutes submitted by the electricity committee referred to a report by the electrical engineer on extensions required to meet existing demands. The installation of an additional 6000 kw. of capacity would cost about £76,500. As an alternative he suggests linking up with the generating station of the London County Council tramways at Greenwich, which would involve a capital expenditure by Poplar of about £8,100. It is considered that if the latter scheme were adopted it would be of advantage to both undertakings, as their respective peak loads occur at different hours. The committee expressed the opinion that it was undesirable at present to embark on the larger scheme, and negotiations with a view to the adoption of the linking-up scheme are to be continued.

The Glasgow Tramways Department has decided to improve the lighting of the cars. In view of the fact that the electric light can be switched off at a moment's notice, it is recognized that a considerable modification may be made of the drastic restrictions which have been in operation since the lighting order came into force in the spring. The present lighting restrictions have thrown a great strain on the motormen, and have hampered the conductors in collecting the fares and announcing the stopping stages. It is hoped that the better lighting of the cars will improve the general appearance of the streets without adding to the risks of aircraft attack.

M. I. Slattery has been appointed tramways manager to the West Ham Town Council in succession to J. S. D. Moffet, who is leaving to take up the management of the Belfast Corporation tramways. Mr. Slattery has held his present appointment under the London County Council for five and one-half years, prior to which he was general manager of the Oldham Corporation tramways. He has been associated with tramways during the whole of his professional career.

It is difficult at present to get new rails for tramway renewals, and much ingenuity is being used in repairing partially worn out rails so that their life may be extended. The rails on many of the tramway systems in Great Britain are not in first-class condition, so that the advent of a machine which has recently been used on several systems for grinding and deepening the grooves of rails has attracted considerable attention. In Wigan the machine of the Woods-Gilbert Rail Planer Company, London, by deepening the groove is thought to have increased the life of this track five or six years. So interested have tramway managers been in the success of this machine that the company demonstrated it recently at Bexley Heath, where grinding is under way. A number of prominent tramway managers were present and expressed appreciation of the process. The machine is of Australian extraction, and has been used on the Oldham, Ashton and Hyde tramways, and at Thanet, Cardiff and Wigan. It is fitted with transverse wheels and lifting gear to enable it to traverse clear of the track, although its weight is about ten tons. In this manner cars are allowed to pass. The machine is self-propelling and is both propelled and worked by a 50 hp. shunt motor. The grinding wheels are mounted on a separate trolley lowered onto the track by levers from the main trolley. A. C. S.

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NEWS OF ELECTRIC RAILWAYS

PLEA FOR ST. LOUIS SETTLEMENT

President McCulloch Says Controversies with Utilities Have Hurt Community Development

In the October issue of the *Bulletin*, the company publication of the United Railways, St. Louis, Mo., President Richard McCulloch made a plea for an amicable settlement of disputes between the city of St. Louis and its utilities, in order that all interests might present a united front for the advancement of the community. He referred in particular to the franchise and mill tax controversies between the city and the United Railways and stated that the company would prefer to be a partner with the city rather than to be forced into the attitude of an opponent.

The detailed comments of President McCulloch were in part as follows:

"One of the obstacles to the growth and progress of this city has been the impression which has gone abroad that it is making war on its large institutions and its public utilities. This impression checks the growth of the city because no manufacturer or jobber would select for his headquarters a city having this reputation. The best asset of the city would be a hearty co-operation with its public utilities, and a national reputation for treating its large industries impartially and fairly. Prosperous enterprises, especially public utilities, would be an advertisement for St. Louis among those people who have money to invest and who are in a position to bring business to the city.

"The controversies between the city of St. Louis and the United Railways have long been advertised over the length and breadth of the land. This advertising has seriously crippled the United Railways in its financial arrangements and has undoubtedly hurt the city by keeping investors out of St. Louis.

"The controversies are two in number: First, the contention of the city as to the expiration of the street railway franchises, and, second, the litigation in connection with the collection of the mill tax by the city. It is the contention of the United Railways that all of its franchises have been extended by the St. Louis Transit and Central Traction ordinances. In the Jefferson Avenue case the company won its contention in the Circuit Court, but the matter was appealed by the city to the State Supreme Court, where it is now pending. In the mill tax case the Supreme Court decided against the company as regards the tax prior to 1910, and in June of this year the company paid to the city $1,839,205. The payment of the tax since 1910, amounting with interest to about $1,500,000, is still in litigation. The immediate payment of this additional large sum would seriously cripple the finances of the company, while the attack on the duration of its franchises puts a stop to all further improvements or extensions until a final court ruling is obtained.

"Would it not be a happy step in the line of progress for the city of St. Louis and the United Railways to get together, formulate an amicable settlement of these differences, clear them up at once and remove the pall which hangs over the property of the company? Would it not be better for the city to have a prosperous and flourishing street railway which would be financially able to keep abreast of the most recent progress in the art, which would be able to maintain its reputation of furnishing the best surface transportation in this country, and which would be a matter of pride to the citizens of St. Louis? Even if the city were eventually able to win all of its contentions and enforce its demand for its full "pound of flesh," would it be to the credit or advantage of the city to have forced its greatest public utility to the wall?

"The United Railways has from 5000 to 6000 employees and perhaps as many investors in its securities living here in the city. These with their families represent a substantial percentage of the population. The settlement of these controversies is a matter in which each one of them is vitally interested. A prosperous street railway is able to do much more for the city and much more for its employees than one which is financially crippled. If the company is to progress, it should not be loaded with burdens. It would prefer to be a partner with the city rather than to be forced into the attitude of an opponent."

The United Railways, through its attorney, Henry S. Priest, has sent a letter to City Counselor Daues, urging the calling of a conference between committees representing the company and the city, to discuss a plan for the adjustment of the mill tax and the question of the duration of its franchise and those of its constituent companies. He stated that with bonds of underlying companies maturing lack of surplus earnings would prevent their being paid out of income and that new bonds could be disposed of only under conditions unfavorable to the company.

PRESIDENT WILLIAMS ON THE FUTURE

Head of Brooklyn Rapid Transit Predicts Moving Platforms and Automobile Feeders for Transit

Col. Timothy S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, was a contributor to a symposium in the seventy-fifth anniversary number of the Brooklyn *Daily Eagle* published Oct. 26, on changes likely to be brought about in the next seventy-five years. His contribution follows in full:

"Seventy-five years is a long period to look ahead in these days, and, of course, it is impossible to make any accurate predictions of what that period of years will show in the way of improvements in local transportation. In order to get a line on the future we naturally turn to the past, and find that during seventy-five years the whole system of urban transportation facilities has developed. For sixty years of this period transportation has been by cars operated on rails, and I imagine that this fundamental condition will not change for at least the next seventy-five years.

"The new railroad structures that are now building, both underground and overhead, would be a waste of money if they do not last at least fifty years, and the subway structures particularly ought to have an indefinite life. There undoubtedly will be changes in the equipment, and quite possibly in the motive power.

"On some lines there possibly will be continuous movement, like that which we have seen occasionally on a small scale in so-called moving platforms. I have heard competent railroad men predict that the street surface railroads would in a comparatively few years become obsolete. This I doubt. Of course, they will cease to be useful for long distances in cities, but the increasing density of population will require some facility for moving vast numbers of people short distances, and I do not see how this can be accomplished otherwise than by the continued operation of large vehicles on tracks.

"At the same time I think we will see in the next twenty-five years at least comparatively few extensions of street surface railroad tracks. This is because of the restrictions now imposed upon their construction in our city, and the impossibility of making their operation profitable in view of these restrictions, the original cost and the small return. In many outlying sections their place will be filled by self-propelled vehicles acting as feeders.

"Flying machines will undoubtedly become an important factor in carrying passengers, mail and small packages over considerable distances, but I hardly see how they can be of much practical use in local urban transportation.

"We are likely to see some radical changes in the conduct of vehicle and car operation on public streets. Regard for safety is likely to make necessary the setting aside of particular parts of our thoroughfares for pedestrians, pleasure vehicles, commercial vehicles and passenger cars, respectively. All cannot continue to be mixed up indiscriminately as they are at the present time."

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DALLAS ELECTION GOES OVER

Failure to Agree on Details of Proposed Contract Makes Postponement Necessary

Negotiations by which it is proposed that both the railway and the lighting utilities of Dallas, Tex., shall be reorganized and taken over by the new companies headed by J. F. Strickland and C. W. Hobson are at a standstill, pending the receipt of the properly executed lease agreement by which the proposed new railway will take over and operate the Oak Cliff street car lines of the Northern Texas Traction Company. Reports from New York, where this lease is being drawn and executed, state that a hitch has developed over minor details, but that these are expected to be settled in a short time and the papers forwarded to Dallas.

The proposed straw vote on the question of permitting a valuation of $8,500,000 for the traction properties, instead of the valuation of $7,100,000 fixed by E. W. Bemis after a survey of the properties, is being held in abeyance pending the settlement of the lease question.

The drafting of the proposed new franchises, which are to be passed by the City Commission, instead of the two model "service-at-cost" franchises approved by the voters of Dallas at the election last April, is going forward in the city's legal department. It is learned that the "service-at-cost" feature will be the basic principle in these franchises, but that several features not included in the model franchises approved by the voters last April will also be included. Originally it was provided that at the end of ten years the city might take over the properties at their actual cash value, plus a small percentage, and at the end of twenty years either the city or some other interest might be privileged to buy them under certain conditions. In the new franchises a provision is inserted under which the properties may be taken over by the city or by any other interest designated by the city at any time. This transaction may be by purchase outright, or on another basis than a cash transaction, by assuming the outstanding obligations in bonds up to the amount of value recognized by the people of Dallas. This adds a means by which the city may acquire the properties without payment of cash.

Mayor Lindsley, in discussing the new features of the ordinances, explained that they were being drafted with two objects kept constantly in view. One is the proper protection to legitimate capital investments in Dallas, and the other the proper protection of the people of Dallas through rate and service requirements.

ATTEMPT AT STRIKE IN JACKSONVILLE, FLA.

An attempt was made on Oct. 21 to provoke a strike of the employees of the Jacksonville (Fla.) Traction Company. Only nine of the 244 employees responded to the call. As soon as the public officials learned that there was likelihood that some of the men would go out, Mayor Bowden issued a statement to the public in which he said:

"No rowdyism, jeering of trainmen, gathering in crowds or other disorder of any character will be tolerated. The police have received positive orders to this effect. Any person attempting any character of disorder will do so at his peril. The law will be upheld and order maintained."

The day after the men went out, Chief of Police Roach made a statement to the newspapers in which he said in part:

"There is nothing unusual as far as I can see. The people rode the street cars and the employees who desired to work did so. There were no cases of disorder, except three, in which arrests were promptly made. There were no fights or hostile gatherings. You may say for me, however, that any man, regardless of who he is, who starts any trouble, is going to have a hard time. Fewer arrests were made last night than have been made during any Saturday night for months. There is absolutely no occasion for excitement on the part of the people."

The places of the men who went out were filled promptly and the interruption to traffic was confined to filling the places of the few men who deserted their cars on the streets. These cars were manned after only a few minutes' delay, by employees transported in automobiles to the scenes of the desertions.

IMPORTANT RAPID TRANSIT LINK OPENED

The Public Service Commission for the First District of New York directed the Interborough Rapid Transit Company to begin service on the Ely Avenue extension of the Queensboro Subway from Hunter's Point Avenue station in Queens north to the new Queensboro Bridge Plaza station on Nov. 5 at noon. This provides the first through rapid transit link between the new $500,000 station on the Queensboro Bridge Plaza and Park Avenue and Forty-second Street, Manhattan. The order to begin service was made following an inspection of the new line by Commissioner Henry W. Hodge, engineer of the commission and representatives of the Interborough Company. The Queensboro subway is one of the most important links in the new dual system of rapid transit. Ultimately it will be extended west from Park Avenue, Manhattan, its present western terminus, to Times Square. At the Bridge Plaza station in Queens it connects with the important Astoria and Corona elevated extensions, which are being pushed to completion and which should be in operation within the next few months. When these lines are completed it will be possible for a passenger from any point on them to travel to the furthest limits of the Interborough lines in the Bronx, Manhattan or Brooklyn for a 5-cent fare. The Queensboro subway was begun several years ago and was earlier known as the Steinway tunnel. It was turned over to the city as a part of the pool of the lines under the dual subway arrangement, and now forms a part of the city's subway system operated by the Interborough Rapid Transit Company. The Bridge Plaza station in Queens has been described as probably the largest elevated station in the world. It is 480 ft. long, 90 ft. wide, and above the street level has a mezzanine and two levels of tracks. Four express tracks and four local tracks will pass through the station, providing accommodation at one time for four ten-car trains of the present 52-ft. Interborough cars, and four eight-car trains of the new 67-ft. cars purchased for the new operation under the dual system by the New York Municipal Railway Corporation.

SAN FRANCISCO CONSIDERING PURCHASE OF UNITED RAILROADS

Would Settle Question of Municipal Railway Extensions and Afford Transfer Privileges—City Could Not Issue Bonds

M. M. O'Shaughnessy, city engineer of San Francisco, Cal., is preparing a report to be submitted to the Board of Supervisors in the near future which will discuss the problems involved in the taking over of the United Railroads' system by the municipality. Perhaps the most urgent railway problem up for settlement is the question of the city's right to operate on upper Market Street. This matter is now pending in court. Meantime, on the completion of the Twin Peaks Tunnel the development of the 5000-acre tract which this tunnel is expected to open up will be delayed and the investment in the Church Street branch line will be deteriorating without having ever rendered service to the expectant residents of that district. Other problems are also involved in additional extensions which the municipality is desirous of making and in the absence of transfer exchange privileges between the municipal lines and the United Railroads. Transfer privileges are being demanded by residents of the North Beach, Golden Gate Valley and other districts where the use of both systems is desirable.

Mr. O'Shaughnessy's report is expected to point out that the United Railroads reorganization plan which has reduced the capitalization about one half has brought the system within the city's purchasing power, and that careful examination, taking into account the original outlay, probable final cost, interest on sinking fund, and depreciation, warrants the conclusion that the city could operate the system within its earning power. The operating revenues in 1915 were about $8,000,000 and in 1916 about $7,750,000. It has been made clear, however, that the success of any plan for purchasing the United Railroads depends primarily upon the possibility of financing it without putting through a bond issue. This is because the city will be close to its legal limit of 15 per cent of assessed valuation upon the issue of the Spring Valley bonds, assuming that the administration will later be successful on this issue.

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ARRESTS MADE IN SUBWAY DYNAMITING CASE

Six men were arrested on Nov. 3 and accused by the police of New York of having been in a conspiracy to blow up subway stations in an effort to force a settlement of the street railway strike that would be favorable to the strikers. The short affidavit prepared at the direction of District Attorney Swann preparatory to the arraignment of the prisoners before a magistrate charged specifically that all of the prisoners, either directly or indirectly, were concerned in the placing of a dynamite bomb which exploded with disastrous results in the subway station at Lenox Avenue and 110th Street early on the morning of Oct. 24, referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 28, page 947. Four of the six men arrested are said to be officials of Local No. 731 of the Amalgamated Association. The prisoners were committed to jail, in default of $20,000 bail each, for further examination. The cases of the men were set for hearing on Nov. 8, but the court put the matter over until Nov. 10, despite the protest of Louis Fridiger, representing the accused men.

Captain Tunney of the New York police bomb squad is reported to have said in an interview in which he described how the plotters had been apprehended:

"Merna confessed it was his plan to dynamite the Times Square or Fifty-ninth Street subway station this morning at 4 o'clock. Merna said to me, 'Why, I'm perfectly willing to give up my life to help these 11,000 strikers.' He said to me, 'I didn't want to kill anybody. At 110th Street we waited until two trains had passed so as to keep from blowing one up.'

"They admitted that all the money they used, $190, had come from the public. You know how strikers have been going around town playing hand organs and begging. They said they got $60, $70 and sometimes $80 a day in small contributions."

FATAL DRAWBRIDGE ACCIDENT AT BOSTON

About forty-seven passengers on a surface car of the Boston (Mass.) Elevated Railway were drowned on the evening of Nov. 7 when the motorman failed to stop before the open draw of the Summer Street bridge over the Fort Point Channel, the car being precipitated into the water from the easterly side of the inlet. The car was a double-truck equipment with a 25-ft. body and hand brakes. The seating capacity was thirty-four. It had longitudinal seats, was of the box type, and had been inspected and found in perfect operating condition less than three hours before the accident. The car left the P Street carhouse in South Boston at 5.13 p. m. inward-bound for the city proper, and carried between fifty-five and sixty passengers as it approached the drawbridge. The motorman escaped injury by jumping from the front vestibule before the car struck the water. He stated that he made a regular stop about 75 ft. east of the draw; that as he approached the latter he noticed the arc lamp at the easterly end of the bridge was not lighted, and that he did not see the gates or the red lantern usually hung on the latter. The car broke through the gates and, with the car body and forward truck, fell into the channel, leaving the rear truck on the bridge. About twelve passengers, besides the motorman and conductor, were rescued, the remainder meeting their deaths under water.

Matthew C. Brush, president of the Boston Elevated Railway, arrived on the scene shortly after the accident and, in co-operation with Mayor Curley of Boston and other city officials, the Boston Fire Department, harbor craft, police, naval officers and wrecking concerns, everything possible was done to reclaim the victims. As the car fell into the water, which is about 30 ft. deep at this point, it turned completely around and remained upright, facing South Boston. Several passengers escaped through the doors and windows after the plunge and were rescued soon after reaching the surface. During the night divers attached to the staffs of the Scott Wrecking Company, New London, Conn., and of the Hugh Nawn Contracting Company, Boston, cleared the submerged car of victims, and at 3 a. m. on Nov. 8 the car was raised to the surface by lighter chains and removed to the South Boston yard of the railway company, where it was subjected to an official examination by the Inspection Department of the Massachusetts Public Service Commission, the police authorities and officials of the company.

The drawtenders asserted that the lighting conditions were normal at the time of the accident. The gates were closed, one being bent backward out of shape by the passage of the car. The track was in first-class condition, and no trees are located in the district. The motorman, 25 years of age, had been in the employ of the company since June of the present year. The wheels of the rear truck, which remained on the street, were all found to be worn flat by the brake application before the car went over the end of the bridge. The motorman was arrested on the charge of manslaughter and was committed pending investigation. Although no official finding had been reached on Nov. 8, the evidence at that time pointed to failure of the human element in control of the car to observe the usual precautions in approaching the bridge. The disaster is the most serious one in the history of the company, which has been a pioneer in the "Safety First" movement and has constantly endeavored not to be excelled in the field of careful operation by any other electric transportation system.

CHICAGO ALDERMEN ON EASTERN TRIP

Robert Ridgway and W. B. Parsons, eastern members of the Chicago Traction & Subway Commission, arrived in Chicago Wednesday morning, Nov. 8, and with Bion J. Arnold, the Chicago member, are in conference in that city. Thursday morning sixteen Aldermen, members of the City Council local transportation committee, left for a tour of several eastern cities for the purpose of studying the subways under operation and construction, and to be better prepared to receive the report of the subway commission. In Philadelphia the aldermen expect to confer with T. E. Mitten, chairman of the executive committee and president of the Philadelphia Rapid Transit Company, and W. S. Twining, city transit commissioner. At Boston Prof. George F. Swain, Boston transit commissioner, and M. C. Brush, president of the Boston Elevated Railway, will conduct the party on the inspection of the Boston subways. In New York Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, and T. S. Williams, president of the Brooklyn Rapid Transit Company, will conduct the members on an inspection tour of the subways completed and those under construction as well. On the return trip the aldermen plan to stop at Cleveland, where J. J. Stanley, president of the Cleveland Railway, and Fielder Sanders, city transit commissioner, will meet them.

NEW PLAN FOR CLEVELAND RAPID TRANSIT LINE

In a letter to the City Council on Nov. 6, W. R. Hopkins, president of the Cleveland Rapid Transit Railway, stated that the former plan for financing the proposition had been dropped and that an entirely new one had been taken up, with excellent prospects of success. The greatest drawback to pushing the work was the greatly increased cost of construction since the franchise was granted. Mr. Hopkins said that the cost of building the first lines would be $3,000,000 above the estimates made when the franchise was granted, but that it was his opinion that the proposition would be able to carry this increased burden, if necessary. He said the company was pushing forward the new plan of financing. Mayor Harry L. Davis stated that, if the company would give the details of the new plan and assure the city of its intention to go forward with the work, he would probably be in favor of extending the franchise, but that the letter received does not contain the information needed. The franchise provides that at least $500,000 shall be spent on construction by Feb. 1, 1917.

Electrification from Stone Harbor to Ocean City Discussed.—Electrification of the Pennsylvania Railroad from Ocean City to Stone Harbor and extension of the line to Cape May were discussed recently between officials of the railroad and representatives of the county and coast resort governments and Chamber of Commerce at Stone Harbor, N. J.

Third Cleveland Power Arbitrator Selected.—Judge John M. Killits of the United States District Court, on Nov. 1, appointed A. F. Ingersoll, secretary of the Cleveland Association of Credit Men, as the third member of the board

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of arbitration which will pass on the proposed power contract between the Cleveland Railway and the Cleveland Electric Illuminating Company. Engineer Joseph Alexander represents the company and Attorney T. L. Sidlo the city.

Franchise Goes Begging.—The city fathers of Henderson, Ky., some time ago drew up a new franchise ordinance which they proposed the Henderson Traction Company should purchase, to take the place of the one that expired on Oct. 22. The franchise was duly advertised for sale without evoking a single response and on the day the old franchise expired the City Council, concluding that no bids would be made, approved a suggestion that cars be permitted to continue running without the franchise. A meeting of the Council has been called to consider the situation.

Franchise Terms of Suburban Line Modified.—As the result of an agreement between the City Council of Seattle, Wash., and the Seattle & Rainier Valley Railway whereby the company is to be relieved of some of its franchise obligations, the company will begin work at once on the construction of its line on Dearborn Street, also an extension of its lines on Genessee Street. By the proposed agreement the company will expend approximately $100,000 in extensions and betterments, and will reduce running time between Seattle and Renton ten minutes. The Council has also agreed to allow the company to operate one-man cars on the Genessee Street extension.

City Replies in Tacoma Case.—City Attorney Harmon of Tacoma, Wash., has filed with the State Public Service Commission at Olympia a reply for the city of Tacoma to the complaint of the Tacoma Railway & Power Company, asking that certain franchise provisions be abrogated because the company was not making a reasonable rate of interest on its investment. The reply by Mr. Harmon was submitted to the city attorneys of Seattle, Spokane, Everett and Bellingham. Attorney Harmon raised the question of the jurisdiction of the Public Service Commission in the matter of abrogating franchise agreements. No date has been set for arguments before the commission.

Status of Norfolk Franchise Matter.—The new Council in Norfolk, Va., which went in on Sept. 1 appointed a committee to handle the matter of a new franchise for the Virginia Railway & Power Company. On Nov. 1 the Council met as a committee of the whole and after considering the proposed franchises for about two hours and voting on various amendments, finally referred it back to the committee and passed a resolution instructing the committee to ascertain the cost of securing an expert to draw new franchises. The cheaper gas committee is preparing data to present to the State Corporation Commission. No date has been set for the hearing.

Toledo Conference to Continue on Nov. 13.—At the conclusion of a conference on Nov. 2, the Street Railway Commission of Toledo, Ohio, adjourned until Nov. 13. A plan of establishing separate routes for the interurban lines and providing better service for their cars in and out of the city was discussed. The feasibility of paying dividends monthly was also before the commission and by some this was considered a good plan, as it would keep the people in closer touch with the proposed new community company. E. P. Usher, president of the Central Labor Union and a member of the Railway Commission, has assured that organization that copies of the franchise will be submitted to civic and labor bodies before it is finally adopted.

Montgomery Light & Water Power Company Wins Suit.—The United States Supreme Court has just denied the application on behalf of Montgomery Light & Traction Company for a writ of certiorari to review the affirmance by the United States Circuit Court of Appeals of the judgment theretofore awarded to the Montgomery Light & Water Power Company in the action instituted by it in the United States District Court to compel the traction company to take and pay for current for the operation of its street railway system from it pursuant to its contract. The contention of the traction company of non-performance on the part of the Water Power Company of said contract justifying a refusal on its part to take current was disposed of by the lower courts adversely to the traction company. The decision of the United States Supreme Court makes the judgment final.

East Cleveland Interests Considered.—In an interview on Nov. 2 between a committee of citizens of East Cleveland and officials of the Cleveland (Ohio) Railway as to the bearing of the proposed annexation of the suburb to the city would have on the street railway situation, John J. Stanley, president of the company, said he would hold the new territory on an equal basis with any other part of the city so far as the franchise and development are concerned. Mr. Stanley said that East Cleveland territory needed extensions and perhaps a crosstown line, but that the company had been unable to make improvements there because of failure to agree on terms of franchise renewal on Hayden and Euclid Avenues. He expressed the belief that the City Council would take a favorable stand on the matter, if the suburb was annexed. Fielder Sanders, street railway commissioner, said that, if the suburb was annexed, the street railway matter would then be under the control of the City Council. On the differences that have existed between the suburb and the company, Council would naturally take a viewpoint favoring its own citizens and in the interest of the people of Cleveland.

PROGRAMS OF ASSOCIATION MEETINGS

Central Electric Traffic Association

The Central Electric Traffic Association will meet in Indianapolis, Ind., on Nov. 13-16, inclusive.

Central Electric Railway Accountant's Association

The Central Electric Railway Accountants' Association will meet in Cincinnati, Ohio, on Friday and Saturday, Dec. 8 and 9.

Illinois Electric Railways Association

The meeting of the Illinois Electric Railways Association, scheduled for Nov. 17, has been postponed until Nov. 28 at the La Salle Hotel, Chicago.

Pennsylvania Street Railway Association

The winter meeting of the Pennsylvania Street Railway Association will be held at the Hotel Adelphia, Philadelphia, Pa., on Tuesday and Wednesday, Dec. 12 and 13.

Central Electric Railway Association

The next meeting of the Central Electric Railway Association will be held at the Secor Hotel, Toledo, Ohio, on Thursday and Friday, Nov. 23 and 24. The executive committee will meet on Wednesday evening, Nov. 22, at the same place.

Safety First Federation of America

The second annual convention of the Safety First Federation of America will be held in Baltimore, Md., Dec. 7, 8 and 9, upon invitation of the Safety First Society of Baltimore. Darwin P. Kingsley, New York, president of the federation, will preside at the sessions. The tentative program includes various subjects pertaining to public safety, such as uniformity in street traffic regulation, the railroad trespass question, fire prevention, health and sanitation, etc., and provides ample opportunity for the discussion of the papers.

Welfare and Efficiency Conference

At the fourth annual welfare and efficiency conference to be held at the Capitol, Harrisburg, Pa., under the direction of the State Department of Labor and Industry, on Nov. 21, 22 and 23, problems relating to the operation of steam and electric railways will be discussed. Governor Martin G. Brumbaugh will deliver the address of welcome. On the afternoon of Nov. 22 William D. B. Ainey, chairman of the Pennsylvania Public Service Commission, will preside. Samuel B. Hare, claim agent of the Altoona & Logan Valley Electric Railway, Altoona, Pa., will discuss "The Accident Problem of the Electric Railways." P. J. McGrath, financial secretary-treasurer of Division No. 85 of the Amalgamated Association of Street & Electric Railway Employees, Pittsburgh, Pa., will discuss the same problem. Similar questions relating to the steam railroads will be discussed the same afternoon.

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Financial and Corporate

ANNUAL REPORT

Fonda, Johnstown & Gloversville Railroad

The income statement of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., for the fiscal years ended June 30, 1915 and 1916, follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Railway operating revenues:				
Freight revenue	$276,788	29.01	$239,574	27.39
Passenger revenue, steam division	51,039	5.35	54,137	6.19
Passenger revenue, electric division	586,208	61.44	536,479	61.33
Mail revenue	3,105	0.33	3,109	0.36
Express revenue	16,759	1.76	14,148	1.62
All other revenues from transportation	5,511	0.58	5,463	0.62
Revenue from other railway operations	14,599	1.53	21,847	2.49
Total operating revenues	$954,011	100.00	$874,761	100.00
Railway operating expenses:				
Maintenance of way and structures	$90,750	9.51	$75,149	8.59
Maintenance of equipment	57,399	6.02	52,553	6.01
Traffic expenses	8,667	0.91	8,155	0.93
Power	37,665	3.95	46,577	5.32
Transportation expenses	233,060	24.43	220,645	25.23
General expenses	65,561	6.87	64,154	7.33
Total operating expenses	$493,103	51.69	$467,236	53.41
Net revenue from railway operations	$460,907	48.31	$407,525	46.59
Railway tax accruals	44,608	4.68	39,500	4.52
Railway operating income	$416,299	43.63	$368,025	42.07
Miscellaneous operations (Sacandaga, N. Y., summer resort)—deficit	2,958	0.31	6,017	0.69
Operating income	$413,341	43.32	$362,008	41,38
Non-operating income	30,559	3.20	31,804	3.64
Gross income	$443,900	46.52	$393,812	45.02
Deductions from gross income	390,037	40.88	380,549	43.50
Net income	$53,863	5.64	$13,263	1.52

The general resumption in business in the cities and towns served by the company was not substantially reflected in its earnings until Dec. 1. During the year an increase in gross of $79,250, or about 9 per cent, was shown. The freight revenues were the largest in the history of the company, showing an increase over last year of $37,213, or 15.5 per cent. Of this $7,838 represented the increase in coal traffic and $29,375 in merchandise freight.

The increase in passenger revenues (electric) amounted to $49,728, or 9.2 per cent, that division carrying 6,586,931 passengers, which figure has never been exceeded except slightly in 1914. During the last seven months of the year more passengers were carried than during the same months of any previous year, which in view of the large number of automobiles in use was most satisfactory. The passenger revenues (steam) decreased $3,097, or 5.7 per cent, due principally to weather conditions and poor excursion business to Sacandaga during July and August of last year. Ticket sales to other points on the steam division showed an increase for the year.

The total operating expenditures of $493,103 showed an increase of $25,867, or 5.5 per cent, over the previous year. Removal of snow and ice cost $14,443, an increase of $9,022, which with amortization of various accounts, depreciation reserves and retirement of equipment exceeded such charges during the previous year by $24,657 and were higher than any preceding year. The company's operating pay roll, included in the above figures, amounted to $357,802, or about 38 per cent of gross revenue—an increase of $34,718, due to higher wages in all departments.

Taxes and income deductions increased, and, while the deficit from miscellaneous operations was smaller, non-operating income fell off. The higher net from railway operations was sufficient to meet these items and still leave an increase in net income from $13,263 in 1915 to $53,863 in 1916. After the payment of preferred dividends of $30,000, there was left a profit and loss balance of $23,863 for 1916, as compared to a deficit of $16,737 in 1915.

"Road and Equipment" account was charged during the year with amounts aggregating $50,615. Of this $29,472 was for paving in Amsterdam, Gloversville and Johnstown, and $10,897 was for five passenger coaches for the steam division. No securities have been issued and sold since 1911, and all additions to property since then, amounting to $256,576, which amount is subject to capitalization, have been financed through the use of surplus earnings and temporary loans.

This company operates 40.75 miles of steam road and 83.97 miles of electric road, a total of 124.72 miles. The following table shows the separate electric and steam revenues and expenses for the last fiscal year, with the increases or decreases as compared with the preceding year:

	Electric 1916	Electric Change	Steam 1916	Steam Change
Revenue from transportation	$591,731	+$49,951	$347,680	+$36,545
Revenue from other railway operations	9,928	—8,689	4,670	+1,440
Total electric operating revenues	$601,660	+$41,262	$352,351	+$37,986
Way and structures	$65,682	+$15,372	$25,067	+$228
Equipment	35,972	+4,221	21,426	+623
Traffic	2,794	—368	5,872	+880
Power	37,665	—8,912	....	....
Conducting transportation	142,650	+8,184	90,410	+4,231
General and miscellaneous	50,184	+2,167	15,376	—760
Total operating expenses	$334,949	+$20,665	$158,153	+$5,202
Net revenues	$266,710	+$20,597	$194,197	+$32,784
Operating ratio (per cent)	55.67	—0.41	44.89	—3.76

Dick, Kerr & Company, Ltd.

Considerably improved results are reported by Dick, Kerr & Company, Ltd., the electrical engineers and contractors of London, England, for the last financial year to June 30, 1916, the gross profits having increased from £46,900 to £71,400, and the net profits, after the payment of debenture charges, from £36,300 to £60,900. A sum of £25,000 was again transferred to a reserve against contingencies and 6 per cent was distributed on the ordinary shares, on which no return had been made since 1910-11, when a dividend of 5 per cent was forthcoming. Finally £20,400 was carried forward, or £2,000 more than the amount brought forward from last year.

The directors feel that, though it is difficult to foresee the position of the business in the future, they are warranted by the last year's results in paying the proposed dividend on the ordinary shares. During the last year, in addition to extensions of contracts for the supply of war material, which have kept the works fully occupied, the construction, equipment and management of one of the new national factories was intrusted to the company by the government. During the year the company also acquired control of Willans & Robinson, and the directors anticipate that the acquisition will be of considerable value in the future expansion of business. It is noteworthy that the last year's profits were arrived at after setting aside an undisclosed amount for special taxation.

Boston & Worcester Street Railway

Notwithstanding adverse weather conditions during almost the entire fiscal year, the gross passenger revenue of the Boston & Worcester Street Railway, Boston, Mass., showed some increase for the year ended June 30, 1916. Freight revenue increased 47.6 per cent, and the total increase of revenue from transportation amounted to $60,242, or 8.3 per cent. Expenses of operation, however, materially increased, largely because of the advance in wages. Increased prices of material, supplies and fuel and a substantial increase of snow and ice and electrical equipment expense also added to the total expenses. The income from operation, however, showed a slight increase for the last

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fiscal year, and 3¾ per cent was paid in dividends on the common stock as compared to 2¾ per cent the preceding year. Surplus for the year, therefore, amounted to $42,205 as compared to $58,126 in 1915.

To give the detailed earning figures for the last two years, it may be said that the total revenue for the year ended June 30, 1916, amounted to $801,253 as compared to $738,796 for the preceding year. Expenses of operation compared as follows: Transportation, 1916, $273,492; 1915, $228,846; maintenance, 1916, $133,349; 1915, $120,425; general expenses, 1916, $81,491; 1915, $81,854; total expenses, 1916, $488,333; 1915, $431,126. The operating income for the two years, therefore, amounted to $312,920 in 1916 and $307,670 in 1915. Deductions showed a slight increase from $170,024 in 1915 to $170,945 in 1916 on account of higher taxes, and the surplus for the year totaled $141,974 in 1916 and $137,645 in 1915. During the year the company operated 2,250,762 car-miles and 154,376 car-hours. The dividends on the preferred shares of the Boston & Worcester Electric Companies, the controlling company, was increased from an amount of $2 to $2.50 per share for the fiscal year.

APPLICATION FOR RECEIVERS FOR THE SEATTLE & RAINIER VALLEY RAILWAY

Counsel States Litigation Is Without Merit or Substantial Foundation

An application for the appointment of a receiver for the Seattle & Rainier Valley Railway, Seattle, Wash., formerly the Seattle, Renton & Southern Railway, has been made to Federal Judge E. E. Cushman by creditors and former stockholders. Judge Cushman has fixed Nov. 16 as the date when the application would be heard on its merits. The plaintiffs are J. W. Wall, who has a judgment against the railway on account of personal injuries; G. A. C. Rochester, administrator of the estate of W. C. Bell, deceased, who also obtained a judgment for personal injuries, and W. F. Bickell, a stockholder of the old company. The application was precipitated by the proposed franchise changes which have been agreed upon by the City Council and the railway. The complainants allege that the bonds of the old company were used by the bondholders, who purchased the company at public auction in May, to pay for the company's assets contrary to law, and that the bonds issued by the newly organized company are void on the ground that they were discounted in violation of the state constitution. It is also asserted that the value of the property is not equal to the securities that have been issued against the company.

The company was reorganized recently and its name changed, after having been operated by receivers since 1912. The property of the company was sold on May 12 and on June 9 the bondholders took over the road, which was bid in by John C. Higgins of Higgins & Hughes, counsel for Augustus S. Peabody, trustee for bondholders, and Peabody, Houghteling & Company, Chicago. In July M. E. Sampsell, Chicago, was elected president of the new company, and Walter Brown was appointed local manager.

The present suit marks another chapter in the litigation which has beset the road since it was organized in 1890 as the Rainier Avenue Electric Railway. In 1894 it passed into the hands of receivers for the first time. Following a sale by the sheriff in 1895, the company, under the name of the Seattle-Renton Railway, was sold to Frank H. Osgood for $90,000. In 1903 the road was transferred to the Seattle, Renton & Southern Railway, the majority of whose stock was obtained in 1906 by William R. Crawford. Following the failure to pay bond and note interest in 1912 the road went into a receivers' hands again, where it remained until sold, in May, 1916.

John C. Higgins, of Higgins & Hughes, has made the following statement concerning the purpose and general merit of the recent development in the case:

"These papers have just been served upon us. We have examined them and think the litigation is without any merit or substantial foundation. It is simply designed to prevent or to embarrass the proposed settlement with the city, under which we are about to proceed with an extension of the railway and the improvement of the service."

Brandon (Manitoba) Municipal Railway.—The earnings from operation of the Brandon Municipal Railway for the year ended June 30, 1916, amounted to $29,258 as compared to $35,969 in the previous year. The operating expenses, however, showed a slight increase from $28,394 in 1915 to $28,660 in 1916, so that the gross income for the year decreased from $7,574 in 1915 to only $598 in 1916. The deductions from income, amounting to $32,552, showed a slight increase, the relative proportion of $20,100 for interest on funded debt, $5,968 for sinking-fund charges and $6,484 for depreciation being about the same as in 1915. The result of operation for 1916 was a net loss of $31,954 as compared to a loss of $24,339 in 1915. The increased net loss for the last fiscal year was due to the closing of the street railway system for ten weeks during the excessively heavy snowfalls of last winter. Not only was the revenue nil during this period, but the City Council decided that the motormen, conductors and carhouse employees should receive employment for the whole of the time the system was closed. The fare passengers carried during the last year totaled 627,739 as compared to 782,011 in 1915.

Bristol & Plainville Tramway, Bristol, Conn.—The stockholders of the Bristol & Plainville Tramway have authorized an increase in the outstanding capital stock of the company from $562,500 to $618,800, and will have the right to subscribe for the new stock at par on or before Nov. 21, on the basis of one share for every ten shares now held.

Boston & Maine Railroad, Boston, Mass.—The annual report of the Boston & Maine Railroad for the year ended June 30, 1916, covers the operations of the two owned electric railway branches, the Portsmouth (N. H.) Electric Railway and the Concord & Manchester, (N. H.) Electric Branch, and the one leased line, the Conway (Mass.) Electric Street Railway. The combined operating revenues of these first two lines for the last fiscal year were $250,358, a decrease of $530 from the returns of the preceding year. The total operating expenses decreased $26,912 to an amount of $158,663, so that the net revenue at $91,695 showed an increase of $26,382. The number of passengers carried increased from 4,916,019 to 4,931,397, while the number of car-miles run decreased from 1,090,202 to 1,068,142. The operating revenue of the Conway Electric Street Railway decreased from $11,107 in 1915 to $10,774 in 1916, but the operating expenses decreased to a greater extent, from $16,006 to $11,176, so that the operating deficit of $4,899 in 1915 was reduced to a deficit of $402 in the last fiscal year. After taxes and interest accrued, the deficit balance for the last year was $7,466 as compared to $11,946 in the preceding year.

Northern Ohio Traction & Light Company, Akron, Ohio.—Hodenpyl, Hardy & Company, New York, N. Y., and E. W. Clark & Company, Philadelphia, Pa., purchasers of the controlling interest in the Northern Ohio Traction & Light Company, during the week ended Nov. 4 placed funds with the Citizens' Savings & Trust Company, Cleveland, for the payment of the purchase price of the stock deposited. A payment of $3 a share had been made a month previously, and the payment on Nov. 4 was to have been $47 a share. The remainder, $50 a share, was to have been paid in one year from that time, but the purchasers decided to clear up the entire transaction at once.

Quebec Railway, Light & Power Company, Ltd., Quebec, Canada.—The gross earnings from operation of the Quebec Railway, Light & Power Company, Ltd., for the year ended June 30, 1916, amounted to $1,731,732 as compared to $1,548,096 in the preceding year, an increase of $183,636 or 11.8 per cent. After adding miscellaneous income of $236,868, the total revenue from all sources for the last year amounted to $1,968,601, an increase of $184,527. The operating expenses rose from $924,817 in 1915 to $1,029,751 in 1916, an increase of $104,934 or 11.3 per cent. The fixed charges and taxes of all kinds amounted to $723,447, leaving a net surplus of $215,403. This, added to the previous surplus, made a total surplus of $562,902 at the end of the year. During the year there was expended on maintenance account the sum of $220,602. The Quebec Railway, Light & Power Company operates 36 miles of line in Quebec and vicinity, including a 9-mile steam and electric road from Quebec to Tourmente. It also does a general lighting and power business.

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Syracuse & South Bay Electric Railroad, Syracuse, N. Y.—The Syracuse & South Bay Electric Railroad and the Syracuse, Watertown & St. Lawrence River Railroad were sold under foreclosure on Nov. 1 to the reorganization committee representing the bondholders, for $201,000 and $35,000 respectively. The properties will be reorganized in accordance with the modified plan of reorganization reviewed in the ELECTRIC RAILWAY JOURNAL for Aug. 19, page 333.

DIVIDENDS DECLARED

Boston (Mass.) Elevated Railway, quarterly, 1½ per cent.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, original preferred; quarterly, 1½ per cent, first preferred.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

Washington-Virginia Railway, Washington, D. C., 2½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Sept.,	'16	$90,489	*$72,639	$17,850	$27,700	††$9,652
1 "	"	'15	88,743	*62,455	26,288	16,908	‡9,559
3 "	"	'16	289,085	*223,941	65,144	83,231	††17,538
3 "	"	'15	271,606	*191,754	79,852	50,894	‡29,398

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m.,	Sept.,	'16	$43,680	*$25,183	$18,497	$11,455	$7,042
1 "	"	'15	40,981	*20,616	20,365	10,973	9,392
9 "	"	'16	351,576	*196,825	154,751	102,553	52,198
9 "	"	'15	322,121	*176,403	145,718	98,759	46,959

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m.,	Sept.,	'16	$847,871	*$619,080	$228,791	$97,959	‡$181,761
1 "	"	'15	754,081	*518,518	235,563	98,014	‡161,289
3 "	"	'16	2,690,807	*1,896,373	794,434	295,228	‡596,689
3 "	"	'15	2,356,784	*1,500,086	856,698	294,424	‡631,820

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m.,	Sept.,	'16	$206,901	*$127,708	$79,193	$41,887	$37,306
1 "	"	'15	184,243	*114,182	70,061	43,526	26,535
12 "	"	'16	2,339,406	*1,436,945	902,461	512,046	390,415
12 "	"	'15	2,137,834	*1,286,864	850,970	496,497	354,473

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m.,	Sept.,	'16	$31,411	*$22,855	$8,556	$7,987	‡$626
1 "	"	'15	37,310	*26,015	11,295	8,000	‡3,364
3 "	"	'16	117,156	*81,596	35,560	23,961	‡11,763
3 "	"	'15	133,351	*86,752	46,599	24,000	‡22,808

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m.,	Sept.,	'16	$50,689	*$45,996	$4,693	§$5,816	††$321
1 "	"	'15	41,652	*40,840	812	§6,354	††3,828
3 "	"	'16	146,761	*135,574	11,187	§19,851	††5,696
3 "	"	'15	124,885	*125,456	†569	§20,542	††15,541

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m.,	Sept.,	'16	$446,666	$286,763	$159,902	$44,759	$115,143
1 "	"	'15	340,917	212,823	128,094	53,081	75,013
11 "	"	'16	3,780,743	2,298,334	1,482,409	447,760	1,034,649
11 "	"	'15	2,829,360	1,748,733	1,080,627	466,669	613,958

PORTLAND RAILWAY LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	Sept.,	'16	$453,731	*$244,193	$209,538	$178,811	$30,727
1 "	"	'15	454,856	*258,679	196,177	184,165	12,012
12 "	"	'16	5,422,757	*3,052,791	2,369,966	2,179,732	190,234
12 "	"	'15	5,639,948	*3,081,249	2,558,699	2,210,355	348,344

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m.,	Sept.,	'16	$334,443	*$183,689	$150,754	$72,351	$78,641
1 "	"	'15	266,302	*153,933	112,369	56,845	55,636
9 "	"	'16	2,930,648	*1,707,140	1,223,508	628,182	599,809
9 "	"	'15	2,234,921	*1,372,515	862,406	503,691	359,899

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m.,	Sept.,	'16	$515,829	*$363,735	$152,085	$120,714	‡$33,072
1 "	"	'15	474,919	*352,574	122,345	120,821	‡3,082
3 "	"	'16	1,672,570	*1,104,535	568,035	362,118	‡210,739
3 "	"	'15	1,458,559	*1,021,732	436,827	361,389	‡79,683

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m.,	Sept.,	'16	$18,372	*$19,805	†$1,433	$1,865	††$3,269
1 "	"	'15	23,397	*21,172	2,225	1,598	‡656
3 "	"	'16	62,574	*64,077	†1,503	5,543	††6,964
3 "	"	'15	74,131	*66,072	8,059	4,786	‡3,364

*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by New York, New Haven & Hartford Railroad under guarantee, also interest on notes held by the New York, New Haven & Hartford Railroad, not credited to the income of that company.

Traffic and Transportation

SIX-CENT FARE AUTHORIZED

Following Massachusetts Commission, New Hampshire Body Approves Fare Increase for Massachusetts Northeastern—Zones Made Uniform

The New Hampshire Public Service Commission, on Oct. 31, authorized the establishment of a 6-cent fare unit on the Massachusetts Northeastern Street Railway, Haverhill, Mass. An abstract of the decision of the Massachusetts Public Service Commission authorizing the 6-cent fare unit on this system within its jurisdiction was printed in the ELECTRIC RAILWAY JOURNAL of Oct. 28, page 951. Hearings were held in Boston jointly with the Massachusetts commission in 1915, a further hearing being held in New Hampshire early this year.

The company operates 45.87 miles of single track in New Hampshire and 82.44 miles in Massachusetts. It does not give service in any city or large town in New Hampshire, its entrance into Nashua being over the tracks of the Nashua Street Railway. The company heretofore charged 5 cents in each zone, and sold school-children's and workingmen's tickets on certain lines at reduced rates. The new tariff filed by it raises the general rate to 6 cents and proportionately increases the charge for the special tickets. As far as the rates are interstate, the Interstate Commerce Commission allowed the new tariff to take effect without question. The Massachusetts commission, after extended investigation, approved the tariff in the main, except as to certain zones radiating from the center of the cities of Lawrence and Haverhill. Lastly, the New Hampshire commission has found the new tariff reasonable in all respects. It went into effect on Nov. 1, the date to which it was suspended.

Like the Massachusetts body, the New Hampshire commission finds that the control over security issues and the scaling down of the issues of constituent companies upon consolidation, taken together with the very moderate capitalization per mile of road as compared with other like properties, preclude any charge of over-capitalization. The increase of rates cannot be said to represent an attempt to earn a return on watered securities. For the purposes of this case, in view of the financial history of the road, without attempting a valuation in detail of the property, its outstanding capitalization is taken as a moderate measure of fair value.

None of the constituent companies in New Hampshire has ever paid any dividends, and the Massachusetts Northeastern Street Railway, since consolidation, has paid one dividend of 3 per cent on the preferred stock, and none on the common. The fiscal year 1916 was the best in the company's history. In that year, after paying operating expenses and fixed charges, the net income remaining was $39,213—a sum insufficient for the payment of dividends on the preferred stock. This net income, the commission finds, was obtained only at the expense of an utterly inadequate reserve for depreciation. The road and equipment are in excellent condition of maintenance, the service generally satisfactory, and the management clearly and admittedly efficient. It is obvious, the finding states, that the failure of the company to earn a fair return can be attributed only to inadequacy of rates. The company is unquestionably entitled to such an increase within reasonable limits, as will, if possible, produce such a return.

The income requirements of the company, and the extent to which they will probably be met by the increase in rates, were fully discussed by the Massachusetts commission, and are not reviewed *in extenso* by the New Hampshire body. The latter board finds that if the raise in rate resulted in no decrease in traffic the revenue of the company would still be insufficient, after meeting operating expenses and fixed charges, to provide for depreciation and for the gradual payment of the floating debt, and to give even the minimum dividend of 6 per cent upon the common stock. It is obvious that the company has a legal right to make the proposed

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increase, unless the rates contemplated are in themselves unreasonable, as being more than the service is worth. Yet for the reasons stated in the Manchester & Nashua, and Manchester & Derry cases, recently decided, it cannot be held that a 6-cent fare for zones of normal length on an interurban road in New Hampshire is unreasonable, when it does not produce more than a fair return.

The new tariff involves one readjustment of fare zones in New Hampshire. Hitherto the line from Hudson Center to Pelham Center has constituted a single zone, 6.22 miles in length. It is proposed to divide this into two zones, from Hudson Center to the Hudson-Pelham town line, 3.1 miles, and from the town line to Pelham Center, 3.12 miles. There is no other zone on the system equal in length to the zone as heretofore established, the average zone being about 3 miles in length. The statutory prohibition against discrimination would seem to be clearly violated by the establishment in one particular locality of a fare zone twice as long as zones generally on the same system in other localities of like character, when there are no considerations of competition, density of traffic or cost of service to justify the discrimination. No such conditions exist in this particular case, and there is no apparent justification for giving to this locality an obviously "undue or unreasonable preference or advantage." In the absence of special circumstances justifying a deviation from uniformity, it is said, the zones should be of as nearly equal length as the topography of the line will permit.

BUFFALO FARE PROCEEDING FINALLY AUTHORIZED

City Council After a Dozen Votes Decides in Favor of Rate Investigation

The City Council of Buffalo, N. Y., on Nov. 1, approved the application of Corporation Counsel William S. Rann for permission to apply to the Public Service Commission for an investigation into the rates of fare charged by the International Railway over its Buffalo city lines. Thomas Penney, vice-president and general counsel of the company, opposed the application and branded the threatened action of the City Council as a mere reprisal against the railway because of its action against the city for a review of its special franchise assessment, claimed to be unjust and exorbitant.

Favorable action by the City Council came as a surprise in view of the fact that the application of the corporation counsel was made almost two months ago, and after a series of hearings and conferences there appeared to be little inclination to favor the recommendation. Almost a dozen votes were taken and each time the application was defeated by a vote of four to one, but after a mass of evidence had been introduced before the Council by the city law department the application was approved.

The International Railway charges a straight 5-cent fare during all hours of the day with universal transfers for which no charge is made. Transfers are issued so as to allow passengers to reach any point in the city by the most direct route. A single 5-cent fare is also charged to Kenmore, a residential suburb north of the city line.

Following the approval of the application for a rate investigation, Mayor Louis P. Fuhrmann issued this statement to the ELECTRIC RAILWAY JOURNAL correspondent:

"I am opposed to using a rate proceeding simply as a big stick to prevent a corporation from exercising its legal rights. The corporation counsel assures us that he proposed this investigation in good faith and intends to put it through to a decision and with that assurance I am content.

"The prosecution of a rate proceeding involves the city in considerable expense, and if we can judge the length of time by other rate proceedings, this one, it is safe to say, will extend over a year or two. The corporation counsel seems to be strongly of the opinion that lower fares will result. While I am not personally so sanguine of the results as he is, I feel that he is better qualified to forecast the result. Lower carfares will result in a large saving to our citizens, and if this can be brought about it should be done.

"Many years ago the street railways then operating in the city, now consolidated into the International Railway, entered into a contract with the city, known as the Milburn agreement, whereby the charge for a transfer from one line to another was abolished and universal free transfers were granted and a rate of fare of 5 cents was fixed. If the institution of this rate proceeding is to abolish free transfer privileges then it is a serious matter. I am advised by the corporation counsel that the prosecution of a rate investigation can in no wise prejudice our right to free transfers.

"I feel, therefore, that the rate proceeding should be instituted and prosecuted to a speedy decision, and I trust that the result of it will be lower carfares for our people."

TWO-CAR FREIGHT SERVICE APPROVED IN BOSTON

The Public Service Commission of Massachusetts has issued a comprehensive finding approving the general principles of two-car electric railway freight service, based upon petitions of the Boston Elevated Railway and the Bay State Street Railway. Supervision of such service by the commission is declared essential to its proper limitation with respect to passenger traffic, but the board holds that a large and at present unutilized opportunity for broader development exists in eastern Massachusetts. In the opinion of the commission, the companies have as much right to operate freight trailer cars as they have to operate passenger trailers. The board enunciates the advantages to the public and to the companies of electric freight service in hours when the passenger traffic is at a minimum or below the mid-day and peak volume, and believes that the development of electric railway freight and express service should be encouraged, so long as such service is not permitted to encroach upon passenger traffic. The finding points out that the streets are not adapted to any large-scale development of electric railway freight service, and cannot, with propriety, be converted into freight yards. At the present time, in the judgment of the commission, such danger is remote.

The year ended June 30, 1916, was a banner year for electric railway freight and express business in Massachusetts, yet the Bay State company received from this source only $426,996 out of a total operating revenue of $9,770,609, while the Boston Elevated Railway received only $82,835 out of a total of $18,686,972. Traffic of a materially greater volume can be handled, in the commission's opinion, without public detriment under the regulation of local authorities and of the board. The commission is of the opinion that properly constructed and operated trailer cars can handle an equal volume of traffic with less public inconvenience and discomfort in two-car trains than in single cars.

FIRST PASSENGER TRAIN FROM NORTH SHORE THROUGH CHICAGO LOOP

The Chicago, North Shore & Milwaukee Railroad ran its first passenger train over the elevated system in Chicago on Nov. 6, to bring a party of 100 women from the North Shore town of Glencoe through Chicago to the Union Stock Yards on the South Side, where they visited the Armour Company's plant. The party was carried on a two-car steel train which had been equipped with third-rail shoes in order to operate on the elevated system, and the trip was made in one hour and twelve minutes. On the train a colored maid was provided to take care of the wraps, and each lady was presented with a corsage bouquet by the railway and a box of chocolate creams by Marshall Field & Company. At the stock yards the Armour Company served luncheon to them and one of their special lecturers took the party through the plant. While this is the first passenger train to make the trip over the city elevated lines, the company is carrying from two to ten tons of papers to the North Shore towns as far as Waukegan each morning on a train leaving the Fifth Avenue Terminal at 5.30 o'clock.

DETROIT REROUTING PLAN UP TO COUNCIL

On Oct. 31 the Common Council of Detroit, Mich., received the joint report of the committees on public utilities and on traffic and police regulations in favor of granting the Detroit United Railway permission to put in curves and other track work necessary to permit of the rerouting of cars to relieve the present frightful congestion in the heart of the city. In its report the committee said:

"Your committees believe the plan should be given a fair

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trial. Your committees, however, feel that the power to fix the routes should be reserved to the Common Council and the accompanying resolutions so provide."

The provision on this point in the resolution states:

"It is further resolved that the Common Council reserves the right to continue the routes as now established or to make such changes in the routing of said cars as in its judgment may be necessary."

The committee's report was debated for and against for a considerable period. Alderman Littlefield led the opposition and moved that the report be referred back, stating he wanted it to die there, but on motion of Alderman Ellis it was laid on the table for a week in order that the members of the Council might familiarize themselves with the matter.

NEW ALBANY FARE TARIFF

The change in rates on the Albany-Troy line of the United Traction Company, Albany, N. Y., noted in the ELECTRIC RAILWAY JOURNAL for Nov. 4, page 996, related to a new tariff filed by the company with the Public Service Commission and not to authorization by the commission of the increase mentioned. The case of the company before the commission in which it sought permission to increase the fare between Albany and Troy from 10 cents to 15 cents was disposed of some time ago by the commission refusing to grant the increase. The new tariff which the company has issued is designed to become effective on Nov. 25. It seeks the elimination of transfers on the Albany-Troy interurban line. This matter has not yet come before the commission for a hearing.

San Francisco and United Railroads in Transfer Agreement.—An agreement recently made between the Municipal Railway, San Francisco, Cal., and the United Railroads provides for an exchange of transfers on a basis of equality between the two lines at Fillmore and Union Streets, where the two systems intersect.

Service Stars for Washington Employees.—The Washington Railway & Electric Company, Washington, D. C., has introduced merit and service badges in the form of five-pointed gold stars to be worn by uniformed employees on the left sleeve, each star indicating five years of continuous service of the employee wearing the insignia.

Heating Order in St. Louis.—An order has been issued to the United Railways, St. Louis, Mo., by the State Public Service Commission, regulating the heating and ventilating of the cars this winter. The new rule requires the ventilators and fresh-air inlets to be kept open at all times except when the temperature outside falls below 10 deg. Fahr.

Petition Presented for Permission to Abandon Service.—The Sandpoint & Interurban Railway, Sandpoint, Idaho, has applied to the Public Utilities Commission of Idaho to be allowed to discontinue the operation of its service between the city and the Great Northern Railway station, and between the city and Ponderay and Kootenai. The company says that the lines are unprofitable.

Park Traffic Stimulated.—Gen. John B. Castleman, president of the Board of Park Commissioners of Louisville, Ky., has stimulated travel on several street railway lines by giving an interview to the newspapers dwelling on the beauties of the autumn coloring in the city's parks. The general mentioned two of the parks particularly, both reached by lines of the Louisville Railway.

Near-Side Stops in Houston.—The near-side stop rule has been put into effect on the street railway lines of the Houston (Tex.) Electric Company. The rule is strictly enforced on all paved streets, but motormen are required to use their judgment at unpaved crossings as to the best side of the street for taking on or unloading passengers. This rule was put into effect on recommendation of the city public service department.

Committee Appointed to Consider Changes in Traffic Ordinance.—A safety-zone committee will be appointed by the commissioner of public works of Buffalo, N. Y., to consider proposed amendments to traffic ordinances so as to create safety zones in the business section. The committee will consist of a representative of the International Railway, the Automobile Club, the Team Owners' Association, the Auto Truck Owners' Association, the Auto Truck Manufacturers' Association, a taxicab company and four other citizens. It is said that one-way traffic in certain congested streets will be advocated.

Jitney and Railway Traffic Compared.—According to checks completed by A. L. Valentine, superintendent of public utilities of Seattle, street railway traffic over the Latona Bridge made a large gain, as compared with jitneys in the last year. Comparing one day last October with one day of October of this year, from 6 a. m. until midnight, the check shows that 449 street cars, carrying 10,766 passengers, were operated this year, and 426 cars, carrying 8353 passengers, a year ago. In one day during October this year 568 jitneys, carrying 2411 passengers, were operated across the bridge, as compared with 1038 jitneys carrying 4613 a year ago

Record Fair Traffic in Dallas.—Approximately 1,500,000 people were carried by the street cars of Dallas, Tex., during the sixteen days of the Texas State Fair, from Oct. 14 to Oct. 29, according to a check of conductors' receipts made in the office of Richard Meriwether, general superintendent of the Dallas Consolidated Electric Street Railway. It is estimated that more than 1,000,000 of these people rode to and from Fair Park. Not a single accident was reported during this time. A regular schedule of one car every forty-five seconds was maintained to Fair Park and during home-going hours five cars were loaded each minute in front of Fair Park gates.

See Mary Pickford Via Sedalia Cars.—To promote street car riding during the dull evenings, the City Light & Traction Company, Sedalia, Mo., has devised a novel scheme. The Sedalia company has made arrangements with the Luna Moving Picture House to honor transfers at its box office for 5 cents in payment of a 10-cent admission to the picture show. This conversion privilege is carried out the first part of each week from 6 p. m. to 11 p. m. The moving picture house charges but a small per cent of the original 5 cents and carries most of the loss. According to S. B. Ireland, general manager, the plan has been in effect a week, and in that time an increase in traffic has been noticed.

United Railroads to Post Accident Records.—A record of the accidents on the lines of the United Railroads, San Francisco, Cal., shows that during July the number of car-miles per accident was 3,955 and the number of passengers carried per accident was 32,546. In August and September the number of accidents was greater, a comparison of September with July showing a decrease of 995 car-miles per accident and 5,987 passengers per accident. Hereafter, according to an announcement in the *United Railroads Magazine* by William Von Phul, vice-president and general manager of the company, a statement of all accidents will be posted monthly in each division, classified as to their character.

Front End Fare Collector in Vancouver.—Aiming at speedier service, the British Columbia Electric Railway, Vancouver, B. C., has placed an extra fare collector at the point where outgoing cars stop on Hastings Street at its intersection with Main during the rush hours, so that passengers on paying a fare to him may enter the car by the front end as well as by the rear. The extra collector will be on duty between 4.30 and 6.30 o'clock on weekday afternoons and between 12.30 and 1.30 o'clock on Saturday afternoons. This is an experiment and the company has publicly expressed the hope that its patrons will adapt themselves to the new scheme so that they may benefit by the saving in time.

Toledo Automobilists Scored.—G. O. Smith, safety expert with the Doherty Operating Company, spent some time in Toledo, Ohio, recently in connection with the safety campaign of the Toledo Railways & Light Company. One of his chief criticisms related to the manner in which automobiles are driven. He said that in the business district the city furnished good semaphores and the police officials seemed to be alert, but in the residence districts, automobile drivers apparently paid no attention to the principles of safety. As long as drivers did not realize the responsibility that rested upon them, or were unwilling to assume at least a portion of that resonsibility, accidents were sure to occur, no matter how careful the motormen were.

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Personal Mention

E. C. Thomas, general agent of the passenger department of the Pacific Electric Railway, Los Angeles, Cal., has been assigned to special duties.

F. E. Billhardt has been appointed traveling passenger agent of the Pacific Electric Railway, Los Angeles, Cal., with headquarters at Los Angeles.

H. O. Marler, traveling passenger agent of the Pacific Electric Railway, Los Angeles, Cal., will have supervision of the work formerly handled by E. C. Thomas.

R. E. Kelly, formerly traveling passenger and freight agent of the Pacific Electric Railway, Los Angeles, Cal., for the Eastern district, with headquarters at San Bernardino, has been appointed general agent for same territory.

John G. Williams, formerly statistician and accountant of the Public Utilities Commission of the District of Columbia, has resigned to become a member of the valuation staff of the Interstate Commerce Commission. His successor is James H. Botz.

L. O. Gordon, manager of the Valparaiso (Ind.) Lighting Company, has been appointed manager of the Jackson Light & Traction Company, Jackson, Miss., to succeed Raymond H. Smith, whose appointment as manager of the Sheboygan Railway & Electric Company, Sheboygan, Wis., is announced elsewhere in this column.

John M. Atkinson having resigned from the office of chairman of the Public Service Commission of Missouri will engage in the general practice of law in St. Louis, Mo. Mr. Atkinson will specialize in rate, valuation and reorganization cases and all other matters affecting public utilities, before state public service commissions and the Interstate Commerce Commission, and all classes of antitrust suits in State and Federal courts. He was formerly assistant attorney general of Missouri, is the author of the public service commission law of Missouri, and was speaker of the House of Representatives of Missouri.

L. H. Palmer, who was appointed acting general manager of the Eastern Pennsylvania Railways, Pottsville, Pa., on May 8, was appointed general manager of the company on Nov. 1. Mr. Palmer became connected with the Eastern Pennsylvania Railways in April, 1916, as general superintendent. He was appointed acting general manager following the death of W. B. Rockwell. Mr. Palmer was a member of the class of 1902 at Williams College. For five years he was employed in the operating department of the Central Railroad of New Jersey at Jersey City. He entered the service of the Metropolitan Street Railway, New York, N. Y., now the New York Railways, in the fall of 1906 as a clerk in the office of Oren Root, vice-president and general manager. In April, 1908, he was appointed assistant to the general manager for the receivers of that company, and in April, 1909, was made superintendent of transportation. He resigned from the Metropolitan Street Railway in November, 1912, to join the organization of Harrison Williams. In June, 1915, Mr. Palmer went to Baltimore, Md., to do some special work for the president of the United Railways & Electric Company. He resigned from that company to go to Pottsville. Mr. Palmer has been very active in the work of the American Electric Railway Transportation & Traffic Association.

Raymond H. Smith, general manager of the Jackson Light & Traction Company, Jackson, Miss., has been appointed general manager of the Sheboygan Railway & Electric Company, Sheboygan, Wis. The property at Sheboygan was recently acquired by the American Public Utilities Company, which also owns the property of the Jackson Light & Traction Company. Mr. Smith has been connected with the railway and light property at Jackson since November, 1912. He entered the employ of the Waterbury (Conn.) Traction Company in 1897 and occupied various positions until 1900, at which time he was transferred from the transportation department of the company to the headquarters of the Connecticut Railway & Lighting Company, Bridgeport, Conn., which absorbed the Connecticut Traction Company and several other properties in Connecticut. At Bridgeport Mr. Smith was made purchasing agent and secretary to J. E. Sewell, general manager. In 1903 he was made superintendent of transportation in Bridgeport and shortly after was appointed superintendent with jurisdiction extended to the repair shops and power plants. In August, 1907, Mr. Smith was appointed general manager of the Albany & Hudson Railroad, which operates a high-speed third-rail system from Albany to Hudson, the local service in the latter place, the gas plants in Rensselaer and Hudson and furnishes electricity for lighting and power. In July, 1909, he was appointed receiver of the Albany & Hudson Railroad and a few months later was made general manager of the Albany Southern Railroad, the successor to the Albany & Hudson Railroad. He continued with the Albany Southern Railroad until he was appointed to the position at Jackson. In Jackson Mr. Smith quickly identified himself with the business and social interests. He was the first president of the Jackson Rotary Club. Subsequently he was made a member of the Board of Trade of Jackson and last year was vice-president of that organization. He was one of the organizers of the Country Club and is vice-president of the club. When the Associated Charities of Jackson was organized, Mr. Smith was placed on the board of directors and received public recognition in the Jackson *Daily News* for his work in the interest of that body. In commenting editorially on Mr. Smith's resignation from the Jackson Light & Traction Company, the *Daily News* said in part: "Raymond Smith is the sort of a man that Jackson simply can't afford to lose. His fairness, his courtesy, his sense of justice, his willingness to put a shoulder to the wheel in behalf of any worthy cause, have not only served to popularize the public service corporation under his control, but have made the man an asset of tangible value to the entire community. The local lighting and street railway plant did not hold a high place in public favor when Mr. Smith came to Jackson. To bring about a complete change in public attitude, and at the same time put the property on a paying basis, was no small task, yet it was accomplished, and by a complete stranger who quickly won his way into the hearts of our people. It is not strange, therefore, that our citizens feel like assembling in mass meeting and putting forth an earnest protest over Mr. Smith's transfer to a new field of labor. Our people feel that he belongs here, and that they ought to have a prior claim to his services, notwithstanding that he has received a substantial promotion in recognition of his splendid work for the company."

OBITUARY

C. F. Emery, a pioneer in street railway work and for the greater part of his life associated with the Cleveland (Ohio) Railway, died at his home in East Cleveland on Nov. 1. Mr. Emery was born in New Hampshire and began work in that State in a chair factory. He went West and entered the same business. He promoted a race track on Miles Avenue, Cleveland, and so laid the foundation for his fortune. Some years later he established a transportation line between the old Wedell house, on Superior Avenue, and Woodland Avenue. This proved a success and he became a stockholder in one of the street railways. He served for many years as vice-president of the Cleveland Railway and its predecessors. A widow, three daughters and two sons survive.

Joseph S. Wells, secretary and treasurer of the Utah Light & Traction Company, Salt Lake City, Utah, is dead. Mr. Wells succumbed to pneumonia on Oct. 18 after a very brief illness. He was born on May 25, 1862, and entered business as a clerk. He became associated with the Utah Light & Railway Company in 1889, in which year he was also appointed secretary of the Salt Lake City Railway. In 1891 he became the company's secretary and treasurer, and in 1901 he was chosen as secretary and treasurer of the Consolidated Railway & Power Company. In 1904 he was made vice-president and cashier of the Utah Light & Railway Company and in 1906 general manager, which office he held until the recent transfer of the control from the Harriman estate, since which he had been secretary, treasurer and a director of the company.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Atlanta & Anderson Electric Railway, Atlanta, Ga.—Application for a charter has been made by the Atlanta & Anderson Electric Railway to construct a line from Anderson to Atlanta, via Hartwell, Royston, Commerce, Jefferson, Hoschton, Duluth, Norcross, Doraville, Chamblee, and Decatur, 140 miles. The line will connect at Anderson with the line of the Piedmont & Northern Railway and will join the Decatur line of the Georgia Railway & Electric Company and also the tracks of the Georgia Railroad at DeKalb Avenue, in DeKalb County, and, according to the petition, will use both of these lines into Atlanta. Among the incorporators are J. L. Murphy, Kirkwood, W. H. Wright, L. G. Mann and Paul D. Reid, all of Atlanta. [Sept. 9, '16.]

FRANCHISES

Peoria, Ill.—The Peoria & Chillicothe Electric Railway has accepted the forty-eight year franchise granted by the Council of Peoria to operate cars over the tracks of the Peoria Railway along Adams Street. [Nov. 4, '16.]

Scranton, Pa.—The Scranton & Binghamton Railway has received a franchise from the Council of Scranton to construct an extension into the center of the town.

Nashville, Tenn.—The Nashville Railway & Light Company has received an extension of its franchise from the City Council of Nashville. It is planned to extend Deaderick Street from Fifth Avenue to the Capitol Boulevard and double-track Deaderick Street. The double tracks will also be laid through the Capitol Boulevard to Church Street, forming a loop which will give an all-car service in the business section of the city. An arcade is to be placed from Deaderick Street to the transfer station. Under the ordinance introduced, the entire expense of making the changes is to be borne by the Nashville Railway & Light Company. Other improvements scheduled in the ordinance are to lay an additional track on Fourth Avenue, south, from Broadway to the Sparkman bridge, a double track across the bridge to First Street and from there a single track, with necessary switches, on Shelby Avenue to Eleventh Street. The ordinance also calls for laying a track on Fifth Avenue, south, from Broadway to Mulberry Street, through private property to Second Avenue, and thence to Lafayette Street and the corporate limits. It will require laying a double track on Fifth Avenue, north, from Deaderick Street to Johnston Avenue. Extension of the West End street car system is proposed by laying a necessary track to operate a line on Compton Road from West End Avenue to Blakemore Avenue.

Huntington, W. Va.—The Ohio Valley Electric Railway Company has received an extension of its franchise from the city of Huntington to run to 1955. In return the company has agreed to make three extensions to its lines within five years, making a total of about 3 miles of new track and involving an expenditure of $100,000. After being in operation ten years it will pay an excise tax of 1 per cent on the gross revenue from two of the extensions.

TRACK AND ROADWAY

Montecito Railroad, Los Angeles, Cal.—This company reports that it will construct a 1-mile extension during the coming year.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The Railroad Commission of California has issued an order authorizing the San Francisco-Oakland Terminal Railways to abandon for five years the operation of street cars on San Pablo Avenue, from the southerly boundary line of Richmond to Potrero Avenue.

Connecticut Company, New Haven, Conn.—The Public Utilities Commission of Connecticut has granted the Connecticut Company permission to relocate and straighten its tracks to conform to the widening of Congress Street from Housatonic Avenue to Main Street, Bridgeport.

Chicago (Ill.) Surface Lines.—A permit has been received by the Chicago Surface Lines from the superintendent of streets to construct extensions on Ewing Avenue from 108th Street to 118th Street, on 118th Street from Ewing Avenue to Brandon Avenue and on Brandon Avenue from 118th Street to 136th Street.

Woodstock & Sycamore Traction Company, Genoa, Ill.—A report from the Woodstock & Sycamore Traction Company states that it contemplates electrifying its road. The company operates a line between Sycamore, Genoa and Marengo, 26 miles, gasoline cars being used.

Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill.—A contract has been awarded by the Murphysboro Company to the Heman Construction Company, St. Louis, Mo., for the construction of an extension to Carbondale. Work will be begun at once and will be completed within six months. The cost of the proposed extension will be about $2000,000.

Union Traction Company of Indiana, Anderson, Ind.—Work has been begun by this company double-tracking 1 mile of track on its Indianapolis-Anderson division leading into Indianapolis. The cost is approximately $40,000.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company has begun raising its tracks 6 in. through Wayne County, Ind.

***Fort Madison, Iowa.**—It is reported that plans are being considered for the construction of an electric railway from Fort Madison to Keokuk, via Nauvoo, and probably to Quincy, Ill. J. M. Fisher, H. S. Payne and J. M. Smith, all of Nauvoo, are interested.

Morristown & Erie Railroad, Morristown, N. J.—The Morristown & Erie Railroad will electrify its line extending from Morristown to Essex Falls, 11 miles. The company has leased for six months an Edison electric storage battery car for a tryout under all weather conditions. If it is successful the company will purchase two cars and operate the road on a largely increased schedule.

Salem & Pennsgrove Traction Company, Salem, N. J.—Plans have been revised for the rebuilding of two spans of the Penns Neck bridge to permit the Salem & Pennsgrove Traction Company to operate its cars over the structure. The revision of plans was made necessary because some of the bids for the work ran as high as $72,000.

Buffalo & Depew Railway, Buffalo, N. Y.—This company reports that during the spring of 1917 it will construct its proposed extensions from Depew to Bowmansville, 2 miles, and from Depew to the New York Central Railroad Station at Lancaster, ½ mile.

Interborough Rapid Transit Company, New York, N. Y.—Operation was begun by the Interborough Rapid Transit Company on the Ely Avenue extension of the Queensboro Subway from Hunter's Point Avenue station in Queens north to the new Queensboro Bridge Plaza station on Nov. 5. The extension will ultimately continue west from Park Avenue to Times Square. At the Bridge Plaza station in Queens it connects with the Astoria and Corona elevated extensions which are being pushed to completion and which should be in operation within the next few months. The Public Service Commission for the First District has approved two agreements providing for the completion of the connection between the West Farms branch of the First Subway and the Jerome Avenue extension of the Lexington Avenue subway at 149th Street and Mott Avenue, and for the lengthening of the platforms of the Mott Avenue station of the First Subway about 280 ft. to the east. The two agreements have been submitted to the Board of Estimate for approval and for the appropriation of the necessary funds. The work of completing the physical connection between the First Subway and the Jerome Avenue line will be done by the Interborough Rapid Transit Company and paid for at an estimated cost of about $110,000. The station platform lengthening will be paid for by the city at an estimated cost of about $350,000.

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Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—This company will lay 100-lb. rails from the Toledo & Ohio Central Railroad track to the eastern corporation line of Bucyrus next spring. The foundation will be of cement and the rails will be laid on steel ties.

Toledo Railways & Light Company, Toledo, Ohio.—A resolution was adopted by the City Council of Toledo on Nov. 6, requesting the Toledo Railways & Light Company to extend the Cherry Street line to the city limits in West Toledo. Another resolution asks for a Y-switch on Detroit Avenue at the terminal of the South Avenue line. A third asks for the removal of the tracks from the east to the west side of Miami Street for some distance and that a loop be built at the end of the line, so that single-ended cars may be used.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Work which was begun about a year ago has practically been completed by the Mahoning & Shenango Railway & Light Company on the reconstruction of its tracks from Wilson Avenue, East Youngstown, to Spring Common on West Federal Street. The improvement involved an outlay of more than $250,000.

Sand Springs Railway, Tulsa, Okla.—This company reports that it is double-tracking its line.

Brantford & Hamilton Electric Railway, Brantford, Ontario.—The Board of Railway Commissioners has authorized the Brantford & Hamilton Electric Railway to reconstruct its bridge across the Toronto, Hamilton & Buffalo Railway at Cainsville.

London, Ontario.—The townships of South Dorchester, Westminster and Dereham will submit a bylaw to ratepayers in January to provide $1,000,000 for a new hydro-electric railway.

London (Ont.) Street Railway.—It is reported that this company is completing the construction of a second track on a 2000-ft. section of Dundas Street, west of the fair grounds. The company plans to extend the Hamilton Road line from the present terminus at Egerton Street to West Street, 2200 ft.

Porcupine-Rand Belt Electric Railway, Porcupine, Ont.—Plans are now being revived by the Porcupine-Rand Belt Electric Railway for the construction of its proposed line. The company was incorporated in 1912, to construct an interurban railway from a point near the eastern boundary of the Province of Ontario in McGarry to Larder City, McVittie, Hearst, Gauthier, McElroy, Lebel, Boston, Dane, Otto, Teck, Grenfell, Eby, Burt, Holmes, Alma, Baden, Robertson, McNeil, Argyl, Hincks, Cleaver, Geikie, Bartlett, Musgrove and Doyle and surveys were said to have been completed for some of the lines. A special general meeting of shareholders was called to be held in Toronto recently to elect directors, to close a contract with the Porcupine Construction Company, to build two branch lines from Boston Creek to Swastika and from the Temiskaming & Northern Ontario Railway via Larder Lake, and for other purposes. W. J. James, Allandale, Ontario, secretary-treasurer. [Feb. 23, '13.]

Montreal (Que.) Tramways.—This company plans to construct at an early date an overhead bridge on Fortification Lane, Montreal.

Dallas, Tex.—Mark Lowd, chief engineer for the Stone & Webster interests in Texas, announces that a double track steel bridge will be constructed over the Trinity River and across the bottoms and will carry the interurban tracks and the tracks of the Oak Cliff street-car lines. This double track steel bridge will form a part of the steel and concrete viaduct that will span the Trinity River and bottom lands from the tracks of the steam railroads entering the new Union Passenger Terminal to First Street in Oak Cliff. The interurban lines recently completed a portion of this viaduct, constituting the eastern approach and that portion which spans the tracks of the railways, at a cost of $110,000. The street-car lines and all interurbans entering Dallas from the west and south now use this overhead crossing. Mr. Lowd announced that work on the extension of this viaduct will begin soon after the Dallas franchise traction problems are settled and will be pushed to completion. It is estimated that the work will cost something more than $300,000.

San Antonio, Gonzales & Houston Interurban Railway, Houston, Tex.—This company proposes to erect the following bridges in connection with its proposed line from Houston to San Antonio: Across Brazos River at Richmond; Colorado River at Garwood; Lavaca River; Guadalupe River at Gonzales; iron span with trestle approaches. Steeve Holmes, Leesville, president. [Oct. 28, '16.]

Marlin-Temple Interurban Company, Marlin, Tex.—William Ginnuth announces that the right-of-way for the Marlin-Temple Interurban Company has been secured through Bell County. Construction work is now under way on the bridge that is to span the Colorado River between Temple and Marlin. [Sept. 16, '16.]

Charleston (W. Va.) Interurban Railroad.—This company reports that it expects to construct an extension from Cabin Creek Junction to Montgomery, 10½ miles, in 1917.

Wisconsin Interurban System, Madison, Wis.—It is reported that work on this company's proposed line from Madison to Portage, Prairie du Sac and Janesville will be begun in the spring of 1917. J. E. Jones, Madison, president. [Sept. 2, '16.]

SHOPS AND BUILDINGS

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company is considering the erection of a new depot at its Washington Street terminal in Paris.

Reading Transit & Light Company, Reading, Pa.—This company plans to erect two passenger shelters for people awaiting street cars in the middle of Penn Square at Fifth Street, providing public sentiment is not against the improvements and the City Council grants the necessary permission. The shelters would be lighted and heated and provided with seats, with an announcer to call out the arrival of cars. The cost would be about $5,000.

Wisconsin Interurban System, Madison, Wis.—It is reported that this company, which proposes to construct a line from Madison to Portage, Prairie du Sac, and Janesville will construct some small passenger stations in the spring of 1917. J. E. Jones, Madison, president.

POWER HOUSES AND SUBSTATIONS

Aurora, Plainfield & Joliet Railway, Joliet, Ill.—This company reports that it is moving its substation from Joliet to Plainfield.

Albia Light & Railway Company, Albia, Iowa.—A report from the Albia Light & Railway Company states that it might rebuild its power house within the next three months. The company has purchased three 250-hp. Murray water tube boilers and expects to purchase one 400-kva. generator, one 100-kva. generator and one 300-kw. railway machine.

Kentucky Traction & Terminal Company, Lexington, Ky.—Announcement has been made by Kentucky Traction & Terminal Company that arrangements have been made for the installation of a 4000-kw. turbine generator in the local powerhouse. This will supplement the two 2500-kw. turbines installed some months ago.

Vicksburg Light & Traction Company, Vicksburg, Miss.—This company plans to install a 15,000-kw. turbo-generator and auxiliary equipment.

St. Johns (N. B.) Street Railway.—This company is building a brick and concrete pumping station at St. Johns.

Toledo Railways & Light Company, Toledo, Ohio.—A new 20,000-kw. turbine has been purchased by the Toledo Railways & Light Company for its Water Street power house. The installation of this unit will bring the capacity of the station up to 85,000 kw.

Quebec Railway, Light & Power Company, Quebec, Que.—This company has ordered a 2000-hp. motor generator from the Canadian Westinghouse Company.

Galveston (Tex.) Electric Company.—This company announces it will install a 300-kw. motor generator in its plant at Galveston.

Ashland Light, Power & Street Railway, Ashland, Wis.—This company will increase the capacity of its power house at Ashland from 3000 to 10,000 hp. An addition will be made to the boiler room and four 600-hp. boilers will be installed. A new concrete stack will also be built.

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INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases **Business Changes** **Trade Literature**

EXTREME CONDITIONS CONFRONT THE MANUFACTURER

Shortage of Materials and Labor—Criticisms from Purchasers on Account of Slow Deliveries—Patience the Keynote

Never before have manufacturers in the electric railway industry been confronted with problems so serious as those now being faced. The chief trouble in their production departments has been shortage of raw materials and skilled labor. A secondary situation, developed in the sales department, is that of strained relations with customers due to slow deliveries. This latter situation should not have been as general as it now is had more patience been exercised by both buyer and seller and had the actual manufacturing conditions been set before the buyers in a more convincing way.

It is now, and for some time it has been, practically impossible for manufacturers to get deliveries of raw materials with any degree of certainty. High premiums have helped but little, and conditions seem to be growing worse rather than better. Some of the prominent manufacturers in the electric railway industry deeply resent being criticised for not having done the impossible. The manufacturers as a class feel that they have been doing heroic work in order to meet the requirements of their customers, yet it is stated that occasionally the railway purchasing agent seems to overlook or disregard the existing market conditions and unduly charges the manufacturer for delay in shipments, when it has been absolutely impossible to fulfill contracts made in normal times.

EXPRESSING RAW MATERIALS

Manufacturers have put enormous pressure on the producers of raw materials and have gone to the extra expense of having their raw materials expressed into their factories in order to accelerate delivery. In fact, it has not been uncommon for deliveries of very heavy materials to be shipped by express in order to save a few days' time for the benefit of the railway company. Raw materials must be paid for now at top-notch prices, and, as freight service is unusually slow, there are daily illustrations of express shipments between raw material producers and manufacturers paid for by the manufacturers which in ordinary times would be regarded as an economic waste. For example, the transportation by express of a carload of special steel from central New York to a factory in Illinois in order to save a comparatively small time on the delivery of the finished product illustrates but one of the extremes to which the manufacturers have gone in their endeavors to make more prompt deliveries.

When a manufacturer goes to such expense it should be quite evident to the purchaser that everything has been done to accelerate delivery which could reasonably be expected under existing conditions. It has been pointed out, however, that sometimes purchasing agents consider these heroic efforts on the part of the manufacturer as a part of his obligation to the purchaser, and therefore the manufacturer gets little credit for his extra effort. In fact, if the deliveries are greatly delayed the manufacturer, it is said, may consider himself lucky if he retains the good-will of such customers.

STEEL AND COPPER DELIVERIES UNRELIABLE

The manufacturer's real problem right now is with the producers of his raw material. As pointed out recently in the *Iron Age*, "Never have producers of iron and steel had so many delicate questions to settle as to what is right in allotting deliveries to their customers. In ordinary affairs the distinction between what is right and what is wrong is supposed to be quite clearly defined, but when mills are behind in deliveries there is simply a choice of evils. The ambition of the average steel maker is to allot the delivery so that all customers will be equally served, that such inconvenience as must be suffered shall be equally distributed."

The iron and steel industry is becoming seriously embarrassed by a shortage of coke and coal, due to the shortage of labor and of cars. The pig-iron situation is becoming strained, and with an increasing consumption it looks as though the furnaces might not be able to take care of the demand. Stocks have become low and prices are stronger, with some talk that there may be a scarcity of ore another season.

Of any one raw material, however, the most difficult for the electric railway manufacturer to obtain at the present time is copper. The shortage of copper for delivery before July, 1917, has caused some of the large sellers to announce that they will be out of the market for the first quarter. One authority estimated that there was only 5 per cent, or approximately 50,000,000 lb., of 1917 copper remaining unsold for delivery before July. These figures are said to be based on a refining capacity next year of 2,000,000 long tons.

Malleable-iron parts are almost impossible to obtain in some sections of the country, and in all sections the price per pound for a given pattern has advanced 200 or 300 per cent. Every conceivable means has been taken to accelerate and stabilize malleable deliveries. One manufacturer has made duplicate patterns and places his malleable-iron orders with more than ten different foundries. Thus, if one foundry has a strike or is so overcrowded that it cannot possibly approach delivery promises the order can be quickly shifted to any one or more of the others on a reliable working basis, and the earlier established relations prevent a waste of time in preliminary negotiations.

The foregoing shows the conditions with regard to some of the raw materials. There are so many others upon which the manufacturers of electric railway equipment depend that it would be out of the question to review them at this time. However, it is safe to say that, so far as raw materials are concerned, the manufacturers have never before been called upon to expend so much money and effort in order to get their supplies. Most electric railway material manufacturers have greatly added to their production departments, and many have gone so far as to withdraw men from their sales organizations and send them out at a considerable expense to locate and to get deliveries of raw materials.

SALES MANAGER SPEAKS FOR MANUFACTURERS

To quote one sales manager: "It is not uncommon in these times for people who furnish raw materials to tell the manufacturer that 'No definite promise of shipment can be made.' If the manufacturer were to make a similar statement to his railway customer the chances are the relation between the two would become strained, to say the least; yet the average railway customer in placing an order with the manufacturer insists upon having a certain definite promise of shipment, which is frequently extremely difficult for the manufacturer to meet with certainty. The reasons for this, of course, are the conditions of the raw materials market and existing labor questions.

"The reputable manufacturer, of course, bases his promises with the railway company upon shipping promises which he has received from the people who supply him with raw materials, and he does his utmost to secure promises of shipment upon which he can rely. The raw material man does not sacrifice profit to keep delivery promises, as does the average manufacturer when dealing with railway companies. In short, the point to be emphasized is that the manufacturing companies are working under the most trying conditions in industrial history; and railway buyers should hesitate to condemn them for delays in shipment.

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particularly where there is evidence to the effect that the manufacturer has done his utmost to make good."

In the larger plants production has been such a task that it has been physically impossible to fulfill orders in a routine way. Therefore it has been necessary frequently to deliver to one customer part of the material manufactured in advance for another customer. In this way the emergencies of the various customers have been met as best could be done.

FUTURE CONDITIONS DOUBTFUL

The conditions in the manufacturing field to-day warrant much thinking and the exercise of much patience on the part of both buyer and seller before either is condemned by the other for failure to fulfill promises made but a short time ago. The situation changes very rapidly. No one can tell what new condition will confront the manufacturing industry a month or even a week hence, and things in industrial circles are moving so fast that any noticeable change in the raw material situation one week seems to affect the dependent industries almost immediately.

A spirit of mutual helpfulness has always been prevalent in the electric railway industry. The manufacturers serving that industry are credited by the railways with having done their full share toward the development of improved mechanical and engineering equipment. And it is fair to presume that in the trying times of the last few months promises have been made for deliveries of material that strictly could not be fulfilled. Allowances for most of such failures have been made, and it is to be hoped that in the future nothing will happen to mar the fine spirit with which the buyers and sellers have formerly co-operated.

LARGE DEMANDS FOR PORCELAIN INSULATORS CANNOT BE MET

Scarcity of Skilled Labor as Well as of Malleable Fittings —Railway Buying Normal—Higher Prices Probable—Buying Heavy for 1917

Porcelain insulator manufacturers have large orders on hand and are experiencing difficulty in getting sufficient men and material to keep production in pace with orders. The material shortage is not one of clay, but of the metal fittings for suspension insulators. The insulator manufacturers are also embarrassed by a shortage of skilled labor in the potteries. Buyers are actively seeking increased quantities of insulators, but owing to the difficulties mentioned some manufacturers are not soliciting orders for the suspension insulators as actively as for those of the pin type.

Inquiries are coming from all sections of the country except the South and the Pacific Coast states; from these sections some manufacturers report good business, while others report it only fair. In the mining field the demand is 50 per cent greater than that of last year. In fact, insulator purchases in all divisions of the electrical industry except railways are far above normal. In the electric railway business inquiries for insulators are said to be about normal.

While the prospects for orders are excellent, conditions inside the factory are not all that the manufacturer could desire, as it is difficult to accelerate production. One factory, for example, is stated to be 500,000 suspension-type and 75,000 pin-type insulators behind in its orders, and ninety days is absolutely the best delivery that can be promised. Conditions in other plants are quite similar, and it would not be surprising if deliveries of four months will be quoted in the near future.

Insulator prices have advanced four times during the past year, the total increases being about 30 per cent, and, due to the general increase in the cost of manufacture, even higher prices are anticipated unless there should be some remarkable change in industrial conditions. Labor, more than any other item, is said to be responsible for the increased prices. On account of the location of many insulator factories near munitions plants, it is only with great difficulty that the insulator manufacturers can keep their mechanics from being enticed by extraordinary wage offers into the war material factories. Generally speaking, the insulator manufacturers state that they have plant facilities to operate at about 50 per cent above normal. Not many, however, are running at that rate, because they cannot obtain men to operate the equipment satisfactorily; and the trade does not have a large following of skilled workmen such as is found in most other industries.

Owing to large demands and uncertain manufacturing conditions, salesmen are advising their customers to place orders in advance of present requirements. The prospects are good for heavy buying until at least the middle of 1917, and the problem now is one of manufacturing and making deliveries rather than that of getting orders.

JOHN B. KILBURN ON FOREHANDEDNESS IN BUYING

Manufacturers Have Difficulty in Placing Orders with Steel Mills for Delivery Within Six Months

Among the comments received on the article mentioned above, which appeared in the ELECTRIC RAILWAY JOURNAL for Oct. 21, 1916, on page 915, was one from John B. Kilburn, vice-president, Hale & Kilburn Company, Philadelphia, Pa., which is as follows:

"We have noted with interest your articles on the subject of "Forehandedness Desirable in Buying," and believe the comments are very timely. Probably we cannot add much in the way of suggestion to what has already been offered, unless it is to say that in the case of a large number of the materials entering into our manufactures the cost has advanced enormously, and the chief difficulty is in securing material within any reasonable time at any price. In the case of steel, as you are probably aware, the principal mills refuse to accept orders—particularly for sheet metal—for delivery inside of six months, and it has been the custom this fall to take all the orders offered and divide their tonnage proportionately among the customers.

"Another feature is that where it was possible heretofore to place contracts for probable requirements with the provision that regular monthly quotas not used could be canceled, mills now refuse to accept a provision of this kind and require customers to take what they contract for.

"Therefore, manufacturers are more cautious and are unable to provide as fully as heretofore for future requirements, unless by carrying an enormous stock to insure early delivery of their product. All of this, with many similar changes from standard methods of doing business, emphasize the necessity for placing car contracts long in advance of requirements in order to secure reasonable delivery and most favorable prices."

CAR ENAMELS AND VARNISHES

Langdon B. Valentine Comments on the Use of Varnish and Enamel

An article entitled, "Car Painting Materials Are High," which appeared in the ELECTRIC RAILWAY JOURNAL of Oct. 14, 1916, page 859, set forth in a brief way a review of the trade conditions in the paint, oil and varnish field, so far as it has to do with the construction and maintenance of electric railway equipment.

The article stated that there was a growing tendency among electric railways to change the outside painting of cars from paint and oil coats with varnishes to enamel.

Langdon B. Valentine, second vice-president, Valentine & Company, New York, N. Y., commenting on the earlier article, said in part:

"You are correct in stating that the prices of raw materials entering into the manufacture of paints and varnishes are now very high. Since your article was written there have been further advances.

"In regard to the use of enamels for finishing the outside of electric railway cars, we believe that this is not the correct method of finishing to insure the most permanent as well as the best looking job. Some roads are using enamels on their old equipment where they do not wish to spend the time and money for a first-class job, as there is no doubt but what there is a saving in first cost by the use of enamels.

"We have made hundreds of experiments testing out the relative durability of enamels and clear finishing varnish over flat color. There is absolutely no doubt but the clear finishing varnish will hold its luster much longer and outwear any enamel."

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COPPER AND OTHER METAL PRICES RISING

Copper for December Delivery Is Quoted at 30 Cents and Iron and Steel Gradually Advancing

Again the swing of the pendulum of the metal market is felt and prices are advancing. Early this week electrolytic copper was quoted nominally at 29.5 to 30 cents for immediate delivery with December delivery but 0.25 cent lower. This is an advance of 1 cent per pound during the week, and several very heavy inquiries at these prices have been received. Holders of the red metal, however, are not particularly eager to sell at these quotations, anticipating as they do to dispose of their holdings at much better prices.

Nor is the spot market alone in this condition. Reports from producers indicate as a conservative estimate that 80 per cent of the copper to be produced during the first quarter of 1917 has been sold, while of that to be produced during the first six months of 1917 from 60 to 70 per cent has been contracted for. Under such a strain the market advanced to 28.75 cents for first quarter electrolytic and 27.75 for first half 1917 electrolytic.

According to reports, brass manufacturers have been the biggest buyers of late.

Pig iron and steel prices are steadily advancing. During the first week in November billets advanced by around $5 a ton. Rods, bars and plates were the same, but shapes advanced about 4 per cent. Black sheets advanced slightly and galvanized sheets from $4.75 to $5. Large buying by manufacturers is reported to be the reason for the advancing market.

ROLLING STOCK

New York Municipal Railway Corporation, New York, N. Y., is reported to be asking for bids on 100 subway cars.

South Bethlehem & Saucon Street Railway, South Bethlehem, Pa., has placed an order for one single-truck freight car.

Springfield, Troy & Piqua Railway, Springfield, Ohio, has purchased a new trailer car and one freight car from the Barney & Smith Car Company.

New York Central Railroad, New York, N. Y., is reported to be preparing to order eighteen 70-ft. multiple-unit cars for the Hudson River electric division.

Hammond, Whiting & East Chicago Railway, Chicago, Ill., are in the market for two four-motor, semi-steel, monitor-deck, double-truck, pay-as-you-enter cars.

Morristown & Erie Railroad, Morristown, N. J., has leased from the Railway Storage Battery Company a 50-ft. combination baggage and passenger Edison storage battery car to be used temporarily until new cars can be supplied by this company. The seating capacity of the car is 45.

TRADE NOTES

Perry Ventilator Company, New Bedford, Mass., has received an order to equip with ventilators the fifty cars recently ordered by the Boston Elevated Company from The J. G. Brill Company.

Carbo Company, Chicago, Ill., has moved its office to the factory at Chicago Heights, Ill., which will enable it to keep in close touch with factory operations and to fill orders with greater promptness in the future.

H. H. Lytle has been appointed representative west of the Mississippi River for the National Safety Device & Manufacturing Company, Chicago, Ill., to sell this company's air rectifier, which is designed to prevent frozen air-brake troubles.

The Valentine-Clark Company, Minneapolis, Minn., whose entire plant was reported destroyed by fire, did not suffer as badly as was reported. The company was fortunate in not losing its buildings, tools, and treating plants, nor a substantial part of its stock, and it is now prepared to fill orders for Northern or Western red cedar from its Minnesota transfer yard.

The Johnson Fare Box Company, Chicago, Ill., is placing forty-four equipments of its fare boxes for metal tickets, which is a complete equipment for the system, on the cars of Public Utilities Company at Evansville, Ind.; fifty-four boxes, which is a full equipment for the pre-payment type cars of the Mobile Light & Railroad Company, Mobile, Ala., and thirteen equipments for as many new cars in Wilmington, N. C. Orders have also been received for these boxes for some of the lines of the Holyoke, Mass., and Watertown, N. Y., properties.

ADVERTISING LITERATURE

Detroit Fuse & Manufacturing Company, Detroit, Mich., has issued Bulletin 37-A on its "Square D" steel inclosed switches.

Pyrene Manufacturing Company, New York, N. Y., has issued a pamphlet on metal boxes and vehicle brackets for fire extinguishers.

Safety Car Devices Company, St. Louis, Mo., has issued a sixteen-page bulletin on the safety car brake with safety control features.

Smith-Ward Brake Company, New York, N. Y., has issued an illustrated pamphlet describing a brake-lever strut for use on slack adjusters.

R. D. Nuttall Company, Pittsburgh, Pa., has issued bulletin No. 15 on trolley poles, trolley wheels, harps, sleet cutters and trolley bushings.

Ohio Brass Company, Mansfield, Ohio, agent for Crouse-Hinds headlights, has issued a folder on "Imperial" incandescent headlights for city service.

Wheel Truing Brake Shoe Company, Detroit, Mich., has issued a pamphlet showing sections representing some of the different styles of its grinding shoes.

Collins Metallic Packing Company, Philadelphia, Pa., has issued a pamphlet on wheel flange lubrication showing the use of the Collins wheel flange lubricator.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued bulletin 34-Z describing and illustrating the type N-SS automatic high speed steam driven compressors.

Differential Car Company, New York, N. Y., has issued Bulletin D3 setting forth the advantages of its differential electric dumping car with traversing tilting body.

Ohmer Fare Register Company, Dayton, Ohio, has issued a pamphlet descriptive of its fare box system. The pamphlet bears the title, "A Basis of Better Business."

Cobb Shockless Railroad Crossing Company, Los Angeles, Cal., has issued a report of the operating tests that have been made with this type of railroad crossing. The report covers an installation which was made in 1914 and which is still in operation at the present time.

Root Spring Scraper Company, Kalamazoo, Mich., has issued a thirty-two-page pamphlet on the "Passing of the Sweeper." This pamphlet describes and illustrates the scrapers made by this company, which include both hand and air-operated types for double-truck cars.

NEW PUBLICATION

Electrical Railways, by Henry M. Hobart, M.I.C.E., reprinted by the Institution of Civil Engineers, Great George Street, Westminster, S. W., London, England. Eighty-eight pages. Paper.

This is a reprint of the "James Forrest" lecture prepared by Mr. Hobart and delivered for him in his absence by J. A. F. Aspinall at the meeting of the Institution held on Dec. 14, 1915.

In this lecture Mr. Hobart first gave a brief résumé of the subject of power supply for heavy electric railways, illustrating the discussion by reference to the Butte, Anaconda & Pacific Railway electrification. He compared the performance of the steam locomotive with that of the electric locomotive, illustrating his comparison by reference to the Chicago, Milwaukee & St. Paul and the Norfolk & Western electrifications. The experience of the New York Central Railroad was also mentioned. He concluded with a comparison of the d.c. and a.c. systems, his conclusions being summarized thus: "The author is satisfied that the high-pressure direct-current system is so distinctly superior in essential respects as ultimately to insure its general use on main-line railways in preference to the single-phase system or any of its modifications."

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Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII NEW YORK, SATURDAY, NOVEMBER 18, 1916 No. 21

INTELLIGIBLE ANNUAL REPORTS

Completeness and simplicity are two highly-important attributes of an annual report of a corporation—these covering, on the one hand, a full publication of all relevant data and, on the other, a straightforward and plain presentation of the salient facts and conclusions to be drawn from the data. Different reports possess these attributes in varying degrees. For example, steam railroad reports with their maze of figures and long explanations are generally complete but too complex for the average stockholder, while many electric railway reports are so simple as to offer enlightenment to all along general lines, but so restricted in data as to make detailed analyses difficult, if not impossible. Each industry can well emulate the other to a greater extent. The Rock Island Railroad, in a desire for greater simplicity, has included in its latest annual report a "summary for ready reference" of the main points in the report, and other steam railroads should adopt the practice. Such a device is not new to electric railways—one company, the United Railways & Electric Company, Baltimore, Md., even has a certified public accountant insert a special analysis of the features of the financial statements. Most electric railways, however, ought to make their reports more nearly complete, and the fundamental outline of the ordinary steam railroad report would serve as a good basis for a careful investigation into this subject. It seems to us that there is an excellent opportunity for the Accountants' Association to do some more constructive work through formulating a model annual report.

COMMITTEE WORK OF THE ASSOCIATION

On another page of this week's issue is printed a list of committee subject assignments for the Engineering and Transportation & Traffic Associations, including those with which these associations and others are jointly concerned. This list is ready a month earlier than last year, and the committees have, therefore, a flying start for the year's work. As an association we were not altogether proud of our committee work, as a whole, during the past year, although some reports were conspicuously good. The dissatisfaction with some of the work was publicly expressed at the convention, particularly at the meetings of the Transportation & Traffic Association. The situation was partly the result of the conditions outlined more than two years ago in an editorial in the ELECTRIC RAILWAY JOURNAL under the heading "Can Committee Work Be Overdone?" The point made therein was that if a committee has accomplished its purpose it should be honorably discharged, or if it has failed to appreciate the opportunity before it, it should be revamped. Probably all will agree that there were too many so-called progress reports presented at the Atlantic City convention. The general plan of committee work of the association is excellent, and much that is of very great value is being accomplished. The result is, however, not what it might be in view of the expenditure of funds and time involved. The amount of money invested by the association each year in financing committee meetings and the much greater money value of the time of high-salaried men spent in committee work should result in reports which will represent substantial progress in our knowledge of the art. The progress of our industry and the standing of the industry and the association in the country depend to a large extent upon the results of committee work. Outside critics judge the association by it, and perfunctory reports reflect upon all concerned.

GETTING THE WORK STARTED WELL AND EARLY

The importance of early planning and starting of committee work is evident when we consider that under present conditions but about one-half of the year is available for planning, for accumulating data and for analysis and deductions. Reports should be completed about four months before the convention, and the acceleration period requires about two months at the beginning of the year. The present plan of operation insures a certain amount of continuity, but each year the committee machinery must be lubricated, brought up to speed and supplied with continuous power. The Transportation & Traffic Association took a commendable step in changing its method of organization this year to insure early beginning of the year's activities, and the Engineering Association also made a good start by appointing its committee chairmen at the convention. The digest of work of previous committees which formed a part of many reports last year should help this year's committees in getting down to business. Above all, however, it is essential that committee members and their employers take this work seriously. Committee appointments are not simply an honor. They mean hard work, and if one is not willing and able to shoulder his part of the task he should not accept the appointment. Most important of all, when a company permits an employee to accept a committee appointment it should be with the determination to see to it that he has time and opportunity to do his share of real work. Never has there been a year when the importance of this was so clearly realized by the members of the association.

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PROTECTIVE DEVICES AT DRAWBRIDGES

The recent accident in Boston when a loaded street car went off a drawbridge into deep water, drowning most of the passengers, should convey a lesson as to safety precautions necessary in so dangerous a place as an open draw. Just how and why the accident occurred has not yet been fully disclosed. But a fact which stands out conspicuously is the altogether insufficient protection afforded by the usual safety precautions at drawbridges of the swinging sort. Two light gates carrying small red lamps are hardly worth considering as efficient guardians of the public safety at a bridge over which hurrying crowds are swarming through the rush hours, utilizing every possible sort of transportation. Safety devices reasonably adequate in the day of the horse car and the wagon cease to be so when the automobile and long electric cars are the chief vehicles concerned. Neither chauffeur nor motorman may be disposed to take chances, but under modern traffic conditions either may see the danger signals too late to prevent a catastrophe.

Year by year the practicable braking distance of street cars has increased, owing to the normally higher speed and heavier cars demanded by the conditions of traffic, and it is difficult to see why safety devices have not met the new conditions. A crowded thoroughfare, with automobile headlights and tail-lights streaming in every direction, and electric arcs flaring overhead, the traffic teams cutting off the view, and the perpetual distraction of the crowd of foot passengers, is not an easy place in which to catch quickly anything except the most conspicuous signals. And when it comes to the matter of drawbridges there is a real necessity for something more efficient than the light guards usually provided, really less effective than would be the presence of a well-trained traffic officer.

Naturally, the first suggestion which comes to mind in this connection is that final dependence should be placed upon automatic mechanical and electrical devices rather than upon human beings, so liable to "man failure." Derailing switches interlocked with the draw, automatic bumpers, automatic stops, etc., would seem to provide the necessary insurance against running into an open draw. It is quite probable that this accident will serve as a forceful further stimulant to invention along these lines.

Automatic devices would no doubt have been adopted more generally long ago on electric roads but for the fact that they in themselves introduce new elements of danger. A derail, for example, set at the wrong time, might do more harm than it could ever prevent; a section of trolley wire might be dead when power was most needed; the presence of an automatic stop might tend to remove a sense of responsibility from the motorman, etc. But we cannot get away from the fact that accidents like that of last week should not happen. An advantage of the increasingly popular bascule bridge, especially the double-leaf variety, is that it places an impassable barrier across the roadway. The Boston accident will undoubtedly impress this fact upon the minds of those responsible for safety at river crossings. It will also exert an influence in forcing the development of other safety devices. Theoretically, the problem is simple, as the mechanical opening of the draw furnishes the opportunity to operate any kind of a safety device.

THE WAGES QUESTION

One of the most important problems which electric railway companies are facing in common with other employers of labor on a large scale is the wage schedule. During the past two years we have witnessed a constantly rising rate, and while this has had many ramifying effects, it has been especially hard on those employers, like railroads, which cannot materially increase the rate at which they sell their product to the public.

The problem has both an economic and a political aspect. The former is represented by the rising and risen cost of living as well as by the tremendous present demand of labor from industrial plants engaged in munitions and other manufacture, brought about at least in part by the war. This condition furnishes a legitimate reason for higher compensation for labor, although we believe that workmen should take into consideration not only the present wages but the chances of the permanency of employment after the present artificial activity is over. Coupled with this economic reason for higher wages, however, is also the recent performances of labor in a political way, illustrated especially by the Adamson law.

Each of these situations calls for the most serious consideration on the part of both the political economist and employer. Hence we are glad to note that the steam railroads have decided to test in court the constitutionality of the Adamson law, that the Academy of Political Science is planning to give all of the time during its meeting in New York next week to a study of the present labor situation, and that the National Civic Federation is planning to take up immediately through a committee meeting at Washington the first week in December the question of how best to improve the state and federal mediation and other labor laws. We hope also that the National Industrial Conference Board, which was organized this week in New York primarily as a clearing house on industrial problems for its members and for the public, will be able to do something toward a study of this subject which is of so much importance to the national prosperity.

The crux of the question lies in the fact that so long as wages are based purely upon the day or the hour spent in work there is constant pressure by the employee toward raising the rate and an equally strong desire on the part of the employer to lower it, regardless of the effect upon the other. This condition introduces the fundamentally wrong concept that their interests are diametrically opposed. Actually what the employer wants to buy is not a day's work or an hour's work but efficient production, and the more of this he receives in a day or an hour the more he can pay. Hence there is really a unity of interest between employer and employee. It is because they have not recognized this fact that the labor unions have made their principal mistake.

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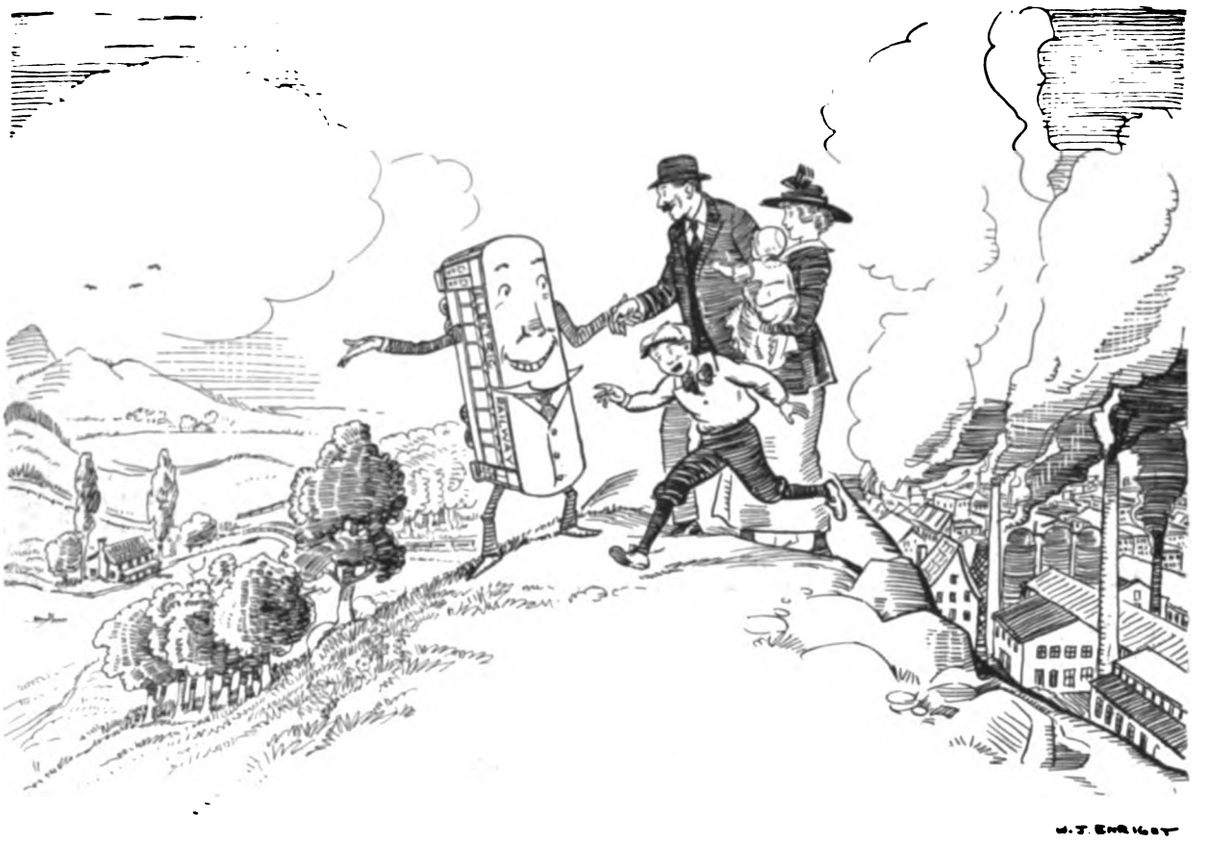
What Are You Doing For the Public—and Do They Know It?



The Railway Allows the Workman with His Family to Live in the Country

THE public mind lays a lot of stress at times upon what electric railways do TO the people.

But do people know and think about what electric railways have done FOR them?

One has only to look over the daily reports of murder, scandal and of men and things gone wrong to realize that there is not much truly GOOD news.

That is to say, the purveyors of news do not regard it as their vocation to go around digging out and reporting things that are going aright.

Nevertheless there is a market and an audience for news and knowledge of such things.

For example, how much has the electric railway of a given community increased property values in districts from which perhaps it is not yet deriving an adequate return on its investment?

How has the electric railway contributed to the health and general welfare by making it possible for people to live away from congested districts?

What is the biggest 5 cents' worth of anything that a man can buy? Unquestionably it is electric transportation.

Have accidents been cut down? How much and how?

How much more service is now being given for less revenue per passenger than was given ten years ago?

How much better are cars, roadway and service, and how much more do they cost now, than when the 5-cent fare was established?

What does the electric railway contribute in wages, taxes and otherwise to the community?

The answer to every one of these questions is an interesting story.

But no one is going out of his way to dig out the material for these stories; the railway must do it.

It is its business to do it because a knowledge of the answers to these and related questions are essential to the establishment of a fair attitude toward the railways.

Think it over. Don't you want the public to know what you have done, are doing and will do FOR your town if you are given a chance?

The telling of these things—with others—is publicity work.

It takes a publicity man—with no other duties on his hands—to do this work the way it should be done.

The main thing, however, is for electric railway managements to decide that from now on there is going to be available at least as much information as there is misinformation about them.

What's the use of living, if the bad we do is bulletined daily, while the good is saved to be buried with our bones?

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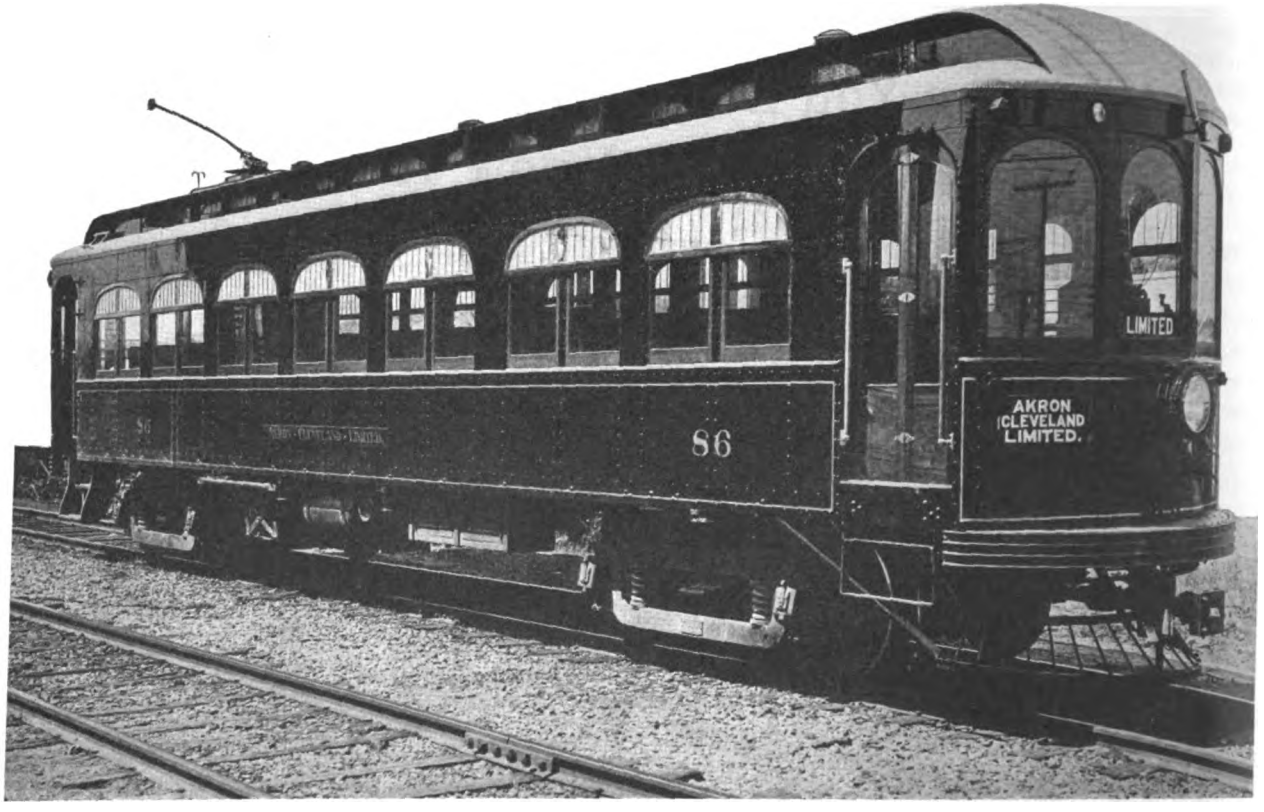

NORTHERN OHIO TRACTION'S STEEL CAR—EXTERIOR VIEW OF COMPLETELY EQUIPPED MOTOR CAR

Car Weight Reduced by Steel Construction

A Description of the New Steel Interurban Passenger Cars Recently Received by the Northern Ohio Traction & Light Company, Akron, Ohio—These Cars Combine Reasonable Weight with Substantial Construction and Weigh 12,000 Lb. Less Than Steel-Underframe Cars of the Same Type

ALTHOUGH the steel interurban cars recently purchased by the Northern Ohio Traction & Light Company, Akron, Ohio, are not radical in any particular, they represent the product of a very careful study of the service requirements. They are 12,000 lb. lighter than this company's steel-underframe cars of exactly the same type, and they have 120 hp. more motor capacity. The new cars were designed primarily for operation in the three-car trains between Akron and Cleveland, Ohio, and the order included thirteen motor cars and two trail cars. This company had forty steel underframe interurban passenger cars in operation which, in so far as dimensions and arrangement were concerned, were satisfactory from an operating standpoint. In preparing the design of the new cars, therefore, it was deemed advisable to adhere to this standard type, but to change the construction from the steel underframe to the steel side-girder type. In making this change, however, the general features of the old cars was preserved so that the new cars could be operated in trains with the old equipment without marring their appearance. It was also considered that better construction could be had if the Gothic transom sashes of the old cars were omitted.

The total weight of the new steel motor passenger car, completely equipped, is 70,000 lb. Of this, 35,000 lb. is in the body and its equipment, including air brakes, heaters and other fittings. The motor equipment weighs 15,000 lb. and the trucks weigh 10,000 lb. each. The old steel-underframe cars weigh 82,000 lb., and they are equipped with GE 204, 75-hp. motors. The new cars are equipped with GE 240-B, 105-hp. motors, and both cars have type MK control. Steel girder construction was adopted for these new cars because it was believed that they would give a longer life in service at a lower maintenance cost, and in case of an accident they were much safer than a wooden or a semi-steel car body.

The general dimensions of these steel interurban motor and trail cars are as follows:

Length over body corner posts	42 ft. 1⅝ in
Length over front platform	4 ft. 9 in
Length over rear platform	4 ft. 9 in
Length over vestibule sheathing	51 ft. 7⅝ in
Length over crown pieces	52 ft. 10⅝ in
Width over sills, including sheathing	8 ft. 6 in
Width over posts at belt rail	8 ft. 6 in
Width at widest part of car body	8 ft. 8 in
Center to center of window posts	2 ft. 10¼ in
Height, top rail to underside of side sills	41⅝ in
Length of smoking compartment	11 ft. 9⅞ in
Length of main passenger compartment	29 ft. 3⅛ in

STEEL FRAMING DETAILS

Commercial sections and pressings were used in the framing of these cars. There are two 8-in. 18-lb.

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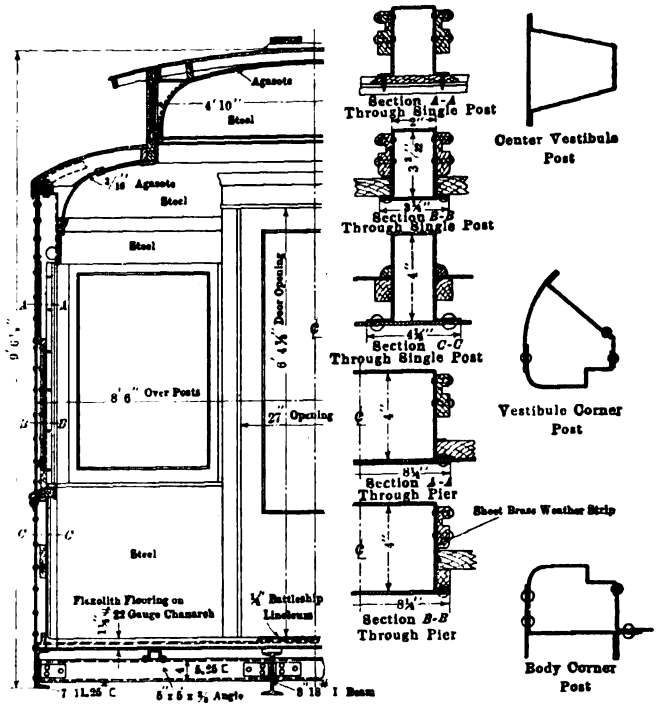
I-beam center sills at 16-in. centers extending from the front buffer to the rear body corner post; 7-in. 12¼-lb. side sills, and a ⅛-in. x 34-in. side plate reinforced at the belt rail with a ⅜-in. x 2½-in. bar. All cross-sills, excepting those at the rear body bolster, are 4-in. 5¼-lb. channels riveted to the webs of the center and side sills. The cross-members at the rear bolsters of the car body are formed of 6-in. 10½-lb. channels. The end sills are 7-in. 12¼-lb. channels, and the needle beams are formed of 6-in. 12¼-lb. I-beams.

A drop platform 7⅛ in. below the main car floor level is provided at the rear end of the car body. The center and outside supports of this consist of 6-in. 10½-lb. channels arranged to clear the motors and trucks, and they extend to the rear body bolster. The front buffer is depressed below the body framing, and it is built of two 4-in. 8½-lb. I-beams riveted to the bottom framing between the side and center sills. The top of this buffer framing is 8 in. below the main car floor level, and it is reinforced by ⅛-in. top plates riveted to the four buffer framing members. The buffer end is formed of a 7-in. 9.8-lb. anti-climber riveted to a 7-in. 12¼-lb. channel. The rear buffer is constructed in a similar manner, except that the longitudinal members are the extensions of those supporting the platform. A pressed U-section longitudinal support is also provided between the center and side sills. The body bolsters are of the built-up type, the top and bottom plates being 1 in. x 10 in. in size, and separated by gray iron castings. The bottom member of the bolster is arranged so that it can be removed without disturbing any part of the underframing.

Other Steel Details

All body posts, including side, corner, vestibule and door posts are made of pressed No. 14 gage sheet steel. These were substituted for commercial shapes because they were considered a more economical section, both as regards weight and strength. The bases of these posts are securely riveted to the underframing and the tops are riveted to the side plates, to the vestibule plates and to the end plates. The belt rail proper is formed of a 3/32-in. pressed brass section extending the full length of the car body. The several post sections and the belt-rail section are shown in one of the accompanying illustrations. The brass belt rail or sash rail is brazed to each post along all lines of contact. The letterboard is formed of ¼-in. steel and is continuous for the full length of the car body. It is riveted to the side and corner posts as well as to the body side plate, which is formed by a ¼-in. x 2-in. x 3-in. angle. The letterboard is further reinforced between the side posts by ⅛-in. x ⅞-in. x 1 in. angles, which also serve as a fastening for the Gothic sashes.

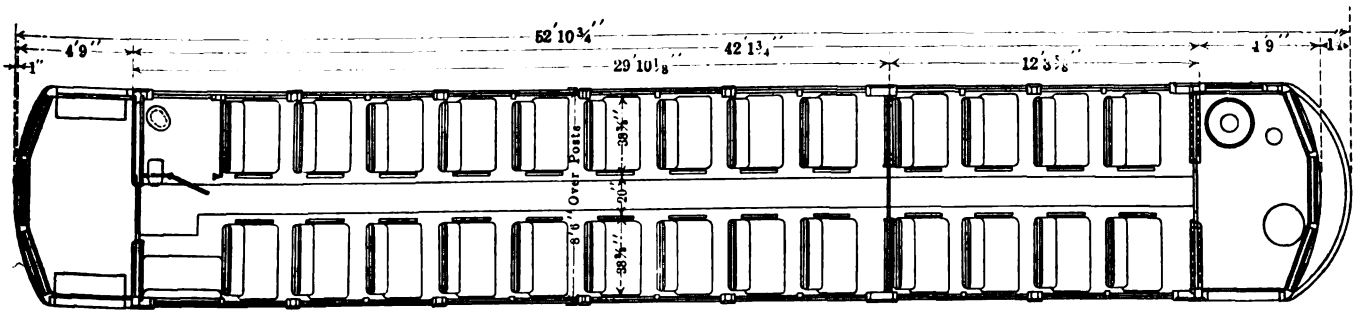
The sash rest in the vestibules is of pressed steel and the dash is formed of No. 14 gage steel. It is also of interest to note that the pressed steel posts which are exposed on the interior of the car body are grained like mahogany to harmonize with the rest of the interior finish. This is also true of the wainscoting, which is formed of No. 16 sheet steel. As a weatherproofing and vibration deadener, all the outside sheathing of the car is covered with ¼-in. cemented felt. The framing of all sashes, doors, molding and the toilet and smoking-room partitions is of mahogany. The flooring is a No. 22 gage Chanarch, covered with 1 in. of Flexolith. The Chanarch is riveted to all longitudinal members in the underframing and thus serves as a diagonal bracing. In the aisle the top surface of the Flexolith flooring is depressed ¼-in. below the surface of the floor beneath the seats. This depression is covered with ¼-in. battleship linoleum thoroughly cemented to the floor. The roof is reinforced with steel carlines forged from ½-in. x 1¼-in. bars and concealed between the wooden carlines. The lower ends of these carlines were forged so that they could be riveted to the body side-plate angle.



NORTHERN OHIO TRACTION'S STEEL CAR—CROSS-SECTION OF CAR AND POST SECTIONS

Interior Equipment

A feature of these cars appears in an interior lighting system similar to the Cleveland Railway's standard, which consists of six 94-watt lamps on a single circuit installed along the center line of the car body, with an extra lamp arranged in the circuit so that it may be cut in through a selector switch in case one of the six lamps in the car lighting system burns out. In addition to these there is a 23-watt side lamp on the deck rail at each panel post. This arrangement of the lighting system required three circuits, whereas the system employed on the old-type steel underframe cars required



NORTHERN OHIO TRACTION'S STEEL CAR—FLOOR PLAN OF CAR

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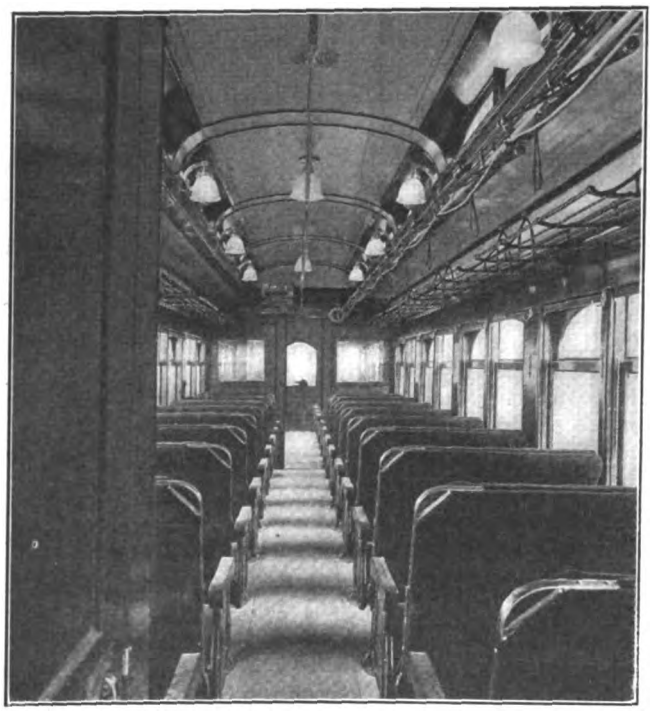
five circuits. An Ohio Brass Company's signal system, including storage battery emergency lamps in the markers and tail lights, was also installed. A pilot lamp in the car advises the conductor of the condition of these lamps.

Other specialties in these cars include a Westinghouse straight and automatic air-brake system with D2-E 25-ft. air compressors, Brill 27-MCB-2 trucks, Tomlinson automatic couplers, Hale & Kilburn seats, Acme Supply Company's curtain fixtures, Edwards automatic closing trapdoors equipped with a self-folding device, Peter Smith OC-2 hot-water heaters of the double-circulating system type, the Cleveland Trolley Supply Company's ticket holders, Electric Service Supply Company's signal gongs, Nichols-Lintern air sand boxes, sand valves and sand traps, Crouse-Hinds arc and incandescent head lamps, Knutson trolley retrievers, Peacock hand brakes, a 15-ton Barrett jack in the emergency tool box and a Pyrene fire extinguisher.

As shown in one of the accompanying illustrations, the bus line receptacles providing for train operation are all installed on a wooden block mounted on the vestibule dash. The back of this block is cut to fit the dash, and it is fastened to it with a rubber gasket for weatherproofing purposes. This block serves as an insulator, and the dash is cut away from behind the block to permit the bus lines to connect with the receptacles. A plug for the headlight was also provided in this block so as to shorten the leads. These cars were designed and built under the supervision of J. G. Swain, general superintendent of power and shops, and P. J. Wood, superintendent of shops, under the direction of Charles Currie, the vice-president and general manager of the Northern Ohio Traction & Light Company. The cars were built in the shops of the Jewett Car Company, Newark, Ohio.



NORTHERN OHIO TRACTION'S STEEL CAR—INTERIOR VIEW OF CAR

The Fort Smith (Ark.) Traction Company in its application before the State Tax Commission has secured a reduction in assessment from $1,016,260 in 1915 to $800,000 for 1916. This was the greatest reduction of any public utility company in Arkansas.

Recent Decisions and Inventories*

Inventories Should Be Classified as to Age, Condition, Use and Extent of Use of Each Class of Service

BY PHILANDER BETTS
Chief Engineer Board of Public Utility Commissioners of New Jersey

THE result of recent decisions is that inventories and the resulting appraisals must be classified. As far as the engineer is primarily concerned with cost, the inventory and appraisal will arrive at the same aggregate in any case, but the engineer is further concerned with the use and operation of the property, and it is his duty to determine to what extent each class of property is required in the service of the public and to what extent it is required for the furnishing of the various classes of service. In preparing the inventory, therefore, such classifications must be made as will readily show the use to which the property is devoted.

As to calculations for depreciation, while the so-called Idaho decision is to the general effect that full or theoretical depreciation should not be deducted in obtaining the fair value of the property, it cannot be said that this principle is at all well established, and it becomes necessary, in the inventory, to determine the accrued depreciation of each item, taking into account not only ordinary wear and tear, but obsolescence and inadequacy (which some authorities call functional depreciation). The writer has long been of the opinion that in order to square valuations with the court decisions, engineers must (1) obtain definite appraisals of the existing physical property, (2) ascertain the full theoretical depreciation, and (3) make such deductions as are necessary because of property built unwisely or for anticipated increases in population which have not materialized or for classes of service which have not been taken on.

In making the appraisal of the physical property, due allowance must be made for overhead charges. In addition there are allowances for various intangibles not properly included under the head of overhead charges. They are (1) cost of organization and obtaining the necessary charters and franchises, (2) deficits in operation in the early history of the project, (3) lack of profits in the later years, and (4) the unearned depreciation which has accrued. It is the province of the engineer to investigate and determine the various items referred to with the exception, perhaps, of items concerning the cost of organization and obtaining the necessary charters and franchises.

The foregoing items should be considered as making up the cost of establishing the business. There has been much contention with reference to the necessity of including going value, but here one is confusing cases involving justice to the investor with purchase and sale cases. Going value is an element to be considered in purchase and sale cases and has no pertinency whatever in rate cases. The United States Supreme Court, in its recent decision regarding the Des Moines gas rates, decided that going value was to be considered in these cases, but based its estimates of going value on those elements which go to make up the cost of establishing the business. In the determination of reasonable or fair rates, full consideration must be given to the sacrifice made by the investor. This will include, in addition to the investment in the physical property, early losses, lack of profits and unearned depreciation, the aggregate of which should be classified as the cost of establishing the business.

*Abstract of paper presented before meeting of American Institute of Electrical Engineers in New York City on Nov. 10.

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In conclusion, it may be said that:

1. Property must be inventoried in such detail as will lead to a determination of its value or cost within a very small percentage of absolute accuracy.

2. It must be classified as to its use and as to the degree of its use in the various classes of service.

3. The inventory must include full information as to age and present condition, this information leading to accurate estimates of accrued depreciation.

Continuous Inventories—Their Value and Preparation*

Four General Groups of Property Suggested, with Forms and Methods of Collecting and Recording Data

BY HARRY E. CARVER

Assistant Engineer Board of Public Utility Commissioners of New Jersey.

A PERPETUAL inventory of property would be useful to any company in the following ways:

1. Data are made available for answering promptly any complaints as to discrimination or overcharges in existing rates.

2. The increased cost of labor and material renders it probable that many rate cases in the future will involve increases, and the company will need to be fortified with all necessary facts as to the cost of service rendered.

3. One of the most urgent reasons for making an inventory and keeping it up to date will probably be the necessity of having some means for judging whether or not a company is making reasonable preparation for renewing its property.

4. The labor and time involved in securing commission approval of security issues on the part of the company and of the commission would be materially reduced by a continuous inventory. There would be less interruption of company work by governmental inspectors in checking up construction expenditures or making a complete appraisal.

5. The market for a company's securities would, doubtless, be increased by a general knowledge that a running inventory of all the company's property was maintained and consequently that some check was available upon property.

6. A continuous inventory would probably make available data for securing franchise extensions from various municipalities under more equitable terms than appears to be possible at present.

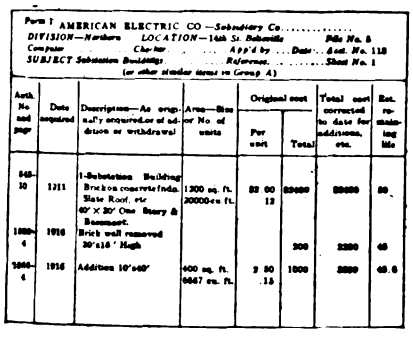
7. Data would be available for making investigations to satisfy the demands of labor.

8. A continuous inventory would be conducive to much more accurate distribution of charges between fixed capital and operating expenses as well as of general overhead charges.

9. Insurance adjustment for fire and other losses could be more readily and equitably obtained.

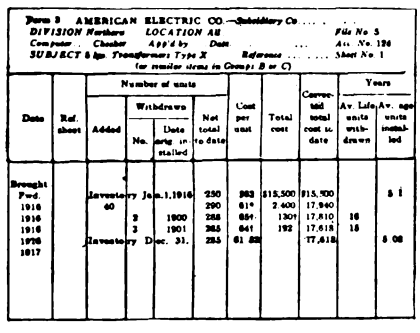
10. Tax commission reports and yearly reports to regulating bodies could be more readily compiled.

*Abstract of paper presented before meeting of American Institute of Electrical Engineers in New York City on Nov. 10.



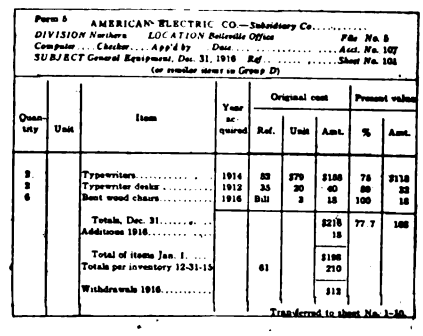
Form 1 AMERICAN ELECTRIC CO.—Subsidiary Co.
DIVISION—Northern LOCATION—14th St. Belleville File No. 5
Computer Checker App'd by Date Acct. No. 118
SUBJECT Substation Buildings Reference Sheet No. 1
(or other similar items in Group A)

Auth. No. and page	Date required	Description—As originally required or of addition or withdrawal	Area—Size or No. of units	Original cost Per unit	Original cost Total	Total cost corrected to date for additions, etc.	Est. remaining life
848-16	1911	1-Substation Building Brick on concrete finds. Slate Roof, etc 40' × 30' One Story & Basement.	1200 sq. ft. 20000-cu ft.	$2 00 .12	$2400	$2400	50
1000-4	1916	Brick wall removed 20'x16' High			300	2200	45
1000-4	1916	Addition 10'x60'	600 sq. ft. 6667 cu. ft.	$ 50 .15	1000	2800	45.6



Form 2 AMERICAN ELECTRIC CO.—Subsidiary Co.
DIVISION Northern LOCATION AB File No. 5
Computer Checker App'd by Date Acct. No. 124
SUBJECT 6 kw. Transformers Type X Reference Sheet No. 1
(or similar items in Group B or C)

Date	Ref. sheet	Number of units Added	Withdrawn No.	Withdrawn Date orig. installed	Net total to date	Cost per unit	Total cost	Corrected total cost to date	Years Av. Life units withdrawn	Years Av. age units installed
Brought Fwd. 1916					290	$63	$15,500	$15,500		5 1
1916		Inventory	Jan. 1, 1916		290	61*	2 400	17,940		
1916		60			290	61*		17,940		
1916			2	1900	288	65†	130†	17,810	16	
1916			3	1901	285	641	192	17,618	16	
1916		Inventory	Dec. 31.		285	61 82		17,618		5 08
1917										



Form 5 AMERICAN ELECTRIC CO.—Subsidiary Co.
DIVISION Northern LOCATION Belleville Office File No. 5
Computer Checker App'd by Date Acct. No. 107
SUBJECT General Equipment, Dec. 31, 1916 Ref. Sheet No. 101
(or similar items in Group D)

Quantity	Unit	Item	Year acquired	Original cost Ref.	Original cost Unit	Original cost Amt.	Present value %	Present value Amt.
2		Typewriters	1914	53	$70	$140	75	$110
2		Typewriter desks	1912	35	20	40	80	32
6		Bent wood chairs	1916	Bill	3	18	100	18
		Totals, Dec. 31				$218	77 7	168
		Additions 1916				18		
		Total of items Jan. 1				$196		
		Totals per inventory 12-31-15		61		210		
		Withdrawals 1916				$12		

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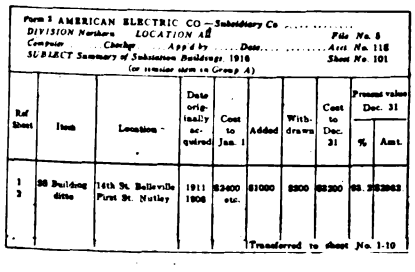

Form 3 AMERICAN ELECTRIC CO.—Subsidiary Co.
DIVISION Northern LOCATION AB File No. 5
Computer Checker App'd by Date Acct. No. 116
SUBJECT Summary of Substation Buildings 1916 Sheet No. 101
(or similar item in Group A)

Ref. Sheet	Item	Location	Date originally acquired	Cost to Jan. 1	Added	Withdrawn	Cost to Dec. 31	Present value Dec. 31 %	Present value Dec. 31 Amt.
1 3	28 Building data	14th St. Belleville First St. Nutley	1911 1906	$2400 etc.	$1000	$300	$3200	93.2	$2982

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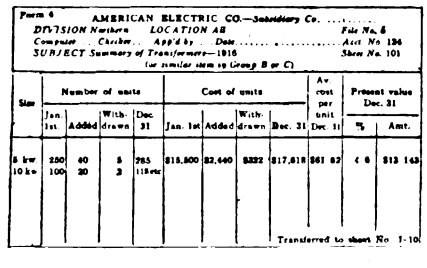

Form 4 AMERICAN ELECTRIC CO.—Subsidiary Co.
DIVISION Northern LOCATION AB File No. 5
Computer Checker App'd by Date Acct. No. 124
SUBJECT Summary of Transformers—1916 Sheet No. 101
(or similar items in Group B or C)

Size	Number of units Jan. 1st	Added	With-drawn	Dec. 31	Cost of units Jan. 1st	Added	With-drawn	Dec. 31	Av. cost per unit Dec. 31	Present value Dec. 31 %	Present value Dec. 31 Amt.
5 kw	250	60	5	285	$15,500	$2,440	$322	$17,618	$61 82	4 6	$13 143
10 kw	100	20	3	117	etc.						

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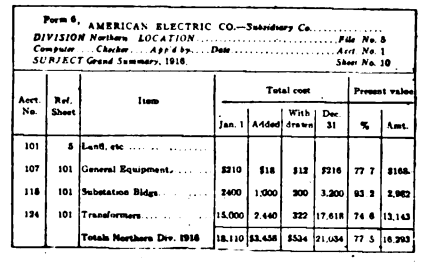

Form 6 AMERICAN ELECTRIC CO.—Subsidiary Co.
DIVISION Northern LOCATION File No. 5
Computer Checker App'd by Date Acct. No. 1
SUBJECT Grand Summary, 1916 Sheet No. 10

Acct. No.	Ref. Sheet	Item	Total cost Jan. 1	Total cost Added	Total cost With-drawn	Total cost Dec. 31	Present value %	Present value Amt.
101	5	Land, etc						
107	101	General Equipment	$210	$18	$12	$216	77 7	$168
118	101	Substation Bldgs.	2400	1,000	200	3,200	93 2	2,982
124	101	Transformers	15,000	2,440	322	17,618	74 6	13,143
		Totals Northern Div. 1916	18,110	$3,458	$534	21,034	77 5	16,293

CONTINUOUS INVENTORY—SPECIMEN FORMS FOR ORIGINAL ENTRIES AND SUMMARIES OF VARIOUS PROPERTY GROUPS

Notes on Form 1:

(a) If any item of property subject to depreciation is acquired subsequent to date of first use, this fact should be indicated together with other information available as to original construction, date, cost, etc.

(b) Remaining life of 45 years is obtained by subtracting 5 years elapsed between 1911 and 1916 from 50 year life first estimated.

Remaining life of 46.6 years is obtained by computing a weighted average of $2,200 at 45 years and $1,000 at 50 years.

(c) Present value on a basis of straight line depreciation may be readily obtained by multiplying $3,200 by ratio of 46.6 years to 50 years, giving 93.2 per cent and $2,982.

Notes on Form 3:

*Average costs for all units of this size for any given period—say one year.

†Prices might be averaged and one figure shown or, if not much variation in price, they might be withdrawn at the average cost of the 250 shown at the beginning of the year.

Notes on Form 4:

(a) Columns on left of form for "Reference Sheet" and "Type" have been omitted in reproduction.

(b) The sign "%" under "Present Value" for straight line depreciation would usually be obtained by comparing average age of units installed with average life of units withdrawn. In this case it is estimated that a 15 or 16 year life is not long enough and life base is arbitrarily taken as 20 years. In some cases it might be desirable to consider salvage in arriving at present value but it is disregarded above for sake of brevity.

Notes on all forms:

(a) Loose leaf sheet (8½ in. x 11 in.) is recommended for all forms.

(b) For all withdrawals use red ink.

(c) Forms 1 and 3 constitute the continuous record. All other forms are made up when it is desired to arrive at totals and are correct for one date only. If periods used are different than calendar year, forms would be slightly modified.

(d) Provision for identifying computers, etc., on Forms 1 and 3 after first entries could be made by having initials inserted in date column or by providing separate column.

(e) Figures carried to grand summary, Form 6, are merely illustrative and not the totals which would be obtained if more entries were made on Forms 2, 4 and 5.

(f) From totals on Form 6, the amount of additions for which new securities may be issued may be readily determined.

(g) By comparing Form 6 as filled out for 1915 with year 1916, the credit which must be made to reserve account from earnings to provide for the year's depreciation may be determined.

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11. A continuous inventory would necessitate the keeping of records which would prevent the lack of correct information regarding the location of property, such as underground conduits, etc.

12. Detailed costs would readily be available from which the costs of rendering any particular service or of making any particular extension or betterment could be accurately determined.

PREPARATION OF THE INVENTORY

As most companies have not a complete inventory and appraisal of their property, however, it seems advisable to state that a company can readily start an inventory of all new property acquired from the present time forward and all old property withdrawn from service and either replaced or abandoned, without detailing a special force of engineers to make a complete inventory of all property. The record of old property can be obtained when the company's engineers and accountants may be available for this work.

The fundamental requirement is an efficient "work order" system. Such a system is in force in practically every company of appreciable size to-day, and with more or less modification can be adapted to give the records required. In order to obtain the necessary records for writing off the original cost of the property when it is retired, however, it is absolutely necessary that one additional step be added to this system as it is generally in force in most companies, *viz.*, an allocation of the cost of each piece of construction or property acquired must be made in detail when the work is completed, and preferably just before the work order is finally closed, as such an analysis will frequently disclose inaccuracies in either debits or credits. This practice is followed by many companies to a certain extent at the present time, but must be applied to all work orders, and the final cost must be reduced to the same units that are likely to be needed in making estimates for withdrawals or additions.

DIVISIONS OF PROPERTY ITEMS

The items of property for the purposes of inventory may be divided into four general groups as follows: (*a*) Those items which are large enough to be recorded individually or in small groups with one entry, but which are likely to be altered or changed in part; *e.g.*, buildings. (*b*) Items which may be recorded individually and which are withdrawn from service as a unit; *e.g.*, meters. (*c*) Items which must be recorded in units of length, pounds, or some similar units and miscellaneous items; *e.g.*, wires and cables, insulators, arresters, etc. (*d*) Those items of property which are usually carried in inventories at the present time and which are usually checked up by field inventory at regular intervals; *e.g.*, materials and supplies, portable tools, office furniture, etc.

There may be considerable difference of opinion as to just what method should be followed in collecting the data required, but a general scheme could be followed for a gas, electric railway or railroad, telephone or telegraph, water or sewer utility or a private industrial plant by classifying the property in the general groups indicated above about as follows:

(*a*) 1. Land and right-of-way. 2. Building and structures. 3. Equipment of stations, buildings, etc.

(*b*) Poles, transformers, meters and services for an electric company; meters, services, fire hydrants, lamps, etc., for a water or gas company, and similar items for these or other companies.

(*c*) Wires, cables, conduits, crossarms, insulators, for an electric company; feeder cable, trolley wire, straight track, etc., for railways; transmission and distribution mains for water, gas and sewer companies.

(*d*) Office equipment, shop equipment, stable equipment, etc.

FORMS TO BE USED

The general form of recording data for items in group (*a*) in detail is given on Form 1. These data should be obtained from the completion report of the work order, an extra copy of which it might be advisable to file with other inventory data. The basis for estimating the unit prices for the cost of brick wall removed (mentioned on Form 1) should be found in this completion report. A list of the quantities involved should be available from the information and plans in the hands of the engineer responsible for the new addition. The summary of all such property classified under any particular account for any particular division or subdivision could be recorded on Form 2.

The same forms (3 and 4) are recommended for both groups (*b*) and (*c*), but the methods of collecting the data required are different. For both groups it is thought best to use unit costs averaged for the district into which the company chooses to subdivide its territory, say a tax district, and for a certain period of time, monthly, quarterly or yearly. The average for labor, storeroom charges, miscellaneous material items, overhead charges, etc., would necessarily need to be computed after the close of the current period or the average taken from the preceding period and final adjustments made for variation. The total quantities for all items in group (*b*), for which a card record is assumed to be made, can be computed more readily from the cards or from the completion reports of the work orders. For all items in group (*c*), the totals of both quantities and prices would probably best be obtained and reconciled with the amounts given in the completion reports of all work orders involved, although they might be obtained from field books, street maps, or pole record and manhole record cards. Form 3 shows method of recording a group of similar units, *viz.*, 5-kw. transformers, and Form 4 shows method of summarizing units of various sizes.

Form 5 is recommended for summarizing items in group (*d*). The first entry for each of these items is naturally the cost new, and it is recommended that this cost new be carried in the inventory in a parallel column with the depreciated value until such time as the item is retired; that the total cost new of all items be carried in the property account; and that the estimated accrued depreciation of all such items be carried in the depreciation reserve account instead of being charged directly to operation each year and lost sight of thereafter as is the practice with many companies to-day. A comparison of such an inventory at the end of any year with the preceding one will indicate the total value of all withdrawals and additions, and a proper adjustment can then be made in one lump sum between the capital account and the depreciation reserve.

Form 6 is to be used as a summary of all property, and probably needs no explanation in addition to notes given.

To carry out the above, it would seem advisable to create a separate department under the joint supervision of the chief engineer, general auditor or controller, and the official in charge of the public relations committee of the utility if such a committee exists. The man in charge of this department should understand engineering, accounting and statistical work, and be capable of co-operating with all other departments of the company to secure the full benefits possible to be derived as outlined in the first section of this paper.

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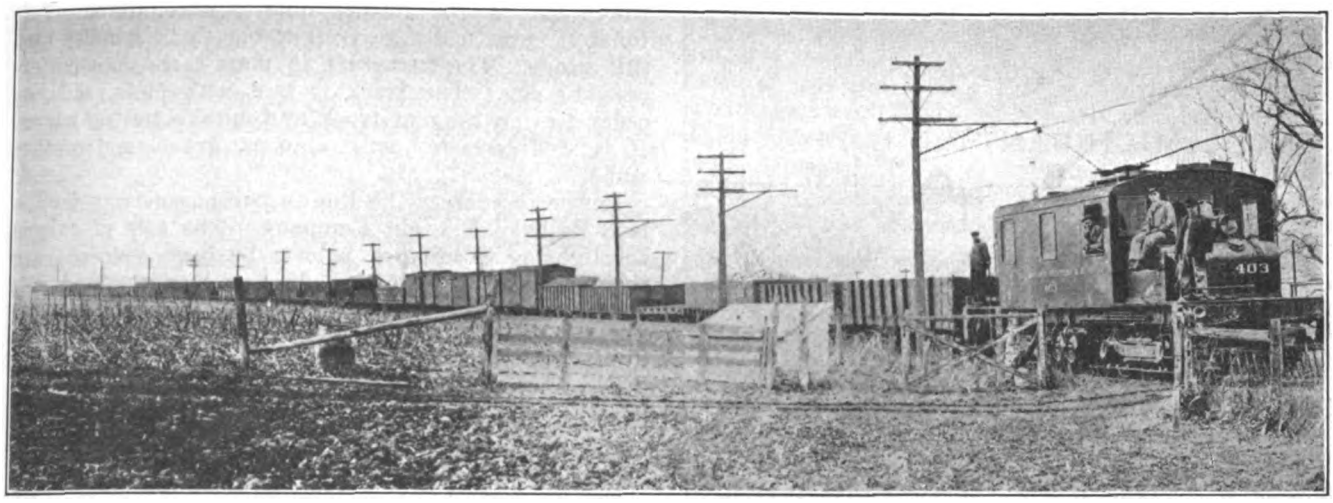

TYPICAL FREIGHT TRAIN ON TOLEDO & WESTERN RAILROAD

An Electric Railway Operating Under Steam Road Conditions

The Author's Statements Show That the Toledo & Western Railroad Has Been a Potent Factor in the Prosperity of the Territory Which it Serves

By A. SWARTZ
Vice-President Toledo & Western Railroad, Toledo, Ohio

THE Toledo & Western Railroad is an electrically operated line handling steam railroad business on its main line between Toledo and Pioneer, Ohio, a distance of 59 miles, and between Allen Junction, a point 16 miles west of Toledo on the main line, and Adrian, Mich., a distance of 21 miles. The road parallels the Lake Shore & Michigan Southern Railroad over the entire length of the Adrian branch. Steam railroad connections are provided through the Toledo Terminal Railroad, a belt line connecting with all steam roads entering Toledo. There are four other steam road connections along the line, and the Toledo & Western has many through rates with the steam roads. The main line is not paralleled by any steam road. This line passes through Sylvania, Metamora, Lyons, Ohio, and Morenci, Mich., and Fayette, Ohio, into Pioneer, Ohio. The Adrian branch passes through Blissfield, Mich., to Adrian, a city of 11,000 inhabitants.

STEAM RAILROAD CONNECTIONS

The Toledo & Western Railroad is organized on the same lines as a steam road and, in fact, is accepted as such by a number of steam roads that interchange business and co-operate by granting divisions of freight rates. Physical track connections are in use at Fitch, Ohio, with the Toledo Terminal Railroad; at Franklin, Ohio, and Adrian, Mich., with the Wabash Railroad, and at Dennison, Ohio, with the D., T. & I. R. R. It is a member of the American Railway Association and the Central Freight Association, representative steam road organizations.

The railroad was built about fourteen years ago to tap territory along the main line, which was very much in need of railroad facilities. At that time the average farm land along the route was worth in the neighborhood of $75 per acre, whereas now it ranges from $125 to $200 per acre. The road traverses a very rich farming country, consisting at present of a large acreage of sugar beets. The annual yield of 2500 acres of sugar beets, at least 25,000 tons, is hauled to Blissfield, Mich., to a large sugar factory having a capacity of 1000 tons of beets per day, the equivalent of 125 tons of refined sugar. Besides this, the yield of 7500 acres is hauled to this factory from other sources, and the beets from an acreage of 1200 are taken to Toledo.

CLASSES OF TRAFFIC HANDLED

The passenger traffic on this road is approximately 70,000 passengers per month. Passenger trains are operated at a schedule speed of 20 m.p.h. The low average schedule speed is due to the time required in incorporated towns. Outside of these the schedule speed approximates 30 to 35 m.p.h. From West Toledo to Sylvania, Ohio, a distance of 8 miles from the Toledo interurban station, the contiguous property is being rapidly developed as suburban homes, and affords quite a suburban traffic, although at the present time this traffic is somewhat erratic and barely pays for the service given.

The regular freight schedule comprises one local and four package freights each way per day. One of the package freights is used on a milk route, and hauls, in addition to its load, two cars of bottled milk daily from Morenci to Toledo. These cars are refrigerated with cold air, and reach their destination in the hottest weather with a temperature not exceeding 42 deg. Fahr. The milk express revenue has increased during the last four years from $5,000 to $35,000, and it is expected that it will reach $100,000 in the next two years. A large sugar beet business is also handled. Approximately 60,000 tons of sugar beets are handled in thirty days during the sugar beet season, practically all in the month of October. For this business about 1800 cars are required, each of these cars having an average haul of 20 miles.

The necessity for package freight cars will be read-

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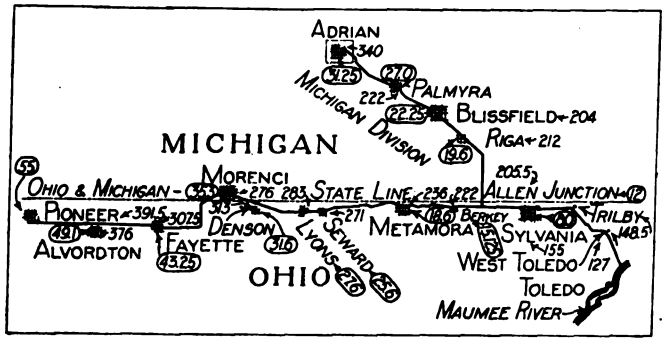


OUTLINE MAP OF TOLEDO & WESTERN RAILROAD

Elevations shown by figures not encircled. Datum is that used by city of Toledo; 91.7 on this datum being mean lake level at Toledo, which is 573 ft. above mean sea level. Figures encircled represent miles from West Toledo.

ily understood when it is stated that during 1914 about 15,000 tons were handled in this manner. The carload business amounts to about 8000 cars per year, and in addition to sugar beets consists principally of crushed stone for road purposes, coal, live stock, hay, grain, logs, sugar and lumber. The total tonnage handled during the two years past shows the following increases for the year 1915 over 1914: 17 per cent for loaded cars, 14 per cent for ton-miles of loaded cars, 12 per cent for car-miles of loaded cars, 14 per cent for empty cars, 32 per cent for ton-miles of empty cars, and 16 per cent for car-miles of empty cars.

The United States government has authorized a regular mail-car service on this road. The car which is used carries a mail clerk and makes trips daily except Sunday from Toledo to Pioneer and return. The Wells Fargo Express Company maintains express service on all freight and on some passenger trains. While at present this is not a source of great revenue, it is expected that the business will grow materially.

TRACK, POWER SUPPLY AND SHOPS

In railroad parlance this road was "built on the ground," and there are some very short heavy grades and sharp curves. The grades, however, do not exceed 75 ft. per mile, with one exception at Adrian, Mich., where one of 100 ft. per mile is encountered. Fortunately, practically no freight has to be handled over this grade. The curvature in most cases does not exceed 10 deg. The track is laid with 60-lb. rails, on cedar ties on tangent track and on oak ties on curves. It is well ballasted with cinders, gravel and crushed stone.

Power to operate the line is purchased from the Toledo Railway & Light Company. The sale of current for lighting to villages, private business concerns, and residences forms a fairly lucrative business, and it is hoped that it may soon grow to produce about $100,000 yearly revenue.

The line is operated at a trolley voltage of 550, direct-current, the power being transmitted over a high-tension line at 13,000 volts. There are nine rotary converter substations. The transmission line will probably be rebuilt in the near future for operation at 33,000 volts to provide for an expected increase in the business of the company.

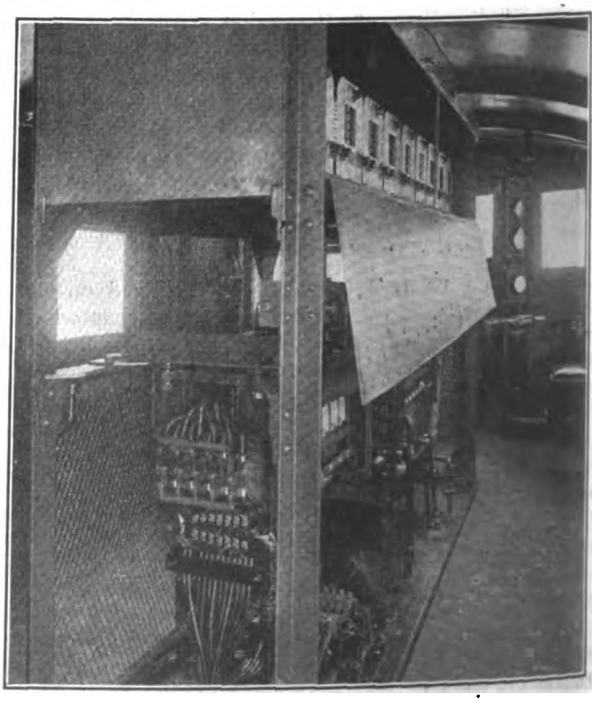
At Toledo joint freight house and passenger depot facilities, provided by the Toledo Railway & Light Company, are used in common with eight other interurban systems. The shops are located at Sylvania, Ohio, where running repairs to freight equipment are made. The heavy repairs to passenger cars and electric motive equipment are made at the Central Avenue shops of the Toledo Railway & Light Company in Toledo.

ROLLING STOCK AND ITS EQUIPMENT

The company owns and operates fourteen passenger coaches, two of which are of the latest type of construction, five package freight cars for small-lot freight, five electric locomotives for carload freight, and 115 freight cars of the same types as those used on steam roads. The two new passenger coaches and five package freight cars are equipped with Westinghouse motors and control.

In order to handle the increased traffic the company has recently placed in operation a 60-ton Baldwin-Westinghouse electric locomotive. The locomotive hauls a trailing load of 2400 tons, although this is in excess of the manufacturers' rating. It has actually pulled the equivalent of 3500 tons on level track. It is of the

CONTROL APPARATUS ON NEW T. & W. R. R. ELECTRIC LOCOMOTIVE



CLOSER VIEW OF OPERATOR'S CORNER OF T. & W. R. R. LOCOMOTIVE

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eight-wheel, swivel-truck type, with double-end control, and is adapted to freight and switching service.

The equipment comprises four commutating-pole motors of the field-control type and HLF control. Field control was selected because the trolley voltage is sometimes quite low and the substation capacity is limited. While the full field is designed primarily for acceleration it may also be used to some extent in slow-speed running. The control equipment is mounted in a grounded expanded-metal cage.

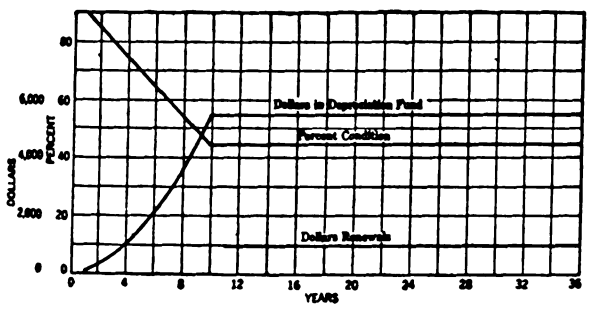
With forced ventilation the main traction motors have sufficient capacity to exert continuously a tractive effort of 9400 lb. at 600 volts. The locomotive can exert a tractive effort of 20,000 lb. at 9.75 m.p.h. The maximum safe speed is 40 m.p.h.

Growth and Depreciation*

Manner of Company's Growth Affects Per Cent Condition—Property Does Not Settle Down to Fixed Per Cent Condition

BY JULIAN LOEBENSTEIN
Junior Electrical Engineer, Public Service Commission of New York, First District

THE following definitions and assumptions are used. By liquid depreciation reserve fund is meant a reserve either as cash in a bank, invested in bonds or employed in any other way so as to be readily convertible into cash for immediate use. This is to distinguish it from depreciation reserve which is invested in extensions and betterments and which cannot be readily turned into available cash. No consideration is taken of scrap value or of a reserve for emergencies or catastrophies, as the calculations are not in any way affected thereby, the effect being simply to refer them to a different ordinate. All calculations are on the straight line basis, and all property is assumed to be kept in the best state of repair.

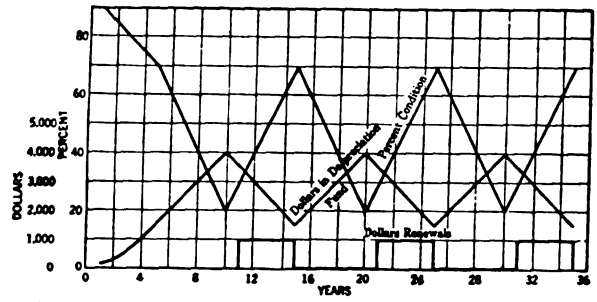


Growth and Depreciation—Curve I—Uniform Investment for Ten Years; End of Growth, Tenth Year; Life, Ten Years. Depreciation Reserve Not Invested in Extensions.

PER CENT CONDITION AFFECTED BY MANNER OF GROWTH

It is generally considered that a property maintained in good operating condition will be between 70 and 85 per cent new. In fact, Whitten, in his "Valuation of Public Service Corporations," says: "It has been stated that a street railway maintained in good operating condition will necessarily show cost less depreciation of from 70 to 85 per cent of the cost new." It is now an easy matter to prove that Mr. Whitten's assumption is wrong, and that the per cent condition of any property is dependent not only on the maintenance, but upon the past and present growth.

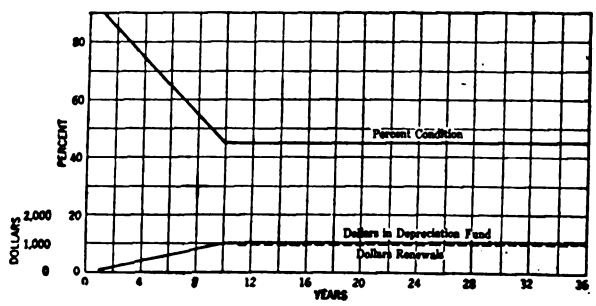
In Curve I, where there has been a uniform investment over a term of years corresponding to the life of the property, the per cent condition varies from 90 to 45 during that term, and then stays at 45 when the property stops growing. In Curve II, where there is a uniform investment over a term of years not corresponding to the life of the property, the per cent condition varies from 90 to 70 while the property is growing. After that it varies in repeating cycles from 70 to 20 and back to 70 again. This, of course, is an extreme case, but it shows the possibilities of variation.



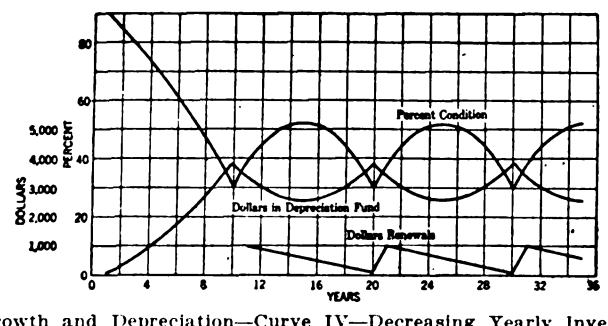
Growth and Depreciation—Curve II—Uniform Yearly Investment for Five Years; End of Growth, Fifth Year; Life, Ten Years. Depreciation Reserve Not Invested in Extensions.

Curve III shows the same characteristics as Curve I, although there was no reinvestment of reserve in the latter. Curve IV shows a more complicated property than the others. Here the variation during the ten years the property is expanding is from about 92 to about 67. It then goes through a cycle the period of which is twenty years, varying from 67 to 35 per cent and back again.

Curve VI is for an actual electric property. The company was assumed to have reached its final growth on Dec. 31, 1913, after which date only renewals were made. The total service value of all the property was approximately $16,500,000, yet it may be seen from the curve that the actual service value varies from $6,200,000 to $11,000,000, or from 37.5 per cent to 69 per cent. Even if some assumptions as to probable life are incorrect, the property will still vary over a wide range and not be in any popularly supposed fixed condition somewhere between 70 and 85 per cent. Curve VIII is for another actual property, but a much smaller



Growth and Depreciation—Curve III—Uniform Yearly Investment for Ten Years; End of Growth, Tenth Year; Life, Ten Years. Depreciation Reserve Invested in Extensions.



Growth and Depreciation—Curve IV—Decreasing Yearly Investment for Ten Years; End of Growth, Tenth Year; Life, Ten Years. Depreciation Reserve Not Invested in Extensions.

*Abstract of paper presented before meeting of American Institute of Electrical Engineers in New York City on Nov. 10.

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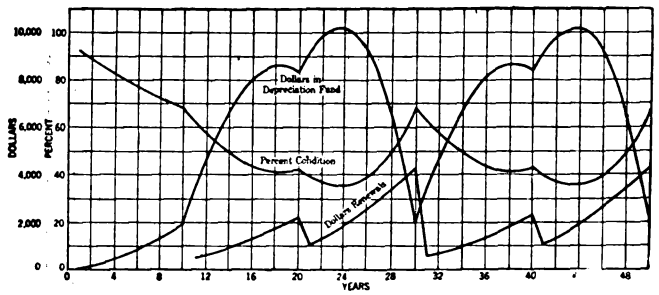
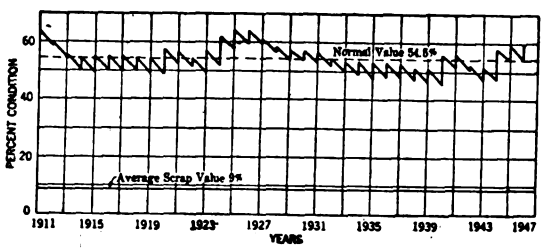
one than that considered in Curve VI. The property is assumed to reach its full growth in 1912, and the remaining service value is shown for the next fifty-three years. The service value varies from $810,000 to $370,000, or a corresponding per cent variation from 77 to 35.

James E. Allison, in a report on the United Railways

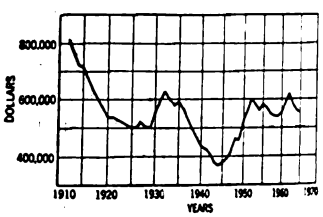


Growth and Depreciation—Curve V—Increasing Yearly Investment for Ten Years; Life, One Group, Ten Years—One Group, Twenty Years; End of Growth, Tenth Year. Depreciation Reserve Invested in Extensions.

of St. Louis, presented Curve VII. He said: "It has been the purpose of the writer to show by diagrams that piecemeal built properties of any complexity will eventually assume a theoretical value curve, closely conforming to the straight normal value line, halfway between 100 per cent and the composite scrap value of the property." It cannot be denied that the curve which he gives most certainly is a uniform curve and tends to support his theory. It should be noted, however, that even his curve varies over a range of 15 per cent during the comparatively short time of thirteen years. When compared to Curves VI and VIII, it shows the danger of drawing a general conclusion from any one curve. Every complex property undoubtedly displays the tendency which Mr. Allison points out, but each property should be investigated separately to determine its characteristics in this respect.

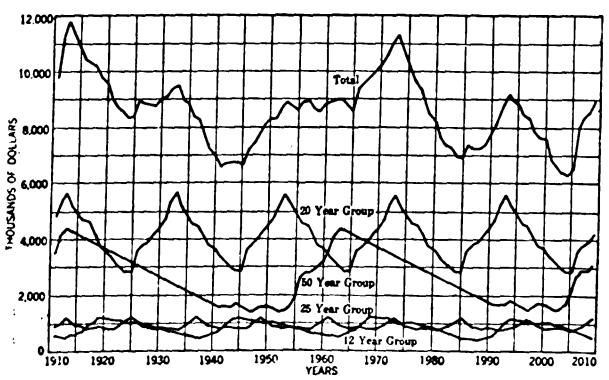


Growth and Depreciation—Curve VII—Total Composite Theoretical Value Curve Depreciable Property of the United Railways of St. Louis.



Growth and Depreciation—Curve VIII—Depreciated Service Values of an Actual Property; End of Growth Assumed Dec. 31, 1912; Original Service Value, $1,056,917; Maximum Per Cent Condition, 77; Minimum Per Cent Condition, 35.

Only when there has been a uniform growth over a term of years corresponding to the life of the property (Curve I) will a property reach a fixed condition and remain there after it has stopped growing. As long as a property is growing, whether uniformly or otherwise, there will be a variation in its per cent condition. In other words, there is an obligation to renew varying amounts of property in different years in the future, and any calculation of reserves based on an assumption that because of perpetual life the company will reach a stable condition either during or after its growth is entirely incorrect.



Growth and Depreciation—Curve VI—Depreciated Service Values of an Actual Property; End of Growth Assumed Dec. 31, 1913; Original Service Value $16,500,000; Maximum Per Cent Condition, 69; Minimum Per Cent Condition, 37.5.

While the property is growing the per cent condition is decreasing, the rate of decrease varying inversely with the rate of growth. When the property stops growing it has reached a certain per cent condition, and thereafter it varies between that condition and some other, dependent upon the manner of growth. When the growth stops, the property may be at a minimum per cent condition, as in Curve IV, where there has been a decreasing rate of growth; or at a maximum, as in Curve V, where there has been an increasing rate of growth. Each property, should it stop growing, will go through a cycle in which it reaches a certain maximum condition less than 100 per cent, this maximum condition being entirely dependent on the manner of the property's growth.

How to Handle Depreciation Reserve

Since it will never be necessary to renew the entire property, some of the reserve necessary to return it to the 100 per cent condition may be dispensed with. It is not correct, however, to say that since the reserve will never be needed it should not be obtained. The stockholder has a right to expect that his capital shall be kept intact at 100 per cent.

When a company is growing at a rate to permit the investment of all the reserve in extensions, as in other cases, the annual charge for depreciation will in some years be less and in some years more than the cost of renewals. In those years when the cost of renewals is less than the charge for depreciation, the difference may be invested in extensions, and in those years when the cost of renewals is greater than the depreciation charge, it will be necessary to issue securities with the extensions made from reserve as a basis, the money from the securities being used for the renewals. The securities, however, should not be issued to an amount greater than the depreciated value of the extensions. Separate accounts should be kept for capital investment and reserve investment.

For a company which has stopped growing or for one which is growing at a rate not large enough to use all of the depreciation reserve for reinvestment in extensions, it will be necessary to have a continually varying amount in a liquid depreciation reserve fund, and this amount will fluctuate in a manner depending upon the company's growth. Curve V shows the condition for a property which has ceased to grow after ten years. At the end of the tenth year there is $1,953 in the reserve. Since the $1,953 will never be used as far as renewal purposes go, and the company has stopped growing, it may as well be returned to the stockholders. It should be clearly understood by the stockholders that

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this is a return on capital invested and not a dividend payment.

RETURNS SHOULD BE ALLOWED ON DEPRECIATION FUND

The same return should be allowed on a depreciation fund as on any other capital invested in the property, and such a return should be available for dividends, provided cost new, less depreciation, is to be used as a basis for rate making. The capital which is wasting away is certainly the capital of the stockholder. He uses up his capital in the service of the consumer, and the consumer replaces the capital so used. The replaced capital in a depreciation reserve fund should be treated the same as any other capital. It should be allowed the same return and for the same purposes.

Suppose that an appraisal were made in the twenty-first year (Curve V), when the property was in a 39 per cent condition. Under this scheme the rates would depend entirely upon the condition of the property in the year it was appraised, and there can be no question as to the unfairness of such a proceeding. The rates should be based on the depreciated value of the property in any year plus the amount in the depreciation reserve, provided only that the sum is not greater than the original capital investment.

Old and New Doherty Cadets at Banquet

NEARLY fifty Doherty cadets, graduates and undergraduates participated in a "get-together" banquet on Oct. 31 at Fraunce's Tavern, New York City. The purpose was to acquaint the large number of young cadets in the New York office with the executives, almost all of whom are graduates of the Denver school. The series of addresses not only told of the past in the Doherty organization, but forecast the future. Frank W. Frueauff, of the firm of Henry L. Doherty & Company, acted as toastmaster.

Holton H. Scott, general manager of the operating department, announced his claim to be the dean of the Doherty college men now in the organization, and rehearsed the connection of Henry L. Doherty with the Madison Gas & Electric Company. Mr. Scott said that the cadet school idea proved so successful in Denver that another has been started in Toledo and a third in Bartlesville for the study of the natural gas and oil problems, and the plans for a fourth, largely dealing with the oil-refining problems, are now being developed. Milan R. Bump, chief engineer, stated that never was the difficulty of finding men qualified to carry on the work of the company more acute than at present. In this connection it will be of interest to note that the systematic cadet work of this company has now been carried on for about ten years with eminently satisfactory results.

According to R. C. Griswold, chief technologist, who himself took the cadet course, the scheme has been considerably extended this year, this expansion being justified by the record of the Denver school graduates. In selecting cadets for the schools of practice, the company has confined itself almost entirely to graduates of electrical engineering courses. The principal value of this selection lies in the fact that young men who take engineering courses probably like engineering as a work, and have an especial aptitude in that line.

These men, as a class, do not like bookkeeping for the very simple reason that if they did like bookkeeping they would have taken a bookkeeping course and not an engineering course. Such success as these engineers make in bookkeeping, in spite of their dislike for that work, is due to their ability to attack these problems on a fundamental basis; and while a report from one of these men may be refreshingly unconventional as to form and treatment, they may always be depended upon to give correct answer.

Bureau of Standards Issues National Electrical Safety Code*

A Limited Edition of Bureau of Standard Circular No. 54 Is Published Under Date of Nov. 15, 1916

AFTER considerable preliminary circulation among affected interests the proposed National Electrical Safety Code is now available in complete form and under one cover. It forms a book of 323 pages. A few copies of the circular will be sent out at once to some special conferees and the general distribution will be made about Dec. 1. Copies can be procured from the superintendent of documents, Government Printing Office, Washington, D. C., at 40 cents per copy. The number of copies in this, the second edition, is limited, but it is probable that, if the demand warrants, an edition in handbook size will be issued immediately after the initial distribution and will contain the same text.

The ELECTRIC RAILWAY JOURNAL has kept its readers informed in detail as to the progress of the code during its development stage, which progress can be reviewed by consulting the references listed in the footnote appended to this column. These show that many conferences were held in the effort to meet the requirements of the industries and utilities concerned, and after a great many suggestions had been incorporated the code was to be issued for a year's trial in tentative form. The title page of the present edition states that the code is issued "for examination, trial and constructive criticism."

The code comprises four parts as follows: (1) A proposed national standard for safe construction and installation of electrical supply equipment in stations; (2) the same for electrical transmission, distribution and signal lines; (3) the same for the electrical utilization equipment of factories, offices and homes; and (4) a set of safety rules to be observed in work upon electrical equipment and lines.

In connection with the publication of this second edition of the code, the director of the Bureau of Standards states as follows: "After a trial period a modification of some of the rules will, of course, be found desirable. A revised edition will, therefore, be prepared as soon as necessary. Subsequent revisions should, however, be made at somewhat infrequent intervals in order to assure a reasonable degree of stability for electrical practice throughout the country. The advantages in this respect of a national code over various local codes are readily appreciated. The bureau desires to secure the experience of all the interests concerned with the code and hopes through the assistance of users and administrators of the code to make it as useful as possible in promoting safety and economy of electrical service."

*For recent references to the National Electrical Safety Code, see the following issues of the ELECTRIC RAILWAY JOURNAL: April 3, 1915, page 673; April 17, pages 741, 750, 758; May 1, pages 825, 845; May 15, pages 939, 941; May 29, page 1036; June 19, page 1162; June 26, page 1189; Oct. 9, pages 697, 776; Oct. 16, pages 791, 839; Nov. 6, page 953; Nov. 13, pages 977, 996; June 3, 1916, page 1048.

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Giving Local 100 Per Cent Service

Actual Performance of Such Service Considered as a Basis for Rate Valuation—Interest on Cost of Achieving Such Service Plus Cost of Maintaining It Should Equal Rates

By H. S. COOPER
Secretary Southwestern Electrical & Gas Association, Dallas, Tex.

A PUBLIC utility privately owned and operated is, primarily, an ordinary manufacturing concern, a distributing concern or, more commonly, a combination of both. Considered only to this point, it is in no way different from any other private enterprise, and, were there no other differences analogy as to valuations of the utility and as to the prices of goods handled, product manufactured and distributed or service performed might continue to the end with great simplification of some of the accounting, statistical and financial problems of the present-day utility. There are, however, further differences of vital import, some of which do not seem to be clearly recognized or at least fully appreciated.

UTILITY CANNOT OPERATE AS IT WILLS

One of the most important differences between the utility and the private enterprise is that the conduct of the business of the latter, as long as it infracts no law or ordinance relating to that business, is a matter that affects only the owners thereof, whereas the conduct of the affairs of the utility is one in which the public is directly and strongly interested. If the owners of the private business choose to let their property or goods or service "depreciate," if their product or service deteriorates in quality or supply, if their delivery of it is irregular, uncertain or otherwise unsatisfactory to their customers, that state of affairs concerns only themselves. The attitude of the public can be only a passive one. The customers, actual or prospective, can refuse to patronize the business; they can buy of a competing concern; they can use a substitute or they can go without the product or service—but they have no legal recourse.

Such a course cannot be pursued by the public utility, and the reasons for this are three. In the first place, in almost all cases, the utility has been allowed by the public to have a monopoly of the manufacture or supply, or both, of its particular product or service. Secondly, the utility is allowed certain powers not legally permitted to the private concern, and it is also permitted to use in its business certain public facilities and property which are not open to the use of the private business. Thirdly, as a compensation to the community for such public privileges, the utility agrees, either directly or by implication, or both, to give the community a "100 per cent service," local conditions or limitations fixing the "par value" of this service.

KEEPING LOCAL SERVICE AT PAR

While comparison between the minor details of the service given in separate communities would be inequitable and nearly useless in the fixation of a 100 per cent local service in any one community, there have been developed in the past certain broad standards of service which can be applied in any community and to every public utility. There is, of course, a theoretically perfect service, but this is an ideal toward which all public utilities may strive but few attain. The agreement, however, between the utility and its public always implies in each local case that the public is to have 100 per cent value for the prices, or "rates," which it pays, and it equally implies that, when the public demands a higher standard of service, and this compels more investment of capital or increased operating expenses, the "reasonable return" of the owners of the utility shall not be diminished thereby. In other words, if the public demands "extras," outside of the original contract, it must pay the cost of those extras.

To have a continuity of such "par" service the utility must keep its whole property at the point where it is continuously capable of giving that standard of service —in other words, the utility must "maintain" its property at the local 100 per cent service point. In doing this, it will be compelled, in the course of time, to "use up" certain parts of the property. If these used-up portions are not replaced in proper time, form or quality, the ability of the property as a whole to give a par service is affected and the utility is not fulfilling its contract. It does not make any difference as to whether the using up of the various portions of the property is every minute, every hour, every day, or at much longer periods. Because a ton of coal is used up every fifteen minutes while the boiler into which it is fed lasts fifteen years makes no difference. That the physical properties of the coal compel it to be "replaced" or "renewed" every fifteen minutes, while those of the boiler necessitate only one half-millionth as early replacement or renewal, in nowise requires these two component portions of the property to be treated in a radically different manner in the accounting, financing or statistics of the utility.

"DEPRECIATION" LEADS TO HAIR-SPLITTING

It is customary to speak of certain portions of a public utility as "supplies," to divide its daily operating expenses into "labor and materials," to call the using up of certain portions of the property "repairs and renewals," and to call a similar using up of certain other portions of the property "depreciation." These are necessary nomenclature in the operation of the property and are designed for the information of the owners or operators, for comparisons as to economy and efficiency, for ease or simplicity of record, etc., but they must not be construed into definite classifications to be used for other and improper purposes. It is eminently proper and useful to differentiate between those portions of the property which are used up almost instantly, those which are used up within longer and arbitrarily fixed periods, and those which are used up in a virtually unknown and unfixable period, but such differentiation must be limited to the needs of operation and not made factors in financial, statistical or commercial relations between the utility and its public.

This diversion of arbitrary factors of operation into public matters in which they have no bearing has caused most of the disputes and hair-splitting on the subjects of valuation, rates and reasonable return, and the most aberrant factor of these disputes has been depreciation. It is conceivable that, in the valuation of a utility

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property for sale or lease to private parties, for sale to the community, or for purposes of taxation or condemnation, the item of depreciation might have a place and, under certain conditions, a very important place. In the valuation of such property, however, to determine the rates or the reasonable return, the farther any mention of depreciation can be kept from the subject the easier and simpler it will be to adjust, and the more correct and equitable will be the adjustment. In the valuation of a public utility property for any purpose other than for rate-making, the property is considered as in "a state of being." It is only when such valuation is for the purpose of rate-making (which includes that of profit-making) that the property is considered as in "a state of action." This is a vital distinction, for there cannot be such a thing as depreciation in an active body compelled to have and maintain a 100 per cent efficiency and service.

HANDLING ABNORMAL MAINTENANCE CHARGES

As it is at the demand of the public that the original contract for its par service was made, as it is the public only which demands the continuity of that service, and as it is the public demand which increases the standard of the local par service, it is the public which must pay all legitimate costs of maintaining that service at par. In equity, the public should pay no more than this, plus, of course, the reasonable return to the owners of the property for the use of the capital legitimately invested in it for the purposes stated. At this point, however, an accounting difficulty arises which has been largely—and in the main unnecessarily—the cause of the hair-splitting that has given to depreciation a place where it does not belong and an importance of which it is not worthy. This difficulty is caused by the fact that the replacements or renewals of the various portions of the property as they are used up come at very irregular intervals and in very irregular amounts of costs, often such as show "red ink" in the periodical statements. The rates cannot, in a public utility, be varied so as instantly to liquidate these abnormal amounts. It is publicly felt and practiced that—outside of a reduction of rates—the public should have, for as long a time in the future as is commercially possible, the assurance of stable rates, and that any rearrangement of them should come at long and, if possible, prearranged periods.

There comes, therefore, a financial inequity between the operating accounting and the selling accounting which should be adjusted in some manner that would be just to both utility and public. It is not just that the utility should be compelled to make large expenditures for the maintenance of the service at par or at a raised standard and not be immediately compensated for the abnormal, as it is for the normal, maintenance expense. Nor would it be just if the public were compelled to prepay such expense and not be compensated for that prepayment. The truly equitable method would be for the utility to pro-rate these abnormal maintenance costs among the customers each time it renders them their bills, but public policy is opposed to this method of procedure. Under these conditions the only other legitimate methods are for the utility to let these abnormal items, with interest, accrue in a memorandum account until there is an opportunity presented to render their total in the form of advanced rates as a bill to the public, or to absorb them by maintenance costs below the normal or by new economies and efficiencies.

ABUSE OF DEPRECIATION FUNDS

It is to be regretted that in the endeavor to solve this problem there has been injected many extraneous and unnecessary matters. Outside of the unnecessary use of subtle distinctions of no possible aid in its solution lies the fact that the very intricacy of the problem has led many utility owners further to cloud the matter for their own benefit—after the habit of the cuttlefish. In nothing has this been shown more plainly than in the use and abuse of the term "depreciation." In many cases the endeavor of the utility owner has been to make of this item an appreciation of the securities of the utility, an insurance that the value of the property should remain at par under all conditions of future operation. Granted that it is proper accounting to keep a fund to take care of the compelled deferred maintenance, erroneously termed "depreciation," that fund is a trust fund for a single specific purpose—the preservation and conservation of a 100 per cent service, the carrying out of the contractual obligations, both specific and implied. Any such fund actually paid in as it accrues has been collected from the public through the rates, and any diversion or attempt at diversion of such a fund from its legitimate use, especially a diversion of it for the purpose of protecting the utility owners from ultimate diminution of the value of the securities behind the property, is a palpable breach of trust. The public is coming, in a hazy way, to understand this point and to resent a misuse of depreciation funds.

PUBLIC SHOULD PAY FOR RAISING SERVICE STANDARD

Depreciation in an active organization is compelled deferred maintenance due to the varying life and characteristics of the multifarious parts that constitute the complex organization, and the necessity and amount of that maintenance is gaged in every community by its standard of 100 per cent service. It matters not to the public as to the operative means by which that standard must be obtained and retained, for that is a portion of the duties and risks which the owners assumed in their contract. The only interest of the public is that the contractual obligations of the utility be carried out to their legal termination as originally set or as extended. If the public, however, raises its standard of 100 per cent service, it alone must foot the bill for so doing. This is a point that has not been urged on the public until recently, and one which will take a large quantity of honest and straightforward logic and a long period of time to convince it. The fault of this lack of present conviction is largely that of the utility owner and operator, who have been so intent on the idea of making depreciation appreciate the securities underlying the properties that the public has come to the conclusion that a public utility property privately owned and operated is less an operative venture than a speculative one. This opinion of the public has been strengthened by the disagreement of the "doctors" called into dispute, no two of which seem to agree in even the nomenclature coined along with the arguments. And a further stiffening of this opinion has been caused by the fact that every endeavor of many utility owners has so often been directed more towards their financial obligations to themselves than to their contractual obligations to the public.

A SIMPLE METHOD OF RATE-MAKING

The proper and legitimate treatment of depreciation leads naturally to an equally legitimate, simple and equitable method of valuation for rate-making purposes —or what is the same thing in effect, valuation for profit-limiting purposes. No "expert" is needed in this matter to show his dexterity in hair-splitting, for the capital legitimately invested in the inception and the

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continued actual performance of the contractual obligation are matters of exact determination. To sum up, therefore:

A community desires a certain standard of utility service for which it agrees to pay. That is its 100 per cent service.

To achieve that standard from the inception of the enterprise, the utility has legitimately had to invest so much capital. That is the value on which its reasonable return will be computed.

To maintain that standard the utility will have to expend a certain amount per period (month, year or term of years). That, plus the reasonable return on the investment, constitutes the rates, which are the reimbursement by the public of the expense of its demand, plus a bonus, reward or return for the use of the private capital and the superintendence.

Or, expressed as an equation, the relationship may be shown thus: Interest on cost of achievement of 100 per cent service + cost of maintenance of same = rates.

American Association News

Committee Subject Assignments for the Engineering and Transportation & Traffic Associations Are Announced This Week—Mid-Year Dinner and Conference Will Be Held in Boston on Feb. 16—Ex-Senator Wakelee Gave Forceful Address on Public Relations in Newark, N. J., on Nov. 16

Midwinter Conference and Dinner Postponed to Feb. 16

On account of a conflict of dates between the Boston American Association dinner, announced for Feb. 2, and a meeting of the Chamber of Commerce of the United States, the midwinter conference and dinner will be held on Friday, Feb. 16. The names of the members of the committees in charge of this meeting were announced in last week's issue of the ELECTRIC RAILWAY JOURNAL, page 1023.

Public Service Section Discusses Public Relations and High Prices

The regular meeting of company section No. 2 was held in the beautiful auditorium of the new terminal in Newark, N. J., on Thursday, Nov. 16.

Aside from the usual business and entertainment features the program was in two parts, one devoted to public relations and the other to high prices of materials and labor. The speaker on the first topic was ex-Senator Edmund W. Wakelee, associate general solicitor of the company, and J. A. Pearson, purchasing agent of the company with headquarters in Philadelphia, Pa., led a discussion on "Effect of the European War on Market Prices and Deliveries of Railway Materials." Mr. Pearson was followed by George J. Newton, local purchasing agent, and General Manager R. E. Danforth, who discussed the general subject, and by F. L. Foulks, H. H. George, P. F. Maguire and A. Scheer, Jr., who presented the viewpoints of the distribution, engineering, maintenance of way and mechanical departments respectively.

Mr. Wakelee's address was a masterly discussion of the fundamentals of the subject and it will be abstracted in a later issue of the ELECTRIC RAILWAY JOURNAL. Mr. Pearson gave an intimate picture of the trying conditions in his department and explained why prices were high and deliveries slow. He urged the early placing of requisitions for next year's supplies and stated that orders involving special designs and specifications are not relished by manufacturers. Standard parts are comparatively easy to procure. He traced briefly the history of the rise in prices which lagged a year behind the beginning of the war. Quoting many price increases he testified that never in his career as purchasing agent had he seen anything like the present condition. He predicted an improvement following the close of the war due to the expected foreign competition and to the low tariff.

Each of the departmental speakers showed how the special supplies of his department have appreciated in price, the statements of all agreeing as to embarrassment due to slow deliveries. Incidents were quoted to illustrate this condition, which was seen to ramify into all phases of railway work even to lead pencils, paper clips and stationery. Mr. Danforth impressed upon the audience the urgency of using the smallest possible quantities of supplies consistent with first-class maintenance, showing how every man, including the platform man, can assist both to save supplies and increase traffic.

Secretary F. J. Davis read a list of thirty-nine applications principally from men in the transportation department, in large part the result of the campaign for new members which closes Dec. 15. A prize of $20 will be awarded to the most successful contestant, the award to be announced at the annual smoker on Dec. 21. President A. T. Warner announced that $50 will be awarded by the company to the member of the section who will win the medal to be awarded by the American Association for the best paper delivered before a company section this year. The monthly awards of $5 each in the suggestion contest for the September and October suggestions were also made. The entertainment of the evening consisted of musical selections played upon a Victrola demonstrated by a representative of a local music house.

Meeting of the Washington R. & E. Company Section

A meeting of company section No. 4 was held on Nov. 13 with President J. T. Moffett in the chair. Prof. C. J. Blanchard of the government service delivered an illustrated lecture on the most recent activities of the Reclamation Service. His talk was confined to electric power development of this important branch of the government, and was illustrated by moving pictures that had not previously been publicly displayed. Vocal and instrumental selections and a buffet luncheon were also features of the program.

A resolution was passed indorsing the local celebration of America's Electrical Week, Dec. 2 to 9, and a committee consisting of William L. Clarke, W. F. Dement, L. B. Schloss, G. S. Kimball and R. A. Vetter was appointed to co-operate with the general committee having the celebration in charge. It was agreed that the company section should enter a motor-driven electrically decorated vehicle in the automobile parade which will be a part of the celebration.

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Committee Subject Assignments for 1916-1917

ENGINEERING ASSOCIATION

Buildings and Structures

1. Review of existing standards and recommendations with a view to the refinement of detail and the elimination of extraneous matter.

2. Further study of the subject of fences, with particular reference to concrete posts and method of casting the same.

3. Design of carhouse inspection pits.

4. Advise committee on way matters of the approval or rejection of all or any portion of the conventional symbols for recording surveys.

5. Advise committee on way matters of the approval or rejection of all or any portion of its study on wood preservation.

Equipment

1. (As above.)

2. Development of check gages and templates, such as:
   (a) Gaging points and terms for wheel and track.
   (b) Wheel mounting and check gage.
   (c) Brake-beam gage, covering spacing of brakeheads.
   (d) Wheel flange and tread contour gage for new wheels.
   (e) Standard wheel tape.
   (f) Plane gage for solid steel wheels.
   (g) Rotundity gage for solid steel wheels.
   (h) Journal bearing and wedge gages.

3. Compilation of data bearing on development of standards for railway motor parts:
   (a) Carbon brushes.
   (b) Bearings.
   (c) Gear cases.
   (d) Bolts.
   (e) Pinions.
   (f) Gears.
   (g) Motor wires.
   (h) Commutators.

4. Advise committee on way matters of the approval or rejection of all or any portion of its study on wood preservation.

5. Consider jointly with the committee on way matters the "use of a curved head for girder rails and specific reference to wheel and track wear."

6. Consider wheel and railhead contours jointly with committee on way matters.

Heavy Electric Traction

1. (As above.)

2. Revision of diagram of location and clearance of overhead conductors, with the suggestion that the height of the hand-brake staff be indicated; and that the height of the car running board be dimensioned on the diagram in cases Nos. 4 and 5 (Engineering Manual, Ds 6a). This subject before final reporting to have the approval of the committee on power distribution.

3. Advise committee on way matters of the approval or rejection of all or any portion of the conventional symbols for recording surveys.

4. Revise dimensions on standard diagram of location and clearance of overhead conductors and include provisions for pantograph clearance.

5. Advise committee on power distribution of approval or rejection of specification for catenary overhead trolley construction to cover high voltage as well as 600-volt d.c. service.

Power Distribution

1. (As above.)

2. Advise committee on heavy electric traction of approval or rejection of the revision of the diagram of location and clearance of overhead conductors, to show the height of the hand-brake staff as well as the height of the car running board in cases Nos. 4 and 5 (Engineering Manual, Ds 6a).

3. Further study of specification for overhead line materials.

4. Specification for metal crossarms and fittings.

5. Development of a specification for catenary overhead trolley construction to cover high voltage as well as 600-volt d.c. service; any specification prepared to have the approval of the committee on heavy electric traction.

6. Advise the committee on way matters of approval or rejection of all or any portion of the conventional symbols for recording surveys.

7. Advise the committee on way matters of approval or rejection of all or any portion of its study on wood preservation.

Power Generation

1 (As above.)

2. Further consideration of operating performances of railway power stations.

3. Report on the development of automatic substations.

4. Historical review of the development of large turbine units.

Way Matters

1. (As above.)

2. Specification for special work with particular reference to steam railroad crossings.

3. Development of a spiral for use in the design of switches, mates and frogs.

4. Development of conventional symbols for recording surveys. Such symbols as the committee may recommend shall be submitted to the committee on buildings and structures, the committee on power distribution, the committee on heavy electric traction and the committee on block signals for their approval before presentation.

5. Further study of the subject of wood preservation, including specifications for preservative. This subject to bear the approval of the committee on power distribution, the committee on buildings and structures and the committee on equipment.

6. Report on the development of hand and power tools for track construction.

7. Complete the design for "drilling of joint plates and their application."

8. Report on the "use of a curved head for girder rails" with specific reference to wheel and track wear. This to be considered jointly with the committee on equipment.

9. Consider wheel and railhead contours jointly with the committee on equipment.

Special Committee to Consider Revision of Standard Stranding Table

1. Make a final report as to when the table for stranding of apparatus cables is to be adopted.

TRANSPORTATION AND TRAFFIC ASSOCIATION

Fares and Transfers

1. Co-ordinate work of previous committees, according to topics the dates being essential but secondary to the main division, which should be by subjects. Attention is called to the method employed by the 1916 committee on construction of schedules and time-tables.

2. Further study of the use of ordinary type cars as prepayment cars without fare boxes.

3. Study of the use of prepayment cars on routes having more than one fare zone.

Passenger Traffic

1. (As above.)

2. Investigation of established traffic departments for promotion of new business, together with results and opinions.

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3. Study of plan whereby charges can be made for carrying baggage. This to be worked out jointly with a committee representing steam railroads.

Rules

1. Necessary revision of city and interurban codes.

2. Block signal rules to be studied jointly with the joint committee on block signal rules of the American Railway Association and the Railway Signal Association.

Schedules and Time-tables

1. Dispatching on urban lines, latest practices and recommendations.

2. Statement of the factors essential in the making of all time-tables and establishment of uniform basis for determining and stating schedule speed.

3. Further investigation of "skip-stop" operation, with recommendations as to proper method. (To be handled as a paper.)

4. Street railway transportation in congested districts. (To be handled as a paper.)

Training of Transportation Employees

1. (See No. 1, committee on fares and transfers.)

2. Consideration of methods that have been employed by various companies in teaching employees the rules of proper service.

3. Employment specifications.

JOINT COMMITTEES

Block Signals

ENGINEERING ASSOCIATION SUBJECTS

1. Review of existing standards and recommendations with a view to refinement of detail and elimination of extraneous matter, with particular reference to:
   (a) Requisites of installations for automatic block signal systems on high-speed interurban railways.
   (b) Use of continuous track circuits for the control of automatic signals for high-speed interurban service (Engineering Manual, Ss 7b).

2. Block signal rules, to be studied jointly with the Transportation & Traffic Association committee on rules, the Railway Signal Association and the American Railway Association.

3. Further study of block signal operations on roads signaled from end to end, covering maintenance cost, efficiency of operation and effect on traffic.

4. Advise committee on way matters of approval or rejection of all or any portion of the conventional symbols for recording surveys.

TRANSPORTATION & TRAFFIC ASSOCIATION SUBJECTS

1. (See No. 1, committee on fares and transfers.)
2. (See No. 2 above.)
3. (See No. 3 above.)

On Claims-Transportation

TRANSPORTATION & TRAFFIC ASSOCIATION SUBJECTS

1. Results obtained by co-operation of transportation and claim departments in a general reduction of all classes of accidents, together with form of reports made and submitted by one department to the other.

2. Investigation of methods used, if any, by both claims and transportation departments in safety campaigns wherein the public is concerned.

3. Safety advertising on cars.

CLAIMS ASSOCIATION SUBJECTS

Not yet assigned.

Engineering-Accounting

ENGINEERING ASSOCIATION SUBJECTS

1. Interdepartmental charges. (See recommendations of 1914 committee for work to be assigned to ensuing committee, 1914 Engineering Proceedings, page 378.)

2. Further study of the development of a property ledger (as started by the 1916 committee) looking toward the maintenance of a continuous inventory. This subject to be considered as applying to the entire physical property.

ACCOUNTANTS' ASSOCIATION SUBJECTS

Not yet assigned.

Transportation-Accounting

TRANSPORTATION & TRAFFIC ASSOCIATION SUBJECTS

1. Determination of formula to show the cost per annum for hauling 1 lb. or 1 ton car weight.

2. Continue the following subjects, assigned the 1916 committee on transportation-accounting:
   (a) Investigation of cost of handling baggage free, to determine whether the cost of handling this baggage wipes out the profit resulting from the fare received.
   (b) Investigation of subdivision of power cost among construction, maintenance and operation.

3. Forms of graphic presentation of transportation data and statistics.

ACCOUNTANTS' ASSOCIATION SUBJECTS

Not yet assigned.

Transportation-Engineering

TRANSPORTATION & TRAFFIC ASSOCIATION SUBJECTS

1. Further investigation of the operation of trail cars in high-speed interurban service; to include the relative merits of trail vs. motor cars.

2. Effect of car and equipment design on duration of stops for both passenger and freight service. Car design to be studied from a traffic standpoint in all its phases, first standardizing the method of determining results, having identical formulas and practice for obtaining observation and data from which conclusions are drawn. Investigation to include specimen data sheet showing information which should be obtained in order that member companies who desire to follow the recommendations may have full information before them.

3. Study of electric current saving devices, including summary showing results obtained, together with costs, including maintenance. (To be treated as a paper).

ENGINEERING ASSOCIATION SUBJECTS

Same as above.

COMMUNICATIONS

Name for One-Man Cars

OAKLAND, CAL., Nov. 7, 1916.

To the Editors:

I saw in a recent issue an editorial request for a good name for one-man cars. I suggest the name "mono-man" cars and "bi-man" cars to distinguish between one- and two-man cars. The terms mono- and bi- are used in a great many every-day expressions.

FRANK L. TRATHEN.

CLEVELAND, OHIO, Nov. 10, 1916.

To the Editors:

Some time ago I noticed an editorial in the JOURNAL requesting suggestions for a better name for the so-called "one-man car."

A car that requires only one man to operate it, of course, reduces the operating expenses; so it is a benefit to the railway companies. A railway company whose operating expenses are reduced can afford to give better service, and this is of benefit to the public.

Therefore, I suggest "Mutual Benefit" as a name for such cars. "Mutual Benefit," no doubt, would soon become, paradoxically, "Double Ben"; and, some of the operatives would cut the name to "Ben" or "Bennie."

LOUIS P. LIPPS.

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Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

Welding High-Speed Tips on Lathe and Planer Tools Cuts Cost—Boston Elevated's Pressure Timber Treating Plant is Now in Full Operation —Connecticut Company Makes Center-Entrance Cars from Single-Truck Ones—Old Hoes Can Be Used in Making Squeegees for Grouting

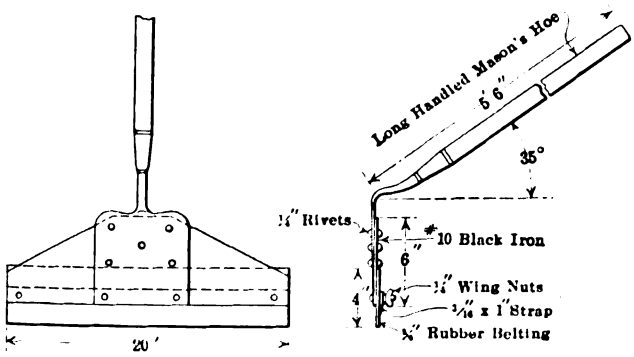
(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Grouting Squeegee Made from Old Hoe

Author Explains Why Brooming Cement Grout Joint Filler Is Not Satisfactory

BY R. C. CRAM
Assistant Engineer Way and Structure Department Brooklyn Rapid Transit System

The application of cement grout joint filler in granite block pavements has always required careful attention to detail. The last or finishing coat is undoubtedly the most important and the usual method of applying it by brooming a comparatively thick mixture into the joints has generally been accompanied by the spreading of a coat of grout from ⅛ in. to ¼ in. thick over the whole surface of the pavement. Attempts to leave the surface of the blocks practically free from mortar and still keep the joints full of grout generally meet with failure where brooms are used, as the bristles pick



SQUEEGEE FOR USE IN CEMENT GROUTING OF GRANITE BLOCK PAVEMENT

the grout out of the joints unless a thick mixture and fairly heavy coat are applied with a broom having quite soft bristles.

The heavy coat on the surface is somewhat wasteful of material, but greater objections to it result from the rather slow reduction of the coating to dust and the action of toe calks on horses' shoes in picking of the grout in such a way as to cause its removal from the tops of the joints. With grout so removed the corners of the block are unprotected and they wear round very rapidly.

Similar troubles have not usually been experienced with grouted brick pavements and the now prevailing practice of using squeegees for applying the finishing coat in grouting brick, combined with the comparatively smooth finish of modern granite blocks, has led to the use of the squeegee for final grouting work on granite pavements also.

The results obtained experimentally by this company last year with the squeegee in track pavements have warranted its adoption as a part of the tool equipment of every track gang, which is also equipped for pavement work. The illustration gives the details of such a tool, which is being used to advantage in Brooklyn. Its manufacture is simple and the use of old, badly worn hoe blades effects some salvage. In passing it may be noted that the Borough of Brooklyn now requires the use of a squeegee for grouting work in new granite pavement where cement grouted joints are specified.

Boston Elevated Completes Pressure Wood Preserving Plant

In the First Pressure Plant Installed on an Electric Railway This Company Can Treat 7,000,000 Feet of Timber Per Year

BY EDGAR W. BRIGHT
Tie and Timber Agent, Boston Elevated Railway

The Boston (Mass.) Elevated Railway has recently completed a timber treating plant at the company's South Boston yard which is the first pressure installation to be built by any street railway in the United States, and which embodies a number of interesting features in design in comparison with ordinary practice. This was referred to in the writer's article published in the issue of the ELECTRIC RAILWAY JOURNAL for March 11, 1916, page 504. The company has used creosoted ties and lumber extensively during the past five years, and for some time the lumber problem of the road has been in charge of the writer, under whose direction the plant has been established. The designing engineer is Grant B. Shipley, of Pittsburgh, Pa., whose patents are embodied in the plans and specifications for the work. The plant is adapted to treatment by either

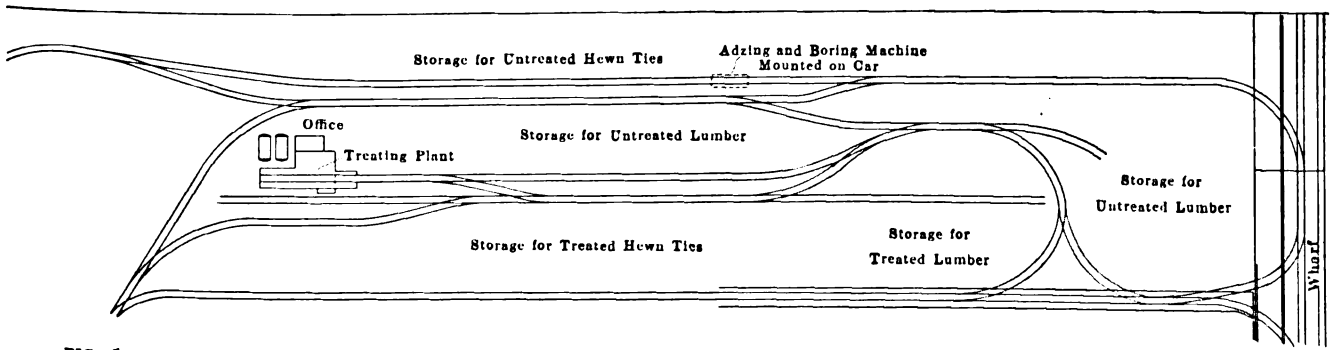


FIG. 1—GENERAL LAYOUT OF TIMBER TREATING PLANT SHOWING RAIL AND WATER TRANSPORTATION FACILITIES

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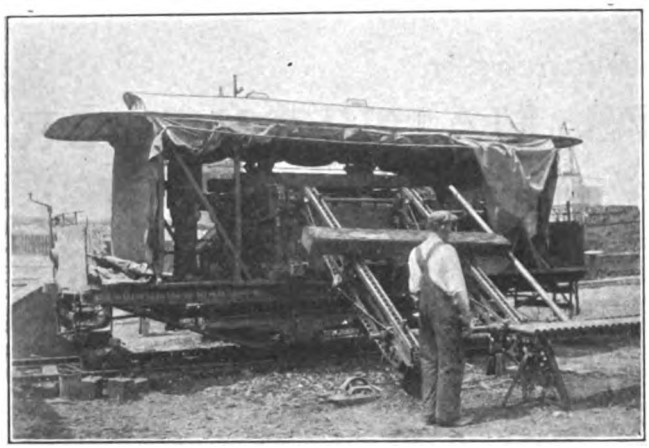


FIG. 2—ADZING AND BORING MACHINE, CAPACITY TWELVE TIES PER MINUTE

the full-cell or the Rueping process. It represents an investment of about $30,000, and has a capacity when operating two charges per day in nine hours of about 210,000 ties of 7,000,000 ft. B. M. per year using air-seasoned timber and treating by the Rueping process.

The location of the plant in the company's general yard affords opportunity for convenient distribution of treated material from a central point and enables shipments to be received by water. Timber is brought to the yard in vessels, as the property fronts on Boston Harbor, and after being unloaded on the wharf indicated in Fig. 1, it is distributed for air-drying by trucks and service cars running on loop and other tracks feeding the storage areas shown. Before treatment ties are adzed and bored on a Greenlee adzing and boring machine (Fig. 2) with a capacity of twelve ties per minute, this machine being mounted on a car and thus being available for service on any track in the yard. Most of the material treated is long-leaf yellow pine. The equipment also includes a timber gainer, which is used in dapping guard timber used on elevated structures and elsewhere.

The treating plant is located near the south end of the property and is mounted on a solid concrete foundation. A general view of the structure is shown in Fig. 3. The installation consists of two storage tanks, a treating cylinder capable of handling lumber up to 50 ft. in length, a pressure tank mounted on scales, vacuum pump and compressor equipment and other apparatus, together with an unusually flexible piping system. All of the principal equipment except the storage tanks is installed in a cylinder house shown in plan in Fig. 4, and in cross-section and elevation in Figs. 5 and 6. The housing is of corrugated iron on steel framework.

FIG. 3—GENERAL VIEW OF PLANT

The plant is one of the few installations in the country in which a standard gage track is operated into the treating cylinder. It is far more flexible than the ordinary installation, besides being remarkably compact. Steam is supplied by a pipe line connecting directly with the company's South Boston generating station, and creosote is delivered to the storage tanks by automobile

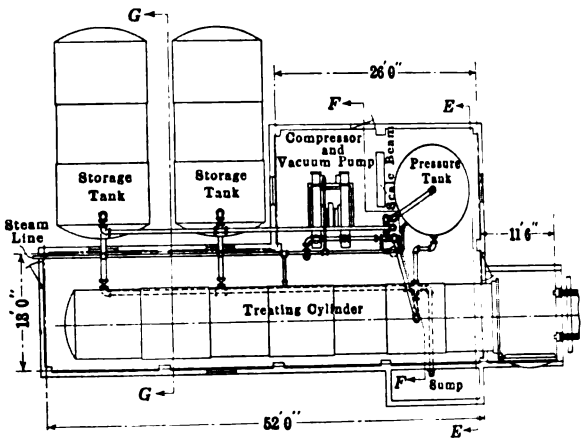
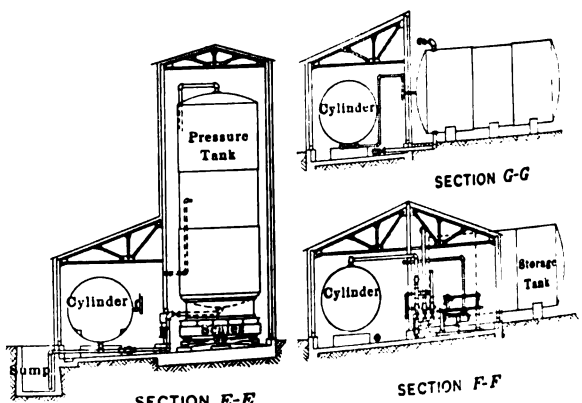


FIG. 4—PLAN OF CYLINDER HOUSE

trucks, provision being made in the piping to empty the truck tanks by either 20-lb. air pressure or by vacuum. This enables the trucks to be completely emptied.

The storage tanks are each 22 ft. 6 in. long by 9 ft. 9 in. in diameter, their capacity being about 13,000 gal. each. They are mounted on concrete saddles and are installed with horizontal axes at right angles to the longer axis of the cylinder house. The piping connections enable either tank to be utilized in serving the pressure tank, and live steam coils are installed in each to protect the creosote from freezing in the winter season. Provision is made for the drainage of these coils through a valve beneath each tank which is left slightly open when in service. Each tank is equipped with a safety valve and a stop valve controlling the delivery of oil to the interior of the establishment. Piping connections are also provided for the introduction of compressed air into the storage tanks to insure rapid delivery of oil to the plant, and throughout the plant the creosote is handled by air pressure. The shells of the storage tank are of ⅜-in. flanged steel, the heads being



For section lines see Fig. 4.

FIG. 5—CROSS-SECTIONS OF CYLINDER HOUSE

of ½-in. steel. An 11-in. x 15-in. manhole is provided at each head end.

Two compressors are in use, both being steam-driven. Nearest the storage tanks is an Ingersoll-Rand "Imperial" type XI horizontal high-duty duplex compressor and air pump, with 7-in. x 7-in. x 10-in. cylinders, mechanical inlet valves and flywheel. This is supplemented

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in high-pressure work by a Westinghouse air compressor capable of handling 29 cu. ft. of air per minute at 80 lb. pressure and delivering it at 200 lb. pressure when operated on a steam line pressure of 135 lb. per square inch. The piping enables the two compressors to be connected in series through valve manipulation.

The working pressure tank, 9 ft. 9 in. in diameter and 22 ft. 6 in. high, is mounted in the cylinder house on a Howe tank scale of the registering beam type, with 10-ft. x 10-ft. supports and graduations reading in 10-lb. steps. The scales are designed to carry a tank of 38,000 lb. steady load, and 120,000 lb. variable load of creosote, a total capacity of nearly 160,000 lb. The working pressure tank is equipped with steam coils for maintaining the proper oil temperature. Its shell is of flanged steel plate 1-in. thick, the tank being designed to withstand a working pressure of 175 lb. per square inch, and a hydrostatic test of 265 lb. Ball-and-socket joints are installed in the air and oil mains leading into the tank, to care for the movement of the latter upon the scales as the creosote volume is changed.

The creosoting cylinder or retort is 7 ft. 6 in. inside diameter and 51 ft. 2⅜ in. long. It has a shell of ¾-in. flanged steel made in seven courses or rings of one plate each. It is mounted on iron saddles resting on reinforced concrete foundations. The door, details of which are shown in Fig. 7, is located at the forward end. This has a steel frame of angle section bored accurately to

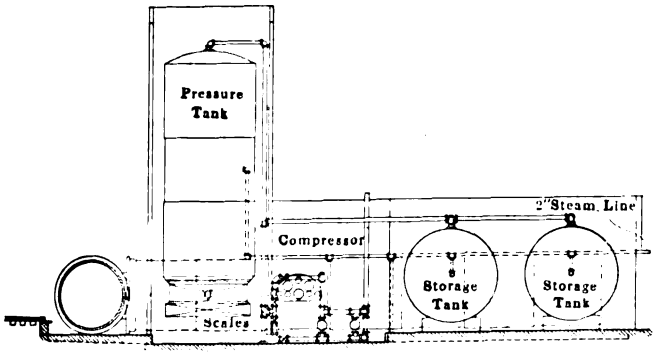

FIG. 6—LONGITUDINAL SECTION OF CYLINDER HOUSE

fit the shell. The outer face of the frame is turned and grooved for a gasket. Fitting the frame and hinged to it is a heavy cast-steel door frame, to which is double-riveted a dished head of flanged steel, designed for a working pressure of 175 lb. and a test pressure of 265 lb. per square inch. The door is carried on two hinges supported by ball-thrust collar bearings. It is fastened by forty 2¼-in. T-head hinged bolts, each equipped with a steel washer and hexagonal nut. The door gaskets are of No. 600 "Ankorite" H. P. asbestos. The cylinder track consists of 4-in. x 4-in. x ¾-in. angles supported by six pressed-steel brackets per course. Fig. 8 shows a charge ready for insertion into the retort, the timber being mounted on special bolster trucks equipped with locking hoops. These hold about 10,000 ft. B. M. per charge, and tie cars hold about 420 ties per charge. The trucks are pushed into the retort by a service car equipped with an extra heavy bumper and loaded with discarded tie plates to provide the necessary traction. Charges are withdrawn from the retort by the same car through a wire cable attachment. The rail sections in front of the retort are pushed back on short pipe rollers to facilitate handling when the door is to be closed. Twelve steel tie cars are also in service around the yard.

The full-cell process consists of impregnating the fibers and cells of the timber with from 5 lb. to 20 lb. of oil per cubic foot. In this operation the wood is either air-seasoned or steamed in the cylinder, sometimes both. This is done to reduce moisture and expel sap; then a vacuum is produced and maintained until the preservative is introduced and the wood is completely submerged. The pressure is then increased from 100 lb. to 150 lb. per square inch and maintained until the desired penetration has taken place, when the remaining oil is drained from the cylinder. Sometimes a vacuum is produced and maintained at the finish to drain the surplus oil from the outside surface of the wood to prevent loss of oil after the material is removed from the retort.

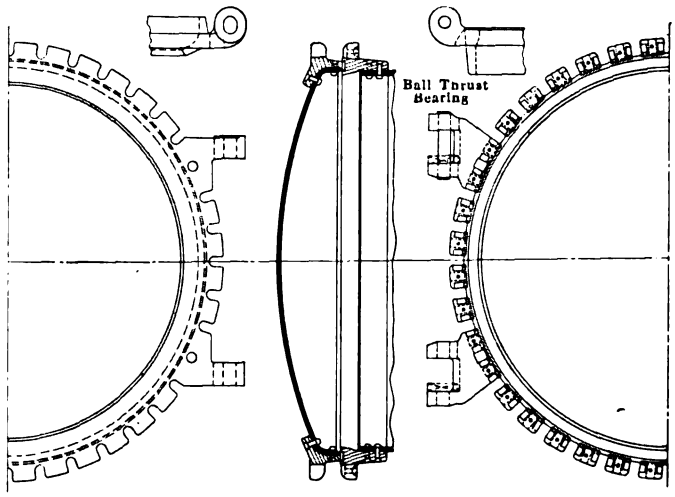

FIG. 7—DETAILS OF CREOSOTING CYLINDER DOOR

The Rueping or "partial cell" process consists of forcing compressed air into the pores of the wood; without releasing this air pressure, the oil is permitted to flow into the cylinder and air is displaced and forced into the top of the working pressure tank. After the wood is completely covered with preservative, the latter is then forced into the wood to the required amount. The air pressure is then released and the preservative is drained from the cylinder. A vacuum is then produced which causes the air within the cells to expand and force fluid out of the wood, leaving from 4 lb. to 6 lb. per cubic foot. About 20 lb. maximum of air suffices to force oil from the storage tanks into the pressure tank. At the beginning of a run about 118,000 lb. of oil is in the working pressure tank. The oil temperature is usually about 170 deg. Fahr. before entering the retort. Steam coils are provided in the retort as well as in the other tanks above noted, and beneath the retort a sump about 9 ft. deep has been built to receive drained oil from the interior of the tank. This oil can be reclaimed by utilizing one of the compressors

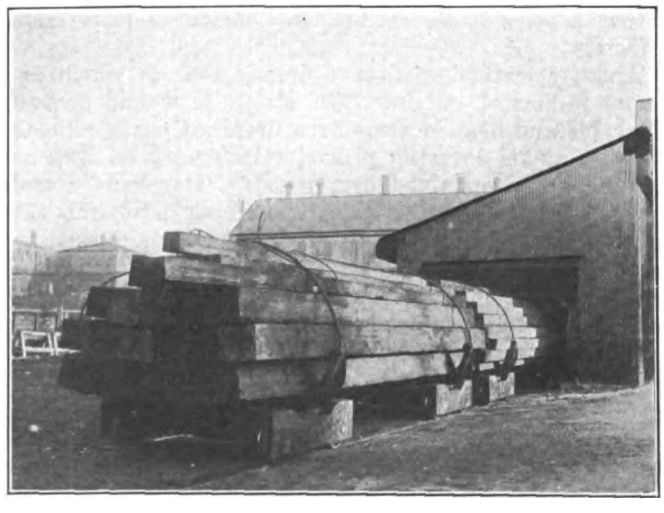

FIG. 8—CHARGE OF TIMBER READY FOR RETORT

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as a vacuum pump; in fact, either pump may be operated on pressure or vacuum work, and the piping enables pressure or vacuum to be applied to either the retort or to the working pressure tank as desired. An extra discharge pipe with cracked valve is also provided in the retort to enable sap, water, etc., to be drained into a blind drain in case the full-cell process is in use. This enables the steam supply to be kept on the coils within the retort throughout any desired period. Before the introduction of oil in the Rueping process, air at 60 lb. pressure is admitted to the retort for about forty minutes, in order to open the cells for subsequent treatment. The amount of oil absorbed is obtained by scale readings instead of by the customary and less accurate system of weighted floats.

The operation of the plant requires the services of twelve negro timber handlers who load ties and lumber on cars; one yard foreman who has charge of loading material on cars for treatment and who also acts as timekeeper; and one engineer. The two last-mentioned report to the tie and timber agent of the company, who is directly responsible for the operation of the plant. The auxiliary equipment includes a full set of Foxboro indicating and recording pressure and vacuum gages, thermometers, etc., and Crosby pressure gages. A complete system of records is maintained on all work handled. The plant construction was begun in March of the present year, the first treatment being given in August.

Protecting Cables in Manholes from Explosion of Adjacent Cables

BY ALBERT F. HOVEY

Several methods of fireproofing cables in manholes against the explosion of adjacent cables have been developed by operating engineers. In one of the oldest and perhaps best known of these methods common rope and concrete are employed. The former is wound spirally around the cable with about 1 in. separation between the turns, and the cable and rope are then plastered with a one to one mixture of sand and cement. The rope provides a rough surface to which the concrete clings readily and gives a slightly flexible background, which aids somewhat in preventing cracking of the fireproofing under a chance blow.

The workmen's hands have proved to be better than any tool for applying the cement for this type of covering. As far as the fireproofing qualities alone are concerned, this covering is satisfactory, but its removal presents a formidable task. Efforts to reduce this difficulty have been made by placing the turns of rope closer together and, except for the fact that rope is now rather expensive, this scheme is considered fairly satisfactory.

Another method of fireproofing is that in which asbestos millboard, cut into 3-in. strips, is wound around the cable and held in place by a fireproof paste, silicate of soda. This covering proved satisfactory as long as the manholes remained dry, but if water ran in and covered the cables, the silicate was dissolved and the asbestos loosened, dropping from the cable. Recently, on account of the difficulty in obtaining deliveries of asbestos millboard, asbestos listing, a woven material with a selvage has been substituted. This material can be purchased in the form of 3-in. tape and wound spirally around the cable, and the silicate of soda covering is used to hold it in place.

When material as expensive as asbestos is used for fireproofing cables, some provision should be made for salvaging the covering when it is removed from the cable. A simple and inexpensive way of doing this is first to wrap the lead sheath of the cable with strips of cheesecloth dipped in paraffine. One layer of cheesecloth is sufficient. Then when repairs are necessary, the asbestos can be separated easily from the paraffined cloth and taken off in long strips. If these strips of asbestos are carefully rolled backward during removal, they can be preserved and re-applied.

In what is perhaps the most recent method of fireproofing underground cables, a layer of paraffined cheesecloth is wound around the sheath and over this metal lath, covered with cement and cut into strips, is spirally wound. The cloth is applied as described above, simply to aid in removing the covering. The metal lath used is a wire mesh covered with brick clay, put on under pressure and baked, the resultant product being a web of small briquettes which can be applied the same as any wire or expanded metal lath. This makes an excellent foundation for the cement mortar, as it is porous and flexible. The cement can be applied with a trowel or by hand, forming the covering into a homogeneous mass. While this type of covering is somewhat more difficult to install than the asbestos covering, it is considerably less expensive, as calculated from the prevailing prices of material. It can easily be removed by breaking the cement covering with a hammer and cutting the metal lath from the cable with a pair of tinner's snips.

Whatever covering is applied should be considered good insurance against both mechanical and electrical trouble. The added application of paraffined cheesecloth under any of these types of covering insures the lead sheath against damage at the time the covering is removed on account of any changes which are made to the cables in the manholes.

Motor Truck Service for Stores Department

The stores department of the Union Pacific Railroad recently installed motor truck service in connection with the operation of its Omaha store, the new equipment being a 2-ton gasoline truck, herewith illustrated,

MOTOR TRUCK USED IN STOREHOUSE SERVICE BY THE UNION PACIFIC RAILROAD

which was purchased from the McKeen Motor Car Company of Omaha, Neb.

In initiating this factor in the material and supplies department it is believed that the Union Pacific is entitled to the distinction of pioneering the introduction of motor truck service in railroading.

The new service supersedes the former teaming transfer system for handling the company's material

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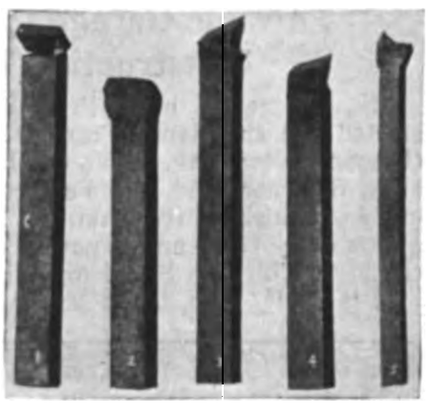
and supplies locally in Omaha and immediate vicinity. It is not understood that this line will use motor trucks for inter-city deliveries of its railroad stock, as this tonnage amounts to hundreds of cars per month and is distributed to the different points on the railroad by stores department steam locomotive special trains.

Welding Tool-Steel Tips to Machine-Steel Shanks

Abnormal Cost of High-Speed Steel Forces Economies in Its Use—Welding Can Be Applied Here with Profit

The constantly increasing price of high-speed tool steel now makes it almost prohibitive for the average shop to use cutting tools composed wholly of such material. Furthermore, with high-speed steel at present prices it is very costly for a shop to have to scrap worn-out tools. However, noticeable economies can be effected by welding high-speed steel tips to ordinary machine-steel shanks.



WELDING TIP ON LATHE TOOL

1—Tip "tacked" to shank.
2—Tool after welding.
3—Tool after first grinding.
4—Tool ready for use after tempering and finish grinding.
5—Tool tested for strength of weld by hammering.

Briefly, the process is as follows: The high-speed steel tip is first "tacked" to the machine-steel shank, and the whole is preheated. After fluxing with borax, welding is started. After welding, the tool is immediately laid in mica dust to cool gradually. It is then given a first grinding and is tempered, after which the finishing grinding is done and the tool is ready for use.

The accompanying illustration shows the several steps in the process. The tool numbered 5 was tested for strength of weld by hammering. It broke above the weld.

In tools made up by this process the reinforcing metal which is built out and around the tip serves both to give larger radiating surface and affords a large conducting path back to the butt of the tool, thus keeping down the temperature at the cutting edge. The machine-steel shank may be of any length desired, of cold or hot rolled, or carbon steel, while the high-speed steel tip should be short.

The above represents the practice of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., which is at the present time using cutting tools with high-speed steel tips and machine-steel shanks for many of its planers and lathes. This company has found the electric arc process of welding very satisfactory, and much cheaper than any other process. This conclusion has been reached after tests employing oxy-acetylene and forging methods. For best results the current for this work should be approximately 100 amp., and the voltage of the welding circuit 60 to 70. A 5/32-in. Norway iron electrode should be used. The work should not be hurried, but a good operator should be able to make between twenty-five and thirty welds on tools of $1\frac{1}{2}$ in. cross-section in a day of nine and one-half hours.

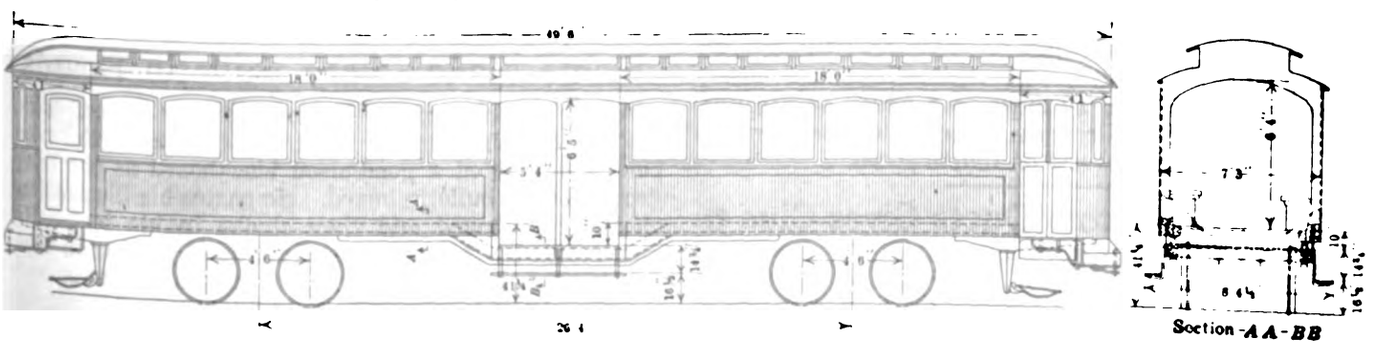
Rush-Hour Car Made of Two Single-Truck Units

Experiment Conducted by The Connecticut Company of New Haven to Determine Commercial Practicability of Plan

The Connecticut Company, like many other companies which have been engaged in electric railway operation for a long time, has a number of short single truck cars with old-fashioned platforms which have become obsolete owing to the progress in the art of car building. To determine whether it would be worth while to splice two of such cars to make one long center door car is a job that has just been completed at the New Haven shops of the company.

Each of the old cars used in the construction of this car were of the panel type, 18 ft. over corner posts and constructed with 4 in. x 6 in. wooden side sills. Additional sills of sufficient width to take the sheathing were bolted to the outside of the old sills making it a straight-sided car. The vestibules, platforms, and bulkheads were removed from one end, and the roofs extended to cover the well. A stirrup step at each end of the car provides access to the motorman's position in the front of the car on the left-hand side, but on the right-hand side a folding door and step is provided. The bracing under the center entrance consists of two 6 in. x 6 in. angles carried back 13 ft. from the center entrance on each side and attached to the old side sill. There are also two 4-in. channels attached to the bottom of the sills, and two 4-in. T-sections in the middle of the car. The channels and the T-sections are carried back 7 ft. on each side from the center door.

The center passageway is divided by an iron stanchion, 2 in. in diameter on which the fare box is mounted. Two folding doors manually operated are provided. The well in the center of the car is 5 ft. 4 in. measured longitudinally with the car and 6 ft. 8 in. measured transversely. This is nearly the same width as the car. The steps are stationary, the clearance conditions in New Haven permitting of this arrangement.



THE CONNECTICUT COMPANY'S DOUBLE-TRUCK CAR MADE BY SPLICING TWO SINGLE-TRUCK UNITS

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The seating capacity of each of the old cars was 26, while the new unit seats 52. The weight of the body without the trucks, trolley or other equipment is approximately 18,000 lb. The drawing shows the car mounted on 33-in. wheels, but it is now mounted on Standard 0-50 trucks with 30-in. wheels and four Westinghouse No. 512 motors. The heights of the two steps from the street to the well are 15 in. and 14¾ in. respectively. The height of the riser from the well to the floor of the car is 10 in. The cost of splicing the two old cars as described was about $1000.

Motor Trucks with Steel-Flanged Wheels

The accompanying photographs show an application of a motor truck in salvaging rails on an abandoned lumber and tie road on the Burlington system. This ran from Nahant, Mont., into the great forests of the Black Hills to the west. The motor truck was used instead of a steam locomotive because wood-burning locomotives, the only ones available, were debarred under the forest reserve laws, the track was in bad repair and there was a rank growth of grass over the track. A White 1½ to 2-ton truck was used and in the first month of service it covered about 3300 miles, averaging 108 miles a day. By the use of a flat car as a trailer it was able to haul 12 tons of rails into Nahant each trip. The truck made two round trips a day, climbing several grades as steep as 7 per cent on second and third gear, and registering an economy record of better than 10 miles to a gallon of gasoline. After depositing its load at Nahant the truck covered the 27 miles to the forests on fourth speed.

SALVAGING RAILS IN THE BLACK HILLS BY MEANS OF AUTO TRUCK EQUIPMENT

AUTO TRUCK EQUIPMENT WHICH OPERATED SUCCESSFULLY ON ABANDONED STEAM ROAD

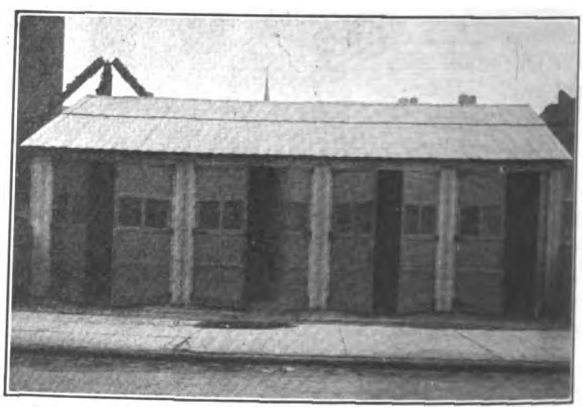
Oil Dripping from Ducts Gives Clue to Cable Troubles

A certain section of underground cable which extended over a hill had been a source of frequent trouble, and the cause of this was by accident and reasoning found out, it is believed. An engineer inspecting the cables in a manhole at the foot of the hill noticed oil dripping out of the ducts, which naturally caused him to speculate as to its source. The cable installed was of an old type in which an oily substance was used as part of the insulation. The company had previously had considerable trouble with electrolysis in this section, but this had been eliminated. The engineer believed that this old electrolytic action had probably made some holes in the cable sheath and, when the cable became hot under load and the oily insulation more fluid, that the oil flowed through the holes and drained down the hill to the manhole. This in time caused dry or weak spots in the cable insulation and consequent burn-outs, several of which had occurred in the section. Working on this theory the cable was replaced with dry paper-insulated cable and the trouble is thought to be eliminated, there having been no burn-outs in this section since, although the new cable has been in use several months.

Portable Garage for Subway Construction Work

The illustration herewith is of a portabe garage erected for the Rapid Transit Subway Construction Company, New York, N. Y., by the C. D. Pruden Company, Baltimore, Md. This structure was put up originally on Thirty-third Street, but has since been moved a number of times and is now located on the northeast corner of Thirtieth Street and First Avenue.

It is 28 ft. wide, 50 ft. long and 12 ft. high at the eaves. The framework consists entirely of structural steel, and the walls are of galvanized steel sheets with beaded edges, thus making the garage fireproof throughout. Four pairs of Kalemeined double doors, 10 ft. x 11 ft. 9 in. are provided, and in addition one single door and four wireglass skylights.



PORTABLE GARAGE USED IN SUBWAY CONSTRUCTION WORK IN NEW YORK CITY

It is claimed by the makers that one firm utilizing this type of portable garage for storage of motor trucks saved the price of the building in less than one year.

Home-Made Safety Bulletin Boards

A recent poster of the National Safety Council is devoted to the above topic. It states that one of the members has adopted a good-sized blackboard as the background of his bulletin board. He pastes his illustrations on the blackboard and then chalks in his text. His men recognize the personal effort he is making in their behalf and are carefully studying the new bulletin board. Another member accomplishes a very similar result with adhesive paper letters which he secures in bright colors as well as white. He, too, uses cut-outs for illustrations.

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NEWS OF ELECTRIC RAILWAYS

Financial and Corporate | **Transportation and Traffic** | **Personal Mention** | **Construction News**

INDETERMINATE FRANCHISE FOR KEY SYSTEM

Charter Amendments Carry Three to One—Personal Appeal Methods of Education and Good Relations with the Public Prove Effective

At the recent election the resettlement franchise amendments in favor of the San Francisco-Oakland Terminal Railways, referred to previously in the ELECTRIC RAILWAY JOURNAL, were carried three to one. Now that the approval of the amendments has been secured, the matter will be placed before the State Legislature for ratification, after which the actual execution of the proposed resettlement franchise must again come before the people for approval. This latter step is expected to be effected at the election in May, 1917. In the meantime the popular favor with which the plan has been received places the company in a much more favorable light financially.

The San Francisco Oakland Terminal Railways operates under 134 franchises, and by reason of the shortness of time some of the most important have yet to run it was found impossible to issue the long-term bonds essential to the proper financing of the desired improvements. When it became apparent that in spite of the urgent need of additional facilities there was no prospect of any relief, a committee of ten prominent citizens was organized to study the subject. This was in May, 1916. After considering the solution adopted in several Eastern cities the plan now in effect in Kansas City was selected as, in the main, most suitable to Oakland conditions, and the committee then drafted the amendments to the city charter, which it would be necessary to enact in order to provide a somewhat similar plan for the territory served by the Key Route System.

In reviewing the conditions under which the Key Route System now operates, the committee commented upon the fact that the 134 franchises could not be expected to possess workable provisions since they had been granted under entirely different conditions. Some were granted to competitive companies, most of them before the universal transfer was contemplated, some of them overlap, and all were for terms ranging from twenty-five to fifty years.

In planning a new basis of operation it was desirable, the committee believed, to avoid the temptation to neglect improvement on a line as the expiration of the franchise approached. Also, it was desirable to provide for the taking over of the electric railway properties by the city if municipal ownership should at some time be favorably considered. These two considerations were embodied in the plan offered as a solution and at the same time the plan was arranged so that it afforded the company a guarantee of sufficient tenure of rights to warrant the financial support required.

The essential feature of the charter amendment adopted is that it now becomes possible for the city to offer any corporation now operating a public utility a resettlement franchise in exchange for all the separate franchises held by that company. The resettlement franchise is to stipulate the value of the property involved, as determined by the State Railroad Commission, and is to give the company the right to operate indefinitely, subject always to the right of the city to acquire the property upon the vote of the people and after a six months' notice of such intention, the price to be based upon the value stated in the franchise. Provision is also made for the formation of a board of control in which the city shall have a representation equal to that of the company. This board will pass upon expenditures for betterments and extensions for the purpose of avoiding extravagant and improvident expenditures and at the same time the citizens will be assured of the necessary activity in this direction. The same board is to determine the value of the additions, improvements and betterments, as well as the depreciation, that have occurred since the appraisal by the Railroad Commission, should the city take over the properties.

The city is to receive not less than 55 per cent of the net operating revenue of the road, which is defined as the "earnings which remain after the payment of wages, insurance, taxes, repairs, depreciation and 6 per cent per annum upon the valuation of the property fixed by the State Railroad Commission." This is in lieu of the present requirements which range from one fourth of 1 per cent to 3 per cent of the company's gross earnings.

Subsequent to the adoption of the resettlement franchise plan, when it is desired to grant franchises for new lines, there is to be advertisement of such intention and sealed bids for providing the desired service are to be received. The successful bidder is to be awarded an indeterminate franchise prepared according to the same terms as the resettlement franchise plan. Should the city decide not to take over the properties under the new plan, it can assign its rights to purchase to a third party under the same indeterminate franchise conditions.

In Oakland it was necessary to use the initiative to put the proposed amendment to the charter on the general ballot. The 8500 signatures required for this purpose were secured twice over without great effort, but the campaigning for the election was not such an easy matter. However, good organization secured the passage of the amendment. The plan of the campaign was laid out so as to utilize methods of personal appeal as far as possible. The citizens' committee, believing in the fairness of the measure, adopted the policy of simply educating the public to the meaning of the new plan, and the results more than justified the belief that the public would readily respond to such treatment.

A list of registered voters in each precinct was also sent to some resident in that precinct whose opinion was believed to carry greatest weight, and he was asked to mail a personal appeal to each voter in the precinct. How well this plan worked is shown by the fact that the amendment carried in 238 out of 241 Oakland precincts, and although the majority was less in Berkeley, it also carried there by a safe margin.

On the day of the election friends of the measure who owned automobiles were on hand to see that voters thought to be favorable to the measure were taken to the polls. It is notable that the public has been, throughout the campaign, on the side of the company and this is believed to be a result of the public policy which the company has followed in recent months. In fact, just prior to the election citizens wholly unknown to the company called up and offered their services, such as the use of their automobiles, in securing the desired vote.

DOHERTY POWER DEMANDS INCREASE

Based upon the present requirements of the properties, it is probable that Henry L. Doherty & Company, New York, N. Y., will have to buy 100,000 kw., in turbine capacity. This includes 40,000 kw. arranged for Toledo, a 12,500-kw. turbine for Denver, one of 5000 for Ozark, and one of 6250 for Warren, in addition to the recent order of a 10,000-kw. unit. Moreover, the indications in Mansfield now are that it will need a 5000-kw. turbine and another of 10,000, instead of the two 5000 units as originally planned. Salina can use 2000 kw. additional, and Bartlesville, Sedalia and Mt. Vernon have made requests ranging from 750 to 1000 kw. Similarly, Danbury desires to add to its plant, while Lincoln, Durham and Athens have equipment ordered which will probably not be delivered until well on in 1917.

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BAY STATE COMPANY SIGNS WAGES AGREEMENT

Agreement Affecting 6000 Men to Continue from Oct. 1, 1916, to May 1, 1920

A new wages agreement extending from Oct. 1, 1916, to May 1, 1920, was signed on Nov. 11 by the Bay State Street Railway, Boston, Mass., and the Amalgamated Association. The agreement covers many points in relation to hours of labor and working conditions and affects about 6000 employees. A total wage increase of 4 cents an hour for blue uniform men and miscellaneous organized employees is spread through the life of the agreement. The previous graduated scale is retained as a working basis for blue uniform men's compensation. For the first period of the agreement, which expires May 1, 1917, wages are increased 2 cents an hour; for the second year, 1 cent an hour, and in the third and fourth years, an increase of 0.5 cent an hour a year is established. The new rate in cents an hour therefore may be tabulated as follows:

Term of Service	Oct. 1, 1916, to May 1, 1917	May 2, 1917, to May 1, 1918	May 2, 1918, to May 1, 1919	May 2, 1919 to May 1, 1920
First six months...	26.5	27.5	28.0	28.5
Second six months..	27.0	28.0	28.5	29.0
Second year.....	28.0	29.0	29.5	30.0
Third year	29.0	30.0	30.5	31.0
Fourth year	30.0	31.0	31.5	32.0
Fifth year	31.0	32.0	32.5	33.0
Sixth year, etc.....	32.0	33.0	33.5	34.0

The agreement contains full provision for arbitration of its terms along the line of a selection of a representative by each party, followed by the choice of a third member if feasible. In case a disagreement remains after six days of deliberation by the officers of the company and of the union, the selection of the third member of the board is to be determined by President Sullivan of the company and President Mahon of the Amalgamated Association.

Shopmen and employees of miscellaneous departments are to receive the same rates of increase in cents an hour as the platform men, added to the existing rates of pay of the miscellaneous employees.

Under the agreement no employee is to be assigned to snow plow work against his wishes so long as juniors on the list are available. Foremen on snow plow work are to receive 45 cents an hour, and other blue uniformed men in this work are to receive 40 cents. This rate also applies to the crews of cars pushing plows, with the exception of passenger cars pushing for one hour or less, and including salt cars, flat cars running in snow work, etc. At least three men are to be provided for each plow. When practicable the running period in snow work is not to exceed twelve hours for each crew, and in no case is a crew to be required to work more than six hours in snow service without time off for meals. The company agrees to pay for meals under snow fighting conditions.

An allowance of 15 cents for each report is to be made to conductors preparing accident reports after the close of their regular day's work. The agreement provides that nine months' work without error entitles a man to a clear record, and the company agrees to establish a duplicate card system of discipline records, one copy to be kept by the local superintendent and one by the employee on request. The employee may have the full particulars of his record, explanations, etc., inscribed on his card if he so desires.

Schedules are to be posted ninety-six hours before going into effect, the picking of runs to begin thirty-six hours after posting and to be concluded within thirty-six hours. At each carhouse runs are to be chosen at least three times a year, upon request. Leaves of absence are not to exceed thirty consecutive days in any three months unless on account of illness or absence from the United States. The company agrees not to discriminate against any member of the union and the latter agrees not to discriminate against any employee because of failure to become a member of the association. In the arrangement of schedules, as many runs as possible are to be planned for nine hours in eleven consecutive hours, the remainder so far as practicable being not less than eight or more than nine and five-tenths in twelve consecutive hours. Not more than 20 per cent of the total runs, however, may exceed twelve hours but not fourteen consecutive hours. Runs are to be scheduled on the basis of a six-hour limit of continuous work, and in no case is the run to exceed seven and a quarter hours straight time if unsatisfactory to the men in the local carhouse. A relief of at least one hour is to be allowed for dinner and supper.

Men having regular runs except in snowplow work and an outside time of more than twelve hours are to be paid 20 per cent extra compensation, and after the first hour at the rate of 35 per cent extra. The basic principle of the work of extra men is to be nine hours in twelve, and only in extreme cases is work beyond fourteen consecutive hours to be permitted. Extra men reporting are guaranteed a minimum of six hours' work in fourteen consecutive hours, work performed after fourteen hours to be paid in addition to the six hours' guaranteed time. After the fourteenth hour additional compensation at the rate of 25 per cent and after the fifteenth hour, at 45 per cent, is to be allowed. Men running extra trips starting before 8 a. m. are allowed a minimum of two hours and this applies to all men reporting to cover the extra list in the early morning, except that double pay is not to be accorded. Instructors of motormen and conductors are to be paid 4 cents an hour above their normal rates. Seniority is to be observed so far as possible in the miscellaneous departments. The hours for all men in the mechanical and other miscellaneous departments are to be nine hours a day in ten consecutive hours on weekdays and eight hours in nine on Sundays and holidays. The same pay for eight hours' work on Sundays and holidays is to be made as for nine hours' work on weekdays.

GOVERNMENT OWNERSHIP INQUIRY ON NOV. 20

The first hearing in connection with the proposed congressional investigation of the subjects of government control and regulation of transportation and of government ownership of public utilities is to begin on Nov. 20 in the Senate office building at Washington. A statement outlining the purpose and scope of the investigation by Senator Francis G. Newlands of Nevada, who is chairman of the committee, has just been mailed to members of the Interstate Commerce Commission and state railroad commissions, commercial, farming and banking organizations and to about forty economists and publicists, as well as to the representatives of the railroads and their employees. The statement was issued for the purpose of inviting all who are interested in, or have any information regarding the subjects of the inquiry, to express their views either by written communication or at the oral hearings.

The resolution creating the committee calls for a report to Congress on or before the second Monday in January, but it is assumed that an extension of time will be granted and tentative plans have been made for an inquiry that may require nearly two years for its completion. It is expected to hold hearings in the principal cities of the country as well as at Washington.

TRACK REMOVAL ORDINANCE IN COURTS

The City Council of Kansas City, Mo., recently passed an ordinance, killed at a previous meeting, for the removal of the street car tracks from a part of McGee Street. An injunction was secured at a late hour that night, and served after midnight on P. J. Kealy, president of the company, to prevent the immediate compliance with the ordinance. The Mayor did not sign the ordinance, and has not yet done so. Following the issuance of the injunction against the enforcement of the ordinance to remove the tracks, came proceedings in the State courts to enjoin the lower courts from interfering with the act of the Council.

Several weeks ago, when an ordinance was pending for the removal of the tracks, a restraining order was secured from the county courts against the passage of the ordinance. At that time a writ of prohibition was asked of the Supreme Court to prevent the lower courts from interfering. The Supreme Court granted the writ, but not until the judge of the lower court had dismissed the restraining order. Then the removal ordinance was passed.

The present proceedings in the Supreme Court will, it is said, be carried through for the purpose of settling the question as to whether the county courts can interfere with the legislative functions of the city government.

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UNION MEN QUIT IN INDIANAPOLIS

108 Out of 900 Trainmen Fail to Take Out Cars on Nov. 10—Service Not Interrupted

Following the hearing of the demands of the minority employees of the Indianapolis Traction & Terminal Company, as reported in the ELECTRIC RAILWAY JOURNAL of Nov. 4, page 988, Robert I. Todd, president of the company, caused an investigation to be made in the different departments to ascertain how many employees had authorized the committee to act for them. It will be recalled that at the hearing previously referred to the committee claimed to represent a majority of the employees but would not state how many, in spite of the fact that 80 per cent of the car service men had already signed the new wage scale and continuation of the individual working agreement of the company. As a result of Mr. Todd's inquiry, at one power station it developed that the committeeman coming from this branch did not represent any of the thirty-six men employed in the station, other than himself, and the station employees prepared a signed statement to that effect. Similar conditions were found to prevail in other branches of the service.

Mr. Todd then forwarded a letter to the committee advising the members of the facts and calling attention to the misrepresentations they had made at the first hearing. The attention of the committee was also directed to that section of the proposed contract which required all the employees of the company to become members of the Amalgamated Association, and their attention was also called to the injustice of attempting to force even one man into an organization as a condition of holding his position. The members of the committee were advised that for a few of the employees to attempt to force such a condition upon the majority of their fellow employees and upon their employer was carrying the matter to extremes, and that as a condition to further negotiations the demand for a closed shop and the demand that the company negotiate and contract with the Amalgamated Association would have to be withdrawn. The company promised that if this was done it would discuss with the committee, as a committee of employees, the merits of the other demands of the committee, that the committee would be expected to bring to the hearing on the afternoon of Nov. 9 a complete list of the employees they were authorized to represent.

When the committee appeared before Mr. Todd on Nov. 9 the members failed to comply with the conditions set out in the letter to them, and negotiations were broken off. The company then posted notices in the various carhouses setting forth an abstract of the injunction issued by the United States District Court on Nov. 7, 1914, enjoining officials and agents of the Amalgamated Association, officials and members of other labor unions, employees and other persons from interfering with the operation of cars, or persuading, intimidating or interfering with employees who are working under the individual contract of the company, which was declared in full force and effect. The employees were also requested to report to the office any such attempts to interfere with their work, in order that the matter might be brought before the court. Large display advertisements were placed in the principal newspapers and upon the front end of the cars notifying all persons that they would be liable to contempt proceedings in the Federal Court if they attempted to interfere with the operation of cars. A notice was also issued to the minority organized employees, advising them that the company again extended to them the privilege of signing the working agreement with car service men and deriving the benefit of the increased wages which had been accepted by more than 80 per cent of the trainmen. In order that the organized men might avail themselves of this opportunity they were given until 6 p. m. on Nov. 11 to sign the agreement, provision being made that they should be allowed sufficient time off, with pay, to do so.

Several of the union men signed the agreement, but during the day of Nov. 10 108 out of approximately 900 trainmen employed on the city lines failed to take out their cars. Their places were immediately filled by men on the extra list so that no interruption of service occurred except during the rush hours, when a few tripper runs were not operated.

On the night of Nov. 10, a mass meeting of the labor organizations was called by the Central Labor Union, at which its president, Otto Ray, was served by the United States marshal with a copy of the federal injunction restraining anyone from interfering with the operations of the Indianapolis Traction & Terminal Company. W. D. Mahon, international president of the Amalgamated Association, and Magnus Sinclair, executive board member, who were to have advised the organized men as to what action they should pursue, failed to appear. The men were told not to take out their cars, but to attend another meeting at 10 a. m. on Nov. 11, but again no action was taken.

An advertisement was inserted in the newspapers by labor unions, in which the facts with respect to the conditions of labor and the wages paid were distorted. In this advertisement it was also claimed that the men had been "locked out" by the company in an effort to break up their union.

In reply, the company published a full statement of the situation under the heading "Street Car Men Are Satisfied." The statement then gave a short history of the contract, statistics of the average and minimum wages paid, an account of how an employee may appeal in case of discipline to a special board of which three of the five members are fellow employees, etc. Figures were also given of wages earned per week by some of the men who claimed to have been "locked out" and an explanation that the trouble was due because less than 20 per cent of the car service employees found they could not force a closed shop and dominating control upon the 80 per cent majority.

Practically no disorder occurred, even at the outer terminals of the street car lines. The police department handled the situation most efficiently, permitting no labor sympathizers to gather on the streets or interfere with the operation of cars. The men who had failed to sign the working agreement at the expiration of the time fixed were considered by the company as having resigned, and their runs were assigned to men on the extra list.

A committee of the so-called "locked out" employees arranged for an audience with Governor Ralston on Nov. 14.

INDIANAPOLIS BOARD OF DISCIPLINE

The Indianapolis Traction & Terminal Company, Indianapolis, Ind., on Nov. 9 announced the establishment of a board of discipline to consist of twenty employees of the company from the various carhouses, three of whom may be chosen by a dissatisfied employee to act with two representatives of the company as a board of arbitration to pass finally upon all matters of discipline. Three members of this board of discipline and two representatives of the company are also empowered to take up any suggestion or complaint of any employee concerning the rules, working conditions, discipline or method of carrying on the business of the company, to investigate the complaint or suggestion and make a report to the president of the company. The order establishing the board of discipline follows:

"The company will provide boxes with four compartments plainly marked for each of the four carhouses. During the month of December each year each carhouse shall choose by popular vote five men whose names shall be placed in the box bearing the name of the carhouse at which they are employed. These twenty men shall constitute the board of discipline. To be eligible to be chosen on this board the men must have been regularly employed in car service by this company for at least three years.

"Any employee who is dissatisfied with a decision by the superintendent relating to discipline may take his case to the president and to the board of arbitration under the provisions of the working agreement with car service men. Or, if he so desires, he may come to the office of the superintendent and by lot may himself choose one name each from three of the boxes, excluding his own carhouse. The three members of the board of discipline so chosen, together with the superintendent and assistant superintendent, shall meet thereafter as soon as possible and hear all the evidence relative to the matter and decide the man's case, and their decision shall be final.

"Any car service man who has any suggestion or complaint to make concerning the rules, working conditions,

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discipline or method of carrying on the business may have the same considered by a board constituted of the superintendent, assistant superintendent and three members of the board of discipline chosen by lot from three different carhouses, excluding the carhouse from which the suggestion comes, which board having considered the same shall make its report and recommendation direct to the president of the company. Nothing in this rule, however, shall deprive any man of the right to take any complaint to the board of arbitration as provided in the working agreement with car service men."

As explained in the notice, the privilege offered the men of taking their cases before the board of discipline for a hearing is optional, and in no way supplants the Public Service Commission of Indiana, the arbitration board provided in the individual working agreement. The company will pay the members of the board of discipline their regular rate of wages for the time they put in when hearing and considering cases, and in addition thereto the sum of $5 a year.

HEARING BEGUN ON CLEVELAND POWER CONTRACT

The hearing on the question as to whether the Cleveland (Ohio) Electric Illuminating Company is to receive the contract for furnishing power for the Cleveland Railway was begun before the board of arbitration on Nov. 9. L. P. Crecelius, superintendent of power of the railway, was the first witness. He said the company now generated 60 per cent of its power and bought the other 40 per cent from the Illuminating Company. He estimated that there would be a saving of $240,000 a year from buying 30 per cent more, making 70 per cent in all. The Cedar Avenue power house of the railway, which is to be abandoned, produced the 30 per cent in question.

On the following day Fielder Sanders, street railway commissioner of the city, was the witness until noon. He testified to the effect that he had conducted negotiations with the municipal plant and had secured a bid for 54 000,000 kw. a year. The Illuminating Company, already having a contract with the railway for furnishing a portion of its power, was able to bid on 120,000,000 kw. annually. On the face of the bids the municipal bid was lower than that of the Illuminating Company, but his engineers had informed him that the company's bid was the lower, when the entire supply was considered. Mr. Sanders said that while he wanted the city plant to get the business, he felt that he must guard carefully the cost of the additional power to the railway on account of its effect upon fares. By dismantling the old plant and buying power from the Illuminating Company the railway would in five years get back the value of the plant and in the next ten years would save $2,000,000 in the cost of power. That would mean about $3,000,000 in fifteen years. Mr. Sanders thought that this would have a favorable effect on the rate of fare. He said that the Illuminating Company was prepared to furnish the necessary power at once, while the city asked for eighteen months in which to install additional generating equipment. The city plant was carrying a full load now and had applications from several thousand homes for domestic service.

W. E. Davis, light commissioner of the city, announced on Nov. 14 that the city will submit a new power bid based upon the cost of producing the power. On the same day Robert Orr, general manager of the Duquesne Company, Pittsburgh, testified that the Illuminating Company was not properly protected in its contract, in view of the very low rate it has proposed. The protective clause in the contract provides that, at the end of five years, new bids may be received on condition that they are 10 per cent or more below the rate at which power is being furnished. The city objects to this clause. Director of Law Fitzgerald stated on the previous day that there was a working alliance between the Cleveland Electric Illuminating Company and the Cleveland Railway. He objected to the 10 per cent clause and said that the railway wanted to buy all its power eventually. President Stanley of the railway said unofficially that the company did expect to buy all its power later on, but he declared he knew of no alliance between the companies. He was doing what he felt was best for the stockholders and patrons of the road and he did not believe it would be the best thing for the municipal plant to take the contract.

The voters at Cleveland on Nov. 7 approved a bond issue of $1,750,000, from the proceeds of which additions to the building and equipment of the municipal light plant will be made.

CONFERENCE ON SAFETY AT BOSTON DRAWBRIDGES

A conference between Mayor Curley of Boston, Mass., President Matthew C. Brush of the Boston Elevated Railway, President P. F. Sullivan of the Bay State Street Railway, President Charles L. Edgar of the Edison Electric Illuminating Company of Boston, Commissioner of Public Works Murphy, Deputy Commissioner Sullivan, Joseph A. Rourke, head of the Boston High Pressure Fire Service and John E. Carty, engineer in charge of Bridge and Ferry Service, was planned for Nov. 16 to study the safeguarding of drawbridge operation. The meeting was called as an outcome of the accident of Nov. 7, when a surface car of the Boston Elevated Railway plunged into Fort Point Channel. Since the accident the company and the public authorities have been investigating all possibly related circumstances, but formal conclusions have not yet been made public. So far as has been learned up to Nov. 15 by the representative of the ELECTRIC RAILWAY JOURNAL in Boston nothing has developed to modify the preliminary view published last week to the effect that the accident was due primarily to the failure of the motorman to observe proper speed on approaching the draw.

Relative to the possibility of further safeguarding operation at drawbridges, Mr. Brush has written Mayor Curley as follows:

"Since the unfortunate occurrence at the Summer Street extension bridge we naturally have been earnestly studying the question of operation of street cars across drawbridges, with a view toward the further prevention, if possible, of similar accidents in future.

"Our rules and regulations have been extremely comprehensive and strict in matters of this kind, and apparently we have taken all precautions customary in such cases. Notwithstanding this, however, we are of the opinion that there may perhaps be development of a recent nature of which, with the co-operation of the city, we may be able to avail ourselves, which may tend still further to prevent accidents of this kind.

"All of our own engineers and operating men have been carefully going over this matter, and we have conferred with H. E. Reynolds, assistant general manager of the Bay State Street Railway, and his engineers on the same matter.

"We are of the opinion that certain steps can and should be taken along the lines of safety, and that the eventual construction of a rather pretentious but effective barrier at drawbridges should receive consideration."

In addition to the above list of conferees, Mayor Curley invited President Richard C. Maclaurin of the Massachusetts Institute of Technology to send an expert to the meeting. The representative of the ELECTRIC RAILWAY JOURNAL in Boston also was present.

CIVIC FEDERATION CALLS CONFERENCE ON STRIKE LEGISLATION

V. Everit Macy, president of the National Civic Federation, has announced the formation of a committee to make suggestions to Congress and State Legislatures for the perfection of laws providing for amicable settlements of labor disputes. The committee is to be composed of representatives of the railroad interests, of the manufacturing and agricultural interests, representatives of the railway brotherhoods, the American Federation of Labor, shippers' organizations, and of the public, represented by the United States Board of Mediation and Conciliation, the National Association of State Railway Commissioners, and the National Association of State Boards of Arbitration.

In a statement made on Nov. 13, explaining the aims of the committee, Mr. Macy said:

"The recent industrial disturbances affecting the relations

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between the railroads and their employees, and the public utility corporations of New York and other large cities and their employees, have brought the country again to a consideration of the question, 'What, if any, amendments can be made to the Newlands Federal Mediation act and to the State Railway Commission laws that will reduce these disturbances to a minimum in the future?'

"A committee of the National Civic Federation drafted in 1913 the measure which became the law known as the Newlands Federal Mediation act. In the recent railroad controversy, however, the machinery provided by that act seemed inadequate, and the President expects Congress to consider the matter of additional legislation in December, a bill modeled after the Canadian compulsory investigation act having already been introduced at his suggestion.

"In the case of municipal utilities, such as street railways and gas and electric light corporations, the Civic Federation, through its department on regulation of interstate and municipal utilities, drafted in 1914 a model State regulation bill, in which an effort was made to incorporate a provision enabling the various State railway commissions to take cognizance of labor disputes but at that time these State commissions did not look with favor upon the suggestion. Since then, however, a number of strikes in large cities have caused many public service commissions to change their views, and the State Legislatures this winter will doubtless have before them many proposals on this subject.

"While the questions relating to railroads can be dealt with only by Congress, and those relating to municipal utilities can be dealt with only by State Legislatures, the principles applying to both sets of problems are identical, and if a satisfactory method of procedure can be found in one case it will be just as applicable to the other."

The first meeting of the new Civic Federation committee will be held in Washington the first week in December.

CHICAGO COMMITTEE IN THE EAST

Chairman of Committee Inspecting Rapid Transit Systems Outlines Purport of Trip

The members of the local transportation committee of the City Council of Chicago which is making a tour of Eastern cities to study rapid transit problems were in New York on Nov. 9. The party was in charge of H. D. Capitain as chairman. Mr. Capitain has been chairman of the committee since May, 1915. He has served on the committee for more than four years and has been a member of the Council for four or five terms. At the headquarters of the committee in New York at the Hotel McAlpin he explained to a representative of the ELECTRIC RAILWAY JOURNAL that the trip of the Aldermen was anticipatory to the receipt by the city of the findings of Robert Ridgway, W. B. Parsons and Bion J. Arnold, appointed in January to report to the city on a unified and comprehensive system of transportation, including the present surface and elevated lines and the proposed subway. Mr. Capitain and some of the other members of the committee were more or less familiar with what had been done in the East in the interest of rapid transit, but it was deemed advisable for all of the members of the committee on transportation to take the trip and to go over the rapid transit systems in the eastern cities so as to prepare themselves better for a more intelligent understanding of the report of the engineers to the city.

Mr. Capitain said that while the members were interested in the physical properties and in the problems which had been met and overcome in the rapid transit lines in the East, they were particularly interested in the terms under which the rapid transit lines in New York, Philadelphia and Boston had been financed and were operated. He explained that one of the duties with which the engineering commission is charged was that of suggesting a financial plan covering the investments of the surface and elevated lines as well as methods for securing additional capital required by the city over and above its accrued traction fund, for subway purposes and for extensions to the elevated line.

The itinerary of the members of the party called for their return to Chicago by Nov. 18. In the meantime they were to visit Philadelphia, Brooklyn, Newark, Boston and Cleveland in addition to New York. The committee was accompanied by correspondents representing four Chicago papers, all of whom sent to their papers each day an account of a column or more covering the work of the committee for the day. Other members of the party were H. H. Evans, secretary of the committee on local transportation; R. F. Kelker, traction supervisor, city of Chicago; O. H. Tousey, representing the Board of Supervising Engineers, Chicago Traction; John F. Wallace, chairman of the railway terminal committee of Chicago, and M. S. Cressy, assistant corporation counsel of Chicago.

While the members of the committee were in New York Mr. Wallace arranged for an interview between Alderman Geiger, chairman of the Chicago Council committee on railway terminals, Mr. Cressy and Charles Peabody, a director of the Illinois Central Railroad. They are said to have secured assurance from Mr. Peabody of the early electrification of the suburban service of the Illinois Central Railroad out of Chicago if the necessary financing can be arranged.

Arbitration of Dismissals Proposed.—Officials of the South Covington & Cincinnati Street Railway, Covington, Ky., have consented to the appointment of former City Treasurer and Commissioner Harry W. Percival as third arbiter between them and their employees, in the matter of dismissal of six employees for alleged infraction of a company rule.

Men Deny Dynamiting New York Subway.—The six alleged dynamiters of the Lenox Avenue subway station of the Interborough Rapid Transit Company, New York, N. Y., appeared before Judge Delehanty in General Sessions on Nov. 13 and through their attorney, Louis Fridiger, entered pleas of not guilty. John McCourt, the seventh man indicted, was remanded to the Tombs until Nov. 15 for pleading.

Reargument of Compensation Cases Ordered.—Reargument was ordered on Nov. 13 by the Supreme Court of cases testing the constitutionality of the Washington, New York, New Jersey and Iowa workmen's compensation laws. No date was set for the rehearing. No reason was given by the court for the order. The court also directed reargument of an Ohio case involving interpretation of the Ohio employers' liability law.

Electrification of Whiteson Line Nearing Completion.—According to reports, the electrification of the Southern Pacific Company's west side line, from Whiteson, Ore., to Corvallis, will probably be completed by Jan. 1, 1917, but the operation of electric trains into Corvallis will be delayed until April or May because the equipment for the transformer plants will not be received until spring. At present the Southern Pacific Company has between 150 and 200 men on post and line crews working on uncompleted portions of the line.

Discussion of Philadelphia Agreements Postponed.—After having set Nov. 10 as the time for opening the public discussion of the proposed agreement between the city and the Philadelphia (Pa.) Rapid Transit Company for the operation of the new high-speed transit lines, the meeting was called off. Chairman Gaffney of the finance committee and Chairman Seger of the street railway committee have to consider the appropriations for 1917, and they agreed that it would be better to postpone the transit meetings until the financial matters were out of the way.

Mexican Military Authorities Equal to Occasion.—Street car operators in Matamoras, Mexico, declared a strike on Oct. 23, following a refusal of their employers to double the wages paid. The demand for higher pay followed the action of the street railway in doubling the fares. Fares were raised from 50 cents to $1, Mexican currency. It is said that the men are paid six pesos a day in Constitutionalists paper money, equivalent at present to about 12 cents United States currency. It is understood that additional demands were made and the men refused to move the cars from the carhouses until they were complied with. The military authorities took the matter in hand and threatened to shoot the men if they continued to refuse to work. The men promptly returned to work, accompanied by an armed guard. The chief business of the railway is between Matamoras and Santa Cruz, a ferry village opposite Brownsville. The line is about 2 miles and is operated by mule-drawn cars.

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PROGRAMS OF ASSOCIATION MEETINGS

New England Street Railway Club

The meeting of the New England Street Railway Club at the Copley Square Hotel, Boston, Mass., on Nov. 23, will be "New Hampshire Night," in charge of J. Brodie Smith, vice-president of the club and vice-president and general manager of the Manchester Traction, Light & Power Company. Mr. Smith has secured as speaker Edwin F. Jones, Manchester, N. H., who has chosen for his subject, "Street Railways—A Look Into the Future." For twelve years Mr. Jones was city solicitor for the city of Manchester. At present he is senior member of the law firm of Jones, Warren, Wilson & Manning, attorneys for the Manchester railways.

American Society of Mechanical Engineers

The tentative program has been announced for the thirty-seventh annual meeting of the American Society of Mechanical Engineers in New York, Dec. 5-8. Among the papers of interest to electric railway operators scheduled to be presented are the following:

"Water for Steam Boilers—Its Significance and Treatment," by Arthur C. Scott and J. R. Bailey.

"Graphic Methods of Analysis in the Design and Operation of Steam Power Plants," by J. S. Pigott.

"Mechanical Design of Electric Locomotives," by A. F. Bachelder.

There will also be a public hearing on Dec. 8 by the boiler code committee which is engaged in the work of establishing uniform rules and legislation throughout the country for the construction and operation of steam boilers.

Academy of Political Science

The annual meeting of the Academy of Political Science is to be held at Earl Hall, Columbia University, New York, on Wednesday and Thursday, Nov. 22 and 23.

The first session is to be held on the afternoon of Nov. 22. The topic will be "Governmental Mediation and Arbitration."

The second session will be held on the evening of Nov. 22. The topic will be "Trade Unions and Compulsory Arbitration."

The third session will be held on the afternoon of Nov. 23. The topic will be "Trade Unions and Mediation and Conciliation."

The fourth session will be held on the evening of Nov. 23 at the Hotel Astor at 7 o'clock. The occasion will be the annual dinner of the academy. The topic for discussion will be "Recent Aspects of Labor Disputes Affecting Public Service Corporations." Oscar Straus will preside.

Central Electric Railway Association

Delegates to the convention of the Central Electric Railway Association at the Secor Hotel, in Toledo, Ohio, on Nov. 23 and 24, will be welcomed to that city by Charles M. Milroy, Mayor of Toledo. A. Benham, president of the Central Electric Railway Association, will respond to Mr. Milroy. The following is the program of papers scheduled for presentation before the delegates on Nov. 23.

Paper, "Headlights," by K. W. Mackall, electrical engineer of the Ohio Brass Company, Mansfield, Ohio.

Address, "The Electric Railway Industry," by Frank R. Coates, president of the Toledo Railways & Light Company.

Address, "Safety," by Harold W. Clapp, general superintendent of the Columbus Railway, Light & Power Company, Columbus, Ohio.

Address, "Electric Railway Freight and Express," by Nathan Rumney, general freight and express agent of the Detroit (Mich.) United Railway.

The program for Nov. 24 follows:

Address by F. W. Coen, vice-president and general manager of the Lake Shore Electric Railway, Sandusky, Ohio.

Paper, "Car Architecture," by L. B. Stillwell, New York.

In addition to the foregoing papers and addresses it is expected that L. S. Storrs, president of the American Electric Railway Association, and James P. Barnes, president of the New York Electric Railway Association, will be present and address the meeting.

Central Electric Railway Accountants' Association

The program has been announced for the annual and thirtieth meeting of the Central Electric Railway Accountants' Association, to be held at the Hotel Gibson, in Cincinnati, Ohio, on Dec. 8 and 9. The executive committee of the association is scheduled to meet at 9 a. m. on Dec. 8. At 10 a. m. the regular session will be begun with the address of the president and the presentation of the reports of the executive committee, the standing committee on passenger and freight accounts, the question-box committee and the secretary and treasurer. It is expected that this program will take up the entire morning session. At the afternoon session on Dec. 8 the following addresses are scheduled for presentation:

Address by P. H. Diehl, district manager of the Railway Audit & Inspection Company, Chicago, Ill., on a subject to be announced.

Address, "Electric Light and Power Accounting," by A. E. Dedrick, auditor of the Mahoning Valley Railway, Youngstown, Ohio. At this session the report of the electric light and power accounts committee will be presented and there will be a discussion of the form of annual report to the Interstate Commerce Commission.

The program of addresses to be presented on the morning of Dec. 9 follows:

Address, "Recent National Legislation Affecting Electric Railway Accounting," by A. C. VanDriesen, chief accountant of the Toledo Railways & Light Company, Toledo, Ohio.

Address, "A Clearing House for Interline Account Settlements of Electric Railways," by E. L. Kasemeier, auditor of the Ohio Electric Railway, Springfield, Ohio.

At the conclusion of the presentation of these papers general business will be transacted and officers for the coming year will be elected.

Pennsylvania Street Railway Association

The program has been announced for the meeting of the Pennsylvania Street Railway Association on Dec. 12 and 13, at the Adelphia Hotel, Philadelphia, Pa. The meeting will be called on the roof garden of the hotel at 11 a. m. The morning session will be devoted to the president's address, the presentation of the report of the secretary-treasurer and the appointment of committees. The afternoon session will be called at 2 p. m., and the following subjects will be discussed:

"Fire Insurance and Prevention." (a.) Co-operation in Fire Insurance, by E. W. Bowman, Supervisor of Insurance of the Philadelphia Rapid Transit Company. (b.) Inspection, by H. W. Forster, general manager of the Independent Inspection Bureau.

"Life Insurance." (a.) Employees Group Insurance, by W. F. Chamberlin, superintendent of the Group Insurance Division of the Travelers Insurance Company.

"Accident and Casualty Insurance." (a.) Some Thoughts on Liability, Casualty, Judiciary, Fidelity, Burglary and Other Forms of Insurance, by M. S. Bowman of the Accident and Casualty Department of the Travelers Insurance Company. (b.) Precaution Against Accident, by A. G. Jack, claim agent of the Southern Pennsylvania Traction Company. (c.) Public Safety Crusades, by Beatrice V. Clinch of the Philadelphia Rapid Transit Company.

Question Box.

There will be an informal dinner on the evening of Dec. 12, on the roof garden of the hotel.

The session on Dec. 13 will be called at 9 a. m. The subjects to be discussed follow:

"Use of the Electric Railways of Pennsylvania in Connection with Mobilization and National Defenses," by Lieut. Col. Chauncey B. Baker, U. S. A.

"Taxation," by Boyd Lee Spahr.

"Lightning Protection," by a representative of the General Electric Company.

"Electric Welding," by E. A. Hoffman, engineer of maintenance of way of the Wilkes-Barre Railway.

"Status of the Jitney," by D. I. McCahill of the West Penn Railways.

There will also be an open discussion of the question of economies made necessary by present-day problems in labor and materials.

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Financial and Corporate

ANNUAL REPORT

Columbus Railway, Power & Light Company

The income statement of the Columbus Railway, Power & Light Company, Columbus, Ohio, for the years ended Dec. 31, 1914 and 1915, follows:

	1915 Amount	1915 Per Cent	1914 Amount	1914 Per Cent
Railway operating revenues	$2,039,383	65.5	$2,086,269	68.0
Power, light and heat operating revenues	1,072,670	34.4	968,238	31.6
Non-operating revenues	1,122	0.0	11,791	0.4
Total gross revenues	$3,113,175	100.0	$3,066,298	100.0
Operating expenses and taxes	1,846,437	59.3	1,886,745	61.5
Gross income	$1,266,738	40.7	$1,179,553	38.5
Deductions from income	476,281	15.3	479,461	15.6
Net income	$790,457	25.4	$700,092	22.9

During the last year the total revenues increased $46,877 or 1.5 per cent. This arose from an increase of $104,432 or 10.8 per cent in power, light and heat operating revenues and from a decrease of $46,886 or 2.2 per cent in railway operating revenues and $10,669 or more than 90 per cent in non-operating revenues. The operating expenses and taxes decreased $40,308 or 2.1 per cent, so that gross income gained $87,185 or 7.4 per cent. Deductions from income showed a slight decrease, so that after the payment of $587,229 for dividends as in 1914, there was left a sum of $202,227 available for depreciation, etc., as compared to $112,862 in 1914.

Important additions were made to the railway properties during 1915, notable examples being a crane car for the handling of heavy material with speed, safety and economy; two special snow-handling machines, and a street-flusher car.

For 1915 as compared with 1914, the results of the safety-first propaganda were a 12 per cent reduction in boarding and alighting accidents, a 15 per cent reduction in collisions between cars and teams, and a 36 per cent reduction in collisions between cars. Collisions between cars and automobiles showed practically no change, although there was an increase of 40 per cent in automobiles in Columbus.

Miscellaneous comparative statistics for the railway department in 1914 and 1915 are given below:

	1915	1914
Revenue passengers	61,062,066	62,837,925
Transfer passengers	15,154,460	16,111,634
Total passengers	76,216,526	78,949,559
Per cent of transfers to total passengers	19.88	20.41
Revenue per revenue passenger in cents	3.20	3.19
Revenue per passenger, including transfers, in cents	2.56	2.54
Car mileage	8,204,525	8,376,901

NOTES TO BE RETIRED

The Republic Railway & Light Company, Youngstown, Ohio, has sold to Harper & Turner, Philadelphia, Pa., $3,500,000 of preferred stock of the Mahoning & Shenango Railway & Light Company, its chief subsidiary. Approximately $3,000,000 of this preferred stock is deposited as collateral behind the $3,000,000 note issue of the Republic Railway & Light Company. From the proceeds of this sale the Republic Railway & Light Company will pay off the entire note issue which would mature Dec. 1, 1918, and these notes will be called for redemption at 100½ and interest. On account of the satisfactory earnings of the subsidiary properties, the directors of the Republic Railway & Light Company consider it wise at this time to fund permanently its $3,000,000 of short-time securities, thereby strengthening the credit of the holding company and placing in a more advantageous position to acquire additional properties to round out its electric light and power and railway business in Ohio and Pennsylvania. After the retirement of these notes the Republic Railway & Light Company will have only preferred and common stock outstanding.

MAYOR CURLEY ASKS SQUARE DEAL

Tells Commission Boston Elevated Should Have Relief if Not at Fault for Present Condition—Favors Lower Taxes Rather Than Higher Fares

Mayor Curley of Boston, Mass., on Nov. 10 told the special legislative commission on the finances of the Boston Elevated Railway that, if in the commission's opinion the management of the company has striven for maximum efficiency in operation, the city of Boston should favor granting relief to the company. The Mayor believed the conclusion to be inevitable that the company must obtain relief in some form if it is to meet the reasonable requests of the public for additional rapid transit facilities. The company's stock is generally admitted to represent actual value, and its dividends have never been in excess of 6 per cent. The attention of the commission, therefore, must be confined to the question of responsibility for the present financial condition of the company. If this is due to the company's own fault, then apparently it is not entitled to some of the measures of relief desired. If, on the other hand, the commission finds that the company's condition is not due to improper management but is caused by its attempt to respond more rapidly to the public demand for increased transportation facilities than its resources would warrant, then it would appear to be a case which calls for extraordinary relief through legislative action.

In regard to the necessity of giving more than temporary relief, Mayor Curley said:

"If you find that a proper case of relief has been made out, I trust that you will not perform only half of your task, *viz.*, to meet the present financial difficulties of the company without taking into account further difficulties that will arise if the still more extensive program of tunnel and subway development is carried out in the near future. If you find that under the limitations of the 5-cent fare the company cannot finance the tunnel and subway undertakings which this community has a right to demand shall be accomplished, then you will be called upon to recommend a radical remedy, one which will go to the root of the trouble and provide a permanent cure."

Taking up specific suggestions that have been made for the relief of the company, Mayor Curley said that as far as providing additional capital is concerned, it may be sufficient to have the State buy the Cambridge Subway and lease it to the company for sufficient rental to reimburse the State for the expenditure. This will be in effect only a loan of State credit to the company, just as the city of Boston lends its credit as a means of procuring tunnel and subway construction. Quite apart from any question of financial relief to the company, however, the mayor advocates State ownership of the Cambridge Subway because he believes that private ownership of the subways and tunnels under the street is prejudicial to the interest of the community. The sooner the Boston system is applied to the Cambridge Subway, the better it will be for the future.

Another means of relief which in the Mayor's opinion will harm no one, is the return by the State of $500,000 deposited by the company as a guarantee for the payment of land damage claims. The 8-cent check used between the Boston Elevated Railway and the Bay State Street Railway should be abolished in the interests of non-discrimination. Moreover, additional relief would come in the granting of legislative authority to the company to take additional land so as to inclose areas at transfer points. This would enable the company to cut down operating expenses to some extent, and it would reduce the loss now caused by the improper use of transfer checks. Regardless of any question of financial benefit to the company, the Mayor strongly advocates the granting of this authority in the interest of the public itself, since these inclosed areas promote the safety, convenience and comfort of the public.

If the commission, however, is brought face to face with the problem of providing relief either through increased fares or a temporary reduction of company taxes, Mayor Curley believes that it will find itself in serious difficulties. The traveling public will oppose increases of fare and municipalities will oppose reduction of taxes. If one of these forms of relief must be adopted, in the Mayor's view it would be better for the community as a whole to have

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a reduction made in taxes than to have relief come through increased fares. If a choice must be made between these two evils, he would unhesitatingly recommend a reduction in taxes.

In explanation of this point of view, Mayor Curley stated that an increase of fares would, in this particular case, be surrounded with great practical difficulties. Legislative opposition would be sure to arise owing to protests on the part of the traveling public. Moreover, there would be serious obstacles to the successful working of the increased fare schedule, whether the schedule provided for a uniform increase throughout the territory or increased fares on only the longer runs. Practically, as far as the public is concerned, there is no great difference whether relief comes in the form of increased fares or temporarily reduced taxes. The great majority of the people living in the municipalities served now use the company's cars, and a still greater number will use them when more rapid transit facilities are furnished. All the people, car users or otherwise, share in the benefits accruing from improved transportation—that is, from increased valuations of property and the resulting reduction of taxes or the extension of municipal service. On the whole, however, less hardship would result from a temporary reduction of taxes.

In closing, Mayor Curley stated that it would be unfortunate for the city if the result of the present inquiry were only to give relief to the company at the expense of the city's own street development or its hospital, public health or public library service, for example. He felt, therefore, that if the commission should recommend a temporary reduction in the taxes paid by the company it should also recommend as an integral part of the proposed legislation, authority to increase the tax limit of the city to an extent sufficient to make up the deficit caused by the reduction in the company's taxes.

I. C. C. ISSUES ACCOUNTING ANSWERS

Another Series of Questions and Tentative Answers Under the Uniform System of Accounts Prescribed by Commission for Electric Railways

Another series of tentative answers to questions raised in connection with the uniform system of accounts prescribed by the Interstate Commerce Commission for electric railways has just been released by the commission. As these answers have not received the formal approval of the commission, however, it should be understood that the decisions do not represent its final conclusions, and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission. The questions raised, and the answers made to them, follow:

Q. This company built an extension to its line, and property owners served by the extension agreed to pay $25,000 toward the cost thereof. How should this contribution be accounted for?

A. The amount donated by the property owners should be credited to profit and loss account No. 305, "Donations." The cost of constructing the extension should be included in the appropriate road and equipment accounts. See the second paragraph of the text and the note of account No. 305, "Donations."

Q. In connection with the reconstruction of a track over which operations are being conducted at the same time, it is necessary to have flagmen and watchmen where the work is being done, for the purpose of regulating the operation of cars and directing passengers. To what account should the wages of such employees be charged?

A. To account No. 66, "Miscellaneous Car Service Employees."

Q. To what account should be charged the cost of paper dials for watchmen's clocks?

A. To operating expense account No. 94, "Stationery and Printing."

Q. Is it permissible to credit operating revenue accounts with amounts representing the cost of transporting men engaged and materials used, in the operations of a company?

A. The rules contained in the uniform system of accounts do not permit charging operating expenses and concurrently crediting operating revenues with amounts representing the cost of transporting men engaged in and material to be used for maintenance and operation. Charges should be made to construction accounts for the actual cost (or an estimate thereof) of transporting men and material for construction purposes. The credit in such case should be made to operating expense general account VII, "Transportation for Investment—Cr.," if the cost of such transportation was charged, in the original distribution, to operating expenses.

Q. To what account should be charged the amount of a premium paid on a bond given the United States government in order to qualify a carrier to transport merchandise in bond?

A. To operating expense account No. 89, "Miscellaneous General Expenses."

Q. To what accounts should be charged rent and taxes on land leased for freight-house purposes?

A. The rent shall be charged to income account No. 217, "Miscellaneous Rents," and the taxes to income account No. 215, "Taxes Assignable to Railway Operations."

Q. To what account shall be charged amounts paid for the privilege of erecting poles to support distribution and transmission lines?

A. To account No. 23, "Miscellaneous Electric Line Expenses," or No. 49, "Transmission Systems," as may be appropriate.

Q. To what account should be charged amounts paid to other companies for the privilege of attaching wires to their poles?

A. To operating expense account No. 23, "Miscellaneous Electric Line Expenses," or No. 49, "Transmission System," according to the character of the line.

Q. Should the entire cost of purchased power be charged to operating expense account No. 59, "Power Purchased," or may the amount of power used by a work train be charged directly to the appropriate maintenance accounts?

A. The cost of all power purchased should be charged to account No. 59, "Power Purchased," as required by the text thereof. In this connection see the text of account No. 61, "Power Transferred—Cr."

Q. A portion of a company's track was laid upon a street which was later regraded by the municipality for the purpose of eliminating hills. The cost of regrading that portion of the street lying under the tracks was assessed against the company. To what account should be charged the amount of this assessment?

A. To road and equipment account No. 504, "Grading."

Q. What is meant by the term "except final distribution," as found in road and equipment accounts Nos. 505, "Ballast," 506, "Ties," 507, "Rails, Rail Fastenings and Joints," 508, "Special Work," and 509, "Underground Construction"?

A. By this term is meant expenses incident to the distribution of ballast, ties, rails, rail fastenings and joints, special work and materials used in underground construction from the storehouse or delivery point to the place where such material enters into construction. (See Case 114.)

Q. To what account should be charged rent of ground used for driveway purposes in delivering coal to a heating plant?

A. To income account No. 217, "Miscellaneous Rents."

Q. What is meant by the term "cost of transporting," as used in operating expense general account VII, "Transportation for Investment—Cr."? Is this term intended to include items of taxes, interest or return upon investment?

A. By this term is meant such expenses as have been, for practical reasons, temporarily charged to operating expense accounts, but which are properly includible as a part of the cost of construction. No credit should be made to this account for such items as taxes, interest or return upon investment, as these are not included in operating expenses.

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Q. Track reconstruction work involves, as a rule, charges to both construction and operating expense accounts. Is it proper to distribute the pay of officials in charge of the engineering and track maintenance departments upon the basis of charges to construction and operating expenses?

A. If a substantial proportion of the time of officials in charge of the engineering or track maintenance departments is devoted to construction work, it is proper to include in the construction accounts an equitable proportion of their salaries, such proportion being based upon the amount of time devoted to construction work.

Q. If clerks in an executive office give substantially all of their time to the preparation of work orders and authorization for construction expenditures, should their salaries and expenses be charged to road and equipment accounts?

A. If clerks employed in executive offices give all or a substantial proportion of their time in the preparation of orders for new construction, or for additions and betterments, an equitable proportion of their salaries and expenses should be included in account No. 550, "Miscellaneous." The basis of apportionment should be upon the amount of time devoted to construction-work orders and not upon the estimated cost of construction.

Q. To what account should be charged the cost of an electric track switch installed in connection with new construction?

A. To road and equipment account No. 508, "Special Work."

Boston (Mass.) Elevated Railway.—The West End Street Railway, operated under lease by the Boston Elevated Railway, has petitioned the Massachusetts Public Service Commission to authorize an issue of $2,700,000 of thirty-year 6 per cent bonds, dated Feb. 1, 1917. The proceeds will be used to refund an issue of like amount then maturing.

Central Illinois Public Service Company, Chicago, Ill.—The Illinois Trust & Savings Bank, the Continental & Commercial Trust & Savings Bank, Halsey, Stuart & Company and Russell, Brewster & Company, Chicago, Ill., are offering jointly for subscription at 90 and interest, yielding more than 5.62 per cent, $4,000,000 of Central Illinois Public Service Company first and refunding mortgage 5 per cent gold bonds. The bonds are dated Aug. 1, 1912, and are due Aug. 1, 1852. The proceeds of the bonds will be used to retire the $3,000,000 of three-year 6 per cent collateral gold notes of the company, due on Dec. 1, 1916, and to reimburse the company for expenditures made for improvements, betterments and extensions.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—The committee representing the holders of the first mortgage 5 per cent gold bonds of the Columbus, Delaware & Marion Railway has been enlarged by the addition of G. M. Dahl, New York, and A. Q. Jones, Indianapolis, J. I. Burke, New York, acting as secretary. The committee has adopted a new form of deposit agreement and urges immediate deposit of bonds with the Guaranty Trust Company, New York. Rudolph Kleybolte, chairman of the committee representing a substantial majority of the underlying first mortgage bonds, recently gave notice that unless the committee for the first consolidated bonds should promptly signify its intention to reorganize the property and assume the first mortgage, they themselves would be obliged to foreclose and take the property.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The Mahoning & Shenango Railway & Light Company has notified the Pennsylvania Public Service Commission that it proposes to issue bonds to the amount of $500,000 which will be sold to Lee, Higginson & Company, Boston, Mass., at 98 and accrued interest, the proceeds to be deposited with the trustee to be drawn down from time to time for improvements and betterments.

Springfield, Troy & Piqua Railway, Springfield, Ohio.—The Springfield, Troy & Piqua Railway on Nov. 10 made application to the Public Utilities Commission for authority to issue $280,000 of common stock and $250,000 of bonds in order that it may reimburse the estate of Asa S. Bushnell, Springfield, to which it is indebted to the amount of $670,844 for money advanced.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—A special meeting of the stockholders of the Steubenville & East Liverpool Railway & Light Company has been called by action of the board of directors to convene at the office of the company at Steubenville, on Dec. 9, to act upon the approval of a proposed contract for the leasing of that portion of the property of the company which is utilized in carrying on the electric light and power business to the Ohio River Power Company. The proposed lease is for the term of three years, with a renewal term of three years, at a rental of $90,000 a year, and is to embrace an option to sell that part of the property to the lessee for $1,500,000.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio.—The Lake Erie, Bowling Green & Napoleon Railway between Bowling Green and Pemberville has been purchased by the Toledo, Fostoria & Findlay Railway and will be operated by it. The property was sold some months ago at master commissioner's sale to a Detroit man, who has since been dismantling it. The line is 12 miles in length.

United Railroads, San Francisco, Cal.—The California Railroad Commission has requested the United Railroads to make an inventory and appraisal of its property in connection with its proposed application to readjust its finances and provide a new issue of securities. The United Railroads has not as yet made application to the commission for a change in either the ownership or financial plan of the corporation, but has advised the commission that it anticipates making a formal application. The commission states that it desires the corporation to prepare for submission, in connection with such reorganization proceedings, a complete statement of its ownership of property and the value of such property. The details of the proposed extinguishment of $44,330,100 out of $91,928,100 of capital liabilities were reviewed in the ELECTRIC RAILWAY JOURNAL of Oct. 7, page 744.

DIVIDENDS DECLARED

Central Arkansas Railway & Light Corporation, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.

Citizens Traction Company, Pittsburgh, Pa., $1.50.

Cumberland County Power & Light Company, Portland, Me., quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON ILL.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Sept.,	'16	$183,593	*$124,894	$58,699	$35,935	$22,764
1 "	"	'15	168,333	*114,960	53,373	36,710	16,663
3 "	"	'16	590,838	*379,662	211,176	107,986	103,190
3 "	"	'15	545,797	*356,352	189,445	109,758	79,687

CITIES SERVICE COMPANY, NEW YORK, N. Y.

1m.,	Oct.,	'16	$1,122,910	$20,041	$1,102,869	$393	$1,102,476
1 "	"	'15	411,504	14,323	397,181	40,833	356,348
12 "	"	'16	8,233,952	232,384	8,001,568	340,068	7,661,499
12 "	"	'15	4,232,914	163,503	4,069,411	490,000	3,579,411

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

1m.,	Sept.,	'16	$203,099	*$134,446	$68,653	$49,298	$19,355
1 "	"	'15	189,667	*124,600	65,067	48,787	16,280
9 "	"	'16	1,860,223	*1,251,301	608,922	438,526	170,396
9 "	"	'15	1,722,831	*1,141,499	581,332	443,599	137,733

GRAND RAPIDS (MICH.) RAILWAY

1m.,	Sept.,	'16	$111,638	*$72,249	$39,389	$15,842	$23,547
1 "	"	'15	100,771	*68,404	32,367	14,002	18,365
12 "	"	'16	1,279,977	*839,802	440,175	176,619	263,556
12 "	"	'15	1,195,379	*824,876	370,503	164,282	206,221

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m.,	Sept.,	'16	$152,529	*$89,152	$63,377	$36,334	$27,043
1 "	"	'15	126,284	*76,711	49,573	36,127	13,446
9 "	"	'16	1,207,012	*753,129	453,883	327,306	126,577
9 "	"	'15	1,032,334	*671,143	361,191	324,833	36,358

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m.,	Sept.,	'16	$78,549	*$50,793	$27,756	$15,134	$12,622
1 "	"	'15	73,130	*42,571	30,559	15,956	14,603
12 "	"	'16	785,306	*526,854	258,452	189,810	68,642
12 "	"	'15	715,579	*467,213	248,366	188,860	59,506

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m.,	Oct.,	'16	$338,613	*$188,922	$149,691	$72,495	‡$78,291
1 "	"	'15	276,355	*166,411	109,944	57,277	‡52,772
10 "	"	'16	3,269,261	*1,896,062	1,373,199	700,677	‡678,101
10 "	"	'15	2,511,276	*1,538,925	972,350	560,969	‡412,671

*Includes taxes. ‡Includes non-operating income.

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Traffic and Transportation

DENVER TRAMWAY BULLETIN IMPROVED

Changes Suggested by Employees Adopted—Rotating Editorial Board of Employees Proposed

The October issue of the *Tramway Bulletin*, published by the Denver (Col.) Tramways, is an anniversary number, marking the opening of volume nine. The paper has been changed over to the familiar 9 in. by 12 in. size, and appears in a new dress of type. The changes in the make-up are discussed by the editor in part as follows:

"The *Bulletin* comes to you this first month of its new volume in a new dress and a larger size. As you turn the pages you will probably see other changes. All this is a working out of the many sugestions for improving the magazine which we received from trainmen, shopmen and other readers.

"In changing the size we are following the lead of all the technical magazines of the railway world and of most of the popular fiction magazines, which, as you have probably noticed, have been rapidly adopting the large page and flat form.

"With the new size we can use larger illustrations; bigger, more readable type; more emphatic headlines, and at the same time give advertisers better 'positions.'

"We have also chosen a big, postery style of cover and are going to change the cover illustration every month.

"We will use a heavier, high-grade glossy paper which will make the magazine look much more attractive and print the illustrations more clearly. The number of pages in future issues will depend entirely on the number required for the printing of the articles and news submitted for publication.

"Perhaps the best suggestion for improvement among the many that were made and adopted is that of an editorial board. This board is to be made up of four trainmen—one from each division—plus the editor and assistant editor. The board will not be author of any articles, but it will be responsible for the contents of the entire magazine and will plan and suggest the kind of articles to be written, decide who shall write them, and generally will be charged with getting out the most interesting magazine it possibly can.

"The division men on the editorial board will change each month. The day men will make up the November *Bulletin*. Then the night men will have a chance to show what they can do, and so on.

"During the year the shop men will be charged with producing a shop number, the power house men with a power house and substation number, the general offices an office number, and we are considering one other number. These special issues, while devoted particularly to their subjects, will naturally contain all matters of interest to trainmen also.

"In starting this new and improved volume, we want to ask the continuance of your past co-operation in giving us little items of news and in writing special articles. We appreciate your help."

LOUISVILLE & INTERURBAN INCREASES FREIGHT BUSINESS

An unprecedented volume of business is being handled by the freight department of the Louisville & Interurban Railway, Louisville, Ky. R. H. Wyatt, general freight agent for the company, stated that several new baggage cars have been put into service and that more such cars will probably be required. The car-lot business generally is handled by the trailers, while the express cars are devoted to package freight. The attention of the freight traffic manager has been directed to providing freight for the return hauls and for the most part it has been possible to keep all cars loaded for both way runs. Numerous specials are used daily on the various lines. From Shelbyville, Ky., the end of one of the branches, the company is hauling 500 hogsheads of tobacco to Louisville. This is trucked into Shelbyville and will supply returning loads for the railway for some time, in connection with other tobacco traffic that is being developed. The shortage of cars on the steam roads has had the effect of practically eliminating competition for the freight department of the Louisville & Interurban Railway, and the company is making the most of its opportunities, incidentally demonstrating to many interurban shippers the superior character of its service.

Close attention is being paid by R. H. Wyatt to keeping all the cars in operation continuously. The same forty-eight hours of free time and the same $1 daily demurrage charges prevail as in the case of the steam roads, but as a rule demurrage is not assessed on the average once out of fifty car lot shipments. In expediting loading and unloading of cars Mr. Wyatt and his subordinates impress on the shipper that they are anxious to get the car on the day after it is delivered.

MUNICIPAL AND PRIVATE LINE MAKE OPERATING AGREEMENT

An agreement has been reached by M. E. Sampsell, president of the Seattle & Rainier Valley Railway, and the city of Seattle, Wash., whereby the city will be allowed to operate cars of the municipal line on Fourth Avenue, down Fourth Avenue to the County-City Building, on Jefferson Street. The common user agreement provides also the exchange of transfers between the Seattle & Rainier Valley Railway and the municipal car lines on a zone basis. A. L. Valentine, superintendent of public utilities of the city, reports that municipal cars operating from Thirteenth and Nickerson Streets to Third Avenue and Stewart Street on Division A will be routed to the County-City Building. Transfers between the city line and the Renton line will be exchanged under an agreement for the equal division of the fares for passengers living north of Hudson Street in Columbia City. On all fares where passengers travel beyond that point to the city limits the Seattle & Rainier Valley Railway will get two-thirds and the city one-third of the fare. The city will pay a rate of 1 cent per kilowatt-hour for the power consumed by its cars on the common-user portion of the Rainier Valley line on Fourth Avenue.

Mr. Sampsell will appeal to the Public Service Commission or to the courts for relief from an order of the commission requiring it to issue and exchange transfers with the Puget Sound Traction, Light & Power Company. He contends that his company is losing $40,000 a year by the exchange of transfers.

ELECTRIC RAILWAY SALES TALK

"Selling Rides" was the subject of addresses delivered to meetings of the trainmen of the Louisville (Ky.) Railway at the first of what will be a series of monthly meetings during the winter. There are two of these meetings, one in the morning and one in the evening, so as to enable all the crews to be present. The first two of these meetings were addressed by T. J. Funk, head of the claim department of the company and for many years superintendent of transportation, and by Frank Cassell, director of sales of the Belknap Hardware & Manufacturing Company, the largest of the jobbing houses in Louisville. Samuel Riddle, superintendent of transportation, also spoke along the same lines.

The men were addressed not merely as operators of street cars, but as the salesmen who dealt with the public in the actual sale of the stock in trade the company sells. In elaborating on the figure of speech the speakers likened the conductors and the motormen to salesmen of various kinds of commodities, in which not only the quality of the article itself had to be considered, but the manner in which it was presented and delivered to the public. The talks were well received and many of the men went away saying that they had formed new ideas as to their relations to the company and to the people they carry daily.

At the head of the stairway leading to the assembly hall in the company's building an electric sign had been erected in which the subject of the addresses, "Selling Rides," was spelled out.

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PORTLAND JITNEY ULTIMATUM

According to an ultimatum of the City Council, jitneys in Portland, Ore., will operate under a franchise as provided in the ordinance passed on July 19 and effective on Nov. 15, or go out of business. This was made apparent by the majority of the City Council at a recent meeting, following a demonstration by jitney men, representatives of organized labor and their friends, favoring repeal of the measure. In opposing the franchise ordinance, and asking its repeal, the representatives of the jitney interests charged that the Council was being influenced by the Portland Railway, Light & Power Company. They declared that the proposal to operate jitneys on streets not occupied by street railway lines would put them out of business. In an effort to show that the jitneys are popular, a petition signed by 16,663 jitney patrons was presented to the Council, in which a request for a repeal of the franchise ordinance was asked.

Although an application for a franchise for the operation of jitneys on various streets of the city has been filed with the Council by the Union Motor Bus Company, the Council has not acted on the petition, but the grant will not be made on the terms sought by the jitney men. The City Commissioners say the jitney should not only be regulated, but should be required to serve districts not now reached by the street railway.

PICK-UP AND DELIVERY EXPRESS SERVICE IN VANCOUVER

For some years the British Columbia Electric Railway, Vancouver, B. C., has been operating an express service over its lines between Chilliwack and Vancouver, a distance of more than 70 miles. This service was operated on the lines of freight traffic except that the movement was much faster, being practically on passenger schedule, and therefore a higher rate was charged than the prevailing freight rates. At the same time, however, these rates were somewhat lower, and in many cases considerably lower than the old line express rates for similar distances.

This service differed from ordinary express service in so far as no delivery was performed at the terminals, nor was the freight picked up for shipment. Recent developments, however, made it advisable for the company to inaugurate in Vancouver a pick-up and delivery service in connection with this express movement. This is being done with no additional charge and no increase in the rate, an electric auto truck making trips sufficient to handle the business offered, both inbound and outbound. At this time it is impossible even to estimate the effects of the improved service, as the change was made at a time when the express traffic, owing to the movement of fruits, etc., was particularly heavy.

HARRISBURG JITNEY MEASURE AMENDED

At the general election in Harrisburg, Pa., on Nov. 7, the voters passed the proposed amendment to the present jitney ordinance. The amendment is the result of the strike of the platform men of the Harrisburg Railways during the summer. For a time during the strike hundreds of jitneys were allowed to operate without complying with the city jitney ordinance, which provides for filing a $2,000 bond by drivers. After the strike was broken and the Harrisburg Railways was again giving adequate service, Mayor Ezra S. Meals insisted that unlicensed jitneys cease their operations and that the jitney rules be enforced. Opposition to the existing ordinance then arose, and an amendment was suggested to Council. Council, however, declined to act on the amendment, and put the matter up to the people to decide by initiative vote. The jitney amendment becomes effective as soon as the official vote is counted and filed. The amendment in brief provides that the jitney owner must file a bond of $50 and pay into the city treasury $5 a month until a fund of $1,000 is raised upon which suit for damages can be brought in case of accident. The license fees are fixed as follows: For the bus carrying not more than seven passengers, $10; more than seven and not more than fifteen, $20; more than fifteen, $30.

ELECTION UNFAVORABLE TO CALIFORNIA JITNEYS

At the election on Nov. 7 several measures passed in California which will place more rigid restrictions upon the operations of jitney buses. The hotly contested rights on Market Street in San Francisco for which the Jitney Bus Association by the use of the initiative had placed a measure on the ballot, was defeated by a majority of 18,000 votes. Both Sacramento and San Joaquin Counties passed regulatory ordinances for interurban buses which are practically the first interurban regulations in the State. In these counties interurban buses will now have to specify and adhere to definite routes, fares will be regulated, and should it be decided that there is no need of the buses under the public convenience and necessity laws, the right to operate can be withheld entirely. The drivers' bond in San Joaquin County becomes $10,000 and in Sacramento County $5,000.

Metal Ticket System Installed in Evansville.—The Public Utilities Company, Evansville, Ind., on Nov. 1, discontinued its use of paper tickets and put in a complete installation of metal tickets and Johnson four-dial fare boxes. The change was made over night, but the public and trainmen were forewarned and educated to the new system in advance of the change by means of special instruction classes for the men and printed circulars and newspaper advertisements for the public.

Reckless Motorists Draw Down Imprisonment Sentences.—In commenting editorially on the increased activity in connection with the apprehension of reckless automobilists in New York, the New York *World* on Nov. 12 said: "Reckless motoring cost those convicted of it $22,991 in Traffic Court fines in October. But it is in the revocation of two drivers' licenses and the twenty-five sentences to imprisonment without the alternative of a fine that the public will derive most satisfaction. These are penalties that count."

Another Massachusetts Road Seeks Fare Increase.—The Norwood, Canton & Sharon Street Railway, Canton, Mass., through its president, M. A. Cavanaugh, has petitioned the Public Service Commission of Massachusetts for permission to increase its fare from 5 cents to 7 cents. The company operates through Sharon and Norwood, in two sections. The first section of the road extends from Day and Washington Streets, Norwood, to the Neponset River bridge between Norwood and Canton. This run is about 3 miles. The second section extends from Cobbs Tavern to Garden Street, Sharon Heights, a distance of 3 miles. The road was built in 1899.

Stormy Weather Demoralizes Jitney Service.—A formal complaint was filed recently with the City Council of Los Angeles, Cal., by the Pacific Electric Railway against the irregularity of the jitney competition which dwindled from 407 machines on a fair day to thirty-five during rainy weather. Due to the sudden shrinkage in the number of jitney buses, the company was obliged to put on extra cars to take care of the traffic. The company points out that it cannot afford to employ additional men, overhaul rolling stock and increase schedules for the few months in the year when jitneys fail to operate on account of wet pavements. In Pasadena eight out of thirty-three buses operated during the rainy days, while in Long Beach less than half the jitneys were running.

New Illinois Traction Map.—The publicity department of the Illinois Traction System, Peoria, Ill., has issued for local circulation a detail map showing the steam and electric lines of Illinois. The map is 19 in. by 27 in. in size, and is contained in a pasteboard folder carrying advertisements of the parlor-car and sleeping-car service. The lines of the company, marked in heavy red, show the main interurban systems from St. Louis 175 miles to Peoria and 220 miles to Danville, together with branches and connecting divisions; also the 110-mile northern system known as the Chicago, Ottawa & Peoria, the Galesburg and its suburban system, and the Cairo system. Smaller insert maps show the Illinois Traction System's entrance over the McKinley bridge and to the terminal in St. Louis and the environs of Chicago, with the most important electric lines indicated in red.

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Personal Mention

William B. McKinley, president of the Illinois Traction System, Peoria, Ill., was re-elected to his seat in Congress at the recent election.

B. C. Cobb, of Hodenpyl, Hardy & Company, New York, N. Y., who with E. W. Clark & Company, Philadelphia, Pa., have taken over the Northern Ohio Traction & Light Company, Akron, Ohio, has been elected president of the last-named company to succeed Henry A. Everett.

Otto Kurtz has been appointed auditor of the Sheboygan (Wis.) Electric Company to succeed August Westermeyer, whose resignation from the company is noted elsewhere in this column. Mr. Kurtz has been connected with the company for several years in the capacity of bookkeeper.

C. O. Snodgrass, supervisor of the Ninth and Brighton division, has been promoted to the Forty-eighth and Harrison Streets division of the Kansas City (Mo.) Railways. This is the largest division, and practically all of the men who have risen through the service have been advanced from it. Mr. Snodgrass succeeds John T. Corrigan.

August Westermeyer has resigned as auditor of the Sheboygan (Wis.) Electric Company, the successor to the Sheboygan Railway & Electric Company, to take over with Edward Hammett, who has resigned as vice-president and general manager of the company, the Northern Furniture Company, Sheboygan, Wis. Mr. Westermeyer was connected with the properties at Sheboygan for fifteen years. He entered the employ of the company there as a clerk. He was born in Sheboygan in 1878.

J. H. Lockett has been appointed superintendent of the Ogden, Logan & Idaho Railway, with headquarters at the interurban terminal in Ogden, Utah. Mr. Lockett has been connected with the Pacific Electric Railway, Los Angeles, Cal., for the last twenty years in the transportation and the mechanical departments. The last six years of his service with that company was in the capacity of general foreman in the mechanical department. Mr. Lockett succeeds J. M. Read with the Ogden, Logan & Idaho Railway.

Norman McD. Crawford, who has been connected with the E. W. Clark & Company Management Corporation, Columbus, Ohio, since March, was elected vice-president of the Columbus Railway, Power & Light Company on Nov. 14 to assist in an executive capacity S. G. McMeen, of the Management Corporation, who is president of the Columbus Railway, Power & Light Company. Mr. Crawford was president and general manager of the Reading Transit & Light Company, Reading, Pa., before he became connected with the E. W. Clark & Company Management Corporation. He was formerly president of the Mahoning & Shenango Railway & Light Company, Youngstown. He was for several years vice-president of the Ohio Electric Railway, Cincinnati, Ohio, and previously for a long time was general manager of the Hartford (Conn.) Street Railway.

Edward Hammett has resigned as vice-president and general manager of the Sheboygan (Wis.) Electric Company, the successor to the Sheboygan Railway & Electric Company, and, with August Westermeyer, has taken over and will manage the Northern Furniture Company, Sheboygan, Wis. Mr. Hammett was born in Wheaton, Ill., and entered railway work with the Aurora, Elgin & Chicago Railroad. He was promoted rapidly while with the Aurora, Elgin & Chicago Railroad, and finally entered the selling field as district manager of the Electric Service Supplies Company at Pittsburgh, Pa. He resigned from that company to become connected with the electric railway and light properties in Sheboygan, in 1910, as superintendent and purchasing agent of the Sheboygan Light, Power & Railway Company. In January, 1914, he was made general manager of the company, to succeed Ernest Gonzenbach. Mr. Hammett is succeeded at Sheboygan by Raymond H. Smith, formerly general manager of the Jackson Light & Traction Company at Jackson, Miss., as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 11.

Henry A. Everett has been succeeded as president of the Northern Ohio Traction & Light Company, Akron, Ohio, by B. C. Cobb, of Hodenpyl, Hardy & Company, New York, N. Y., who with E. W. Clark & Company, Philadelphia, Pa., recently negotiated the purchase of the controlling interest of the Northern Ohio Traction & Light Company. Mr. Everett was born in Cleveland on Oct. 16, 1856. For a number of years he was secretary and treasurer of the East Cleveland Railroad, of which his father, Dr. A. Everett, was president. This was one of the principal constituents of the present Cleveland Railway. Under the Everett regime the company was one of the first to adopt electricity as motive power. After the first consolidation in Cleveland in which the East Cleveland Railroad became a part of what was known as the "Big Consolidated," Mr. Everett entered the independent telephone field and also the interurban electric railway field. One of his first interurban projects was the Akron, Bedford & Cleveland Railway, which is now a part of the Northern Ohio Traction & Light Company. The skepticism of many of the bankers in Cleveland as to the success of interurban railways in the early days, the financial and engineering difficulties overcome and the final triumph of the interurban line between Akron and Cleveland are told by Mr. Everett in an interesting article which appeared in the ELECTRIC RAILWAY JOURNAL for Oct. 8, 1904. In the early nineties also Mr. Everett, with his associate Mr. Moore, took over the Toronto Railway under a franchise offered by the city and installed electrical equipment. Later he was identified with other electric railways and telephone interests in Canada, as well as in several cities in this country and built one of the early electric railway lines in Detroit. The Everett-Moore interests also took over the Toledo Railways & Light Company and Mr. Everett was president of that company until 1908, when he retired on account of ill health. He was also interested in the syndicates which built the Cincinnati, Dayton & Toledo line, the Aurora, Wheaton & Chicago, the Washington & Annapolis, the New York & Long Island Traction Company, the Springfield & Xenia Traction Company and the Scioto Valley Traction Company. At present he is one of the vice-presidents of the Lake Shore Electric Railway, Cleveland, Ohio, and is also interested financially in the London (Ont.) Street Railway, of which E. W. Moore, his associate for many years is president.

OBITUARY

Marshall Rust, president of the Mexico Investment & Construction Company, Mexico, Mo., operating a 16-mile electric railway between Mexico and Molino, Mo., died at Kansas City, Mo., recently, after a long illness.

Redmond Quain, one of he incorporators of the Ottawa (Ont.) Electric Railway and for some years a director of the company, died suddenly at Ottawa on Oct. 5, aged fifty-seven years. Mr. Quain was a native of Ottawa. He was a nephew of Thomas Ahearn, president of the Ottawa Electric Railway. A widow, one son and four daughters survive.

George L. Bugbee, manager of the Pacific Electric Land Company, Los Angeles, Cal., and for years one of the prominent railway figures of the West, died recently following an operation. Mr. Bugbee had been in Los Angeles for the past eleven years, and was auditor of the Los Angeles & Pacific Railway before its consolidation with the Pacific Electric Railway.

Wilbur Fisk Sadler, Jr., adjutant general of the State of New Jersey, and promoter of electric railways, died on Nov. 10 at Carlisle, Pa. General Sadler was taken ill following the mobilization of the New Jersey troops at Sea Girt, N. J. In 1892 and 1893 he built 33 miles of electric railway in Shenandoah, Girardville, Ashland and Mahanoy City, Pa., and a year later built a 19-mile electric railway between Scranton and Carbondale. In 1895 he promoted the electric railway from Pittston to Scranton, Pa. Two years later he assisted in building 33 miles of electric railway from Greensburg to the edge of Greater Pittsburgh, Pa. In 1898, General Sadler removed to Trenton, N. J., and assisted in building the Yardley, Morrisville & Trenton Street Railway and the Philadelphia, Bristol & Trenton Street Railway. General Sadler was president of the Broad Street National Bank, Trenton. He was unmarried.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

Dighton, Mass.—The Bay State Street Railway has received permission from the Public Service Commission to relocate its track on Main Street, at Somerset Avenue, and on Pleasant Street, Dighton.

Springfield, Mo.—The Springfield & Western Railway, which proposes to construct a line between Springfield and Carthage, has asked the City Council of Springfield for an extension of its franchise to January, 1919. The franchise of the company expires in January, 1917. Under its terms the company was required to have 10 miles of the line in operation by that time. J. P. McGammon, Springfield, is interested. [June 12, '15.]

Newark, N. J.—The Public Service Railway has been granted permission by the Board of Works to construct new tracks on Frelinghuysen Avenue, Newark.

Buffalo, N. Y.—Two franchises recently granted by the City Council to the International Railway were submitted to voters for approval at the November election and were carried by large majorities. The franchises give the company permission to lay double tracks and operate cars in Franklin Street between Chippewa and Allen Streets and in Elmwood Avenue, from Hertle Avenue to the north city line.

Belpre, Ohio.—The Town Council has granted to the Kanawha Traction & Electric Company a franchise to install and operate an electric light and power system in Belpre.

Elyria, Ohio.—The Cleveland, Southwestern & Columbus Railway has received a twenty-five-year extension of its franchise from the City Council of Elyria. The contract specifies eleven tickets for 50 cents and permission to extend the tracks to the factory districts.

TRACK AND ROADWAY

Visalia Electric Railroad, Exeter, Cal.—Surveys have been completed, and work will be begun at once by the Visalia Electric Railroad on its proposed extension to Lindsay. The line will enter the city limits from the south, and will use the depot and terminals of the Southern Pacific Company.

Glendale & Montrose Railway, Glendale, Cal.—A report from the Glendale & Montrose Railway states that it will probably build an extension to Sunland, 6 miles.

New York, New Haven & Hartford Railroad, Stamford, Conn.—This company has asked permission to reconstruct its eleven bridges over South Boston streets, at a cost of about $1,000,000.

St. Petersburg-Tampa Railway, St. Petersburg, Fla.—Plans for the construction of a bridge by this company across Old Tampa Bay have been approved by W. B. Ladue, United States Engineer, Jacksonville. The plans provide for three 1000-ft. openings to accommodate small boats drawing not less than 6 ft. of water, and one 5000-ft. opening to accommodate large boats. George S. Gandy, Sr., St. Petersburg, president. [Sept. 16, '16.]

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii.—The board of directors of the Honolulu Rapid Transit & Land Company has authorized the construction of a new 2-mile line from Liliha Street along School Street to Kalihi Road and the sale of $400,000 stock to present stockholders to cover other minor extensions.

Pocatello Traction & Interurban Company, Pocatello, Idaho.—C. G. Haynes of Blackfoot, representing the Pocatello Traction & Interurban Company, reports the project of his company to build an electric railway north from Preston to the Yellowstone, is assured.

Chicago, Milwaukee & St. Paul Railway, Chicago, Ill.—Announcement has been made that the Chicago, Milwaukee & St. Paul Railway has added 110 miles to its electrically operated lines in Montana, extending from Deer Lodge to Alberton. It is expected that work on the fourth and last unit between Alberton, Mont., and Avery, Idaho, will be completed about the first of the year.

Elgin & Belvidere Electric Company, Chicago, Ill.—This company has sold most of the rails belonging to the Belvidere City Railway in Belvidere, and the tracks will be removed on West Lincoln Avenue from the fair grounds to State Street and on South State Street from Logan Avenue to Eighth Street. The track on State Street from the right-of-way of the Chicago & Northwestern Railroad to Harrison Street will remain intact for another year.

Galesburg Railway, Lighting & Power Company, Galesburg, Ill.—This company has opened service on the new North Seminary Street extension as far as Fremont Street.

Chicago, North Shore & Milwaukee Electric Railway, Highwood, Ill.—This company contemplates an extension of the present Libertyville and Area branch that will tap the Lake districts of the county and may ultimately proceed to Woodstock and McHenry.

Murphysboro Electric Railway, Light, Heat & Power Company, Murphysboro, Ill.—This company has purchased a large steel bridge to span the Big Muddy River, between Carbondale and Murphysboro, in connection with its proposed extension to Carbondale. The cost of the bridge was $80,000.

Cumberland Traction Company, Edmonton, Ky.—George H. Greenup, Elizabethtown, Ky., formerly general manager of the Cumberland Traction Company, recently sold at a commissioner's sale, has effected a reorganization of the company, and has bought in property rights, etc. He is making preparations to continue with construction work in the spring. [Oct. 21, '16.]

Cumberland & Westernport Electric Railway, Cumberland, Md.—This company is relocating 4000 ft. of its line to secure easier grades and improve the alignment. The work includes the construction of one steel bridge 24 ft. long and a concrete wall 700 ft. long and 7 ft. high.

Towson & Cockeysville Electric Railway, Towson, Md.—This company contemplates the construction of an extension from Timonium to Texas, Md., about 2 miles.

Northern Massachusetts Street Railway, Athol, Mass.—This company is laying new track from Central Square to the end of the line on West Main Street.

Boston (Mass.) Elevated Railway.—It is reported that an agreement has been reached whereby the Commonwealth of Massachusetts will construct a line to be used for freight service to and from the Commonwealth Fish Pier to be rented by the Boston Elevated Railway. Track construction will be begun immediately after the agreement is signed.

Springfield (Mass.) Consolidated Railway.—Work will be begun by this company on the construction of its proposed extension to Bergen Park as soon as the right-of-way can be secured and railroad crossings arranged for. The property owners along the new line have donated a fund of $2,500 to help in the construction.

City Light & Traction Company, Sedalia, Mo.—Application has been made by this company to the Public Service Commission for authority to issue $29,400 in securities to reimburse the company for betterment expenditures. Additional improvements are planned.

Trenton, Lakewood & Seacoast Railway, Trenton, N. J.—Approval has been given by the Board of Public Utility Commissioners of New Jersey to the Trenton, Lakewood & Seacoast Railway to issue $20,000 certificates of indebtedness and $19,500 of its capital stock. The application filed by the company requested that permission be given to issue $34,000 certificates of indebtedness and $26,000 of its capital stock. In approving a portion of the request the Board stated that it would approve the balance upon submission by its chief inspector of statements that expenditures covering such balance have been actually made. [March 18, '16.]

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Trenton & Mercer County Traction Corporation, Trenton, N. J.—The Board of Utility Commissioners has issued two orders to the Trenton & Mercer County Traction Corporation, one requiring the company to align and resurface its tracks and put the paving in good condition between and alongside of its rails on Pennington Avenue and replace the ties there which have rotted, and one directing the company to resurface a portion of its tracks on Stuyvesant Avenue.

New York Municipal Railway, Brooklyn, N. Y.—Bids will be received by the Public Service Commission for the First District of New York, on Nov. 29, for the construction of the connecting link of the New Utrecht Avenue (West End) Line and the Culver Rapid Transit Railroad in Brooklyn. The section is to be a three-track approach to the Culver Line, about 600 ft. long, rising from the Thirty-eighth Street cut at a point where the West End Line leaves that cut, slightly west of Tenth Avenue and south of Thirty-seventh Street. The approach, beginning in open cut and curving to the northeast, rises to the elevated grade of the Culver Line at a point 371 ft. east of Tenth Avenue. The work to be done is in part open cut and in part embankment between retaining walls. The work must be prosecuted so as not to interrupt continuous train operation over the tracks of the Culver street surface railroad, which operates upon a right of way adjoining the proposed work. The work must be completed within four months of the delivery of the contract.

Southern Public Utilities Company, Charlotte, N. C.—This company is now building 2 miles of additional track in Charlotte, N. C., extending from the Morehead-South Boulevard connection with the Dilworth division toward Myers Park. The track is built on a solid concrete foundation 6 in. thick, with ties spaced 36 in. on center. Seventy-pound T rail is being used, and after the ties and rails are lined up the whole is concreted up to the surface of the rail. The surface of the concrete is floated with a wooden float to provide a wearing surface. As the concreting is being done the space between the rails and 14 in. on the outside is being paved. The remainder of the street is being paved by the property owners.

Minster & Loramie Railway, Fort Loramie, Ohio.—This company, which is operated by the Western Ohio Railroad, reports that it has under consideration an extension to Covington or Piqua, making a through line from Lima to Dayton.

Youngstown & Southern Railway, Youngstown, Ohio.—It is reported that plans are being made by the Youngstown & Southern Railway to construct a line from Columbiana to East Palestine to connect with the line of the Pittsburgh, Harmony, Butler & New Castle Railway.

Tulsa (Okla.) Traction Company.—This company reports that it will construct its extension to Sapulpa within the next six months.

Toronto (Ont.) Suburban Railway.—The Ontario Railway Board has issued an order approving the plans of the Toronto Suburban Railway for change of grade to standard, and renewal of tracks with girder rails where necessary on Dundas Street.

Southern Oregon Traction Company, Medford, Ore.—This company reports that it is building 2 miles of track.

Quebec Railway, Light & Power Company, Quebec, Que.—This company proposes to construct about 4 miles of city and suburban track during 1917.

Cleburne (Tex.) Traction Company.—Operation has been suspended by the Cleburne Traction Company owing to lack of sufficient patronage.

Dallas (Tex.) Southwestern Traction Company.—This company plans to begin construction of its proposed electric line from Dallas to Eagle Ford in the near future. Later the line will be extended to Grand Prairie and Cleburne. E. P. Turner, Dallas, president. [May 20, '16.]

Lynchburg Traction & Light Company, Lynchburg, Va.—Work has been begun by the Lynchburg Traction & Light Company double-tracking its line on Main Street.

Norfolk & Western Railway, Roanoke, Va.—This company contemplates extending electrification on its main line from Vivian to Farm, W. Va., about 11 miles; also an extension up Tug Fork branch from the junction near Welch to Wilcoe, W. Va., about 5 miles, and an extension on the Bluestone branch from Cooper to a point a mile beyond Simmons, 3 miles. Part of the construction will be done by the company's own forces and part will be done by the forces of Gibbs & Hill, electrical engineers of New York, who have been engaged to supervise the construction. With these additions the railroad will have 47 miles electrically operated.

Grays Harbor Railway & Light Company, Aberdeen, Wash.—According to reports, the Grays Harbor Railway & Light Company will call for bids at once for paving between its tracks on Riverside Avenue. If the bids submitted are not satisfactory to the company, it will do the work on its own account. The matter of paving between the tracks has been before the city commission many times during the past few months, and an ultimatum was issued recently by the city, directing that the work be started at once, or the city would barricade the tracks along the street involved.

Seattle & Rainier Valley Railway, Seattle, Wash.—It is reported that $100,000 will be expended by this company in the construction of track and paving of street intersections in the Genessee Street extension and the construction of tracks on Dearborn Street.

SHOPS AND BUILDINGS

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received by the Public Service Commission for the First District of New York on Dec. 4 for the construction of station finish for nine stations on the Seventh Avenue portion of the Seventh Avenue-Lexington Avenue Line in Manhattan. The stations are located at South Ferry, Rector Street, Cortlandt Street, Chambers Street, Franklin Street, Canal Street, Houston Street, Christopher Street, and Fourteenth Street.

Rhode Island Company, Providence, R. I.—A report from the Rhode Island Company states that it expects to place contracts during the next three weeks for a new carhouse at Clyde with a capacity for forty-eight cars. The company has recently placed a contract for an addition to its Cranston carhouse.

POWER HOUSES AND SUBSTATIONS

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—This company has been rebuilding the high-tension wires extending from the power house of the Northern Illinois Light & Traction Company to Spring Valley.

Iowa Railway & Light Company, Cedar Rapids, Iowa.—This company contemplates the installation of a new 100-kw. generating unit at its Guthrie Center power plant.

Cumberland & Westernport Electric Railway, Cumberland, Md.—It is reported that two new power plants are under construction by the Cumberland & Westernport Electric Railway.

Southern Public Utilities Company, Charlotte, N. C.—A contract has been let by the Southern Public Utilities Company to W. W. Johnson, Anderson, S. C., for deepening the tail race and raising the bulkheads at the Portman Shoals hydroelectric plant owned by that company near Anderson, S. C. The deepening of the tail race is expected to increase the output at this plant, and the raising of the bulkheads will protect the power house from high water. The increase in power output is estimated at 20 per cent. The draft tubes to the five hydro-wheels are to be lengthened, as is that from the exciter turbine, and the floor of the power house is to be rebuilt of concrete, on a level 2 ft. higher than the present floor, to provide for better drainage and to escape high water. The new work will cost about $30,000.

Rhode Island Company, Providence, R. I.—This company reports that it expects to place contracts during the next three weeks for a new substation at Oakland and a new substation at Harmony. The company has recently placed a contract with the General Electric Company for equipment for two substations.

Wisconsin Valley Electric Company, Merrill, Wis.—This company reports that it is constructing a new power plant and overhead lines, changing all equipment from direct-current to alternating-current.

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INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases **Business Changes** **Trade Literature**

THE PRICES OF TO-DAY AND OF TWO YEARS AGO

Statistics Are Given Showing an Increase in Many Cases of Several Hundred Per Cent—Some of the Causes Are Analyzed—The Problems of Purchasing

BY E. E. STIGALL

Purchasing Agent, Kansas City Railways Company

The prices of all materials have shown a steady advance during the past two years, and it is a wise idea to watch them closely. The ratio of present prices to the prices of two years ago is shown in Table I. This table gives the prices on materials generally used in street railway construction and maintenance, and in many instances it also shows what this increase means in dollars and cents per unit.

TABLE I—SHOWING PER CENT INCREASE IN PRICE IN TWO YEARS

Material	Requirements	Approximate Per Cent Increase in Present Price as Compared with Price of Two Years Ago
Copper	Overhead system, stations and cars.	220
Steel	Track and shops.	300
Tin	Babbitt, solder, cables and overhead	110
Lead	Babbitt, solder, cables and overhead	200
Spelter	All galvanized material.	200
Alloy metals	Tool steel, special work.	200 to 800
Lumber	Poles, ties and shop work.	125
Leather	Belting	125
Rubber	Belting, hose, insulation.	110 to 125
Cotton	Fabrics, insulation, waste.	130 to 150
Glass	Windows	125
Varnish	Car work	135
Paint	Cars, buildings and pole line.	125
Fibre	Insulation	133⅓
Rattan	Seats and sweepers.	120 to 200
Paper	Stationery and printed matter.	150 to 250
Dry colors	General paint shop work.	400
Linseed oil	Shop work, buildings and pole line.	250
Gears and pinions	Motors and air-brake equipment.	125

Deliveries for material regularly required will vary from thirty days for material in stock, to six months or one year for material from the mill, or where the material is to be manufactured according to order. In addition to the high cost of materials and the extended deliveries promised some materials have become so scarce that one is inclined to the opinion that certain species have almost become extinct.

Care must be exercised by a company in ordering material to avoid the order covering too small or too large a quantity. The temptation to buy in advance large quantities in order to prevent trouble from the stock becoming exhausted is met with the possibility of overstocking against a future decline in price. The cost of carrying stock, of course, must also be considered when large quantities are ordered. The situation can only be met by constantly watching the conditions surrounding all of the material required from month to month and following up the orders after they have been placed.

The unit prices in Table II showing change in cost of particular items will illustrate what the general condition shown above means in added costs to the street railway companies.

In view of the conditions which have surrounded the purchase of staple articles for the last two years, I presume many purchasing agents have been looking for a substitute for the word "speculation." It is apparent that the present prices are based neither on the cost of doing business nor on the intrinsic value of the materials, but are due to a heavy demand throughout the country, resulting in the general policy to charge "what the traffic will bear."

There has been considerable difficulty in obtaining paper without paying an excessive price for it, and the Federal Trade Commission has just made public the statement, following its investigation of these prices, that during one year the common stock of one of the large paper companies went from $10 to $50 a share. This same situation, of course, can be found in connection with the increased prices of other commodities.

Almost every street railway company will doubtless experience considerable difficulty in obtaining coal during the present winter. In my judgment the car shortage is due not only to the fact that the shippers and brokers are using cars for storage when they should be unloaded and released for transportation service, but this shortage has been made more acute on account of the railroads using coal cars for shipping lumber, steel products and other commodities which yield a much greater return per ton-mile than coal. The recent change in the tariff filed by the railroads to become effective on Dec. 1, providing that the demurrage charge will be increased after the first two days' free unloading time, from $1 per day as at present, to a schedule showing a $1 advance for every day a car is held should receive active support. Such a plan will tend to release cars from storage and place them again in transportation service.

TABLE II—SHOWING PRESENT PRICES AND THOSE OF TWO YEARS AGO

		Present Approximate Price	Price Two Years Ago
1	mile No. 00 trolley wire.	$721.00	$327.00
1	No. 00 straight line ear.	.52	.40
1	No. 00 splicing sleeve.	.78	.42
1,000	ft. 9/16-in. steel span wire.	35.70	19.50
1	Steel pole for line construction.	36.00	27.00
100	lb. Steel bars	3.62	1.67
100	lb. Steel sheets	3.95	1.87
100	lb. Steel shafting ½-in.	7.70	2.10
1	lb. High-speed tool steel.	3.25	.65
1	lb. Manganese 80 per cent.	.12	.02
1	Car axle	21.50	11.25
1	Boiler tube 4-in. 18-ft. No. 10.	7.42	3.78
1	Manganese switch and mate.	330.00	170.00
1	Overhead trolley switch.	4.55	3.15
1	Air-brake equipment	230.00	170.00
1	Electrical equipment, 4 motors, 1 controller	3,250.00	2,450.00
1	10-in. valve, automatic stop.	290.00	210.00
1	White oak tie.	.68	.54
1	Leather belt, 2-ply, 8-in. 30-ft.	46.00	34.56
100	yd. Duck, 48-in. No. 8.	78.00	34.00
1	doz. Warehouse brooms	5.50	2.75
10,000	Letterheads, No. 16 bond.	52.50	31.50
10,000	Yellow second sheets.	9.00	3.50

It is obvious that this increased cost of doing business is being absorbed by the street railway companies and cannot be passed along to the patrons as can easily be done in practically every other business. Our terms continue to be 5 cents cash and a universal transfer throughout the system.

HIGHWAY CROSSING SIGNAL INQUIRIES NUMEROUS BUT PURCHASES ARE FEW

Orders for highway crossing signals from steam roads have been very active during the past summer. The Santa Fé road is making a large installation, and other steam roads have planned to protect all the hazardous crossings of their tracks with the Dixie and the Lincoln automobile highways. Electric railway companies have made quite a few inquiries about highway crossing signals during the summer, but no general buying has taken place. In fact, the electric roads have bought very few such signals during the past season, as compared with the purchases of previous years.

The swinging aspect or disk commonly known as the wig-wag, has met with great favor by purchasers of such signals. It has been shown conclusively to the steam roads and to a great many electric lines that a crossing warning by sound alone is not sufficiently effective, particularly on highways much traveled by automobiles. Probably the

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most arrestive aspect for daylight use is the wig-wag design. Some manufacturers, however, have installed with success banks of flashing lamps as a daylight warning to supplement the bell signals.

The installation of a highway crossing signal on an electric road offers a more difficult problem than it does on a steam road. The question of control, which is now obtained in numerous ways, is most important. Some signals are controlled by trolley contractors, others by short sections of third-rail, others by the depression of the running rail, and still others by track instruments. Signals of various makes are operated mechanically by springs, or by different sources of electric energy, such as primary and storage batteries, or by 600-volt current taken from the trolley wires. One manufacturer in conjunction with the engineers of an operating company has recently planned to install some highway crossing signals to be actuated by alternating current and to be controlled by alternating current devices. It is thought that by using alternating current for control and operation the reliability can be greatly increased.

FOREHANDED BUYING MEANS EFFICIENCY

James H. Drew, Indianapolis, Discusses Effects of Different Buying Methods on Manufacturer and Purchaser

In a recent interview with a representative of this paper James H. Drew, president Drew Electric & Manufacturing Company, said, in part:

"The subject of forehandedness in buying, to which the JOURNAL has been giving attention, deserves serious consideration. As the interests of supplier and user in the electric railway field are interdependent, any methods of forehanded buying are of advantage to both. If the manufacturer is able by this wiser buying to make a better product at a lower price, the railway benefits by the lower price.

"According to all indications basic materials will continue at the present high level for some time to come. The largest industrial and utility companies are buying for the second and third quarters of 1917 and even beyond. Immediate deliveries of iron and steel products are to be had only at a considerable premium, if at all. Copper base products of any magnitude are, in that respect, little better. From these conditions the lesson seems obvious, forehandedness in buying is certainly desirable.

"There is the possibility that some international complication may arise to affect our munitions export, which is generally said to be the reason for the present tremendous activity in all lines, but such complications are in nowise forecasted. If we can judge by present reasonable expectations, the war in Europe will continue for at least two more years, and war prosperity in this country will continue unabated. Such being the case the electric railways may expect to have a continued period of bounteous receipts with the attendant requirements for maintenance material and additional equipment. The demand will hold the prices up. As opposed to forehandedness in buying, hand-to-mouth purchasing will be attended no doubt by inconvenience, higher prices and disappointments in delivery.

"Of course, buying too far in advance of visible needs becomes speculation. This, however, is a charge that can hardly be laid to electric railways. Owing to the serious handicaps placed on their financial resources, most of them have not been able in the past to use that principle of forehandedness that good judgment would dictate. I believe, however, that owing to wise publicity and more open methods, the general public is coming to see less of 'horns' and more of 'halo' on the average operator, and this sentiment is bound to be reflected in business and investment circles as time goes on. With the business established as a necessary public institution, financial support will become more stable. Furthermore, a great deal of capital is coming back from abroad and will be available for an investment in American utilities. This is a subject all by itself and will not permit of discussion here. I mention it because money has to do with forehanded buying.

"Most companies, if not all, can and do know their ordinary requirements for several months or a year or two in advance, and the requisitions or estimates of any department should not be pigeonholed for any unreasonable length of time. The evil day (I say 'evil' with a manufacturer's reservation) will surely come when the trolley will wear out or break, or when a certain piece of car equipment will 'go bad,' or when more cars or power-plant equipment will be needed. The order will then have to be placed to keep the line running. Why not take the necessary steps beforehand and have the material ready? If any department is found wanting in efficient operation or economical maintenance it comes in for criticism. A year or so ago one line superintendent stated that he was maintaining his overhead lines (about 400 miles at that time) on emergency requisitions. Sometimes it was a question of 'using a club' to get the materials. This was probably an extreme case, but there are others of similar but less pronounced unforehandedness. As compared to the above example I know of one purchasing agent who saved three and one-half times his year's salary on one purchase by studying the market and buying at the lowest period of that year.

"In emergency buying there are several disadvantages. There is not time for careful consideration in order to secure the material best suited for the conditions. There is not time to get competitive prices, quality and design. The manufacturer who receives the order may have to disarrange his routine to turn out the material in the specified time, a course which will cause him or the buyer or both confusion, delay and additional expense. There is then the chance that the product may not be delivered quickly enough and that it will not be deliberately and carefully made up and inspected. Then, if defects show up in operation and cause the railway customer vexatious and expensive delay or accident he will become prejudiced against that manufacturer's goods and the latter will not only lose a customer but part of that goodwill which is so valuable to all manufacturers who have a loyal interest in the electric railway industry. Orders placed when a department is tied up usually have expensive carriage charges attached. In some instances they have to be installed on the road with overtime labor or under other circumstances which pile up the costs, directly and indirectly.

"In most sections of the country up to this time the weather has been unusually mild. As weather conditions generally average about the same during a year's period, very bad weather for electric railway operation may be expected before next summer. I dare say the transportation of coal and other heavy supplies will be seriously handicapped between now and then. There is even now a coal shortage. When bad weather does come, unless the principle of forehandedness has been applied, it will probably find many companies short of those materials such as trolley splicers, sleet cutters, spare poles, snow-fighting equipment and other materials needed to keep the lines in operation during snow and sleet storms.

"Judging, then, by present conditions, when all manufacturers are running to full capacity and with less stock than usual on hand, and with the delay in getting raw materials, it seems to me that electric railways should by all means go into this subject of forehandedness in buying now. They will thus provide the necessary material and equipment to conduct their service expeditiously and, at the same time, increase their revenues and their economy of operation. By prompt handling of their business they will also secure that other desideratum—public goodwill. By forehandedness in buying they secure the quantity price on the right material and have it when needed. As a result their property is strengthened physically and financially."

WIDESPREAD DEMAND FOR CHESTNUT POLES

"When it is considered that 3,500,000 round poles exceeding 20 ft. in length are used annually by telephone, telegraph, electric railway and light companies, we must naturally consider the future supply of the chestnut pole." This statement and the others that follow were recently made by John L. Fay, sales manager of the Paducah Pole & Timber Company, Paducah, Ky. Mr. Fay pointed out that the general tendency toward central power supply, the increased demand for efficiency and the growing cost for line materials have caused railway and lighting property operators to study carefully the ultimate cost of their transmission and distributing system. The strength of the pole line is another factor that has been prominent of late, owing to the increased need for continuity of service.

There is a large demand now, Mr. Fay says, for chestnut

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poles. A report made by R. S. Kellogg of the United States Department of Agriculture sets forth that 25 per cent of all the poles used by the public utility companies in the United States are chestnut poles. The pole purchasers generally are becoming better acquainted with chestnut, and this is evidenced by the fact that when Mr. Fay's company first started in business it was able to sell chestnut poles only in its own locality. However, as time has proved the comparative high strength of the chestnut pole and its great life, Mr. Fay cites that those companies which are now paying special attention to the strength of their lines have increased their demand for chestnut and the field has broadened so that it has of late been a large task to meet the requirements for supply.

With regard to the future, Mr. Fay's company has shown its faith in the possibilities for the sale of chestnut poles by acquiring, in addition to its 15,000 acres of chestnut timber, sufficient chestnut pole stumpage not only to care for the present heavy demand but for the unquestionable additional demand that will come in future years.

CLEARING-HOUSE FOR ECONOMIC INFORMATION

National Industrial Conference Board Formed to Study American Industrial Problems and Report to All Concerned

To prepare the industries of the United States for the economic changes that are to follow peace in Europe, the National Industrial Conference Board, representing the twelve most important industrial organizations in this country, has been formed. This announcement was made on Nov. 15 at the twentieth annual convention of the National Founders' Association held in New York City.

The general aims of the board, as described to the convention by Magnus W. Alexander, its manager, who is assistant to the president of the General Electric Company, include a clearing-house of economic information, a forum for constructive discussion, and machinery for co-operative action on matters that vitally affect the industrial development of the United States. Explaining in greater detail, he said: "The essential point is the purpose of the conference board to study every problem and its development, to resolve it, if possible, into its essential facts for the information of the public, of government, of labor and all the members of the various associations represented in the board." The new organization, it was stated, would seek to influence legislation only by the presentation of facts and arguments carefully studied and of a character leaving no doubt as to their accuracy.

The twelve industrial organizations forming the conference board comprise 15,000 employers, who furnish industrial employment to about 7,000,000 workers in the United States. Frederick P. Fish of Fish, Richardson, Herrick & Neave, attorneys, is chairman of the board. The membership of the board as announced included the National Founders' Association, National Metal Trades Association, National Council for Industrial Defense, National Association of Manufacturers, National Erectors' Association, National Association of Cotton Manufacturers, American Cotton Manufacturers' Association, National Association of Wool Manufacturers, Silk Association of America, United Typothetae and Franklin Clubs of America, American Paper & Pulp Association, and the Rubber Club of America.

In discussing at the convention the subject, "How Shall Manufacturers Contribute to American Industrial Progress?" E. W. Rice, Jr., president General Electric Company, predicted that troubles will begin in this country when the war ends. He continued: "One of the most interesting industrial problems awaiting a satisfactory solution is that of real co-operation among the men and women engaged in industry. The lack of understanding and confidence is largely due to lack of knowledge of each other, and this knowledge is lacking in the manufacturer as well as in the wage earner."

At the annual banquet of the National Founders' Association on the evening of Nov. 15, Mr. Fish, chairman of the new conference board, said in the course of an address on "Industrial Co-operation": "During the next ten years the United States will be confronted by new and complex problems in industry and finance. It is impossible to predict how serious these problems may be, but it is safe to say that the only way to meet them is by a knowledge as perfect as possible of the fundamental facts and causes existing in the situation. It is necessary at the outset to know precisely the condition of things as they are to-day, to understand the various elements entering into our manufacturing industry, and to analyze and study all the points which go to make for a prosperous manufacturing industry."

STEEL RAILS AND COPPER TAKE BIG JUMP

United States Steel Corporation Announces Advance in Steel Rails of $5 a Ton—Copper Reaches Highest Point of Year

An advance in standard steel rails of $5 per gross ton has just been announced by the United States Steel Corporation, this being the second advance since the first of the year. The increase, which is effective immediately, makes Bessemer rails $38 and open hearth $40 a ton f.o.b. Pittsburgh, Pa.

Angle bars and fish plates also advanced $5 a ton and wrought-iron pipe advanced $2 a ton.

On Tuesday of this week the price of electrolytic copper had advanced to 32.5 cents nominal for prompt delivery. The advance during the week was 2.75 cents. Prices of copper, which have been advancing daily for the past ten days, are making new high records for the year. Prompt second-hand copper was offered early in the week at 33 cents, 32 cents bid. Already bids have been made for first quarter delivery at 30.5 cents, with 31 cents asked. For the second, third and fourth quarters the metal is being held for 30.5, 29.5 and 29 cents, respectively.

So great has been the demand both for European and domestic consumption that even at these greatly inflated prices there is but a small percentage of 1917 production remaining unsold.

NEW INTERESTS IN THE HESS-BRIGHT MANUFACTURING COMPANY

To correct misleading rumors, the Hess-Bright Manufacturing Company, Philadelphia, Pa., announces that a group of bankers, including Frank A. Vanderlip, Philip W. Henry, Thatcher M. Brown and Franklin B. Kirkbride, of New York, and Marcus Wallenberg of Stockholm, have recently acquired from the American group of stockholders a controlling interest in the shares of the Hess-Bright Manufacturing Company. This group of bankers owns also a substantial interest in the S. K. F. Ball Bearing Company of Hartford, Conn.

The two companies will be operated quite independently of each other. The former policy of the Hess-Bright Manufacturing Company will be continued, except that its manufacturing facilities will be increased somewhat more rapidly to meet the constantly growing demand for its product. B. D. Gray, who retains his former stock holdings, will continue to manage the business as president. F. E. Bright retires from active participation in the company's affairs, but remains identified with the company as chairman of the board. Aside from these two changes the organization remains as before.

The directors are: F. E. Bright, chairman; B. D. Gray, president of the Hess-Bright Manufacturing Company; Willard Parker Butler, New York; Arthur V. Morton, vice-president of the Pennsylvania Company for Insurance of Lives and Granting Annuities, of Philadelphia; and Paul von Gontard, managing director of the Deutsch Waffen und Munitions Fabriken, Berlin, Germany.

COMMISSION TO STUDY LUMBER MARKET ABROAD

A commission to be financed jointly by the government and by the lumber interests will shortly be appointed for the purpose of studying the lumber markets abroad. The members of this commission will be experienced in timber production, manufacture of forest products and marketing forest products and will visit all the important European countries.

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ROLLING STOCK

Seattle & Rainier Valley Railway, Seattle, Wash., are in the market for a one-man car.

Seattle & Rainier Valley Railway, Seattle, Wash., are in the market for thirty fare boxes.

Monroe Street Railway, Monroe, La., is reported to be in the market for three new street cars of the latest design.

Detroit (Mich.) United Railway is purchasing fifty trail cars and may buy several interurbans within the near future.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has ordered five city cars from the St. Louis Car Company.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., will shortly purchase two passenger and two express interurbans.

Chicago (Ill.) Surface Lines have ordered ten city cars from the American Car Company, St. Louis. These cars will conform to the design of the last order for 228 cars.

Hydro-Electric Power Commission, Toronto, Ont., has ordered two interurban cars from the Jewett Car Company for the London & Port Stanley Railway.

Lake Shore Electric Railway, Cleveland, Ohio, noted in the ELECTRIC RAILWAY JOURNAL of Oct. 21, 1916, as being in the market for fifteen 60-ft. motor cars, is said to be considering the purchase of sixteen trail cars.

Mason City & Clear Lake Railroad, Mason City, Iowa, is contemplating the purchase of two one-man cars for city service and also two electric locomotives for handling freight on their proposed belt line around Mason City.

Hodenpyl, Hardy & Company, New York, N. Y., and E. W. Clark & Company, Philadelphia, Pa., are reported to be considering the purchase of at least sixty city cars and twenty interurban cars to be used by the Michigan Railway Company and the Northern Ohio Traction & Light Company.

Southern Public Utilities Company, Charlotte, N. C., has ordered six double-truck cars from the Southern Car Company of High Point, N. C., for use on the Charlotte system. These cars are to be similar in every respect to the six purchased from the same company in the spring of 1915, and will become a part of what is known as the "70 series." They are to be 38 ft. 2 in. long, 8 ft. and 7½ in. wide. They will be equipped with two 750-volt motors, maximum traction trucks, air brakes, 750-volt air compressor, electric heaters and ventilators, Ohmer fare registers, inclosed vestibules with folding doors and step, and projecting type fenders.

TRADE NOTES

Perry Ventilator Corporation, New Bedford, Mass., has received an order to equip with ventilators the fifty cars being built by the Laconia Car Company for the Boston Elevated Railway.

Lord Manufacturing Company, New York, N. Y., has received an order for 100 Horne double-acting brakes for the fifty surface cars being built by the J. G. Brill Company for the Boston Elevated Railway.

Sherwin-Williams Company, Cleveland, Ohio, manufacturer of paints and colors, celebrated its jubilee anniversary this week at the Hotel Statler, Cleveland, Ohio, at which salesmen, agents and representatives from all parts of the world were present.

Westinghouse Electric & Manufacturing Company, Westinghouse Lamp Company and R. B. Nuttall Company, announce the removal of their San Francisco offices to the seventh floor of the First National Bank Building, 1 Montgomery Street.

Vaughn, Meyer & Sweet, Consulting Engineers, Majestic Building, Milwaukee, Wis., have recently changed their organization, returning to the original firm name of Vaughn & Meyer, after the recent dissolution and the withdrawal from the firm of Arthur J. Sweet. F. A. Vaughn and H. J. Meyer will continue to conduct the same engineering activities with their present organization as they have been doing for years past.

Westinghouse Air Brake Company, Pittsburgh, Pa., at its last annual meeting created the position of chairman of the board and H. H. Westinghouse was elected to that office. John F. Miller, who has been vice-president of the company since 1905, was elected to the office of president. A. L. Humphrey was made first vice-president and general manager. Charles A. Rowman, heretofore auditor, was promoted to the position of comptroller, and John T. Eichner, formerly assistant auditor, was made auditor.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., reports the receipt of a contract from the New York Connecting Railways, New York, N. Y., for all the catenary hangers used in its construction. It has also received an order from the Pittsburgh (Pa.) Railways for 25,000 2/0 15 in. bronze trolley ears and an order from the Timber Butte Milling Company, Butte, Mont., for a 60-ton, double-truck locomotive, equipped with four 600-volt motors and HL control. This locomotive will have single end straight automatic air brake equipment and a pantograph trolley.

C. S. Hawley has resigned as president of the Laconia Car Company and of the Consolidated Car Heating Company to accept the position of treasurer of the Remington Arms-Union Metallic Cartridge Company, Bridgeport, Conn. Mr. Hawley, who was elected president of the Consolidated Car Company in 1909, left to become president of the Laconia Car Company in 1912. He again became president of the Consolidated Car Heating Company in 1916. Mr. Hawley has also taken an active part in the affairs of the American Electric Railway Manufacturers' Association, serving as a member of the executive committee from 1908 to 1912, as chairman of the finance committee in 1908, as vice-president from 1909 to 1912, and as president of the association from 1913 to 1914. No successor to Mr. Hawley has been named in either of the two companies above mentioned.

ADVERTISING LITERATURE

Chicago Pneumatic Tool Company, Chicago, Ill., has issued bulletin 34-X on its Giant gas engine. This is a horizontal, straight-line type engine with crosshead, and two stroke cycle operation, built as a single cylinder machine in sizes from 16 to 110 hp. and as a duplex machine from 70 to 220 hp.

Peter Smith Heater Company, Detroit, Mich., has just issued bulletin No. 8 on forced-ventilation electric heaters. In this 20-page bulletin are shown schematic diagrams of this type of heater, illustrations of the heater and blower, motor fan and of a forced-ventilation electric heater and control installed on a city car.

Electric Railway Improvement Company, Cleveland, Ohio, has issued a thirty-two page booklet on the early history and present facts regarding the installation of rail bonds by electric and copper welding. This booklet illustrates and describes the different types of electric weld bonds for the different types of rails.

Holden & White, Chicago, Ill., general sales agents for the Garland Ventilator Company, have issued a comprehensive catalog on car ventilators and ventilating systems. It first deals with the ventilating problem from the viewpoint of the transportation department, because car ventilation is of prime importance to successful passenger service. This catalog describes the condition which must be overcome in order to give a properly ventilated car, and shows why the ordinary deck sash is ineffective. For the mechanical department, a complete description is given of twelve types of car ventilators, including those for city, suburban and interurban cars, both monitor and arch-roof types. Among these is a ventilator for use in combination with lighting fixtures, a combination intake and exhaust ventilator, two types of intake ventilators, and two of forced ventilation. The importance of cowls is emphasized by illustrations to show the action of the air currents induced by these cowls. An interesting chapter describes the ventilators in tests, and shows the volume of air passing through the ventilators in cubic feet per hour, both tabulated and in chart form. A comparison of these ventilators with other ventilators is also graphically illustrated. Considerable space is given to the following subjects: Intake and exhaust; intakes; circulating or balanced ventilation; Garland forced ventilation. All of these subjects are of particular importance at the present time. A chapter is devoted to this company's honeycomb ventilator for carhouses and power houses.

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Electric Railway Journal

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ARE SPECIAL PEAK LOADS PROFITABLE?

The idea is widely held by the public that extraordinary peak loads are highly profitable to a modern urban electric railway system. Take the case of the recent World Series of baseball games and consider merely the traffic problem in the winning city of Boston. At first blush it would seem that the traffic to and from Braves' Field, about 3 miles from the center of the city and reached in part by a new and efficient subway line, would be a bonanza to the operating company. Forty thousand persons attended some of these individual games, but does this mean that the company profited to anything like the extent implied? Not a bit of it. This journal holds no commission from the Boston Elevated to minimize the value of such traffic, but let us consider a few pertinent points. In the first place, the company has invested something like $50,000 in a pre-payment station bordering the ball grounds, in order that the traffic may be expeditiously moved and with minimum possible interference to the travel on the adjacent main lines traversing the district. The annual charges on such an investment at say 8 per cent consume the entire revenue of no less than 80,000 car-fares. These are covered in the course of a season probably several times over and need cause us little concern. The extra operating cost involved in the series, however, is quite another matter.

SPECIAL PEAK OPERATING EXPENSES

On account of the early travel to the field, it was necessary to inaugurate short-interval service on various lines early in the day and to hold many extra platform men for hours. It is possible that six hours' service might be required of say 300 men, and extra meals furnished by the company at a cost of perhaps $100. Extra station labor involved perhaps thirty to thirty-five extra employees, including special officers. To these should be added say twenty inspectors on the street, and crews had to be stationed at different points to handle any trolley wire failures, switch troubles, etc. Without any exact detailed figures before us, it is clear that the extra cost of handling the extra cars required (much of the traffic being long-haul business) might run up to $1,000 or more for a single game. To meet this outlay, 20,000 fares must be taken and the full total of such receipts applied to the extra cost, obviously an impracticable course. Furthermore, money must be expended on various minor car repairs after such a traffic peak, broken car windows being frequent, and the extra labor costs, it should be noted, include the expense of concentrating cars on temporary sidetracks near the grounds during the games. One more point may be mentioned, and that is that if there was no game a large proportion of the traffic would be handled by the company twice during the day anyway, many patrons of the game going directly from office to grounds and thence homeward at the close of the contest, so that the railway receives extra pay for only one haul. It does not require any very exhaustive calculations to show that even a World Series group of games may actually cost a company like the Boston Elevated money instead of pouring the fat surplus into the treasury which the passenger himself pictures as a result of the crowded grandstand.

TAXING THE POOR MAN'S CAR

Several thinking members of the transportation committee of the Chicago City Council, according to newspaper reports, have come to the conclusion that in Chicago the car rider does not get the full value of his nickel in transportation, and that, in the words of a certain cartoonist, "it's all wrong." They see no reason why the passenger should pay for street pavements, street cleaning, snow removal and other municipal services, instead of having such items charged against general and special taxation as in the East. Their conclusion is that the poor and middle classes which use the street cars are being taxed for the benefit of the rich users of autos and taxis which benefit from these street improvements but bear little part of the cost. Aside from the fact that taxing methods as regards electric railway companies are not so different in the East and the West as the examination of the Chicago aldermen on their recent trip to the Atlantic Seaboard apparently led them to think, the conclusion of the aldermen is not far wrong. If city legislative bodies could get the idea firmly fixed in their heads that the payment of paving charges by electric railway companies means the taxation of the poor man's car for the benefit of the rich man's auto, there would probably be a much fairer distribution of the burden. As we have many times pointed out, these taxes have been retained largely because it was thought to be easy to raise them in that way, but when they are added to the present cost of labor and materials in electric railway operation, the margin in profit in transportation practically disappears in the case of most railway properties. This means that these burdens will have to be removed and placed where they belong or passengers on electric cars will have to pay a higher fare than they do now. Adjustment of this matter has been too long delayed, and the time has come when present conditions rather than the practice of forty years ago should control the allocation of these charges.

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SERIES MOTORS AS GENERATORS

In connection with the description of the regenerative braking scheme used on the Chicago, Milwaukee & St. Paul locomotive, published in our issue of Oct. 21, a question has been raised as to the propriety of saying that the main motor fields are "super-excited" while the locomotive is regenerating. In connection with this query attention has been directed to the fact that in general when a series motor is used as a generator the field terminals are reversed with respect to their connection with the armature so that the field flux may remain in the same direction when the current reverses. In the St. Paul engines, however, the fundamental principle herein involved is complied with, without mechanical reversal of the field terminals, as is explained below. The applicability of the term "super-excitation" is evident from the following facts:

When emf. is applied to the terminals of a motor, the armature automatically attains such a speed that, neglecting the resistance drop in voltage, a counter emf. equal to the line emf. is generated. As the only effective elements here are the speed and the field flux it follows that in any constant potential motor there is a definite field flux corresponding to a given speed. If at this speed the field flux is increased by any means, a point will be reached at which there is an exact balance of line voltage and counter emf. and no current will flow. Of course, under these conditions it will be necessary to supply mechanical power from some source to keep up the speed. If now the field flux is still further increased and sufficient mechanical power is supplied, the machine becomes a generator. This justifies the use of the word "super-excitation," which simply expresses the fact that, at a given speed and line voltage, more field flux is required when a machine is operating as a generator than as a motor.

In the St. Paul locomotive it will be remembered that for regeneration the field flux is held, by means of a motor-driven exciter, in the same direction that it had when the locomotive was drawing power from the line. The connections of the main and exciter circuits were clearly shown in the diagrams on page 892 of the issue referred to. The exciter is provided with two field windings, a shunt winding and a series winding, which series winding carries all of the power current and opposes the exciter field as the regenerated current increases. The exciter is out of circuit except when the machine is regenerating. As the armature and line current must reverse when the machine changes from motor to generator it follows under the latter condition that, although still connected in series, the armatures and field windings have currents in opposite directions. The exciter armatures form, as it were, a by-pass for the line current, shunting it around the field windings and at the same time supplying exciting current to the fields. Essentially, this is the same as reversing the field terminals.

The exciter, of course, does a great deal more than maintain the flux in the proper direction, as it absolutely controls the braking operation. The automatic control is adjusted to hold the exciter field current constant, and this with the reversed series ampere-turns of the exciter's field tends to give a constant braking effort at a given setting of the braking controller. The exciter further affords a most delicate manual control of the braking.

We have used a great many words to explain a simple matter, but as the equipment of the St. Paul locomotive is so unique and must, in future, be so frequently referred to as the pioneer application of d.c. regeneration on a large scale, the fundamental principles should be held clearly in mind.

MINIMIZING LINE TROUBLES

In the early days of interurban railroading the roads were short, and the question of transmission line troubles never bothered anybody very seriously. Today, with the network of transmission lines necessary for feeding the substations of a large traction system and for supplying energy in many instances to outlying communities, line troubles may be matters of serious importance, not only to the railway company, but to its pole line neighbors as well. Such troubles are highly "contagious," and unless proper precautions are taken and proper protection provided, trouble caused by a faulty insulator, an accidental ground or a local thunderstorm may spread quickly to other parts of the system network.

For the localization of disturbances, and thereby the minimization of trouble as far as the system as a whole is concerned, it was brought out in a discussion at the last convention of the American Institute of Electrical Engineers that the isolation transformer has been used with gratifying success. This transformer has a one-to-one or other low ratio of transformation, and its function is to insulate sections of a network from each other while linking them together electrically.

Alternating-current lines belonging either to the transmission network or to a lower voltage distributing circuit, while operating satisfactorily as far as the actual transmission or distribution of power is concerned, often give trouble by causing noises in neighboring telephone circuits. With the increasing tendency of many railway companies to supply power to neighboring communities, the number of cases of such trouble in which railway men are interested has naturally increased. In many instances these cases of inductive interference can be remedied by better insulation and proper transposition of the telephone circuits. In other cases, as, for instance, when two wires of a three-phase circuit are extended to furnish single-phase service, the electrostatic unbalance which results sometimes produces noise troubles which no reasonable amount of transposition will remedy, and the use of an isolation transformer at the end of the three-phase circuit often offers the cheapest and best solution of the problem. The isolation transformer is by no means a panacea for all the ills that beset railway transmission networks and their interlinked distributing circuits, but it is felt that in the past its advantages have not been sufficiently emphasized.

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How Are Complaints Handled on Your Road?

Would Your Patron Be Surprised if Greeted Thus?

IS it a fact that complaints from your patrons are welcomed?

And when a complaint comes in do you investigate it and satisfy the man who made it?

Is it your attitude that every complainant is per se a Pestiferous Person?

Or is it that EVERY COMPLAINT IS AN OPPORTUNITY to correct something that is wrong or to satisfy someone that the complaint is unjustified?

If the railway's attitude toward complaints is the right attitude—in other words, if it answers the last question in the affirmative—it should let people know that this is the fact, not to flaunt its virtues, but to encourage more complaints;

It should show the public that here is a road in connection with whose service it IS worth while to make a kick.

For about the most fatal thing for people to believe about any public institution is that complaints are ignored and that "it is no use to say anything."

This feeling has hurt all sorts of public utilities; it rankles in a man's mind to feel that he has been misused and is unable to secure redress.

A determination to get even some way is quite human.

On the other hand, A COMPLAINT COURTEOUSLY RECEIVED AND PROMPTLY REDRESSED USUALLY MAKES A STAUNCH FRIEND.

Complaints are so valuable that they should be advertised for; hotels and shops beg their patrons to complain when they are not satisfied; why shouldn't railroads do the same?

The man or men handling railway complaints and the Publicity Department should work so close together that no one can tell one from the other.

Without a publicity man a railroad doesn't know half of the time what's hurting it, and the other half of the time it doesn't care as much as it should about the public impressions that a publicity department will correct.

These Talks have discussed principally the general or common misunderstandings between the public and the utility company, and how to correct them.

Don't let thousands of individual grouches be added annually to the grievances, real or fancied, that the public holds as a group.

No railroad can afford to do this.

And for very much the same reasons no railroad can afford to be without a Publicity Department.

Such a department represents an investment in good will, from the lack of which railroads are suffering more than from any other one cause.

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New Bonding Methods Developed for 150-lb. Third-Rail

Cast-Copper Bond and a Spot-Welded Joint with Copper Splice Bars Soldered to the Web of the Rail Are the Two Types of Bonds Used by the New York Municipal Railway Corporation

ALTHOUGH the total length of all bonds forms a small part of the length of the positive feeder layout of any railway system, still the bonds constitute one of the most important links of the power circuit, and a great deal of attention has been given them by the engineers engaged in the new rapid transit work in New York City. The purpose of this article is to describe the methods of installation of the two types of bonds which have been developed by the New York Municipal Railway Corporation and used by it for bonding the 150-lb. third-rail on its portion of the dual system of rapid transit.

The shape of the rail, together with the heavy current and severe traffic conditions, required the development of a method of bonding different from any previously used. The thickness of the web of the rail is 2¾ in., and it was decided that this would not permit the use of a compressed terminal bond. It was also decided that any bond which projected below the base of the rail was undesirable because it would necessitate a special spacing of rail joints to avoid interference with the third-rail insulators and anchors.

THE CAST-COPPER BOND

The first bond developed to meet these conditions was a cast-copper splice which has been used for the bonding of about 75 miles of third-rail. The bond consists of two copper lugs, 5 in. in length, which are cast on the web of the rail. The joint thus formed will stand a tensile stress of 30,000 lb. without deformation and 60,000 lb. before fracture occurs. The electrical conductance of the joint is equal to that of an equal length of the unbroken contact rail, the conductance of this rail being about one-seventh that of annealed copper.

The accompanying illustrations show the steps in the installation of this bond. The surfaces of the rail which are to come in contact with the bond are first ground to remove the scale and rust and give a bright, clean contact surface. An electrically driven hand grinder is used for this purpose, the operation being done by one man in about twenty minutes. A carbon mold is then placed around the joint and held in position by two iron clamps, care being taken that the rails are in perfect alignment. After the mold has been placed, the cracks between it and the rail are filled with plaster of Paris. One man can place the mold and make it ready to receive the molten copper in about ten minutes. Instead of filling the cracks between the mold and the rail with plaster of Paris, a later practice has been to use a sand mold having a carbon lining. As soon as the mold is ready, the copper which is melted by a special furnace is poured into the mold, and after it has cooled for a few minutes the clamps and the mold are removed. Heavy lugs on each side of the bond proper are cast simultaneously with the bond itself and are for the purpose of heating the rail sufficiently to insure a perfect weld between the copper and the rail. That this is obtained is shown by the presence of a considerable amount of iron in the bonds that have been removed. After the joints have cooled, these lugs and other superfluous metal are cleaned off, and the bond is trimmed to the proper dimensions. The in-

THIRD-RAIL BONDING—COMPLETED CAST COPPER BOND

THIRD-RAIL BONDING—THREE OPERATIONS IN INSTALLATION OF CAST COPPER BOND: GRINDING THE RAIL, PLACING THE MOLD, POURING THE COPPER

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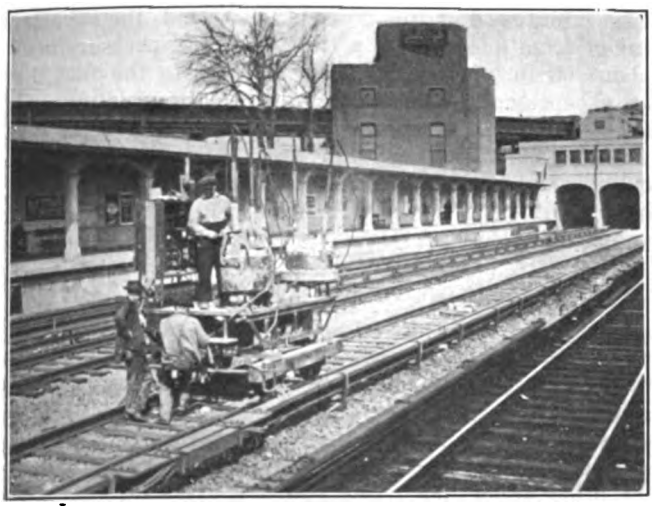
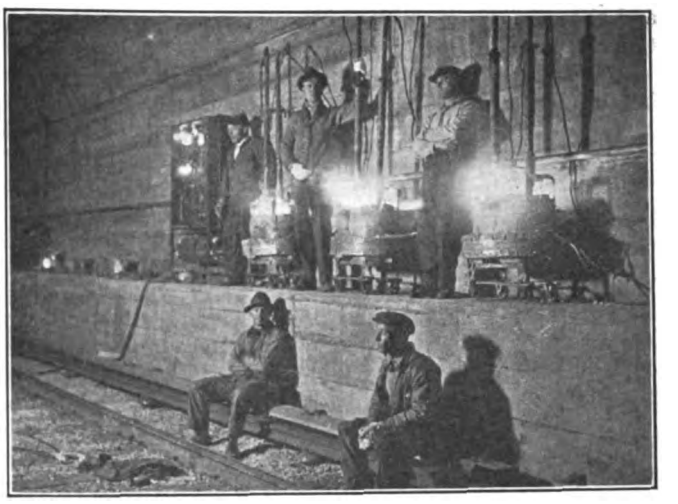


THIRD-RAIL BONDING—ELECTRIC FURNACES FOR HEATING COPPER ERECTED ON SPECIAL TRUCK HAVING THIRD-RAIL SHOE



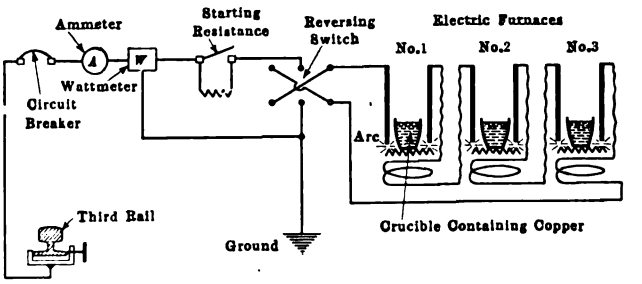
THIRD-RAIL BONDING—ELECTRIC FURNACES FOR HEATING COPPER BEING OPERATED IN SUBWAY WHERE CLEARANCE IS SMALL

stallation of these bonds was made by the Electric Rail way Improvement Company, Cleveland, Ohio.

FURNACES FOR MELTING THE COPPER

The furnace which was first used for melting the copper burned kerosene for fuel. In this furnace combustion was secured by discharging the vaporized oil through a small nozzle at a velocity sufficient to generate an induced draft of air. For the operation of one furnace a small air pump, operated by hand in the manner of an ordinary blow-torch, was sufficient to supply the necessary pressure for the oil. It was found, however, that the efficiency of this furnace depends on the quality of the wall material, since the volume and direction of the induced draft of air was affected by the deterioration of the walls of the combustion chamber. The difficulty in maintaining a proper furnace lining was one of the reasons which led to the use of the electric furnaces.

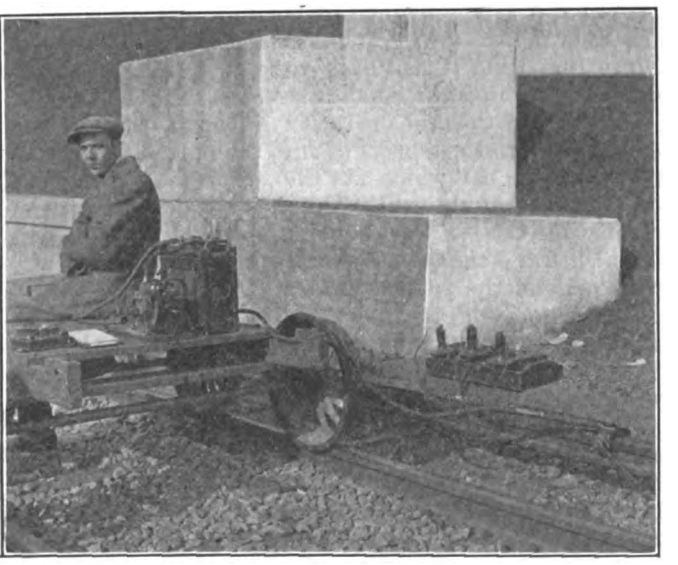
The electric furnaces are operated in batteries of three. One of the accompanying illustrations shows a battery of furnaces in operation in the subway where the space is limited. Another shows the furnaces and control apparatus installed on a flat car which is equipped with a shoe for taking the current from the third-rail. The method of wiring the furnaces is shown in the design reproduced below. The current enters each furnace through a long vertical terminal which holds a carbon rod that can be raised and lowered by a ratchet attachment. An arc is maintained between this rod and a bed of granular carbon on the bottom of the furnace. The current passes through this



THIRD-RAIL BONDING—WIRING DIAGRAM OF ELECTRIC FURNACES

bed, through the second arc similar to the first and out by the long vertical terminal on the other side of the furnace. From here it passes through a coil around the base of the furnace, the object of the coil being to create a magnetic flux parallel to the arc for the purpose of steadying it. From this coil the current passes to the next furnace. The furnaces have an oval shape,

THIRD-RAIL BONDING—SPOT WELDING A JOINT WITH OXY-ACETYLENE WELDING TORCH



THIRD-RAIL BONDING—TESTING EQUIPMENT MOUNTED ON HAND CAR AND CONNECTED TO THIRD-RAIL

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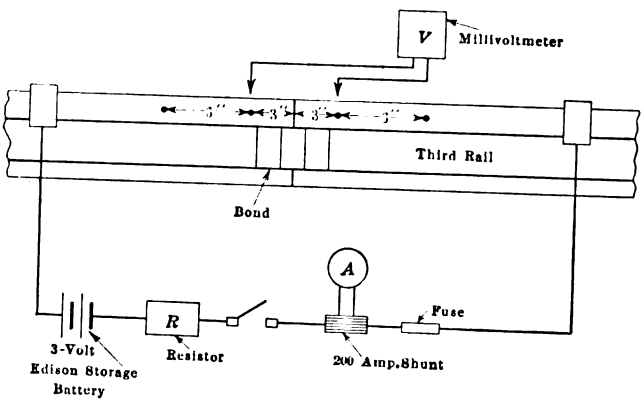
and the crucible containing the copper rests on the bottom between the two arcs.

The operation of the furnaces is as follows: Before the current is turned on, all the carbon terminals are lowered until contact is made with the granular carbon bed. The current is then applied through the starting resistance, and the arc terminals are raised until arcs of proper length are obtained. The length of the arc is judged by the drop in potential across the terminals of the furnace, a voltmeter being provided for this purpose. When the arcs are established the starting resistance is short-circuited. The three furnaces are connected in series across a 600-volt circuit, and an average current of about 200 amp. is used. Heats can be made every thirty minutes.

The difficulties in obtaining pure copper and in getting satisfactory deliveries owing to the market conditions caused by the European war led to the development of the second method of bonding.

THE SPOT-WELDED JOINT

In this method two copper splice bars bolted and soldered to the rail furnish the necessary conductance, while the required strength and stiffness is obtained by welding the abutting ends of the rail together at the top and on the side of both of the bottom flanges. The mechanical strength of the bond is such that the rail can be raised 6 in. by a lever placed under the joint, and this operation can be repeated six or eight times without any sign of fracture appearing. The conductance obtained is greater than that of an equal length of unbroken rail. This method of bonding was described in the ELECTRIC RAILWAY JOURNAL for Aug. 12, page 282. Since that time it has been possible to obtain further details regarding the bonding process.



THIRD-RAIL BONDING—WIRING DIAGRAM OF TESTING EQUIPMENT

Before the welding operation is begun, the abutting ends of the rail are brought into alignment, and a temporary splice bar which fits the web tightly is clamped on each side of the rail. This holds the rails in alignment while the top weld is being made. After this weld is finished the clamps and the temporary splice bars are removed and the bottom flanges of the rail are welded. In making a weld, the operator first burns out the metal or cuts it away mechanically at the point where the weld is to be made and then fills up the space with Norwegian iron, which he melts off from a ¼-in. rod.

The welds can be made with either an electric arc or an oxy-acetylene blow torch. In the electric arc welding a d.c. generator driven by a small gas engine supplies the necessary current. The positive terminal is connected to the third-rail, and the operator holds the negative terminal in his hand. The arc is started by merely touching the negative terminal to the third-rail. The rails can be welded at the three points in about fifteen minutes. For the oxy-acetylene welds the oxygen is taken from one tank at a time, the hose pressure being about 60 lb. per square inch. Owing to the fact that an exceptionally large tip is used on the welding torch, the rate at which the acetylene is used is greater than with ordinary welding. For this reason three acetylene cylinders are used at once to feed the torch, about 6-lb. hose pressure being used. About 19 cu. ft. of oxygen and 21 cu. ft. of acetylene are consumed for each joint.

APPLICATION OF THE COPPER BAR SPLICE PLATES

After the rails have been welded together the next step is to apply the splice bars. These bars, which are the product of the American Steel & Wire Company, are made of copper, tinned with a heavy coating of hard solder. One of the bars for each joint is drilled in the shop and is used as a templet for drilling the rail and the other splice bar. Any rough projections that have been caused by the welding are cleaned off with a cold chisel, and the splice bars are placed on each side of the rail at the joint. They are held in position during drilling by two clamps. The drilling of the rail and one splice bar in a single operation while the other splice bar is used as a templet insures a true fitting of the bolt. The drilling of each hole requires about 20 minutes, a weak solution of soap and water being the only lubricant used.

The clamps and splice bars are then removed, and the surfaces of the joint which come in contact with the splice bars are ground until they are smooth and shiny. After being ground the abutting ends of the rail are heated until a bluish color appears by means of a kerosene blow torch having two burners. The splice bars are then heated while the rail is being tinned. This done, the bars are bolted in position with the heads of the bolts on the track side of the third-rail. Extra solder is applied through grooves in the splice bar provided for the purpose, and the bolts are tightened until the superfluous solder is forced out. About twenty minutes is required for the application of the splice plates. The splice and bond is then complete and ready for testing.

ELECTRICAL TESTS

The specifications require that the electrical resistance of the bond shall not be greater than an equivalent length of third-rail. The testing equipment comprises a two-cell Edison storage battery, a variable resistor made of carbon blocks, an ammeter with suitable shunt, and a line switch and fuse, all connected in series, and a millivoltmeter for measuring the drop in potential along the rail. By means of a wooden jig, punch marks are made on the side of the head of the rail 3 in. and 9 in. from the abutting ends. These punch marks are brightened up with a drill just before the test is made. The apparatus is then connected to the rail, and the current is adjusted to 200 amp. The drop of potential along 6 in. of rail including the bond is read and compared with the potential drop along the adjoining 6 in. of rail on either side of the bond.

The safety-first movement in Illinois is credited largely in the last year with having cut the number of accidental deaths by railways and electric lines 286, and the number of persons injured 1489. These figures are contained in the first annual report of the accident division of the engineering department of the State Public Utilities Commission. A comparison of the accidents on the electric railways for the years 1914 and 1915 shows a decrease from 188 killed and 2174 injured to 186 killed and 1246 injured.

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The Public Relations of Public Utility Companies*

Honest Publicity Is a Sequel to Honest Action and Honest Purpose—The Proper Attitudes of the Utility and the Authorities Defined

BY JUSTUS I. WAKELEE
Associate General Solicitor Public Service Railway, Newark, N. J.

IN discussing the question of public relations, much has been said about publicity, and we are almost led to think that publicity is a remedy for all our ills. Of course, we want publicity, but it does not matter very much whether we want it or not, we get it, we live in it, we are surrounded by it. The very nature of the business brings it. This has always been so. In the past, when any utility corporation attempted to get away from it and conceal something, somebody was sure to let go a torpedo, and the dark place was opened. This is as it should be.

Honest publicity is certainly essential to proper public relations, but honesty of action and honesty of purpose are still more important. Therefore, publicity is not the beginning and end of our public relations. Utility companies, in addition to publicity, need more fully to develop a corporation character that, when known to the public by some proper scheme of publicity, will gain for them the public confidence to which they are entitled.

DIFFERENCES BETWEEN UTILITIES AND PRIVATE BUSINESS CORPORATIONS

Public utility corporations are different from private business corporations, although they have some of the attributes of the latter. Thus, they have stock privately owned. The stockholders elect the directors who manage the business. They own property which is just as much private property and entitled to the protection of law as the merchandise on the storekeeper's shelves or the furniture in your houses. The only difference is that the utility company has dedicated its property in the streets for public use, and it must be used within the undertaking. Right at this point is where many people go wrong. They think that because the property of the utility is in the street and is dedicated to the public use, somehow that property belongs to the public. This is not so. It belongs to the company, but it must be used in the street according to the undertaking of the company, and this brings us to the public side of these utilities. While they have some of the attributes of private business corporations, they also have some of the attributes of a public or municipal corporation. In furnishing transportation, gas and electric power to the people, they are rendering a service which is in a sense exactly the same as the city government renders in repairing the streets, maintaining markets and the like, except that the utility corporation usually does its work better and more economically and the utility cannot conceal bad management or increase the tax rates to make up for the losses. But the state has gone further than simply permitting these utilities to organize and do business. Many of the utilities have the power to condemn land in case the owner does not desire to sell. Then they have the right to use the public streets under certain conditions, and finally they are made practically monopolies.

The state, however, reserves to itself the power to compel the utility to carry out its agreement, to perform its undertakings and to furnish adequate, safe and proper service at reasonable rates. It also reserves to itself the right to say what is adequate service and what is a reasonable rate. Right here is another side track upon which many minds run. Many think that because the state has reserved the right to decide what is proper service and what is a reasonable rate, that the state has reserved the right actually to manage the property and dictate the use of the property, whether such is within the undertaking or not. My opinion is that because the state reserves to itself the right to decide upon the service and the rate, the state should recognize more fully than it apparently does the reciprocal duty to protect the corporation in the exercise of its legitimate functions. The companies because of their public character are entitled to such protection. As the companies have no right without a corresponding duty, they have no duty without a corresponding right.

*Abstract of an address presented at the company section meeting at Newark, N. J., Nov. 16, 1916.

THERE IS REALLY A UNITY OF INTEREST

I have pointed out the reciprocal rights and duties, and I have indicated the line-up—the directors and officers of the company on one side and the legislature, the public service commission and the municipal governments on the other. This is not a hostile line-up, however. The forces of the corporation are not going out to battle against the forces of the public, and the wise statesman will not lead the forces of the public against the forces of the corporation.

Let us go a step further and see whom the directors and the officers of the corporation represent, and whom the legislature, the commission and the municipal governments represent. On the side of the utility we find the owners of the stock and bonds of the company, all those who have money in the savings banks which invest in these stocks and bonds, all those who have policies of insurance in companies which invest in these securities. We find a great army of employees and their families and those depending upon them, and finally the customers of these utilities—those who take the gas or the electric current and who ride upon the cars.

On the side of the legislature and the municipal government, we find the very same people. Who are these people? In large measure they are those interested directly or indirectly in the securities of the public service companies. They are the employees and the families of these employees in public service companies. They are the patrons and users of these utilities. So, as we analyze the situation, the line between the corporation and the people fades away. It is one great army in which there are several officers, all of them having different duties.

WHAT IS THE PROPER ATTITUDE OF THE UTILITY TOWARD PUBLIC RELATIONS?

Now the question arises, if the utility companies carry out their part of the contract, properly perform their functions, what attitude should these utilities take upon the subject of public relations? The companies can control their own attitude upon this subject even if they cannot be influential in determining the attitude of the public. To bring about proper relations between the public and the company, I suggest two things: The first is for the utility acting through its officers and employees to do its full and complete duty, to fulfill its every obligation, and give the public adequate, safe and proper service at a reasonable rate. The second is for the utility fearlessly and publicly to demand its rights and insist that the other representatives of the people, namely, the legislature, the commission and the municipal governments recognize the

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right of the utility and give to it the protection to which it is entitled.

When I said that the first requirement is for the utilities to do their duty, I do not mean that in any narrow sense. They should not wait until they are forced. I believe that utilities should, in a large way, take the lead in all matters along the lines of their particular business. They should develop. They should advance.

While the first requisite of public utility companies is to do their duty and fulfill their obligations, the second requisite is just as important. It is that the companies fearlessly and publicly demand their rights. The company should be firm and unafraid in putting forward its side of every question. When unfair demands are made, the reasons for refusing should be carefully and fully explained, but the unfair demands should be firmly refused. When bills are introduced in the legislature, as they are every year, the design or the effect of which would be to injure the utility, the companies would fail in their duty if they were not heard in protest and explanation. Whenever the interests of these companies are being discussed, they should be represented, whenever action is being taken which affects their welfare, whether in the courts, the legislature, the municipal councils or anywhere else, they should be heard. The people expect this and would not excuse failure brought about by lack of proper representation. It should not be overlooked, however, that the ability to carry out all this which I have called the second requirement depends upon the manner in which the companies carry out the first requirement. It is the fact that these companies are doing their duty which gives them the standing and the strength to demand their rights and protect themselves against attack.

Having in mind these contractual relations between the companies and the public and having described the parties to the contract and recognizing the necessity on the part of the company fully to perform their duty and fearlessly to demand their rights, I am ready to join the procession and advocate publicity as a final requisite to bring about proper public relations. In this country public opinion is the final authority. No institution can exist without the approval of the people nor can it long survive possible distrust.

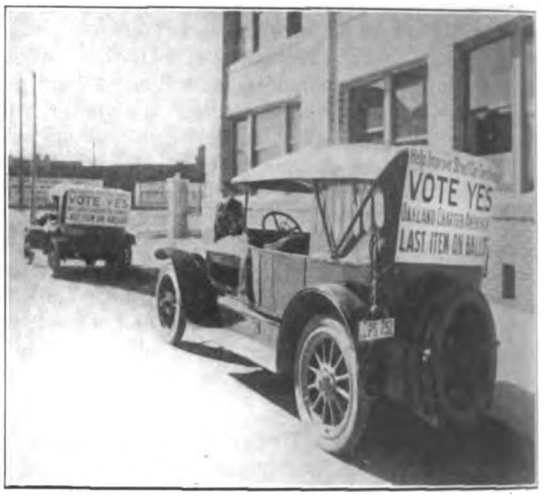
THE DUTIES OF THE OFFICERS AND EMPLOYEES

Now a word about ourselves, the officers and employees of these companies. What should our personal attitude be on these public questions? As I have met you men I have not seen any difference between you and the men employed in other occupations. Everybody I meet around here seems to be a normal human being. We spring from different races, we go to different churches, we belong to different political parties. This is as it should be. We are part of the people. Therefore, we should act as part of the people, and we should not permit ourselves to be put in a class by ourselves or to be treated as if our employment in these companies makes it impossible for us to act as other citizens. The best way to combat this idea is to let people know the facts. We can be the best publicity agents for our companies. We know these companies are honestly conducted, let us boldly stand up and say so. We know that these companies are not seeking a special favor of such advantage, let us not hesitate to make that plain to the people.

In conclusion, let us do our duty. Let us demand our rights. Let us take the public into our confidence. If we take this attitude fearlessly and maintain it we shall command the respect of the public, and, in addition, we shall respect ourselves and each other.

How the Public Helped

HOW the public responds generously when the problem of securing better public relations is well handled by an electric railway was clearly shown in connection with the recent adoption of charter amendments in Oakland and Berkeley, Cal., as noted in last week's issue. These amendments, in the nature of an enabling act making possible the adoption of a resettlement plan for the San Francisco-Oakland Terminal Railways, were passed by a three-to-one vote, largely owing to the interest of various civic clubs and the personal appeals made to the voters.



SIGNS ON PRIVATE AUTOMOBILES USED TO BRING OUT FRANCHISE VOTE IN OAKLAND AND BERKELEY

On election day friends of the amendments who owned automobiles were on hand to see that voters thought to be favorably inclined toward the measure were taken to the polls. Citizens wholly unknown to the company telephoned and offered the use of their automobiles. How some of these machines carried a message to the public is shown in the accompanying illustration.

Throughout the whole campaign the general public was on the side of the company, and this is believed to have been due to the publicity policy which the company followed in recent months. The public in operating and construction matters was taken into the company's confidence, and the result speaks for itself.

The National Research Council and the Bureau of Standards

The National Bureau of Standards has been asked to co-operate with the National Research Council in mobilizing the research facilities of the United States. This council was organized at the request of President Woodrow Wilson by the American Academy of Sciences, but Congress has made no appropriation to the Department of Commerce to enable the Bureau of Standards to participate in the work. The council comprises representatives of departments of the federal government, of engineering societies, of the research laboratories of industrial corporations and others. The aim is to make it possible for college and other laboratories to co-operate in the large research enterprises. In view of the increasing demand upon its facilities, as exemplified by the above, it is understood that the Department of Commerce will ask Congress at its next session for increased appropriations. Such an appropriation should receive the support of all who profit by the work of the Bureau of Standards.

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Railway Commissioners Meet in Capital

Reports by New Public Utility Committees Overshadowed by Those Dealing with Question of Federal Versus State Regulation—Tendency Toward Centralized Control Attacked

ALTHOUGH the committee organization of the National Association of Railway Commissioners was expanded last year to provide for greater attention to problems affecting utilities other than steam railroads, the reports of the four new utility committees on rates, service, safety, and statistics and accounts which were presented at the annual convention in Washington, D. C., last week, occupied a quite subordinate position. Taken as a whole, they covered important points in utility regulation, but in most cases they were simply received and filed with little if any discussion. At practically all of the sessions, from Nov. 14 to Nov. 17 inclusive, the big topic of discussion was the inadvisability of exclusive federal control of interstate carriers and other utilities. The association was in general opposed to any abolition of the present dual system of regulation, and it favored legislation by Congress authorizing the courts to determine which is the reasonable rate in the case of conflict between federal and state commission orders.

PUBLIC UTILITY RATES

The first report of the other-than-steam railroad committee group dealt with rates. Although this specifically covered only electric, gas and water companies, it aimed to bring together in concise form the more important principles, theories and practices connected with utility rates. Starting with the fundamental statement that rates must be just and reasonable so as to produce a fair return on the fair value of used and useful property, the report stated that the total return should be such as to provide for the cost of economical and efficient operation, taxes, depreciation, a fair net return on the value of the property devoted to public use and a proper margin for the successful conduct of the business. The fair amount to be set aside for depreciation would vary with local conditions, and could be determined only by careful accounting for a long term of years. The composite life of the plant, determined from the probable length of life of its various parts, would give the percentage for a working basis, which should be subject to such modifications as experience required.

The fair rate of net return, the committee stated, would vary widely with local conditions. In general, the legal rate of interest might properly be taken as a standard of measure of the fair rate of net return to be distributed to the stockholders, but this might require modification to fit cases which were exceptional in the amount of risk connected with the investment. If a business was of a permanent and stable character, and free from irresponsible and destructive competition, the rate of net return might well approach that on bonds and savings-bank investments. On the other hand, when an exceptional element of risk pertained to the business, as in obsolescence of plant or obvious possibility of competition of other substitute service, a rate substantially above the legal rate of interest might fairly be allowed. The legal rate of interest is 5 per cent in three states, 6 per cent in thirty-one states, 7 per cent in eight states and 8 per cent in six states. The rate of net return allowed should be such that new capital would be available for the extensions and improvements necessary for the proper development of the business.

The committee felt that some allowance should be made in the rate of return authorized as well as in the rate of dividends distributed when necessary in order that the business might become firmly established with a substantial surplus within a reasonable length of time. Exceptional efficiency of management should receive consideration and encouragement. It was deemed a sound business principle worthy of general adoption "that decreased costs and increased profits due to skillful and wise management shall be shared in lower prices to the public and higher dividends to the stockholders."

The report was signed by Thomas W. D. Worthen, New Hampshire, chairman; M. H. Aylesworth, Colorado; Robert C. Bacon, Vermont, and John J. Treacy, New Jersey.

The discussion of this report concerned, in the main, lighting rates. It was suggested by a utility representative that "value of service" as a rate basis might well be considered to a greater extent, but the commissioners did not see how the question of service value entered the case if they knew what the term meant. In regard to the advisability of basing rates for municipal service on the same principles as those for private service, Commissioner Walter A. Shaw, Illinois, thought the plan all right in theory, but mentioned various snags in the form of ordinances, tax limits, etc., that would make it difficult in practice. The report was simply received without adoption and ordered printed.

PUBLIC UTILITY SERVICE

In the opinion of the committee on public utility service, patrons of a public utility are more dependent upon the public service commission in the matter of correcting unsatisfactory service than they are in the matter of securing reasonable rates. The report described the general features of commission work in checking and regulating service, and then discussed in detail questions arising in connection with different classes of utility service.

Taking up the electric railway group, the committee stated that the obligation of a local carrier to render adequate service at a reasonable rate is fundamental. What is adequate service and what is a reasonable rate, as applied to the different classes of service, are questions which cannot be determined by standard rules applicable to all classes. As to service, the problem of a smaller locality is different from that of a larger. Whereas in a smaller community the riding population can adjust itself to the carrier's schedule of service, if it fairly meets their needs, the larger community demands that the carrier adjust itself mainly to the requirements of the riding public, including the shifting of tides of traffic. In metropolitan and interurban service, the questions of rush-hour and non-rush hour traffic are intricate and difficult, owing to the great difference between the demands in equipment, motive power and labor of each class. Even the differences existing between the more extended rush-hour period of the morning and the restricted, more congested rush-hour period of the evening are factors which increase

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the difficulties. The use of the nickel as a fare unit, and the statutory provisions limiting the rates chargeable by railways, add other features to be considered.

In the opinion of the committee, the questions may be local in application, but they are extensive and country-wide in interest. The equipment used by street railways, both rolling and stationary, should at all times be in a safe operating condition. Nothing can excuse a disregard of this prime duty. The character of the equipment should be determined by capacity and traffic requirements. It is obvious that a fixed number of cars should not be prescribed without reference to the carrying capacity of those cars. In adopting a particular type of car, carriers should seek to provide additional seats rather than additional standing room.

The main elements in schedules of operation, the committee said, are (1) accommodation furnished by seats for passengers, (2) frequency of operation, and (3) limiting points of loading and traffic movement. The first two elements apply to service in all localities, the last element mainly to metropolitan operation. It is not sufficient to provide a comfortable riding place for each passenger boarding a street car, when he is obliged to wait for a car for so long a time as to result in inconvenience. Adequacy of service cannot be obtained where passengers have to wait an unreasonable length of time for cars. Of course, demands as to frequency of service may be unreasonable. Short of that, the public is entitled to liberal consideration, as encouraging more frequent use of facilities, assisting communal development and promoting the carrier's prosperity.

The rush-hour evil in large centers of population is one which, the committee thought, may not be easily eradicated. It may be minimized by routing and terminal facilities. Distribution of population through various routes and lines will relieve the pressure from particular lines. Avoidance of terminal congestion by methods of operation and trackage arrangement is also vital. Excess loading, however, is almost inevitable, but the degree of excess should be regulated. Carriers have sometimes asserted an absolute right to operate cars with a percentage of standees during rush-hour periods. Such a right does not exist. Excess loading can generally be prevented during non-rush hours, and if it cannot be avoided during rush hours it should be minimized.

Congestion at loading points, caused either by density of passenger traffic or by physical or track limitations, is a problem largely metropolitan. By providing a sufficient number of guards, controlling the course of ingress and egress, and using informative signals, a good deal of this trouble can be obviated. The adoption of traffic rules to regulate the movement of vehicles on streets is another means of relief.

Public service commissions are usually vested with authority to require reasonable extensions of mains or lines of various classes of utilities. Their powers with regard to street railway extensions, however, are limited on account of charter, franchise and property-owner rights. Yet, in the committee's opinion, the full benefits of regulation cannot be obtained without power in the commissions to require extensions of street railways in cases where the existing facilities do not go far enough. There need be no more apprehension as to whether this power would be exercised reasonably than there is now with reference to the power over gas, electric and water services.

In conclusion, the committee made the following general recommendations:

1. That the matter of regulating the service of public utilties, other than steam railroads, be vested (as is now done by many of the states) in the public service commissions of the various states.

2. That each state commission establish standards of service for each class of public utilities within its jurisdiction.

3. That inasmuch as some kinds of public utilties are not confined to state boundaries, some uniformity of standards is desirable, to the end that a single enterprise, doing business in several contiguous states, may not be required to observe a different standard in each state.

4. That each state commission prescribe forms, upon which the various classes of public utilities shall be required to keep a record of the important factors that indicate the character of the service of each utility.

5. That each commission establish and maintain a service division to inspect and from time to time determine the quality and character of the service furnished by the various public utilities.

6. That each commission recognize at all times the importance of adequate service to the public, and that it take such steps as may from time to time be necessary to insure the furnishing of adequate and efficient service by public utilities.

The report was signed by Richard Yates, Illinois, chairman; John M. Kinkel, Kansas; H. B. Shaw, Missouri, and Travis H. Whitney, New York, First District. At the conclusion of the report it was moved that the recommendations be adopted by the association, and it was so voted.

SAFETY OF OPERATION OF PUBLIC UTILITIES

The committee on safety of operation of public utilities reported that the subject covered such an extensive field that it probably could not be dealt with satisfactorily from the standpoint of discussion or recommendation. In its opinion, probably the corporations which have made the greatest advances in improving the safety of operation are the electric railway and the electric light and power corporations. It was the view of the committee that commissions should have full power and authority to make orders covering operating matters affecting safety whenever they seemed to be required. There are so many opportunities for corporations, however, to benefit financially and otherwise by making their operating conditions as safe as possible that the committee felt that the matter might be safely left with the utilities primarily, and that the work of the commissions should be principally devoted to investigating operating conditions, from time to time giving advice to the corporations with reference to such operations and making recommendations concerning them whenever it seemed proper to do so. If the corporations understood this to be the attitude of the commissions, there was no reason why there should be any friction between the interested parties. The report was signed by James O. Carr, New York, Second District, chairman; C. F. Foley, Kansas; R. W. E. Donges, New Jersey, and S. S. Kendall, Colorado.

After presenting the report, Commissioner Carr read a dissenting opinion by H. D. Loveland, California. Commissioner Loveland was of the opinion that to secure uniformity in the operating methods of various classes of utilities, it was often necessary that the initiative be taken by somebody having authority. It would appear, therefore, that the commission having jurisdiction would be the proper source for the initiation and formulation of rules having as an object the safety of operation, and that the co-operation of the utilities should be expected and required. Tentative regulations should be drawn up, conferences held with the utilities, etc., to the end that the final determina-

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tion might be incorporated in an order specifying definite rules which would be reasonable and effective.

As a last word on the report Commissioner Carr then made the following statement:

"From our experience we believe that by co-operation with the corporations, and by suggestions, and as Mr. Loveland says by conferences, operating conditions will in nearly every case be so carried out as to produce safety for all who are interested, the public, the employees of the corporation and the corporation itself. It is going too far to require the commission to undertake to prescribe rules and regulations for the corporations. From my individual standpoint the commission has no right to tell the corporation how it shall conduct its business. It has the right to make orders requiring the corporation to do certain things, but when it commences to prescribe rules and regulations for the conduct of its business as such, I think it is going too far. The same result is accomplished by the order of the commission, and then the corporation can make its rules and regulations as it sees fit.

"The corporations have much more incentive to study the question of safety than any of the commissions can possibly have, because the corporations are the ones directly affected through their pocketbooks; and what affects them through their pocketbooks is likely to obtain quite careful consideration. Another thing which is tending to cause great strides to be made in this direction is the formation of the national associations of the various classes of public utilities. These deal with the subject in a broad way, and as the result of investigation and consideration adopt certain standards, which in turn are almost uniformly adopted by the corporations. In the event that the local corporations do not comply with the rules for safety which have been adopted as national standards, the commissions are in a position to bring the matter to their attention and urge the adoption of the standard rules."

At the end of the discussion it was voted that the majority and minority reports should merely be received and printed.

STATISTICS AND ACCOUNTS OF PUBLIC UTILITIES

According to the report of the committee on statistics and accounts of public utilities, there are now only eleven states which have not provided for publicity of accounts of electric railways. Nearly all the delinquent states are essentially agricultural, with relatively small urban populations. Of the thirty-eight states in which reports are provided, the commission in thirty-two is authorized to prescribe accounts and in twenty-six accounting classifications have been adopted. The newest utility brought under supervision is the bus company. At least five state commissions exercise jurisdiction over this service, but none apparently has yet prescribed accounting classifications. The form of report devised for street railways is readily adapted to the city autobus company and has given entire satisfaction thus far in New York City, which has one large bus corporation. Outside the large cities bus operations are on a small scale and a very simple form of report is said to be all that is required.

About one-half of the thirty-eight states requiring detailed reports of electric railways use the Interstate Commerce Commission's form in consequence of statutory enactments designed to prevent conflicting accounting requirements for interstate carriers reporting to both federal and state authorities. The inclusion of electric railways under such laws, the committee stated, was a mistake which has been rectified by amendments of the statute in some of the states, as in New York. In New York City, which is in the midst of a program of rapid transit extensions costing more than $350,000,000, the expenditures are being classified in accordance with the accounting system promulgated by the New York commission in 1908, six years before the Interstate Commerce Commission adopted a uniform system of accounts for electric railways. In the opinion of the committee it is hardly to be expected that the New York commission will revise its accounting regulations for the sake of removing some differences between them and the rules subsequently prescribed by the federal body, which has jurisdiction over one or two of the New York City companies and a small number of interurban companies outside the city. The intent of Congress, as shown in recent laws, to leave electric railways subject to state regulation must be recognized.

Most of the remainder of the committee's report was devoted to the subject of depreciation. In fifteen states there are special enactments requiring the utilities to maintain depreciation reserves or conferring authority upon the supervisory body to make such requirements. Seven additional states have exercised such authority as a matter of accounting just as the Interstate Commerce Commission has done, without any other authority than to regulate accounting procedure. These twenty-two states embrace most of those that supervise the purely local utilities like gas, electric and water companies. In fifteen other states, telephone and electric railway companies are subject to the requirement, either under federal or state regulations, while only nine states (besides Delaware and Utah, which have no state commissions) have not taken action so far, namely, Connecticut, Georgia, Kansas, Nevada, North Carolina, Oklahoma, Vermont, West Virginia and Wyoming.

In most cases the statutes go beyond the mere requirement of a depreciation account in that they confer power on the commission to fix the rates of depreciation and require the company to spend the money reserved for depreciation under regulations prescribed by the commission. A review of the action taken by the commissions under these statutes indicates that they are proceeding with caution in establishing rates and regulations as to the use of depreciation funds. In nearly every state orders have been issued only after thorough investigation in individual cases involving the determination of rates or the approval of security issues. Both the straight-line method and the sinking-fund method of computing depreciation are used—the former in nearly all cases in which reproduction cost is used as a rate basis, and the latter in many cases in which investment is taken as the rate basis.

The report then went on to say that the public interest which requires public supervision of utility accounting necessarily requires public determination of rates of depreciation. The commissions were therefore urged to ascertain and prescribe depreciation rates of individual companies as soon as possible, and, until such individual investigations had been completed, to require utilities to make depreciation charges at some minimum rate, which might approximate 3 per cent on the entire fixed capital of manufactured gas companies and 3½ per cent in the case of electric companies. Such a requirement, it was thought, would secure some degree of uniformity in a field where there now exists perplexing diversities.

Lastly, the committee approved the idea of an association of statisticians and accountants of public utility commissions. The report was signed by A. F. Weber, statistician, New York, First District, chairman; Arthur A. Lewis, Washington; Joseph B. Eastman, Massachusetts; B. W. Waltermire, Ohio, and Henry S. Lyon, statistician, New Jersey.

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The action of the association on this report was confined to referring to the executive committee the section dealing with the organization of a separate association of commission statisticians and accountants, and that dealing with the question of federal commission jurisdiction over local utilities incidentally engaged in interstate commerce, and also to merely receiving the remainder of the report without adoption. Thus the proposal for minimum depreciation rates for gas and electric utilities was dismissed with only a short discussion. Commissioner Thorne, Iowa, stated that it was time for definite uniform accounting forms to be developed for all commissions, but that he would hesitate to commit himself to such principles as that of having uniform depreciation rates as suggested. Able steam railroad experts had testified that they were taking care of depreciation of freight cars out of repairs and renewals, in which case an allowance for a depreciation reserve would constitute an absolute duplication. A company that rebuilt its cars, charging the cost to operating expenses, would keep them in service for a longer period. If such a company were allowed to set aside the same amount for depreciation as a company which did not rebuild its cars, but abandoned them for new equipment, the proper depreciation treatment would not be given in both cases. In his opinion, the policy of each company would have to be considered before a commission could prescribe the proper rate of depreciation. Commissioner Walter A. Shaw, Illinois, believed that the commission should not be bound in any of their findings by the adoption of the report.

FEDERAL VS. STATE REGULATION

The first indication of the attitude likely to be taken by the association in the matter of federal versus state regulation came at the very beginning of the convention, when R. C. Prentis, Virginia, president of the association, in his opening address opposed exclusive federal control of interstate carriers. President Prentis said that there was an organized movement having for its ultimate object nothing less than the absolute elimination of the state commissions from all jurisdiction over interstate rates, and that the movement was inspired and fostered by the railroads. If the movement should succeed the work of the last thirty years in building up state regulation would be lost. The most serious complaint now made against the present dual system of regulation was the lack of uniformity, but it would not be wise to destroy the very agencies through which such uniformity as did exist had, in great measure, been secured. The great work of the association, he asserted, had been in promoting and securing uniform laws and regulations, and if the state commissions were shorn of their powers the cause of regulation would be hindered. President Prentis stated that the state commissioners would in the future, as in the past, unite their efforts with those of the members of the Interstate Commerce Commission so to amend the commerce act as to enable the latter commission the better to perform the service which the country desired it to perform.

In welcoming the state commissioners, Balthasar H. Meyer, chairman Interstate Commerce Commission, took up the question of co-operation between federal and state regulatory bodies and referred particularly to a conflict of rates arising in the "Shreveport" cases. He suggested what he believed to be a promising step in the direction of progress in railway regulation, namely, in Shreveport cases to provide by law for the co-operation of the state commissions and the Interstate Commerce Commission and thus to give their joint and co-operative efforts a definite legal status. Under such a plan the investigation would be conducted jointly by the state commissions and the Interstate Commerce Commission. Every state commission directly involved would be given an opportunity in accordance with law to participate in the deliberations and to assist in formulating the final conclusions upon a record jointly made. The one rate within the zone of reasonableness established through the joint efforts of the respective commissions would then apply to all business, state and interstate, and thereafter there could be no Shreveport case in that territory and with respect to that commodity.

The plea of Commissioner Meyer for co-operation in a matter where the courts have ruled the federal commission has the higher power, however, was not favorably acted upon by the association. Following a recommendation of the first of the general committees, the committee on state and federal legislation, the association adopted a resolution to the effect that for the settlement of disagreements between federal and state commissions, Congress should restore to the courts the power of saying what is a reasonable rate. The association almost without dissent favored the Sheppard bill, which provides that before a carrier may disregard a state rate in favor of a federal rate it must procure the decision of a court of competent jurisdiction holding the state rate to be unreasonable.

The committee on federal and state legislation, composed of L. B. Finn, Kentucky, chairman; Clifford Thorne, Iowa; H. F. Bartine, Nevada; P. W. Dougherty, South Dakota; H. T. Clarke, Jr., Nebraska; E. Northcott, West Virginia, and J. S. Harlan, Interstate Commerce Commission, made other recommendations, including one for the creation of subordinate regional commissions for the Interstate Commerce Commission. This was indorsed with a reservation of the right of appeal or review in proper cases. A proposal to amend the commerce act so as to give to the federal commission "the power to compel proper publicity as to the issuance of all securities made by interstate common carriers, however they may be authorized," was sent back to the committee.

CAPITALIZATION AND INTERCORPORATE RELATIONS

The elaborate report of the committee on capitalization and intercorporate relations, the second general report, which was somewhat in contradiction to the report of the committee on federal and state legislation, was read and simply received with little discussion. This report was signed by Edwin C. Edgerton, California, chairman; J. F. Shaughnessy, Nevada; W. C. Bliss, Rhode Island, and P. B. Trammell, Georgia. Judson C. Clements, Interstate Commerce Commission, concurred in the recommendation for federal control of the issuance of railway securities, and C. B. Aitchison, Oregon, concurred with the report in part and joined to bring it before the association. The full recommendations follow:

1. That the Interstate Commerce Commission have power to regulate the stocks and bonds of the interstate carriers.
2. That the Interstate Commerce Commission or some other federal agency be empowered to regulate the rates, practices, stocks and bonds of the interstate public utilities.
3. That Congress enact the necessary legislation to provide for a national incorporation act for interstate railroads and interstate public utilities.
4. That the Interstate Commerce Commission be empowered to exercise jurisdiction over mergers, consolidations and incumbrances of interstate railroads.
5. That the Interstate Commerce Commission have authority to exercise jurisdiction in receivership proceedings, preferably to the fullest extent, but at least over all matters relating to capitalization.
6. That federal and state statutes be amended, where

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necessary, to permit the issuance by railroads and public utilities of a common stock without par value.

7. That the Interstate Commerce Commission and the state public utility commissions be permitted to invoke the aid of the Federal Trade Commission to determine the reasonableness of the cost of essential materials of railroad and public utility construction.

8. That adequate legislation be enacted, both national and state, to provide for voluntary wage agreements; methods of arbitration, and for federal and state intervention in emergencies, to adjust wage conditions in the railroad and public utility service; nothing contained in such legislation to require men to work against their will.

9. That such legislation as is consistent with the public interest be enacted for the enhancement of railroad credit and for the protection of American railroads against the competition in the American market for funds for private exploitation in foreign countries.

10. That a new committee be appointed to study the question of relationship between government and the railroads, to consider the possibilities of co-operation between the government and the railroads, and to report at the next annual meeting.

In connection with the last recommendation the committee cited the partnership agreements adopted in connection with electric railway resettlements as proper objects for study by the suggested committee.

VALUATION

The last important general report was that of the valuation committee. The attention of this committee had been entirely directed to the valuation of interstate carriers being made by the Interstate Commerce Commission, and to the various points in which the state commissions were particularly interested. In ultimate and legal effect, if not in nominal and immediate effect, the federal valuation was thought to be the touchstone whereby the lawfulness of all railroad rate systems, state or interstate, would be tested. When the principles applicable were determined, they would largely control analogous cases with respect to other public utilities, and the state commissions might find too late that the valuation principles were effectually settled for them in all matters relating to purely state commerce, and without their being heard except as they voiced their views in the present proceedings. The remainder of the report was taken up with a discussion of various points arising in connection with the federal valuation, the most important being that findings made under the valuation act are incomplete in so far as they fail to ascertain and report original cost to date as an element of value; that it is at least as practicable to estimate original cost, if company records are unavailable or unreliable, as it is for the engineer to estimate the present cost of reproduction (if anything within smaller limits of error), and that original cost should be the strongly controlling factor in the ultimate determination as to the weight to be accorded land values in a rate case. The report was signed by C. E. Elmquist, Minnesota, chairman; C. B. Aitchison, Oregon; Max Thelen, California; J. L. Bristow, Kansas; G. A. Henshaw, Oklahoma; E. C. Niles, New Hampshire, and W. A. Shaw, Illinois.

During the brief discussion on this report H. M. Edwards, New York Edison Company, one of the representatives of the National Electric Light Association, asked the co-operation of the association in formulating a glossary of valuation terms. The request was first ordered to be filed without printing but was later reconsidered and referred to the committee on valuation. The report was then approved and adopted.

SAFETY OF RAILROAD OPERATION

The committee reports in the steam railroad group numbered seven, but few contained points of interest to electric railways. The most important of these was the report of the committee on safety of railroad operation. This was devoted partly to a review of some of the causes which contribute toward the failure of materials, while another section dealt with railway signals and the problems involved in their use. In connection with the latter subject, the report stated that although there had been a comparatively rapid increase in signaling in this country, good standards of construction and efficiency in maintenance had not been overlooked, and very few accidents caused by failures of the signal system had been reported. On many roads, less than one "false clear" failure, or failure to indicate stop when necessary, to 1,000,000 signal operations, was a common record, while a record of one failure to clear, thus improperly indicating stop, to 25,000 signal operations was one easily maintained.

The committee noted that the continued and fairly uniform introduction of the block system had been followed by a steady decrease in collisions, but that although there are nearly 260,000 miles of railroad line in the United States, less than 100,000 miles are operated by the block system. Accidents continued to take place even on well-signaled roads, the committee said, and it seemed evident that something else was required to prevent such disasters. Yet automatic control of trains was a serious problem requiring careful consideration and extensive study of conditions on any road where it was proposed. Many devices had been submitted to the Interstate Commerce Commission, most of which were utterly impracticable. Some were worthy of additional development, and a few merited tests under railroad operating conditions. It was felt, however, that further development must rest with the railroads. While in some quarters it was said that the automatic control of the trains was wrong, it seemed wise to the committee, considering the present state of affairs, that a practicable system should be developed, ready for extensive use should it be finally decided that such a system was necessary. In its opinion, the best possible signal system should be installed and properly operated before it could be said that an automatic track control system was necessary.

The report was signed by C. C. McChord, Interstate Commerce Commission, chairman; R. C. Dunn, Florida; O. L. Owen, New Mexico; D'Arcy Scott, Ontario; F. M. Sheppard, Mississippi; C. D. Jackson, Wisconsin, and W. D. B. Ainey, Pennsylvania.

The report of the committee on grade crossings and trespassing on railroads (Thomas Duncan, Indiana, chairman), which was printed without signatures, formally placed on record the recommendations made last June at a joint meeting of the association and the American Railway Association. The recommendations for standard crossing signs then adopted were published in the ELECTRIC RAILWAY JOURNAL of Aug. 12, page 270. The present committee emphasized the fact that the presence and the uniformity of warning signs are imperatively demanded if accidents are to decrease. The only specific against disasters, however, would be the separation of grades. Additional powers should be given to state commissions to establish new highways. As to trespassing, the enforcement of laws requiring fencing of right-of-way and forbidding trespassing would reduce accidents, but the growth of public opinion was deemed the best solvent of the problem.

The election of officers for the association resulted in the usual promotions. Max Thelen, California, was made president; Edward C. Niles, New Hampshire, first vice-president, and Charles E. Elmquist, Minnesota, second vice-president. W. H. Connolly, Interstate Commerce Commission, remains as secretary, and James Blaine Walker, New York, first district, as assistant secretary.

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Conferences and Commission Rulings Following Boston Drawbridge Accident

Mayor of Boston Holds Conferences to Consider Safeguarding and Has Called Another for Nov. 27—Commission Orders Positive Stops at Drawbridges on Massachusetts Railways but Recommends No Automatic Devices at Present

FOLLOWING the accident at the Summer Street drawbridge over the Fort Point Channel in Boston, on Nov. 7, in which a large number of street car passengers were drowned, the subject of safeguarding at drawbridges has been studiously considered by the city authorities, the Public Service Commission, the railway management and others more or less directly interested. The story of the accident was related in the issues of the ELECTRIC RAILWAY JOURNAL for Nov. 11, page 1034, and Nov. 18, page 1074. The situation was commented upon editorially in the latter issue, page 1048.

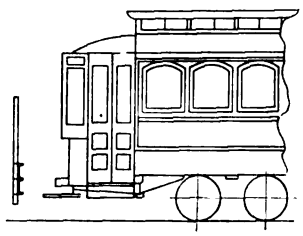
Mayor Curley's Conferences

At the invitation of Mayor Curley of Boston, Mass., a conference on drawbridge operation was held at the Boston City Hall on Nov. 16, the meeting being attended by George W. Bishop, head of the Inspection Department, Massachusetts Public Service Commission, President M. C. Brush of the Boston Elevated Railway, Henry E. Reynolds, assistant general manager of the Bay State Street Railway, Prof. C. M. Spofford of the Massachusetts Institute of Technology, Commissioner of Public Works Murphy, and about fifty engineers associated with local utilities, city service and private firms. In opening the meeting, Mayor Curley said that the primary object of the gathering was to consider methods of preventing accidents at drawbridges similar to that at Fort Point Channel on Nov. 7, when a surface car of the Boston Elevated Railway went through the gate and was precipitated into the harbor with heavy resulting loss of life.

DEVICES FOR PREVENTING DRAWBRIDGE ACCIDENTS

Various suggestions relative to accident prevention were outlined by the Mayor from communications received since the particular accident in question. These included the installation of a trolley switch actuated from the drawtender's cabin and designed to cut off the current supply whenever the draw is open; a motor-driven girder designed to interpose a solid barrier whenever a gate is closed; increasing the distance between the edge of the draw from present low limits of 15 ft. and 25 ft. to 75 ft. minimum; the use of sirens, gongs, and illuminated signals. Reference was also made to a rigid stop which has been in successful use against teams and automobiles on the Boston ferries during the last two years.

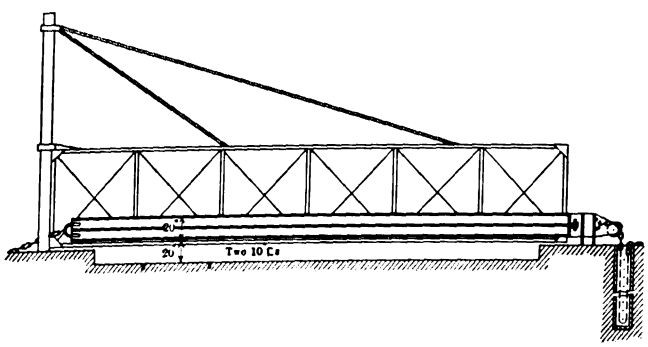
Following the Mayor's outline of the principles involved in the suggested safeguards, President Brush said that the Boston Elevated Railway is of the opinion that there should be eventually constructed at all drawbridges an absolutely positive barrier which will prevent street cars and all vehicles from reaching the edge of the draw; and that this barrier should be of a nature to stop vehicles with as little injury as possible to individuals and should be at a point not less than 75 ft. from the edge of the draw. Such a barrier must positively be so interlocked with the bridge mechanism that it is an impossibility to operate the draw until the barrier has been positively closed and locked. All the schemes outlined below should be installed pending the final construction of such a barrier, and should be applied with the latter.



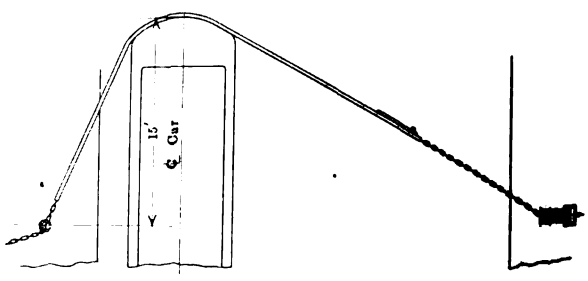
ANTI-CLIMBER AND GATE REINFORCEMENT

SCHEME DEVISED BY JOHN LINDALL

A car stop for drawbridges designed by John Lindall, superintendent of rolling stock and shops Boston Elevated Railway, and shown in the illustrations on this page, was then exhibited in working model form. This arrangement consists of reinforcing the drawbridge gate with two 10-in. channel irons to stiffen the gate and prevent climbing, the free end of the gate being provided with a heavy steel chain or cable carried around a pulley into a well sunk at one end of the gate. The chain is looped around a series of steel bolts in the well, the end finally being secured to a rigid attachment at the top of the well. When a car strikes the gate, the latter may bend as it receives the impact of the bumper, but if the car pushes the gate outward, shearing off the bolts in succession from the bottom of the well upward, the car will be brought to a gradual stop through the shock absorption thus secured.



LINDALL'S SAFETY GATE WITH CHANNELS, CHAIN WELL AT RIGHT



LINDALL'S SAFETY GATE BENT UNDER THE IMPACT OF THE CAR

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Mr. Brush said that this stop had been designed by Mr. Lindall since the Fort Point channel accident and that the company has every reason to believe it will prove practical. Another gradual stop, a counterweighted flexible gate safety device, has been worked out by David Curtin, chief engineer maintenance of way Bay State Street Railway. To consider these designs and all other suggestions available, Mayor Curley appointed an engineering committee headed by Prof. Charles M. Spofford, and including representatives of the Boston Elevated Railway, the Boston Edison Company, the Bay State Street Railway and other organizations, which will report its conclusions at a general meeting to be held on Nov. 27. John Carty of the Public Works Department, 602 City Hall Annex, Boston, was named as secretary and was empowered to receive in writing all available suggestions.

President Brush's Recommendations

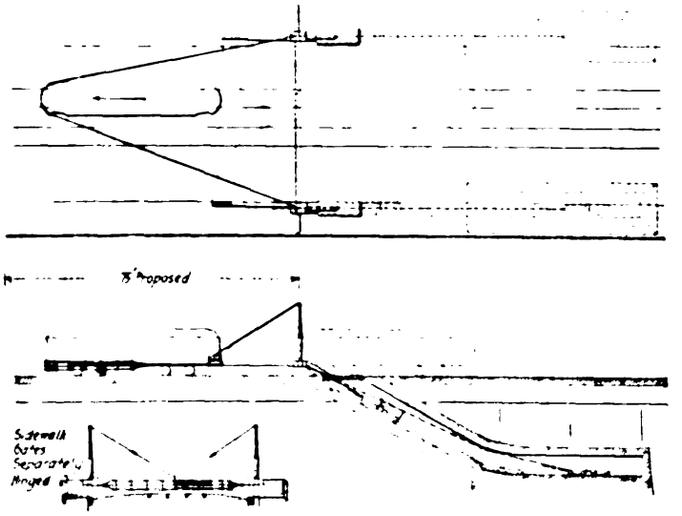
Following the exhibition of the car stop designed by Mr. Lindall, Mr. Brush vigorously emphasized the danger inherent in the use of any rigid stop against which any vehicle is operated at high speed, pointing out that the passengers cannot be properly safeguarded by bringing a car with kinetic energy of more than 2,000,000 ft.-lb. to an instantaneous stop against a rigid body. A positive bumper is at present in service on the private right-of-way of the company's East Cambridge Viaduct, but the drawtender is not allowed to open the draw and raise the bumper until a car is standing within about 100 ft. of the bumper. On the Charlestown Bridge a third track for elevated trains is now being installed between the two running tracks north of the draw, and the switch leading to this track is interlocked with the draw so that a train cannot approach the bridge on the main line track southbound from City Square without being deflected upon the emergency track. The latter ends in a pebbly surface which will stop an eight-car train at a safe distance from the bridge opening. At the interlocking tower south of the Charlestown Bridge, the main line switches connected with the northbound bridge track have been interlocked with the bridge-operating mechanism so that the draw cannot be opened unless these switches are set to carry trains past the bridge track entrance whether such trains are coming from the North Station or the Atlantic Avenue elevated line.

The company believes that pending the construction and installation of positive barriers immediate steps should be taken to paint the present gates of all bridges white with black stripes; that one or possibly two red lights with large lenses should be installed on all gates directly between the rails at an agreed-upon distance above the highway (such lights to be under the control of the drawtender); that there should be installed signs 100 ft. and 200 ft. respectively from the gate indicating "Slow" and "Stop," for the guidance of motormen, when the draw is open; that these signs should be not less than 36 in. long and 12 in. wide; that there should be immediately installed at each drawbridge a large gong, electrically operated, interlocked with the bridge mechanism so that it will be impossible for the drawtender to open the bridge until he has closed the switch which actuates the gong, the latter to ring as long as the bridge is open as a warning to all vehicles.

"The company further believes," said Mr. Brush, "that an ordinance should be passed prohibiting any vehicle standing on a track directly in front of a street car, while drawbridge gates are closed, in such a position as to obscure the view of the red light placed on the gate for the guidance of the motorman. None of these precautions other than the installation of the positive barrier itself will prevent vehicles dropping into the draw in cases where the operator has lost control of his vehicle."

David Curtin's Safety Device

At a later meeting of the committee appointed by Mayor Curley to investigate practicable means of increasing safety of operation at drawbridges, David Curtin, engineer of maintenance of way, Bay State Street Railway, Boston, submitted drawings of a suggested flexible gate safety device as shown herewith. In brief, this device consists of a flexible gate connected to a system of counterweights in such a manner that a runaway car striking the gates automatically brings into action the operation of the counterweights. Across the front of the gate, facing the approaching car, steel cables are stretched, the space immediately before the track being provided with a heavy wire or cable mesh to prevent climbing or shearing of the car body. The first shock of the impact will be taken care of by the flexibility of the gate and cables. At each end of the gates a cable is carried past a suitable support to two or more counterweights



CURTIN'S STOP FOR SAFEGUARDING AT DRAWBRIDGE

located on a track at the bottom of a chamber below the street surface. A series of heavy springs attached to the cable ahead of the counterweight will further lessen the impact and retard the speed of the car, finally bringing the counterweight into action. The weight of the counterpoise and the gradient of the incline determine the rate of retardation and consequently the time and distance during which the car will be brought to a stop. After the counterweights have run a short distance upon the track it is intended to discontinue the latter and to allow the counterweights to slide forward and upward on two rails with narrow spacing laid in the center of the channel. A hydraulic plunger may be used in extreme cases, as in connection with drawbridges at the foot of grades.

Finding of the Commission

The Massachusetts Public Service Commission issued a finding on Nov. 21 relative to the accident following an exhaustive investigation of the circumstances by the inspection department of the board. In general, the condition of the car was found to be satisfactory and the commission devotes itself mainly to the discussion of preventive measures.

Report of Inspection Department

George W. Bishop, chief of the inspection department, submitted an extended report to the board on Nov. 14 which is quoted in full in the finding. After

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noting the departure of the car from the P Street carhouse in South Boston and stating that nothing unusual in its operation was observed prior to the drawbridge approach, the report states that the motorman in charge suddenly discovered that the warning gates were across the street and the drawbridge open. The motorman claims to have immediately applied the brakes and reversed the current, but the car was so close to the gates, which were only 25 ft. from the opening, that the car crashed through the gates and went into the water. The motorman, who was saved, estimated the speed of the car at the gates to have been 8 m.p.h., while a passenger standing on the front right hand step at the time estimated the speed at 15 m.p.h. This person stated that he fell as he jumped from the car to the street, but soon recovered himself and assisted in removing a man from the water.

Many conflicting statements concerning the accident, undoubtedly made in good faith, have reached the department. In some cases these have proven helpful, in others not. The department has interviewed the conductor and motorman, as well as surviving passengers and persons who were near the scene of the accident when it occurred, and has secured all available information concerning it. The Boston Elevated Railway and the bridge department of the City of Boston have freely given all information requested concerning the operation of the railway and the drawbridge.

After the car had been raised from the channel all of its parts were thoroughly examined by Assistant Inspector Philip Scott. The following is an extract from his report concerning the condition of the car:

"After a careful inspection of control, trucks, sand boxes and brake rigging, I am of the opinion that the car was in good working condition up to the time of the accident and that all damages to the car and equipment occurred as the car went over the draw."

Inspector Scott also found that this car received a regular inspection on Oct. 31, 1916; that the brakes were adjusted during the afternoon of Nov. 7, and that this was the first trip thereafter. Mr. Bishop states that he is unable to learn from any source that the brakes were not in proper working condition; in fact, there is sufficient evidence to show that they were working and that the car skidded. The condition of the track approaching the draw opening was, soon after the accident, found to be favorable for the safe operation of cars. The track on the bridge and for a distance of 200 ft. easterly of it is a tangent and nearly level.

TESTIMONY OF THE CAR CREW

A stop sign, about 17 in. long and 4.5 in. wide, with letters, 2 in. x 3 in., suspended to a span wire 20 ft. above the rail, is located easterly about 175 ft. from the gates and 200 ft. from the draw opening. This sign was installed at this point, according to the company, for the purpose of bringing all cars to a full stop before reaching the drawbridge. Mr. Bishop is of the opinion that to have served this purpose effectively, a much more conspicuous sign, visible both by day and by night, should have been located not more than 50 ft. from the draw opening. The motorman states that he did not make the stop on this run; that he only slowed down sufficiently for a man to board the car and proceeded without receiving two bells from the conductor. This failure to stop was a violation of the rules, the observation of which might have prevented the catastrophe.

The statement of the conductor, who had been in the service of the company sixteen months, shows that he was in the car collecting fares from the time he left the Boston Edison plant in South Boston until the car reached the bridge and did not notice anything unusual in its operation until it struck the gates, when he reached the rear door and jumped. The conductor was apparently unable to fix the rate of speed of the car or to state definitely whether or not the car made a stop at the stop sign above mentioned. A street arc light is located about 25 ft. easterly from the draw opening in the bridge, between the tracks, and nearly opposite the gates. This light, if kept burning at night, is of great assistance to the motorman in determining the position of the draw. The motorman in charge of the car claims that this light was not burning at the time of the accident. His statement is substantiated by a passenger on the car, as well as by a person riding in an automobile, who arrived immediately after. There is further evidence that later in the evening the light went off and came on again.

The channel drawbridge is maintained and operated by the city of Boston. Mr. Bishop says that he is unable to find any good reason why the gates should not have been placed 50 ft. or 75 ft. from the opening instead of 25 ft. to give persons using the street earlier warning when approaching danger. Such warning would have been valuable to the motorman operating the car involved. Measurements on five other drawbridges in Boston show that the distance of the gates varies from 23 ft. to 69 ft. from the opening, indicating a lack of uniformity, which is so much to be desired. The red lantern used on the gate at the place of the disaster is attached to the right hand gate on the side toward the channel, so that its iron work is somewhat obscured by the ironwork of the gate as one approaches. A better practice would be to provide two lanterns for these gates, the additional one to be placed over the street railway tracks and both to be hung on the side of the gates toward which persons are approaching rather than on the channel side. The motorman claims not to have seen the red light. The man in charge of the draw says it was in place at the time of the accident. Other conflicting evidence appears relative to this light, which may have been obscured by teams even if in its designated place.

SUGGESTIONS CONSIDERED BY INSPECTION DEPARTMENT

The seriousness and magnitude of this accident are such as to call for co-operation, due consideration and prompt action by all persons directly or indirectly responsible for the maintenance and operation of drawbridges and of street cars operated over them. Among others, four suggestions, none of recent origin, which have reached the Inspection Department, with the object of preventing a repetition of this accident are commented on by Mr. Bishop as follows:

1. *Reduction of Speed of Cars Approaching Drawbridges.* This method leaves the matter to the judgment of the motormen and conductors to estimate the rate of speed at which a car is moving, the results of which often prove unsatisfactory.

2. *The Installation of Automatic Electric Signals.* This method is both practicable and feasible. However, to be effectual, they must be connected with the drawbridge in a manner that will require the signals to be set in danger position before the draw is opened and remain in that position until the draw is closed. This requires the approval of municipalities and creates a joint responsibility in the maintenance and operation not altogether desirable.

3. *Installation of Derails.* This method is possible but in my opinion most undesirable in public ways. To make a derail effective it must be connected with the drawbridge and the signal to protect the derail must be placed a proper distance from it. This combination should be so connected that to open the draw the signal

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must first be set at danger, when the derail may be set in position to throw a car from the track. After this, the draw may be opened. A reverse movement of draw, derails and signals will clear the track for traffic. I consider the derailing of a car in a public street dangerous. There is no assurance of the direction the car will move or the results it will produce. It is just as liable to do one thing as another. It may overturn; it may go upon the sidewalk; it may collide with pedestrians or teams using the street at the same time; and in either event something serious is liable to happen.

4. *Installation of Positive Stops.* This method may have some objections, but it is free from the complications mentioned in Nos. 2 and 3. The management of street railways may install positive stops along their lines whenever in its opinion public safety so requires. It is always safe to stop a car provided it is properly protected when at rest.

Mr. Bishop is of the opinion that the fourth method is preferable and that with proper supervision and discipline on the part of the management it is reasonably safe. It may be put into operation at once and without great expense. He therefore recommends that every street railway company in Massachusetts operating cars or trains over drawbridges shall at once install positive stops not more than 100 ft. nor less than 50 ft. from each draw to protect traffic going in either direction, and shall erect at each stopping place a stop sign visible by day and night, the type of sign and rules governing its use to be approved by the commission.

CONCLUSIONS OF THE COMMISSION

The suggestions in Mr. Bishop's report in regard to the location and illumination of highway gates used in the protection of drawbridge openings relate to matters over which the commission has no jurisdiction, for such gates are operated and maintained by the municipal authorities. The board has been informed, however, that the city of Boston is considering steps for the improvement of existing conditions. It is greatly to be hoped that equally prompt and effective consideration may be given to the subject by other municipalities controlling drawbridges. With the recommendation made by the inspection department in regard to street railway operation, the commission is more directly concerned. For many years the Massachusetts law has required street railway cars to make positive stops at steam railway grade crossings, and the statute imposes a penalty upon any motorman or company violating its provisions (Statutes 1906, Chap. 463, Part 3, Sec. 82). In the case of drawbridge openings no similar statute requires such a practice, nor, with certain exceptions, does it appear that it has been voluntarily adopted by the companies themselves. The rule of the Boston Elevated Railway in regard to safety stops makes no mention of drawbridges. While in the case under consideration it happened that such a stop had been established at an intersection street about 200 ft. from the drawbridge opening, no similar stop had been established upon the other side of the opening. Further, the stop sign was not well located nor particularly conspicuous, and there is little evidence that the company has ever attempted effectively to inforce the rule in question.

While a uniform rule that positive stops be established wherever drawbridges are located would to some extent interfere with the expeditious operation of cars, the commission is convinced that safety considerations far outweigh any embarrassment which the companies or the public might suffer from this cause. An order to this effect therefore has been issued. No such order, the commission declares, will accomplish the results desired unless the positive stop rule is rigorously enforced by the companies through adequate penalties for the infraction of this rule by employees of the company.

It has frequently been suggested that some mechanical means should be adopted for bringing cars automatically to a stop at drawbridge openings, so that safe operation may not depend entirely upon the human element. The inspection department, however, after the careful study of this question, is unable at the present time to recommend to the commission any such device for use in surface car operation whose disadvantages are outweighed by its advantages. Many such devices, however, are in process of development, and it is possible that the department in the near future will find itself in a position to review its present findings and recommend the adoption of such an automatic stop. The subject will continue to receive the attention of both the department and the commission. For the immediate present the requirement that positive and habitual stops be made by the motorman at all drawbridge openings seems best to meet the needs of the situation.

The possibility of occasional infractions of this rule, however, seems to make it necessary to provide for additional safeguards. If in this case the gates had been installed a reasonable braking distance from the draw opening the accident would undoubtedly have been averted. The commission is therefore of the opinion that every street railway in the State should lay this matter before the proper municipal authorities and endeavor to secure the location or relocation of gates at a proper distance from such drawbridges. It is desirable, also, that such gates should be painted with alternate black and white stripes. These gates should also be provided at night with red lights, located at reasonable intervals along the upper portion of the gate, and should also be interlocked with the bridge machinery so that the latter cannot be operated unless all gates are closed. It is possible, however, that in some cases it may not be feasible to locate or relocate drawbridge gates in the manner indicated. In such cases the commission is of the opinion that the companies, with the necessary consent of the municipal authorities, should install and maintain at a suitable distance from each end of every drawbridge a smashboard signal or similar device so interlocked with the operating mechanism of the draw span as to make it impossible for the draw tender to open the draw before the smashboard is in proper position. The impact of this device upon the car body would arrest the attention of the motorman and convey the warning in season to avert an accident. The question as to whether the positive stop shall be retained after drawbridge gates or smashboard signals have been installed to the satisfaction of the commission is reserved for future consideration.

In the present instance there is no evidence that the accident was due in any way to defective brake equipment, or to the presence of passengers in the front vestibule of the car. On the contrary, the evidence indicates that the brakes, while of the hand-operated type, had recently been inspected and were in good working condition. While there is no reason to believe that air brakes would have averted this accident, the general superiority of air brakes to the hand-operated type, as applied to double-truck cars, is well established. It is also true that many companies have found it desirable to adopt a rule positively excluding passengers from the front vestibule. In order that every reasonable precaution may be taken to prevent accidents in the future, the commission will take up these two matters in the near future at public hearings, at which all companies may have an opportunity to express their views.

ORDERS RESULTING FROM THE INVESTIGATION

Every street railway in Massachusetts operating cars or trains over drawbridges on surface lines shall at once

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establish positive stops at a reasonable braking distance from each drawbridge, subject to the approval of the commission, to protect traffic going in either direction, and shall erect at each stopping place a stop sign visible both by day and night, the type of sign and rules governing its use to be approved by the commission.

Every such company shall make seasonable application to the proper municipal authorities for the location or relocation by such authorities, at a reasonable braking distance from each end of each drawbridge, of suitable gates, painted with alternate white and black diagonal stripes and provided at night with red lights located at reasonable intervals on the upper portion, such gates to be properly illuminated and interlocked with the bridge machinery so that the latter cannot be operated unless all the gates are closed.

Wherever, for any reason, it is found impracticable to secure such location or relocation of drawbridge gates, every such company, provided the necessary consent is obtained from the proper municipal authorities, shall install and maintain, at a reasonable braking distance from each end of each drawbridge, a smashboard signal or similar device so interlocked with the operating mechanism of the draw span as to make it impossible for the drawtender to open the draw before the smashboard is in proper position.

Labor Disputes and Public Utilities

Academy of Political Science Listens to Addresses on Government Mediation and Compulsory Arbitration—Labor Leaders Oppose Legislation to Secure Industrial Peace

ONE of the most pressing questions of the day has to do with the means that can be adopted in the United States to secure and maintain industrial peace. In view of this fact, it was very appropriate that the Academy of Political Science, at its annual meeting in New York City on Nov. 22-23, should have devoted its entire time to addresses and discussions on the general subject of public utility labor disputes.

As a perusal of the following abstracts will show, this main subject was attacked from the points of view of what has already been accomplished in this country and abroad in the line of governmental mediation and arbitration, and what the unions think of compulsory arbitration, or even of governmental investigation with mediation and conciliation. Some speakers felt that compulsory arbitration had been successful in foreign countries in restricting strikes, but were of the opinion that the time had not yet arrived for arbitration to be enforced here by legislative enactment. On the legal side it was thought that the restricting of the right to strike through criminal penalties was constitutional, but the union representatives frankly opposed the compulsory principle as a violation of the rights of labor under the Thirteenth Amendment, and asserted that compulsory arbitration could not be enforced. In general, there was a strong plea for machinery to fix standards for wages, hours and working conditions.

GOVERNMENT MEDIATION AND ARBITRATION

The first address at the opening session on Wednesday afternoon was by William L. Chambers, United States commissioner of mediation. Mr. Chambers stated that two factors have been responsible for anti-strike legislation and legislation for the orderly settlement of industrial disputes. One group of countries primarily had in mind the protection of the public against the injurious effects of industrial warfare in the railway and other public utility service. Such reasons were evidently responsible for the legislative enactments in Canada, France, Italy, Russia, Roumania, Spain and Portugal, and the attitude toward employees of the railway administration of Austria and Germany. On the other hand, the preservation of industrial peace and the advancement in economic welfare of certain industrial classes had been primarily considered in framing the legislation of Australasian countries, and the prevention of industrial conflicts in the railway service was incidental to these broader purposes.

Among the Australasian countries, Mr. Chambers continued, the general tendency of legislation has been to place a limitation, and with practically one exception a prohibition upon the right to strike upon railway and practically all other classes of industrial workers. Another group of countries, on the other hand, such as Canada, the Transvaal, Spain and Portugal, have not denied absolutely the right to strike, but have made the exercise of this right contingent upon certain conditions—a notification to the government of the intention to strike or a governmental investigation and report. In the case of certain other European countries the right of utility employees to strike is absolutely prohibited, and no machinery is provided for ventilating grievances. Great Britain and the United States occupy the unique position of having no legislation abridging the right to strike. Both countries have provided official machinery for the adjustment of wage and other difficulties between the railroads and their operating forces. In the United States the mediation and arbitration of railway wage disputes is provided for by the so-called Newlands law. In the case of these two countries, Mr. Chambers asserted, where legal machinery has been provided for the settlement of grievances without any limitation upon the right to strike, the most pronounced success in dealing with disputes seems to have been attained.

Mr. Chambers said that in only one case had the efforts of the United States Board of Mediation and Conciliation to adjust a settlement by mediation failed and Congressional action been made necessary to deal with a situation for which there was no existing preventive remedy, *i.e.*, the threatened steam railroad strike this year. It remained to be seen, however, whether the attempt to settle an industrial dispute by special legislative action would prove as efficacious as mediation and voluntary adjustment. Mr. Chambers believed that the requirement of an investigation before a strike could be called, as in Canada, would be of real value only in offering further means for conciliation. In his opinion, the time has not yet arrived in this country when the principle of compulsory arbitration should be attempted by legislative enactment, and he was not convinced that the compulsory feature should be attached to any mediation movement, for the very idea of mediation depends on voluntary action.

CANADIAN AND AUSTRALASIAN PRACTICE

The next speaker was Victor S. Clark of the Carnegie Institution, Washington, D. C., who described the Canadian industrial disputes act. This act does not provide for compulsory arbitration; its purpose is limited to

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forbidding lockouts and strikes that directly affect the public welfare until their causes have been authoritatively investigated and made known to the people who will suffer through them. The jurisdiction of the law extends only to industries that serve immediately the general public. These embrace railways and transportation lines, yard and wharf labor, telegraphs and telephones, power, light and traction companies, and mines. Changes in the labor conditions of these industries must not be made without thirty days' notice. If either employers or workers object to a proposed change they may apply to the federal minister of labor for a board of investigation and conciliation, showing that a lockout or strike will occur unless the points at issue are settled. Thereupon the minister, after assuring himself of these facts, appoints a board consisting of three members, one of whom is nominated by the workers and the other by the employers. These two select the third member, or chairman, or if they fail to agree the minister of labor appoints him. No person having a direct or indirect money interest in the business affected is eligible to membership.

Wide latitude is given the boards in their method of conducting an investigation. They have the powers of a court to summon witnesses, to require the production of books and papers, and to take testimony under oath. They may personally inspect works and factories. If the parties cannot come to terms, the board reports its findings, which need not be unanimous. These contain a statement of the grounds of the dispute, an opinion as to the justice of the respective claims presented, and recommendations for a settlement.

Pending the investigation a lockout or strike is prohibited under penalties ranging from $100 to $1,000 a day for lockouts, $10 to $50 a day for striking, and $50 to $1,000 for inciting or aiding an unlawful lockout or strike. After a board has reported, employers may lock out their employees, or workers may strike, if they wish to do so. The only exception to this rule is when both parties have previously signed a formal agreement to abide by the decision of the board.

According to Mr. Clark, in the more than nine years of operation 212 disputes had been referred to boards and twenty-one strikes had occurred. Probably the number of employees involved in strikes that have occurred in Canada either in violation of the act, or legally because workers refused to accept the findings, is larger than the number involved in disputes successfully adjusted. No great strike, however, has occurred in this time. The enforcement of penal features of the law has generally been left to the aggrieved parties, but the provisions have acted as a deterrent. In Mr. Clark's opinion, legislation in this direction is demanded in the United States by the interest of all the people.

The subject of compulsory arbitration in Australasia was discussed by Matthew B. Hammond, professor Ohio State University, Columbus, Ohio. Professor Hammond said that all of the Australasian states try to use mediation and conciliation before proceeding to compulsory arbitration, and the former means are usually successful. In New Zealand, for example, from Jan. 1, 1909, to March 31, 1915, 466 disputes out of 694 were settled by conciliation, while 130 were substantially settled and only ninety-eight were referred *in toto* to the arbitration courts. In his opinion, the compulsory feature led many to settle their disputes by agreement.

In Professor Hammond's opinion, if compulsory arbitration is to succeed in keeping strikes at a minimum, it must set up conditions of employment, and the system tends to guarantee reasonably high wages and good working conditions. Drastic penalties to prevent strikes are not approved by the public, although moderate fines upon the workmen and heavier ones upon the labor leaders are favored. The best cure for strikes, however, is to provide conditions under which the men have no incentive to strike. Compulsory arbitration has greatly reduced the number of strikes, but from experience it is not a perfect preventive means.

In discussing the foregoing addresses, Peter J. Brady, secretary Allied Printing Trades Council, said that labor organizations in Canada and Colorado have voted for the repeal of compulsory investigation laws in these places. Labor is opposed to such laws because the investigation gives the employers time to prepare against strikes. In his opinion, there can be no law or interpretation of law by the courts that will compel men to keep at work under stated conditions of employment.

LABOR OBJECTIONS TO COMPULSORY ARBITRATION

At the evening session on Wednesday the first speaker was W. S. Carter, president Brotherhood of Locomotive Firemen and Enginemen, who stated the objections of organized labor to compulsory arbitration. Mr. Carter said that perhaps some objections were extreme and not founded on fact, but they were what workmen believed. Furthermore, they applied specifically to compulsory arbitration, and might or might not apply to the Canadian industrial disputes act and similar measures. The objections of organized labor were summarized by Mr. Carter in the following words:

1. It is but a scheme by which the employer hopes to gain a mastery over his employees:
   (a) By making strikes illegal, and thus deprive working people of their only economic power.
   (b) By suppressing labor organization, through depriving them of the power to effect their purpose.
   (c) By creating conditions of labor through judicial process, which process the master class always has and always will greatly influence.
2. It is but the expression of a selfish desire of those who complain:
   (a) To avoid the personal inconvenience incidental to all strikes, without regard to the injustice against which the workers are struggling.
   (b) To avoid the financial loss to business interests engaged in production and transportation, regardless of the financial loss that may fall upon the workers.
3. It is but a symptom of the mental and moral degeneration, through which all great and prosperous nations have passed, when:
   (a) Fundamental principles of individual liberty are forgotten.
   (b) That for which the founders of liberty were honored becomes a social menace.
   (c) The struggle for wealth overshadows all else, with consequent disregard for the rights of the working classes.
4. It is a deliberate effort to deprive working people of their economic power:
   (a) Through guise of legislation to preserve public peace.
   (b) Through an artificial public opinion, largely created by those who control the public press.
   (c) Through a presumption that for public convenience the federal judiciary will find a method of depriving all working people of their constitutional rights against involuntary servitude except as punishment for crime.

In discussing Mr. Carter's remarks, Everett P. Wheeler, chairman committee on industrial arbitration, Reform Club, New York, N. Y., denied the existence of any master or servile class in this country. In his opinion there should be a tribunal to fix rates, on the one hand, and wages, hours, etc., on the other.

CONSTITUTIONALITY OF COMPULSORY ARBITRATION

Thomas I. Parkinson, Legislative Drafting Research Fund, Columbia University, in discussing the constitutional aspects of compulsory arbitration said that the courts have recognized the practical limitations upon the power to compel the performance of a contract for personal service. On the other hand, when the ques-

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tion of service to the public was involved, he did not consider that it would be violative of the involuntary servitude clause of the Thirteenth Amendment if a law should be passed undertaking to restrict by means of criminal penalties the right to strike. The right to quit work is not the same as the right to strike, and every restriction of personal liberty does not involve involuntary servitude. The public ought not to take away from employees the right to strike, however, unless a substitute should be given in the form of legislative standards for wages, hours and working conditions so that mediators and the public would be able to judge the relative merits of opposing claims. While a compulsory arbitration law would probably be constitutional, Mr. Parkinson made the observation that not all constitutional things are desirable.

ADVISABILITY OF ARBITRATION BOARDS

A written discussion from Emerson McMillin, chairman of board American Light & Traction Company, New York, N. Y., was presented at this session. Mr. McMillin believed that the statutory right of boards to investigate disputes promptly, either before or after strikes or lockouts, would tend to create a desire on the part of both parties to settle controversies. The only absolute essential is that the parties shall meet and discuss the question, and if the state must use compulsion it should first be used in the direction of requiring such meetings to be held before a strike or a lockout shall be inaugurated; or, in lieu of such meetings, it should be obligatory upon each of the parties to see that the state board is notified of the impending trouble and have time to investigate.

Mr. McMillin said that the Amalgamated Association of Street & Electric Railway Employees of America is required, by its constitution, to offer to arbitrate questions before a strike can be legally begun. Of course, it would be possible to make such an offer to arbitrate in a way that would assure its rejection. That strikes by local sections of this organization do take place sometimes without the offer of arbitration first being made would not be disputed, Mr. McMillin presumed. The representatives of this same organization were known to be opposed to compulsory arbitration, and that, too, while advocating that compulsory requirements so far as employers were concerned should be provided for in local franchises.

Mr. McMillin believed that for states to compel the employee and the employer to live up to the terms of an industrial agreement—for a definite time and until sixty days' notice of either party of a desire to terminate—could hardly be classed as involuntary servitude, the agreement being one that each party was competent to enter into and one that could not be construed against public policy. Should the courts not accept the principle of enforceable time contracts for industrial cases, it is still conceivable that it might be applied to railroad systems and public utilities. Mr. McMillin thought that all trade agreements should be for definite periods, and, in addition, should provide for a further continuation until the expiration of sixty or ninety days after notice of one or both parties that a termination was desired.

Mr. McMillin suggested that arbitration boards should contain five persons, including one from employees and one from employers. These two should be the active mediators and investigators. The other three, to be chosen from members of the bar, should arbitrate only such questions as would be certified up to them by the first two. Under the usual system, with two members practically committed to the views of their respective parties, Mr. McMillin thought that it was asking too much of each of the contending parties that the third man decide alone the momentous questions brought before him.

Some capable and active members of boards, Mr. McMillin said, are of the opinion that the present public desire is for the publicity of correct statistics, and that when this information is had, public sentiment will compel a reasonable solution. Agreeing that correct statistics should be given to the public, however, he did not think the information could, as a rule, be obtained in time to be of value in forming public opinion concerning the merits or demerits of an impending industrial disturbance. Nor did he believe that the public, during the period of such disturbances, would be more competent or more disposed to agree and amicably settle the question fairly than would the parties themselves. The great mass of the public would be guided largely by its sympathies and not by reason.

An address on "Arbitration of Street Railway Strikes" was scheduled for W. B. Fitzgerald, general organizer of the Amalgamated Association, but Mr. Fitzgerald was not present and no paper was submitted.

AIDS TO INDUSTRIAL PEACE

Three addresses were delivered at the opening meeting on Thursday upon various phases of work to secure industrial peace, as follows: "Federal Intervention in Labor Disputes Under Existing Laws," by David A. McCabe, professor Princeton University; "Mutual Aid Funds," by Miles M. Dawson, New York, N. Y., and "A League to Enforce Industrial Peace," by Judge J. H. Cohen, New York, N. Y.

Professor McCabe described the origin, passage and results of the Erdman and Newlands acts, and told how the threatened railroad strike this year found the country not fully prepared. The Adamson law, hastily passed, presents certain grave defects, in that Congress laid down terms without any inquiry into their merits and turned over a prejudiced case to a commission not possessing power to make recommendations which capital and labor can be called upon to accept and keep the peace.

Mr. Dawson described in general terms the mutual aid funds in this country which, although started on a narrow basis, have developed into real aids to industrial peace. In outlining the fundamental requirements of a sound aid fund, he laid particular emphasis upon the feature of joint contributions and management by employer and employees. He described a basis for computing the contribution of workers so as to carry the full measure of cost exclusive of the occupational hazard element. He did not consider that mutual aid funds would prevent strikes, but he believed that they would eliminate an inclination to strike for trivial reasons and that the mutual contact of employer and employees in administering such a fund would make for increased amity and respect.

The most elaborate and most constructive address of the session was that by Judge Cohen, whose remarks were listened to with special interest, because of his share in formulating the famous protocol that brought an unusually long period of peace to the unsettled garment-making trade in New York City. Judge Cohen stressed in particular the superior right of the public in labor disputes, and said that the law was ready for a better method of settling such disputes, but public opinion was lagging behind. He then proposed a definite league made up of all elements of society—the consumer, the neutral public, the worker and the employer (*i.e.*, the state itself)—founded upon the following propositions:

1. The clear recognition of the moral and legal right of men to organize.
2. The establishment of tribunals sanctioned by law.

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whose membership shall be representative of all three parties (employees, employers and public).

3. The creation of fact-gathering machinery to enable such tribunals to determine what is in any given case a "fair and reasonable wage" and what are "fair and reasonable working conditions."

4. The clear recognition of the necessity for efficiency and discipline in all industrial organizations.

5. Opportunity to every worker to secure just redress from arbitrary or oppressive exercise of the employer's functions.

6. Opportunity to every employer to secure just redress from arbitrary or oppressive exercise of power by the men.

7. The right to appear by his chosen organization or spokesman before all sanctioned tribunals and in all dealings between employers and employees.

8. The registration of all collective agreements.

9. A national council, without whose sanction there shall be no concerted cessation of work or closing-down of plants, to which any interested party may apply for relief, as it may in public service matters to the Interstate Commerce Commission or the public service commissions, or, in trade matters, to the Federal Trade Commission.

10. Such national council to be constituted of members elected from groups of employers and groups of workers and representatives of the public.

11. In public utilities, clear recognition of the function of the state, as part of the regulation of the service and the rates, to determine what is a reasonable wage and what are reasonable working conditions.

12. Clear acceptance of the proposition that, adequate machinery being established for the redress of all just grievances, the right to coerce by concerted stoppage of work in all service affecting the public health, safety or convenience shall be made as obsolete as the duel or as illegal as lynching. (This principle to be applied if and when such machinery is established.)

In closing Judge Cohen said: "The basis of the great industrial compromise is here. The trade-unionist must yield in his opposition to governmental regulation of his organization; the employer must yield in his opposition to the organization of trade unions; the public must yield in its indifference to the conditions under which human work is done; the business man must yield in his opposition to 'social uplift' in industry, and the social reformer must yield in his indifference to efficiency and discipline in modern production. Upon such a compromise can be founded a program of preparedness for peace."

RATES SHOULD BE SUBORDINATE TO WAGES

At the last session, the annual dinner, Oscar S. Straus, chairman New York Public Service Commission, First District, said that the paramount question is how and to what extent should the power of the state be applied in order to compel the two industrial groups, operators and employees, to subordinate some of their group rights, just as the individual must subordinate some of his natural rights, to the general welfare. In order that public service monopolies may be at all times enabled to serve the public, the employees must also be made to recognize a duty to the public. They should not be permitted to appropriate the public necessities so as to compel public utilities, under threats, to concede their demands. In return, however, there should be accorded to and guaranteed to such employees exceptional wages and conditions of service. It has been suggested there should be in each state and in the nation a wage commission with power to regulate not only rates but also wages. In Commissioner Straus' opinion, the human element, wages and conditions of employment, should be paramount. Rates should be subordinate to wages and not wages, as now, subordinate to rates.

W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, described the present wage system on steam railroads and gave two reasons for the refusal of arbitration by the men. These were, first, that arbitration had not been satisfactory in the past and, second, that the steam railroads had asked to have some of the smaller railroads excluded from the arbitration. In principle, arbitration was anomalous because the award had to be administered by one of the parties to the dispute.

Frank Trumbull, chairman executives' advisory committee and president Chesapeake & Ohio Railroad, the next speaker, pointed out that the railroads were limited as regards rates and hence could not do all they would like to do in the way of wages to their men. He reviewed the history of the negotiations last summer and the circumstances which led up to the passage of the Adamson law. He believed that the railroads owed a duty to shippers, passengers, their other employees, other employers and to the holders of railroad securities not to grant increase of such magnitude until the reasonableness of it had been recommended after investigation by an impartial board.

Bainbridge Colby, the last speaker, believed that the right to strike on public utility companies ought to be subject to limitation but defended the action of Congress and the President in passing the Adamson law under the circumstances that then existed.

Some Problems of the Industry*

There Are Too Many Supervising Bodies—Reforms Are Also Needed in Taxation

BY F. W. COEN
Vice-President and General Manager Lake Shore Electric Railway

ON the property which I represent we have to deal with seventy-five different political bodies, all of which feel it their duty in some measure to tell us what we should do and when to do it. The county commissioners or the county road supervisor will say that the track is too high or too low along some portion of the roadway, the township trustees will complain about some crossing, the councilman from the tenth precinct wants more service, a director of public service says that the paving needs repairing, the Mayor tries the trainmen for speeding, and likely as not the Council and the Mayor combined want a lower rate of fare with more liberal transfer privileges. Somebody will file a complaint with the commission that the company is not performing all of the duty which it should perform or that its employees are not treating the public properly, etc. Then the tax commission tells us what we should pay in the way of taxes toward the support of all the various parts of our government. With this I would have no quarrel if the same rule held good with the manufacturer, farmer, or all others by whom taxes are or should be paid.

For example, the public utilities, such as electric railways, electric lighting and others, are taxed generally on the basis of their net earnings; that is, gross income with the ordinary operating expenses deducted, and this sum capitalized on the basis of 10 per cent, represents the value of the property on which taxes should be paid. This method of valuing properties for taxation may be, and perhaps is all right, but if it is correct, why are not other industries taxed in the same manner? In a neighboring city there are three large and prosperous manufacturing industries whose net earnings for the past year amounted to approximately $36,000,000. If these concerns had been taxed on the same basis as our companies, they would have paid on a tax value of $360,000,000. But what is the fact? The

*Abstract of a paper read at the convention of the Central Electric Railway Association, Toledo, Ohio, Nov. 24, 1916.

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tax value on these same companies was given to the public within the past week, and I find the tax value was fixed at about $37,500,000 or $1,500,000 in excess of their net income. In other words, the basis of taxation of The Lake Shore Electric Railway, if you please, is ten times greater than that of the manufacturing industries above referred to. This is only one instance of gross inequality; there are many others throughout the state and the entire country.

Then, in the matter of taxation, as you all know, we have the street paving, the sewer assessments, the sprinkling assessments, the street cleaning assessments, the general real estate tax, the personal property tax, the excise tax on gross earnings, the tax for the maintenance of the Public Utilities Commission, the federal income tax which has just recently been doubled, in some cases a franchise tax, in other cases a tax on gross receipts payable in some instances to the city, as well as numerous others. All of these items tend only in one way, and that is in the increase of operating expenses, without anything in return. It has always been my belief, and is now, that a number of these tax charges should not be made against the utility and that whatever benefit, if any, is derived therefrom, should be given to the utility if it needs it properly to maintain its property and return a proper income on investment and to a proper remuneration to its employees; and if there is anything then remaining, it should go to the benefit of the general riding public.

There is another thought which comes to my mind. The automobile industry has made wonderful strides during the past few years. We find the jitney, the auto truck, the auto bus operating between various communities, and the automobile used for almost all purposes. These conditions have made wonderful changes in the transportation industry and no doubt many changes will come in the near future. But I should like to have someone give me a good reason why the jitney, the auto truck and the auto bus should not be declared public carriers? Jitneys should be required to get a certificate of public necessity and the auto bus should have a license, and its rates and regulations should be prescribed the same as for any other public utility. Finally some action of the legislature compelling automobile drivers to stop before crossing any railway track is absolutely necessary to prevent enormous loss of life.

There is an old saying, that "man can serve but one master." In our predicament we have many masters, and it is my firm opinion—and when I say this I am expressing my opinion only—that there should be one central authority covering as many of these questions as is possible. For example, the matter of operation of our property should rest in one authority. The matter of granting franchises should rest in that same authority. The matter of the type of construction of our properties and the service given by them, should likewise rest in this same authority. The charges which we should be permitted to make should be subject to review and revision by the same authority to determine if the rates and charges are fair, just and equitable, as between all parties interested. In other words, I believe that in this state the Utilities Commission, if you please, should have authority on a showing of necessity, to grant this company or any other company, a franchise to operate a railway and that such permission should be without limit as to time so long as such utility gives reasonable service at reasonable rates and performs the function delegated to it to be performed. This same commission should have authority, if necessary, to require additional service or reduce the service as changing conditions require. It should have authority to order, if necessary, additional equipment, the rebuilding of tracks, the installation of additional power, or in fact anything going into the operation and maintenance of the utility. The commission should likewise have authority to protect the utility in the matter of earnings and of unnecessary requirements of extensions or street improvements, and it should be in position to guarantee beyond question to an investor, that a reasonable return could and would always be earned, barring, of course, calamities such as no one can foresee. Even in case of a calamity, a company should be allowed to earn sufficient to take care of such a contingency. This commission should be composed of men eminently fitted for the work, men in whose judgment every one would have confidence, and their compensation should be such as would properly pay them for their service.

Furthermore, I do not believe that earnings should be limited to any such rate of interest as 6 per cent on investment. The business of the electric railway has in days gone by changed so rapidly that the risk is too great for any such return. Furthermore I believe it would be advantageous to everybody concerned, if there was a premium on economy and efficiency in the operation of the property.

I hope that each and all of you will become, if you are not already, personally acquainted with every member of the legislature in your territory, so that you can go to him and explain in detail if necessary, why this bill or that bill will be a benefit or a detriment to the property which you represent. I believe that a great many bills become law simply because the whole truth about them is not known to the lawmakers. Give them the real facts and all of the facts, place yourself in such a position that you can go to your representatives and discuss with them freely any matters in which you are interested, to the end that they may have full and complete information before they are asked to pass upon important questions. If you will do this you will have done much for your property and the community.

Safety Work in Electric Railway Operation*

Results in Columbus, Ohio, Have Justified the Efforts Expended During the Past Two Years

BY HAROLD W. CLAPP
General Superintendent The Columbus Railway, Power & Light Company, Columbus, Ohio.

At the present time man lives with scarcely a thought of the necessity of giving attention to his personal safety. The general trend of a curve representing the amount of man's thought for personal safety has been downward until it almost reached the zero point. This was about the time when the influence of such organizations as the National Safety Council began to be manifested. A better sentiment had already began to take form in the systematic and persistent organized safety work undertaken by the Chicago & Northwestern Railroad and other corporations. It was gradually augmented from time to time by the entrance of industrial companies into the field until the formation of the National Safety Council in September, 1913.

The scope of safety work includes every phase of life, every avenue of human endeavor. It is good for us at play-time and in our home life. It embraces the fields of fire prevention, sanitation and conservation of health, as well as the prevention of accidents of all kinds, at all places, at all times.

In our own organization at Columbus at about the

*Abstract of a paper read at the convention of the Central Electric Railway Association, Toledo, Ohio, Nov. 23, 1916.

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close of the year 1914 we began to realize that the amount of money being expended for lost time and physicians' fees in connection with employee accidents, and for damages in public accidents was excessive. We decided that organized safety work would afford us relief, and launched our movement on Jan. 4, 1915. Our first year's work produced a reduction in employee accidents of 10.2 per cent. We are receiving the hearty co-operation of our employees and are still making progress.

The plan of the public side has been very simple. I shall outline briefly what we are doing.

First, we are maintaining equipment in good operating condition and are requiring our men to live up strictly to the rules. We post weekly on special bulletin boards attractive literature dealing with the subject. In order to keep up interest in August, 1915, we commenced a special contest between car houses to reduce collisions between cars and vehicles. No reward was offered for good work; we relied upon the competitive spirit of the men to bring results. On July 1, 1916, however, we began a second contest and set aside the sum of $1,000 to be divided among the men of the two car houses making the best showing as compared with the record of a year previous. We announce the scores made each month by means of specially prepared cartoon bulletins. This contest has awakened much interest and has reduced these accidents.

We have acquainted the public each month with the results accomplished through a series of car window posters giving only the records of collisions between cars and automobiles, and between cars and wagons, and accidents in boarding and leaving moving cars. These posters have been the means of securing much co-operation from car riders.

In common with other cities we have been experiencing an increase in the number of collisions between cars and automobiles, but our increase is smaller than that in the majority of cities of our size and traffic conditions. In this connection we mailed last week 11,000 circular letters to all automobile owners in Franklin County explaining the principal ways in which accidents occur between cars and automobiles, and requesting co-operation. The result has been very satisfactory.

Our company has now been engaged in organized safety work for nearly two years. A statement concerning the four classes of accidents above referred to will indicate whether or not the work has been worth while. The average number of boarding-moving-car accidents for the first ten months of 1914 was 8.5 per 1,000,000 passengers as compared with 7.2 for the same period of 1916, a decrease of 15.3 per cent. The average number of leaving-moving-car accidents for ten months of 1914 was 12.1 per 1,000,000, while for ten months of 1916 it was 4.06, a decrease of 66.4 per cent. The average number of collisions between cars and wagons for ten months of 1914 was 64 per 1,000,000 car-miles, and for 1916 it was 38.8, a decrease of 39.4 per cent. In collisions between cars and automobiles we had 51 per 1,000,000 car-miles for ten months of 1914 as against 67.4 for this year, an increase of 32.1 per cent, but even this 32 per cent is a good showing, when it is considered that there are 83 per cent more machines on the streets than there were two years ago. In addition this year has seen three times as many new men employed in the transportation department in the first nine months as during the entire year 1915, due to peculiar labor conditions.

There are two undeniable reasons why safety work should be undertaken; first, the humanitarian reason, and, second, the sociological. Safety work has proved that accidents can be very largely eliminated. At one time in our railroad history we were inclined to think that schedules and speed should be maintained and humanity allowed to take care of itself, but now it is different. The public conscience will not stand for it, and that very same public conscience has been influenced in very large measure by the humanitarian spirit of the men back of our corporations, which were once considered heartless.

Along with the humanitarian phase of safety work is the efficiency and financial phase. Such work teaches cleanliness, alertnes sand thoughtfulness, and these make for efficiency and economy in all branches of industry, whether private or public. The influence which this work has in causing the platform men to study operation more closely makes a very appreciable showing in maintenance costs. In addition, I might add that our claim department settlements during the first year of safety work were reduced 45 per cent.

On the sociological side it may be said that the pauperizing of individuals and families resulting from the annual loss of life and reduction of effectiveness together with the attendant loss of opportunity for education and physical and mental development, has had a close relationship to crime. Hand in hand with safety work, however, have gone employees' welfare work; the establishment of works hospitals, community centers and playgrounds; the enforcement of sanitary regulations, etc., the whole tendency being to influence employees so that there will be a smaller number of accidents. The cost of all of this has been very much less than the cost of accidents. The entire plan has had the effect of bringing employees and management closer together.

In conclusion we may raise the question, Will safety work pay, does it pay? I reply that it does pay and in two ways: First, in the satisfaction of so operating a property that there shall be at the end of the year a shorter list of maimed and killed, and this is the greatest part of the pay; second, in the less number of dollars that have to be paid out each year as a partial recompense for losses that can never be adequately offset, even with cash.

Railroad Investment Must Be Attractive

Speaking before the Boston (Mass.) City Club on Nov. 13, Ivy L. Lee, formerly assistant to the president of the Pennsylvania Railroad, stated that the steam railroads are now doing all the business they can possibly handle, but the facilities are woefully inadequate and the disparity between facilities available and traffic presented is becoming greater every day. In his opinion the attitude investors have taken is very clearly to be gathered from the fact that during 1916 not $1 of new railroad stock has been listed on the New York Stock Exchange to provide money for new railroad building.

Mr. Lee believes that the solution of the present railroad problem lies in developing without any delay a system of railroad regulation which shall not be controlled by political animus or prejudice, and which will frankly recognize this fundamental fact. If the country is to obtain the railroad facilities absolutely necessary to move the national trade, it must be willing to pay the bill. That means that it must permit railroads to earn sufficient profits to attract the necessary private capital. Otherwise private capital will put its money elsewhere, and government ownership, with all its inevitable blight upon the national life, with all its red tape, waste and cost to the people, will be the only recourse.

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Truss-Side Construction for Railway Cars*

The Author Outlines the Reasons for the Development of Truss-Side Designs for Steel Cars and Discusses the Action of Car Framing in Severe Collisions, Reaching the Conclusion That Increased Strength of Superstructure Is Essential

By L. B. STILLWELL
Consulting Engineer, New York City

STATISTICALLY considered, a car is simply a covered bridge supported near its ends. Designers have developed three types: (*a*) That in which the load, including the sides, ends and top of the car, is supported by the underframe. (*b*) The type in which the load is supported by the underframe assisted by a light plate girder on each side of the car, the depth of which is equal to the distance from the upper edge of the belt rail to the lower face of the sills. (*c*) The high side frame, or truss construction, in which the load is carried on the sides of the car constructed as truss girders.

It appears obvious that, if an engineer were called upon to design a covered bridge equal in length to a 70-ft. car, he would use the side-truss construction, and the question arises as to why has this type not been adopted generally. The difficulties in the way are those incident to designing the truss girders that constitute the sides so as to leave proper spaces for the windows. These difficulties call for careful proportioning of the members, but are by no means insuperable. In fact, the problem has been solved satisfactorily, as is evidenced by several hundreds of cars now in use, of which many have been subjected to exceptionally severe service for a number of years. An answer to the question, therefore, is to be sought in the history of the evolution of the steel passenger car, and this at once gives the key.

For many years cars were made of wood, a material the characteristics of which are such that it is not practicable to construct the sides of cars as trusses, with appropriate spaces for windows, owing to the practical impossibility of securing necessary strength in tension and compression at the joints between the members. Consequently, wooden cars have been so designed that the underframe, reinforced by steel truss rods as tension members, carries the load, including the superstructure.

The next stop in the evolution of the modern passenger car was the complete substitution of steel for wood in the underframe, the superstructure still being constructed of wood. The depth of the sills being limited by considerations of necessary clearance, the distance between points of support of the center sill made it necessary to employ a comparatively large section, which, of course, involved great weight.

The third step was the substitution of a steel superstructure for its wooden predecessor. In a great majority of cases this has been done without modification of the structural scheme of the car framing.

The first steel car for electric railways in the United States, if we are informed correctly, was built for the subway in New York, and in this instance the steel underframe was assisted in carrying the load by a girder on each side of the car. The upper member of this girder was the belt rail, the lower member the side sill, while a ⅛-in. web, riveted to the upper and lower members, completed the girder construction. The side sills constituted the tension members of the plate girders, and the latter carried the load, the center sills being comparatively shallow. This design has not been adopted extensively by steam railroads, although it is largely used in electric railway service.

The next step (and from a structural standpoint it would seem to be necessarily the final step) in the evolution of a steel passenger car of maximum strength and minimum weight was the development of the high side frame, or truss, construction, in which the entire height of the side frame of the car, from side sill to roof, was developed as a supporting girder. It is obvious that, when the members comprising the entire side of the car are fully developed as a truss, the load is supported by a framework some 7 ft. in height, as compared with a girder about 3 ft. in height when the members below the window line of the car form the girder, and as compared with the insignificant depth of the underframe when this alone is utilized to support the weight. The high side frame employs a side plate at the top and a side sill at the bottom. These are about equal in section and are connected by side posts specially designed to resist bending, and thoroughly braced and stiffened by the side sheets and the so-called "letter board." This structure is stiffened against horizontal deflection at the top by the deck, which may be considered aptly as a horizontal flange for the high side girder. Such a design produces a car wall of exceptional stiffness which is practically as strong at the roof as at the floor.

The high side frame, or truss system possesses not only great carrying power, as compared with the contrasted types of car framing, but its natural and logical development is a co-ordinated car structure characterized not only by great load-sustaining power, but also by exceptional capacity to resist collision impact. Moreover, this distribution of material, which takes metal from the underframe and utilizes a part of it in strengthening the sides and roof of the car not only secures a car of great stiffness and load-carrying capacity, but also tends to prevent collapse of the superstructure in case of derailment.

In severe collisions the side walls sometimes are torn from the underframe, and at other times are spread apart at the roof line. These failures obviously point to the desirability of a strong side frame and an end frame which will secure the side walls from spreading either at top or at bottom. They also point to the necessity of a thorough development of all joints of the structure.

In that type of side-frame construction which employs the members of the side walls below the window-sill line to carry the principal load, the side posts and side plate at the roof line are usually very light and, consequently, incapable of withstanding any great

*Abstract of a paper presented before the Central Electric Railway Association at its Toledo, Ohio, meeting, Nov. 23-24, 1916.

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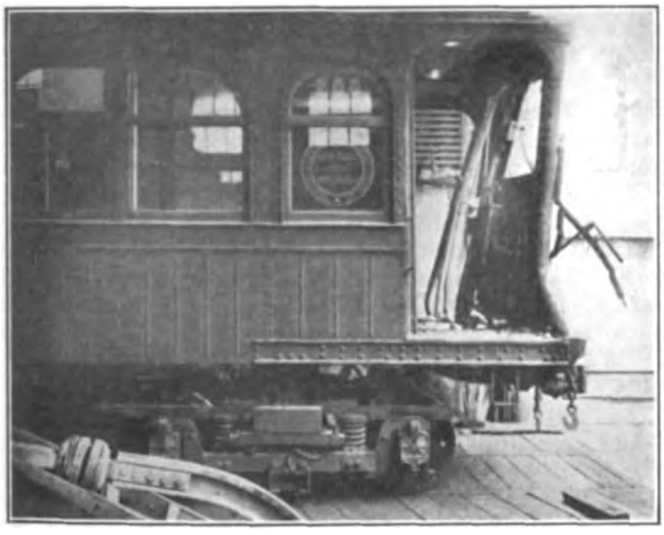
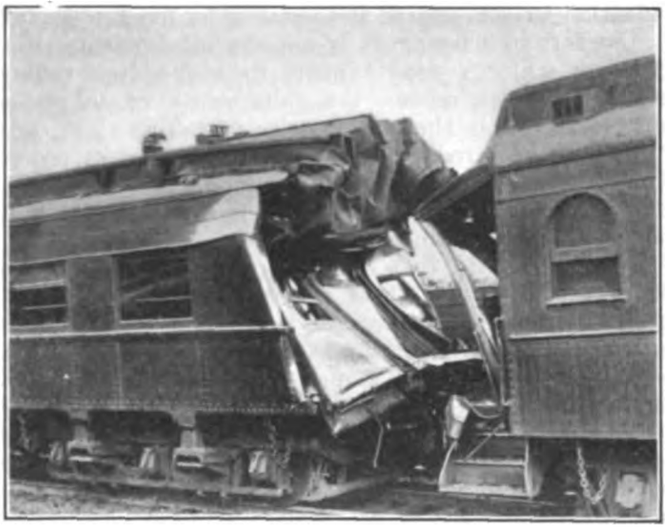
stress if the collision impact is applied above the window-sill line. The high side frame, however, affords a far better opportunity to minimize the effects of such stress, for the reason, as has been shown, that the side walls are of great stiffness and practically as strong at the roof as at the floor.

Generally speaking, in the case of violent collision observation shows that the underframe of one car is raised by the shock of impact sufficiently to clear the underframe of an adjacent car, and that in this position the latter, as we say, is telescoped. Before one car can enter the other, however, the body end-posts of the latter must be torn from their fastenings, and, as usually constructed, these members offer but little resistance. The high side-frame construction, however, provides in itself a comparatively very stiff structure at the roof line.

It may be pointed out here that the vestibule construction now in such general use can be utilized to good effect to cushion the shock of collision, as considerable energy is absorbed in the distortion or destruction of the vestibule. It is obvious that, if the car body proper has a side frame capable of resisting the shock at the roof line as well as in the under body, the effect of the collision will be concentrated—if the term may be used—upon the vestibule. This function of the vestibule as a buffer in case of collision has frequently been pointed out.



TRUSS-SIDE CARS—EFFECT OF COLLISION ON CAR WITH TRUSS-SIDE FRAMING



TRUSS-SIDE CARS—EFFECT OF COLLISION ON CAR WITH LIGHT SUPERSTRUCTURE

An examination of photographs of train wrecks and a study of many wrecked cars apparently justifies the following conclusions: 1. It is seldom that any serious damage is caused by the failure of the underframe. 2. In cases of collision the most serious damage usually results from the underframe of one car over-riding that of a neighboring car and destroying the superstructure of the latter by separating the side walls a distance sufficient to permit the entrance of the penetrating car body. 3. Failure of a structure occurs through a disruption of joints; members are seldom completely fractured between joints, the riveting usually proving inadequate to develop the full strength of the associated members. 4. Vestibules cushion the shock of collision with good effect, a large amount of energy being absorbed in the crushing of the vestibule members before penetration of the car body occurs.

To minimize loss of life and injuries to passengers in case of collision, the strength of the superstructure should be increased, if possible, and particularly in respect of its ability to resist telescoping or crushing, by end shock. Also the great weight and strength of the underframe are factors which contribute materially toward increasing the damage when one car overrides another. Obviously, devices for preventing the over-riding of cars, by maintaining the underframes in line, are of great value in so far as they can be made effective, but it is very difficult, if not impracticable, to construct such devices so as to prevent over-riding in case of violent collision or derailment, when the underframe of a car is frequently forced against the superstructure of another.

As regards depreciation of steel cars in normal service, about the only conclusion which can be deduced with certainty from examination of wreck photographs is the fact that, as usually constructed, the riveting of associated members does not fully develop the strength of those members; in other words, that the line of rivets is the line of weakness. It requires no argument, however, to prove that the life of an all-steel passenger car is practically the same as that of its weakest essential joints. If riveting is inadequate, either because the number and size of rivets are insufficient or because the holes punched in two connected plates are not accurately aligned before riveting, the strains to which the superstructure is subjected, even in normal service and assuming no accidents, may be expected to result in a more or less serious movement of one member with reference to the other. Unless great vigilance is exercised in keeping all joints painted, this movement will result in more or less corrosion of plates and rivets. Here, again, it seems obvious that the high side-frame construction possesses marked advantages over either of the contrasted types of framing, and particularly over that type in which the underframe supports the entire load.

When a car passes around a curve, the outer rail of which is elevated, the outer side bearing on the front truck tends to lift the car body, the lifting force being exerted vertically at a distance of approximately 2 ft. 6 in. from the center line of the car, and if the superstructure is lightly constructed it may be subjected to excessive torsional or twisting strains. So far as the effect of this lifting effort is concerned the center sill, no matter how heavy, cannot prevent the strains upon the superstructure. Under similar circumstances the high side-frame construction, which makes of the superstructure a strong steel box with heavy end walls, is affected far less seriously, since every element of the superstructure can be so constructed as to oppose to the strains incident to the superelevation of the outer rail ample resisting strength.

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Consideration of car design involves, naturally, the subject of truck construction and brake equipment. In 1911 we were called upon to design a special truck for steel cars 72 ft. in overall length. As it was, of course, desirable that the total weight of the car should be kept down, special attention was given to the framing of the truck to minimize its weight while retaining all possible elements of strength and to secure an easy-riding vehicle. The truck was designed and built without equalizer bars, helical springs being placed directly between the journal boxes and the truck frame. The side frame of the truck was built up of rolled members, and was of the deep side-truss, or arched bar, type of construction. The transoms were especially deep and well connected to the side frames of the truck. Extra long elliptic springs were permitted by this deep side-frame construction. In use this truck has proved very satisfactory. It is light, easy running, and its riding qualities are exceptionally good. Favorable comment by the patrons of the road, who noted particularly the easy riding qualities of the equipment, has led to the adoption by this line of the name "The Road of Ease."

Comfort of passengers is not the only consideration through which a road benefits by easy-riding rolling stock. Unquestionably the minimizing of vibration affects favorably the maintenance of rolling stock, and the power required to move an easy-running car is less than that required by a hard-riding car. Moreover, the effect upon track and roadbed is in the direction of decreased maintenance.

It may be said that the motor trucks of these cars were provided with clasp brakes—the first to be applied in electric railway service—because the weight of the cars was such that very high brake-shoe pressures had to be used. Experience extending over several years has demonstrated that the brake shoe wear is 15 per cent less on the motor trucks fitted with clasp brakes than on the trailer trucks of the same car which are fitted with single brakes, due allowance being made for the work of retardation effected by the two trucks. This is due to the lower temperature and consequent higher coefficient of friction in the case of the clasp brake equipment. It has been found, also, that the reliability in service of trucks fitted with clasp brakes is materially increased, owing to the fact that journals run cooler and the bearing surface of the journal is not disturbed in its position under the brass by an unbalanced brake-shoe pressure such as occurs when the single brake shoe is used. However, the improper application of two brake shoes per wheel may easily produce conditions worse than those which now occur with a well hung, single brake shoe.

COMMUNICATIONS

Finding the Defect in Car Axles

UNION TRACTION COMPANY OF INDIANA
ANDERSON, IND., Nov. 15, 1916.

To the Editors:

You might be interested to know that since your publication of my article on "Finding Defects in Car Axles" we have found a defective car axle of large dimensions—one of our very large type with a diameter of 7 17/32 in. at the gear seats. The axle was cracked about half-way around. This no doubt would have proved to be a very serious matter if we had not been able to find it through the process which I described, as the flaw was not visible to the eye after the gear was pushed off. In this case it was necessary to remove the gear to renew it, and our standing order is that when a gear is removed, both wheels must also be removed and the axle tested.

Needless to say, I am extremely thankful that this defect was found as it was under one of our heavy interurban cars which operates at high speed.

R. N. HEMMING,
Superintendent of Motive Power.

Demand for the One-Man or "Light Safety" Car

ST. LOUIS CAR COMPANY
ST. LOUIS, MO., Nov. 20, 1916.

To the Editors:

Apropos of the several suggested names for the type of small rolling-stock units known as one-man cars, we have been urging the use of the name "light safety" cars. That name would assist in their introduction, and it certainly signifies the aims of their designers and users. In agitating the use of these cars and setting before the industry the benefits to accrue from their use, the ELECTRIC RAILWAY JOURNAL is doing a work that will redound to the benefit of railways and manufacturers alike. We are trying to do our part by building "light safety" cars in advance for stock.

We have recently contracted with the city of Monroe, La., for three "light safety" cars, with all safety control features for double-end operation; with the Wichita Falls (Tex.) Traction Company for five cars with all safety control features for single-end operation, and have received a duplicate order from the Aberdeen (S. D.) Street Railway Company for "light safety" cars.

The future of the "light safety" car seems assured. Reports coming from Fort Worth are so glowing that we can discount them and still claim that the "light safety" type is the best proposition for economy. We have in our files hundreds of letters showing an intense interest in this class of equipment and are actually figuring with some twenty-five roads for orders. It would appear that the further one goes into this question the more he becomes convinced of its merit. So strongly imbued are we with its future that, as mentioned above, we are building some for stock. I estimate that within the first six months of next year at least 300 of these equipments will be ordered, and in making this estimate feel that I am conservative.

NIC LE GRAND.

First Multiple-Unit Electric Locomotives?

NEW YORK, Nov. 21, 1916.

To the Editors:

There is a statement in the paper by Frank J. Sprague, appearing in your issue of Oct. 14, 1916, which I should like to see elucidated. On page 774 it is stated that the original New York Central locomotives "were the first to be equipped with the multiple-unit control so that two or more could be operated together." To the best of my recollection, the first of these locomotives was completed in October, 1904, and put into experimental operation on the experimental track at Schenectady. It was announced in the technical papers that the order for these locomotives had been placed in November, 1903.

About August, 1903, the B. & O. Railroad received (from the same builders) four eight-wheeled units, each unit or half locomotive weighing 80 tons, built for slow heavy-freight service on the Belt Line. These lo-

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comotives were designated as General Electric Type L.R. 654 and came equipped with the type M control, Form C, and from the start were operated two together, by the Sprague-General Electric multiple-unit control system. They are still in service, and are operated three units together, because of the much heavier trains being hauled nowadays. I am quite positive about that control, I saw the locomotives the day they arrived and rode on them many times subsequently. Mr. Sprague states that the New York Central locomotives were the first to be so equipped. Was their apparatus manufactured a year or so before the order for the locomotives was placed? Or did Mr. Sprague overlook the B. & O. locomotives in preparing his paper? If so, does not this make them the first ones so equipped? I ask the question as a matter of historical interest.

H. J. KENNEDY, M.E.,
Electrical Engineer and Engineer of Construction.

[NOTE. The above letter was brought to Mr. Sprague's attention and he stated that he was pleased to have the circumstances surrounding the early application of the multiple-unit system to heavy traction set forth in this way. He was not directly in touch with the B. & O. installation and was not aware of the exact date of the delivery of locomotives to this railroad.—EDS.]

Improvements in the Work of the Engineering Association

PITTSBURGH, PA., Nov. 23, 1916.

To the Editors:

We are grateful for the steps taken by the ELECTRIC RAILWAY JOURNAL to arouse keener interest in association affairs. It may interest you to know that the executive committee of the Engineering Association, realizing the weaknesses pointed out in the editorials appearing in your issue for Nov. 18, have adopted a new plan which we hope will be productive of much improvement in the work lying before us. Arrangements have been made whereby the starting of committee work is made possible immediately at the close of the convention. This coming year the committee on subjects will have concluded its investigation and report prior to the convention. The incoming president will have in his hands sufficient information concerning the qualifications of candidates for committee membership that it will be possible for him on the closing day of the convention to announce the full committee organizations and the subjects which the committees are to study.

There are other needed reforms which we believe will be put into effect in the very near future, particularly with regard to the Convention Proceedings. There is a surfeit of detailed material in committee reports which is essential for committees to consider but which need not be dwelt upon in the Proceedings. We might profitably dispense with the reading and discussion of much of the extraneous matter, which has heretofore been presented to the convention, utilizing the time assigned to the meetings to the discussion of the broader aspects of the several subjects. This should tend to stimulate greater interest in the meetings.

Referring to the association and its mission I believe that the electric railway engineer bears a responsibility not only to the company by which he is employed but also to the industry as a whole. This is true because whatever progress is made in the art of transportation, and whatever developments the future may bring forth, must come only as a result of the activities of the engineer. Without a medium of exchange of thought, and organized concerted effort to produce the desired results, much time and money are bound to be lost. In this regard the electric railway engineer finds right at hand an association designed and organized for the very purposes which conduce to economy and stimulate progress in the art. It is therefore the duty of every electric railway engineer to become an enthusiastic, active member of this association.

F. R. PHILLIPS,
Superintendent of Equipment Pittsburgh Railways,
President American Electric Railway Engineering Association.

AMERICAN ASSOCIATION NEWS

T. & T. Committee Appointments

Secretary Burritt has announced the following committee appointments. Lists of other association committees will be printed in later issues as completed.

Construction of schedules and time-tables—Edward Dana, Boston, Mass., chairman; R. T. Sullivan, Youngstown, Ohio, vice-chairman; C. F. Flocker, New Orleans, La.; Howard F. Fritch, Boston, Mass.; Alexander Jackson, Newark, N. J.; J. A. Stoll, Baltimore, Md.

Fares and transfers—C. S. Ching, Boston, Mass., chairman; E. E. Strong, Rochester, N. Y., vice-chairman; G. S. Brush, Portland, Me.; Charles Currie, Akron, Ohio; W. C. Harrington, Kansas City, Mo.; J. T. Moffett, Washington, D. C.

Passenger traffic—Chairman (appointment to be announced); E. M. Walker, Dubuque, Iowa, vice-chairman; C. R. Gowen, Syracuse, N. Y.; I. H. Pound, Benton Harbor, Mich.; R. M. Sparks, Boston, Mass.; C. F. W. Wetterer, Boston, Mass.

Rules—J. E. Duffy, Syracuse, N. Y., chairman; F. H. Hill, Elmira, N. Y., vice-chairman; H. L. Beach, Salt Lake City, Utah; A. Benham, Springfield, Ohio; Harold W. Clapp, Columbus, Ohio; S. W. Greenland, Fort Wayne, Ind.; W. M. Kessler, Tippecanoe City, Ohio.

Subjects—H. C. Donecker, Newark, N. J., chairman; F. W. Coen, Cleveland, Ohio; James E. Gibson, Kansas City, Mo.; R. P. Stevens, Youngstown, Ohio.

Training of transportation employees—Chairman (to be announced); C. W. Kellogg, Keokuk, Iowa, vice-chairman; W. A. Carson, Evansville, Ind.; L. H. Conklin, Scranton, Pa.; H. B. Flower, Baltimore, Md.

JOINT COMMITTEES

Block signals for electric railways—Transportation & Traffic—J. W. Brown, Newark, N. J., vice-chairman; J. J. Brennan, Fort Wayne, Ind.; J. J. Doyle, Baltimore, Md.; G. K. Jeffries, Indianapolis, Ind.; (Engineering Association members not yet announced.)

Claims-Transportation—Transportation & Traffic—H. A. Bullock, Brooklyn, N. Y., chairman; A. Gaboury, Montreal, Que.; E. E. Soules, Peoria, Ill.; (Claims Association members not yet appointed).

Transportation-Accounting—Transportation & Traffic—A. E. Reynolds, Glens Falls, N. Y., chairman; N. H. Brown, Buffalo, N. Y.; J. H. Van Brunt, St. Joseph, Mo.; (Accounting Association members not yet appointed).

Transportation - Engineering — Transportation & Traffic.—G. H. Clifford, Fort Worth, Texas, co-chairman; F. W. Coen, Cleveland, Ohio; F. W. Hild, Denver, Col.; (Engineering Association members not yet announced).

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

United Traction Company, Albany, N. Y., Finds Air Tamper Useful for Breaking Concrete, Cleaning Rusty Steel, Drilling, Pocketing Brick, Etc., as Well as Tamping—Virginia Railway & Power Company Finds Automatic Stop Entirely Practicable—Lehigh Traction Reclaims Worn Motor-Axle Bearings—English Railway Official Discusses Gear Case Maintenance as Practised in Great Britain

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

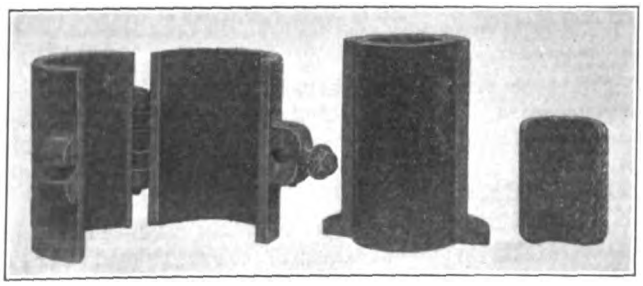
Reclaiming Motor-Axle Bearings

Babbitting Jig Effects a Saving of $80 Per Car on an Interurban Road

BY JAMES W. BROWN
Superintendent of Shops Wilkes-Barre & Hazleton Railway and Lehigh Traction Company, Hazleton, Pa.

Remarkable economies have been obtained on the Wilkes-Barre & Hazleton Railway and the Lehigh Traction Company by the use of babbitting jigs in reclaiming motor-axle bearings. One of the many jigs used in the shops of this company is that for a GE-69-C motor-axle bearing shown in the illustration herewith. The bearing can be re-lined or re-babbitted by means of this jig, which was designed to hold either half of the bearing.

The bearing is first placed in a special split chuck, which was described in the ELECTRIC RAILWAY JOURNAL of May 13, page 913, and bored out 9/64 in. larger than the diameter of the axle. The collar of the bearing is



JIG FOR RECLAIMING MOTOR-AXLE BEARINGS

faced off to 7/16 in. thickness, and the bearing is then taken out and each half of the old collar is drilled for riveting a new brass collar on to its face. This new brass collar is cast in a solid ring, faced on one side and then drilled to take 3/8-in. diameter copper rivets, which are made from scrap copper wire. The new brass collar is then sawed in two and riveted to each half of the old motor-axle collar. The bearing is then placed in the jig and the outside brass collars faced to the original diameter. After the collars are faced to the proper distance between the hubs, the bearings are taken to the babbitting room, tinned and placed in the jig (shown at the left of the illustration) and babbitted.

This device eliminates clamps and bolts, and no clay is necessary to hold the bearing while it is being set up in the foundry. A small riser is cast on the end of the bearing which permits the gas to escape from the top and insures a clean bearing free from blowholes. The fins are trimmed off the bearing and it is then placed in a boring jig in the lathe and bored out 0.0014 in. larger than the axle. There are four 5/8-in. dowel pin holes drilled in each motor-axle bearing, hence there are no rights or lefts. Again, in re-babbitting these bearings, the good dowel pin holes are utilized. The bearing is, therefore, placed on the opposite side from which it was used before being re-babbitted.

The total cost of the bearing, including the labor, the brass collars and the babbitt metal, is approximately $5. These bearings have made from 50,000 to 75,000 miles on the Wilkes-Barre & Hazleton cars, which weigh 90,000 lb. and are operated at 40 m.p.h. on grades up to 3 per cent. The original cost of these bearings averages $15 each, and as scrap babbitt metal was used, the results show a net saving of about $80 per car.

Gear Case Maintenance Experience

Troubles Due to Design of Gear Cases and Conditions of Track and Roadbed

BY "VULCAN"
A.M.I.C.E., A.M.I.E.E., England

The amount of trouble attributable to motor gear cases varies considerably on different electric railways. For instance, on one system well known to the author there are over 300 electric cars, and the number of gear cases purchased per annum has not exceeded half a dozen, whereas on another system of about the same size the number purchased and used during the year was over thirty times as large, and in addition to this a great many gear cases were repaired for further service.

The latter is probably an extreme case, but was fully accounted for by the extremely bad condition of the track, which set up excessive vibration and subjected the different parts of the equipment to unusually severe shocks and jolts. The conditions, however, were favorable to comparing the different methods of construction embodied in the various types of surface car gear cases. These different types of construction are described in this article, and the result of the author's experience in the use of gear cases under widely different conditions is given.

The gear case of an electric railway motor must of necessity be rigidly supported and overhung from the end of the motor. The brackets or lugs which carry it and also the parts of the gear case to which the latter are attached are therefore subjected to severe shocks and stresses when the car is continually jolting over bad rail joints and special work. The severity of these conditions is the determining factor in the life of the gear cases, and if the track conditions are abnormally bad great care must necessarily be used in selecting a suitable type.

Probably the most common type of gear case has its two halves made of malleable iron, the lugs forming part of the upper half casting. The ribs or webs connecting the feet to the side spread the stresses over a considerable area of the main casting and form strong supports. This class of gear case has undoubtedly given general satisfaction, and the only objection urged against it is its weight, which is somewhat excessive as compared with other types now to be obtained.

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The first attempts of any importance made to reduce the weight of gear cases consisted in making them of sheet steel in many sections, joined together by rivets. These were very soon found to be unsatisfactory, for even on good track the riveted joints, particularly those between the feet and case, shook loose and were generally troublesome and noisy. A more substantial job was made by the electrical spot-welding process. The spot welds between each rivet had a stiffening effect, and thus considerably increased the life of the gear case.

Another method which has been employed for joining the parts of sheet steel gear cases together is the oxy-acetylene process, which has the advantage of low first cost. These cases have been experimentally tried on many systems and have given a certain amount of satisfaction under the favorable conditions of good permanent way, but the trial records show that they are not capable of successfully withstanding the excessive vibration and shocks which bad track produces. Under the latter conditions the life of oxy-acetylene welded gear cases is generally a short one, the joints being as a rule the first parts to give way. The trouble seems to be due to the difficulty in getting a metal to form the joints and fillets, which after being applied by the oxy-acetylene blowpipe will still retain its original ductility. A considerable improvement was effected by the introduction of the pressed steel type of gear case, the top and bottom halves being pressed from a single sheet of steel.

With the object of producing a gear case of light weight many designs employing different kinds of wood have been tried. These generally had wrought-iron feet and were stiffened by sheet steel plates and corner pieces, some having this material for the whole peripheral face. This type of gear case may have been successful when used on good track, but all which have as yet been tried have proved unsatisfactory for extreme conditions of service.

LUGS CAUSE TROUBLE

The lugs of the earlier patterns of pressed steel cases were also of sheet steel riveted on the vertical face, and later also to fasten the peripheral face of the top half of the case. After considerable experience it was found that the lugs, due to the additional strains, soon worked loose at the rivets and broke. A broken supporting lug proved to be a difficult thing to replace, because on account of its special pressed shape new ones could not be made in the shops, but had to be purchased from the original suppliers. It was also almost impossible to fit a second lug properly because of the difficulty of matching and fitting new rivets into the distorted holes in the gear case.

Many instances have occurred where the pressed steel lugs have been fractured even when the rivets have remained firm. This has come as a surprise to many a rolling stock superintendent in view of the fact that under exactly similar conditions the cast lugs on old type gear cases were giving no trouble whatever. When a pressed steel lug has broken in the way described an examination of the material round the fracture showed that the shocks and vibration have caused a complete change in the structure of the material, and instead of being ductile it was granular and brittle.

After experiencing scores of such fractures, and with the results obtained with other types in mind, one realizes that for purposes of severe service the pressed steel type lug, no matter how fixed to the gear case, is not satisfactory. Some manufacturers now use steel castings for the lugs in place of the pressed pattern. They are fixed to the gear case by riveting and spot welding. Such lugs have now been thoroughly tested, and they have proved their superiority over the preceding types.

Gear cases are usually fixed to the motor by either two or three bolts passing through the lugs which project from the top half of the case. If these bolts are allowed to get loose the gear case will drop out of alignment and stresses due to vibration and jolting will then be greatly intensified.

The method adopted on certain modern motors of providing for carrying the gear case on lugs centrally situated on the case, *i.e.*, in line with the middle of the gear teeth constitutes the greatest improvement on the more general arrangement that has up to now been tried. In this type the lugs on the gear case have to withstand direct pressures only, whereas on the older types they are subjected to heavy bending moments also, due to the center of gravity being outside the supporting faces. An additional clamp consisting of a horizontal bolt fixed near the top is also provided in many cases and serves to complete a first-class job. In a few instances a horizontal bolt support is provided for on the old type of gear case, but even where it did not originally exist, the author has found it advantageous to adopt the arrangement by fixing an angle iron bracket to the motor casing and a simple fixture on the gear case. The addition is effective in steadying and prolonging the life of the gear case.

Too small a clearance between the gear and the side of the gear case often causes severe rubbing of the gear against the case due to wearing of the vertical faces of the motor suspension bearings. This soon destroys the gear case and, moreover, is objectionally noisy in the process. Practically all equipments will allow of the use of sufficiently wide gear cases to give at least 5/16 in. side clearance.

Convenient Lamp for Tunnel Inspections

BY G. R. THAYER
Catenary Engineer

An inspection lamp for tunnel and emergency work which has proved indispensable in inspection work on one property is shown in an accompanying illustration. The outfit consists of an automobile lamp, a piece of ¼-in. rubber hose about 6 ft. long and a small tank of Prestolite such as is used on motorcycles or automobiles. Holes were drilled into the top and sides of the automobile lamp and two handles were attached to it. In addition a leather case for the tank was made and fitted with a strap to go over the inspector's shoulder.

PORTABLE LAMPS IN USE BY TUNNEL INSPECTOR

This is a very convenient equipment to carry, and by means of the strong white beam, a tunnel inspector can locate cracked insulators or other defects before actual breakdown occurs. The equipment of a 3000-ft. tunnel is inspected twice each day with the aid of this outfit, so there is small chance for an insulator at any one of the forty stations failing without such failure being quickly detected. The total weight of this equipment is 17 lb., and at the present

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rate of inspection one tank charge will last about two weeks. These emergency lights have proved useful in several directions as they can be used at night in making temporary repairs on the line and in inspection work.

Varied Uses of a Pneumatic Tamping Outfit

BY CHARLES BRENNAN
Engineer Maintenance of Way, United Traction Company, Albany, N. Y.

The acuteness of the labor situation in 1915 necessitated a substitute for track laborers, and as the larger steam roads in the East during the seasons of 1914 and 1915 were using pneumatic outfits with excellent results in ballasting track, this company turned its attention to the tamping question. After going into the situation thoroughly it was decided to try out the pneumatic type of tamper. An order was accordingly placed for equipment for a trial test, and upon the completion of this test, which was highly satisfactory, an order was placed for a gasoline-engine-driven pneumatic tamping outfit. The following description shows to what varied uses such an outfit can be put, and the economies which are effected thereby.

USES OF A PNEUMATIC TAMPING OUTFIT: AS A TAMPER; FOR TOOTHING OUT POCKETS IN BRICKS; AS A DRILL FOR TIE RODS AND BOLTS

The first outfit obtained was gasoline-engine driven and it was purchased in 1915. With this equipment 12,714 ft. of track was tamped between Oct. 1 and Dec. 2, 1915, in addition to miscellaneous jobs completed. In the spring of 1916, a 10-hp. motor-driven outfit was put into service as being more economical for an electric railway, although it had to be towed, whereas the gasoline outfit was self-propelled. Both outfits came from the Ingersoll Rand Company.

At present a test, namely, that of using four guns instead of two, by the substitution of a 15-hp. motor for a 10-hp. motor and by changing to a larger pulley, which an Eastern railway property is trying out, is being watched with considerable interest. If the test proves successful, it is the intention of this company to remodel its outfit accordingly, as it now operates but two tamping guns. A compressor outfit mounted on a wagon that will operate from four to six guns will be built in the United Traction Company's shops during the coming winter.

In reballasting, where tracks are being reconstructed in connection with improvement of streets, and where traffic is being carried on continuously on both tracks, an outfit mounted on a wagon with wide tires is easier to handle than one equipped to run over tracks, since it weighs in the neighborhood of 4500 lb. Where track is being reconstructed without traffic operating over it, the latter outfit can be placed on the tracks and can follow up the work, the operator moving the machine along as required. The present outfit is operated at a working pressure of from 70 lb. to 80 lb. without objectionable noise.

Under continuous traffic conditions, the average cost of hand tamping 6 in. to 10 in. of crushed stone ballast is approximately 15 cents per foot of track. This cost, however, is increased where a second tamping due to settlement is necessary or where the ties are not absolutely on a solid bearing, as cracks in the concrete base will appear where concrete is poured under traffic. This condition is minimized when the track is tamped by the pneumatic outfit, as the stone underneath the ties is very compact. Also, indifferent tamping by hand is eliminated. As the tamping guns work at any angle this outfit is especially efficient in tamping ties in special work and in corners where a tamping pick or tamping bar would be useless.

The average cost per day of tamping in 1915 by the pneumatic outfit was as follows:

DISTRIBUTION OF TIE TAMPING COSTS

Operator	$2.75
Two tampers	4.20
One ballast distributor	2.00
74.6 kw.-hr. at 1 cent per kilowatt-hour	0.746
0.3 gal. compressor oil	0.075
0.5 lb. Polarine cup grease	0.045
Overhead, charges based upon a life of ten years, at 6 cents per tie (180 ties considered a day's work)	1.08
Total cost per day	$10.896
Cost per tie	0.06

This tamping outfit cost about $1,300, the two tamping guns $100 each, and the tamping bars $1.75 each. As the pneumatic outfit is still engaged on tamping track, the average cost for 1916 has not been compiled, but undoubtedly will be higher, due to increased wages paid this year to all classes of labor. These figures serve to show a saving of approximately 56 per cent. A true comparison is the net result at the end of the season, and to keep the actual cost a job order is assigned to cover the operation of the tie tamper for the season in connection with a job order issued to cover the particular reconstruction job. At the completion of each job the cost of ballasting can be readily obtained. Another factor to be considered is the increasing number

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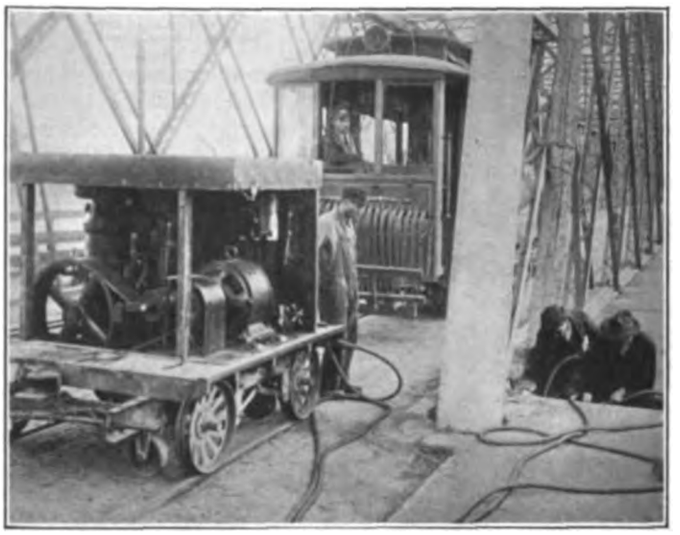
THE PNEUMATIC TAMPING OUTFIT AS A DRILL FOR CUTTING OUT CONCRETE



THE PNEUMATIC TAMPING OUTFIT AS A BLOWER FOR REMOVING RUST FROM STRUCTURAL WORK

of laborers required on reconstruction work. The tamping outfit will take the place of at least ten laborers, and these laborers can then be used to good advantage ahead in tearing up and reconstructing tracks. Laborers were needed very badly during the past summer, and as most way engineers know there was not a job this year that had half its quota of men.

The municipal engineers of the several communities through which this road operates were so well pleased with the work of the pneumatic tamper that they requested that it be used on certain jobs, and having only one outfit we were kept busy moving it to the various municipalities when we could do so consistently.

Excellent results in the breaking up of concrete base have been obtained by the following procedure. Rather than work continuously off the face of the concrete, as it has been our experience, the base can be removed more quickly by a series of trenches and cross trenches, and the slab between can be pried up and broken off with sledge hammers. The laborers operate guns with dull pointed bars at an angle of 45 deg. and at about 2 in. or 3 in. from the face, at the same time using the gun as a lever to pry up the concrete slabs. If they try to take off too much the drill will stick. In order to effect an economy it is necessary to let the men cutting trenches in the concrete get a good start so that the laborers breaking and loading the concrete will not be delayed.

In order to clean bridge rollers and seats from rust successfully it is necessary to remove the guns and cut down the opening in the hose to a small size, as the compressor will not build up or hold the required working pressure with a $^3/_4$-in. hose connection. This scheme was used on one of the big bridges and better results were obtained by using one line of hose instead of two. In removing rust one laborer uses a sharp instrument to break up scales, dirt, etc., and the air blast will take care of the rest.

For drilling holes up to $1^1/_4$ in. in diameter two Thor air drills are used to operate in connection with the pneumatic outfit and the results so far to date have been very satisfactory. It is proposed by this company to use the outfit for drilling bolts and tie-rod holes in the short pieces of rail which are cut during the winter months as soon as the tamping work is completed. This will not only effect a saving but it will speed up the replacement of broken rails.

Anyone who ever attempted to pocket out half bricks preparatory to laying new blocks knows what a tedious and unsatisfactory job it is. As a rule, the whole brick adjacent breaks off, which requires that it come out also. By using a chipping hammer a series of sharp blows does the work without breaking the adjacent block. In order, however, to secure a good bond in the toothed portion it is necessary thoroughly to clean the cement out of the groove of the old block. In cleaning the old block the brick is placed against the edge of the curb, and a dozen bricks can be cleaned, as against one by the hand method. Not much cleaning of brick has been done on the street, the tamping requiring the machine almost constantly. The old bricks are hauled to the storage yard, and when the outfit is not in use it will be used to clean this old brick.

These examples show how an outfit of this type can be used, and it is necessary for every way engineer to be on the lookout for all labor-saving devices if an indication of the rising labor market is to be taken as a criterion.

Flood-Lighting Railroad Yards

The accompanying halftone shows the appearance of a railroad terminal illuminated with Western Electric-Davis flood lamps which do not throw out a defined and concentrated beam, but rather tend to spread the light uniformly over the section on which they are directed. This system was demonstrated at the recent convention of the American Electric Railway Association at Atlantic City, where the railway men in attendance manifested much interest in it.

RAILROAD YARD ILLUMINATED BY FLOOD-LIGHTING SYSTEM

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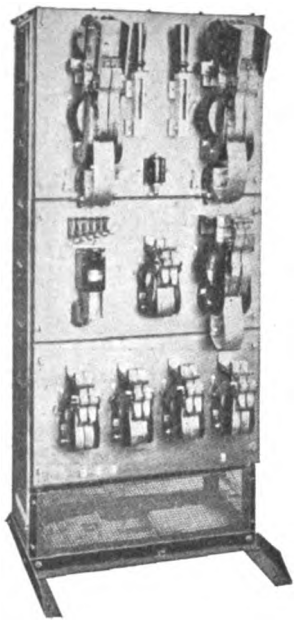
A Large Automatic Controller

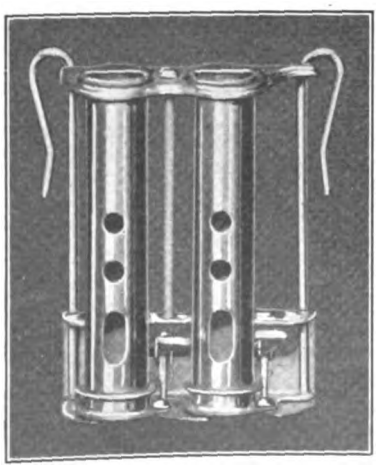
The controller shown in the accompanying illustration is a recent development of the Industrial Controller Company of Milwaukee, Wis., intended for use with large direct-current motors. This controller combines both current limit and time limit acceleration, thereby securing protection not only to the motor by means of the current-limit acceleration, but preventing too rapid acceleration of the motor under light loads. The controller consists of a number of large magnetic contactors, the first of which is equipped with a powerful blowout and arcing shields. The acceleration is accomplished by means of a master solenoid at the left of the panel, which upon closing energizes the coil of the large magnetic contactors successively, thereby closing the switches and bringing the motor up to speed. The acceleration of the master solenoid is retarded by means of an air dash pot, and in addition by a braking magnet, which in turn is controlled by a current limit relay at the center of the panel. When the current in the motor exceeds a predetermined amount, the master solenoid is prevented from operating until the current is reduced to the amount for which it is set. On the controller illustrated, magnetic switches with blowouts are provided for both sides of the line and each are equipped with overload relays.



AUTOMATIC CONTROLLER FOR LARGE D.-C. MOTORS

Metal Tickets for Registration of All Classes of Fares

The metal ticket is a recent refinement in the registering fare box system of fare collection. When it is used in conjunction with the familiar clock register, this system plus the metal ticket makes possible the complete application of the double-check system, which has been quite generally accepted as an efficient one on a large number of important properties. On those properties where the the ticket fares represent a large proportion of the total, in certain instances as high as 86 per cent and even 96 per cent, the registering of tickets is a very important consideration since this, and the release of tickets for re-sale by the conductors, accomplished pronounced economies in the accounting department and place an additional safeguard around each fare.



TWO-BARREL METAL TICKET CHANGE CARRIER

The new metal tickets of the Johnson Fare Box Company for use in conjunction with its standard fare box equipped with two extra cyclometers (described in the Jan. 15, 1916, issue of ELECTRIC RAILWAY JOURNAL, page 136) provide a means of registering all classes of fares. These tickets are made of German silver in such form as to make counterfeiting difficult. A letter in the middle is used to indicate the name of the town, to prevent broadcast counterfeiting, and the letters may also be varied for different classes of fares in one city. As planned for Mobile, Ala., the small six-for-a-quarter ticket has an "M" in the center, the employees' pass (a metal ticket of the larger size) has an "E"; and the passes for mail carriers, policemen, etc., a cross. These are shown in an accompanying illustration.

The tokens are punched out around the letter in the center to distinguish them from coins, and they are made in two sizes, one slightly smaller than the dime and one slightly smaller than the nickel. Tickets of the same value are made of the same size, although they may have different classifications, as noted above. The lettering and geometric lines on the tickets, and their high intrinsic value, all conduce to make counterfeiting costly. The smaller tickets will cost from

METAL TICKETS FOR USE IN CONNECTION WITH REGISTERING FARE BOX

$10 to $12 a thousand and the larger ones $12 to $14. They can be used almost indefinitely.

The system of collection advocated by this company in conjunction with the metal tickets provides a registration for every passenger, regardless of the class of fare paid, and a double check on all cash and ticket fares. The passenger drops his dime, nickel, pennies or metal ticket into the fare box, and at the same time the conductor "rings up" the fare on the clock register inside the car. Transfers are registered on a separate dial of the clock register. After the platform has been cleared the conductor grinds the coins and tickets through the fare box, registering them and releasing them for use in change or for resale. The four dials on the box register separately the three classes of coins and tickets of two denominations, and give the total of all fares in number of fares. The box registration plus the transfers indicated on the car register corresponds with the total of both sides of the car register, giving the double-check—the manual registration against the mechanical recording of cash and ticket fares. This possibility of registering the metal tickets as well as coins eliminates the principal objection to

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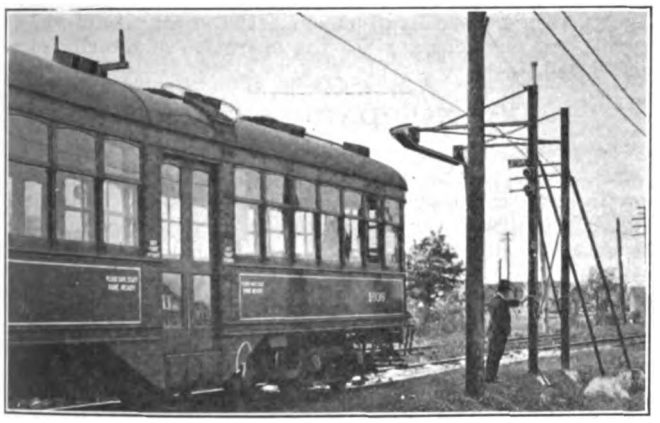
tickets and precludes the possibility of substitution of one class of fare for another.

The sale and handling of the metal tickets by the conductor is facilitated by the use of a metal ticket change carrier just put out by the same company. This is a simple two-barrel holder which the conductor wears on his vest, so constructed that a pressure of the lever drops six tickets into his hand to be given in exchange for a quarter. When two sizes of tickets are used, these carriers are made with two sizes of barrels to accommodate them.

Car Stop for Highway and Grade Crossings

Virginia Railway & Power Company Provides Automatic Protection on the Ocean View and Bay Shore Division by the Use of This Safety Device

For the past two years the Virginia Railway & Power Company has had in use on its Ocean View and Bay Shore Divisions an automatic car stop invented and patented by A. Taurman, superintendent of rolling stock of the company. The stop is said to have proved very successful. The principle involved is as follows: On each side of a crossing there are two contact de-



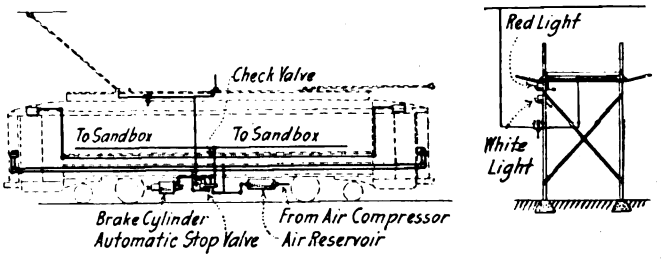
CAR PASSING OVERHEAD STEEL STRUCTURE, SHOWING DETAIL OF SPRING CONTACT ON TOP OF CAR AND INVERTED CHANNEL

vices which unless de-energized manually will bring a car to a sudden stop through the agency of a contact spring mounted on top of the car and connected in circuit with an electro-pneumatic valve.

In applying the stop, two steel overhead structures were erected on each side of the crossing, each carrying an inverted steel channel. These were located 150 ft. and 400 ft. respectively from the grade or highway crossing. The channels are energized from the trolley line through switches which close automatically, and are de-energized by the manual operation of the switches. At the outer or distant stop the automatic closing switch is placed on the steel structure. The switch controlling the energizing and de-energizing of the channel at the inner stop is located on the far side of the crossing so that it is necessary for the platform man to cross the crossing in order to de-energize this channel.

By means of the electro-pneumatic valve on the car provision is made for supplying air to sand the track, for supplying air to a small cylinder on the circuit breaker which cuts off the current, and for supplying air to the brake cylinder to apply the brakes. In addition to the operation of the valve through the spring contact on the top of the car, it can also be brought into action by means of a pull switch operated by a cord extending the length of the car. By means of this cord, the conductor can easily cause the car to make an emergency stop. When operated from either source the magnet will operate the valve in 1/18 second. The cycle of operations in passing a crossing is as follows:

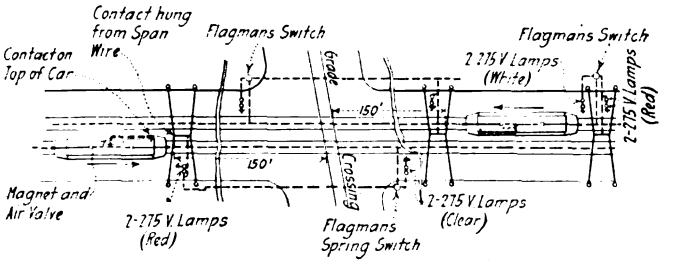
On approaching within 400 ft. of a grade crossing the car encounters a danger signal at the first stop, and



ELEVATION OF CAR AND OVERHEAD STEEL STRUCTURE SHOWING ARRANGEMENT OF AUTOMATIC CAR STOP

the motorman brings his car to a stop in the usual manner. The conductor then goes ahead to operate the switch which cuts out the danger signal, de-energizes the stationary contact and displays the clear signal, after which the motorman proceeds. On reaching the stop nearest the crossing the motorman brings his car again to a stop. The conductor then crosses the grade crossing, after properly flagging it, operates the switch in the same manner as described before, cutting out the danger signal and displaying the white signal for the motorman to proceed. If the motorman fails to bring his car to a stop, in approaching the grade crossing, then the spring contact on top of the car, engaging the channel, energizes the magnet of the electro-pneumatic valve, causing it to produce an emergency stop. The conductor or motorman must then alight from the car and reset the valve before the car can proceed, as power cannot be restored to the car nor can the brakes be released until this electro-pneumatic valve has been reset by hand. This valve is purposely so located that it is necessary to get off the car to perform this operation.

Mr. Taurman has recently arranged for the development and marketing of this device by the Consolidated



RAILROAD CROSSING SHOWING INSTALLATION OF AUTOMATIC CAR STOP

Car Heating Company, Albany, N. Y., which furnished the equipment for the Virginia Railway & Power Company.

Local engineers are conducting a research regarding the return circuit conditions on the property of the Omaha & Council Bluffs Street Railway with a view to possible improvement in the distribution system. The United States Bureau of Standards will take the results of this work, which are understood to be practically ready for the purpose, and will work them up into a complete report.

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NEWS OF ELECTRIC RAILWAYS

Financial and Corporate | Traffic and Transportation | Personal Mention | Construction News

P. R. T. COMPANY RENEWS PROPOSAL TO CITY

Further Conferences Proposed With Prospects Reported Good for Settlement Soon

Ellis Ames Ballard, chief counsel for the Philadelphia (Pa.) Rapid Transit Company, announced at the public hearing on Nov. 17 before City Councils' joint committee on street railways and finance that the company was willing to enter an agreement with the city for the operation of high-speed lines, with the 1914 Taylor tentative agreement as a basis. The statement made by Mr. Ballard follows:

"The company appreciates the opportunity of stating to you and through you to the public its attitude in respect to the equipment and operation of the city high-speed lines.

"In May, 1914, as a result of conferences held between representatives of the company and Mr. Taylor, who was then director of city transit, a basis for a suggested agreement was prepared, which was dependent, however, upon the rapid transit company securing financial aid from the Union Traction Company. The essential features of this tentative agreement were:

"1. The program at that time was limited to Frankford, stopping at Bridge Street; Broad Street Subway, stopping at Pike Street, with branches and a delivery loop, and Darby. It was estimated by the director of city transit that the contribution of the company for equipment of these lines would be slightly less than $12,000,000.

"2. Exchange tickets were to be abolished in order that the two systems could be operated as one. The company was to receive a partial consideration for this concession. A year later Director Taylor suggested some changes in this consideration which you will find in his official report for the year 1915.

"3. In so far as the competition of city-built lines depleted the current net earnings of the company's own system (except net earnings from exchange tickets) that loss was to be made up to it by a preferential payment out of the earnings of the city's lines. That is to say, those earnings were to be applied (1) toward paying 6 per cent upon the cost of equipment furnished by the transit company; (2) toward making up any loss in its said current net earnings which the company had experienced from this competition; (3) toward meeting the interest and sinking fund charges on city bonds, and (4) the balance of earnings to be divided between the parties in proportion to their contribution to the city lines.

"Two and a half years have elapsed since these conferences, and the situation has changed materially in many respects. First, the Union Traction Company has not up to the present time agreed to furnish the necessary financial assistance. Second, since the suggested agreement the city has provided for extensions and additions to the original Taylor plans which materially increase the commitment of the operator and alter the financial results to be fairly expected. Third, the cost of all items of construction and equipment are much greater than the original estimates, so that the company now estimates that to equip even the lines originally included in the 1914 plan will take from $17,000,000, as against $12 000,000 then estimated.

"However, I wish to say on behalf of the company that it stands ready to enter into a contract with the city of Philadelphia incorporating the spirit of the 1914 plan, with the 1915 amendment as to exchange tickets, and that it will go just as far in this matter as its credit will permit. It will be necessary, however, to make such financial arrangements as may be required to enable the company to secure the money not only for the equipment of city-built lines, but for its own current needs for refunding and extensions. The problem does not seem to us to be insurmountable, but is one which will require careful thought and concessions on both sides. The understandings which have been reached between the company and the city's representatives are not to be confounded with the form of contract which has been submitted to you by his honor, the Mayor. That is a draft in the preparation of which the rapid transit company representatives have had no voice. As already stated, however, we stand ready to carry out the understandings of 1914 and 1915 to the extent of our ability, and for that purpose will be glad to join with the city in the preparation of a contract which shall fairly protect both parties."

Chairman Gaffney, of the finance committee of Councils, has invited officials of the Philadelphia Rapid Transit Company, the Union Traction Company and the Market Street Elevated Railway to confer on details of the future contract with himself, the Mayor and Chairman Seger, of the street railway committee.

At the meeting of the directors of the Philadelphia Rapid Transit Company held on Nov. 20, E. T. Stotesbury and T. E. Mitten were appointed a special committee of the board to negotiate with the representatives of the city in connection with the proposed agreement between the city of Philadelphia and the company for the operation of the city-built high-speed lines.

DALLAS NEGOTIATIONS CONCLUDED

The proposed franchises to be granted by the city of Dallas, Tex., to the consolidated street railway and the new lighting company to be organized by J. F. Strickland and C. W. Hobson were approved at a conference on Nov. 19 between city officials and the Strickland-Hobson interests. There remains the taking of the straw vote by which the citizens of Dallas will pass on the proposed valuation of $8,500,000 for the street railway properties. The vote will be taken within the next few weeks, and if the valuation of $8,500,000 is approved instead of the valuation of $7,100,000 as fixed by E. W. Bemis after a survey of the properties, the settlement will become a reality.

The lease by which the Strickland-Hobson interests will take over the operation of the Oak Cliff lines expires in 1935, and will give the new traction company control of all properties of the Northern Texas Traction Company within the corporate limits of Dallas. The lease gives Mr. Hobson the option to purchase the leased properties when the mortgages of the traction company are discharged. The Northern Texas Traction Company maintains the right to operate its interurban railway into the city. This company also agrees to complete the viaduct across the Trinity River. Rent to be paid by the Hobson company is based upon the sliding scale, beginning with $115,000 a year and increasing in the seventh year to $150,000.

The valuation agreed upon by the city and the utilities interests for the Oak Cliff lines is $1,665,760, as of Sept. 30, 1915. Since that date approximately $120,000 has been spent in betterments. If the Hobson company buys the traction company's properties it must pay $2,000,000, or if the city should take over the lines it will have to pay the 1915 valuation figures plus expenditures made up to the time of purchase.

The actual cost of the interurban terminal up to Sept. 30 is given at $1,301,516. With other bills to be paid and costs for other real estate to be taken in for the use of cars not having been transferred to the terminal company, the total cost of the terminals will be brought up to a figure estimated at $1,500,000. Additional property to be used for parking of cars, across Wood Street from the rear of the terminals, is to be acquired.

Arrangements are being made to place before the voters in pamphlet form all the details of the settlement, including a review of the negotiations and the new contracts and proposed franchises in full.

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CHICAGO ALDERMEN RETURN FROM INSPECTION

Alderman Capitain, Chairman of the Local Transportation Committee, Gives Impressions of Ten Days' Study in Eastern Cities

The sixteen Chicago aldermen, members of the local transportation committee of the City Council, have returned to Chicago after their ten-day trip through the East to study city railway conditions. In an interview in Chicago with a representative of the ELECTRIC RAILWAY JOURNAL, Alderman Capitain, chairman of the committee, gave the principal impressions which the aldermen received as the result of their study. He said that the aldermen noted particularly the co-operation between the companies and the municipalities. Apparently the public could have anything it wanted in the way of transportation so long as it was willing to shoulder its proper part of the cost. The committee was impressed particularly with the progress which has been made in the electrification of steam railroads around New York City, and with the plans under way by the New York Central Railroad for the complete electrification of the West Side yards.

Mr. Capitain thought that Chicago was particularly fortunate in that conditions in the East gave to Chicago a greater incentive to better its transportation facilities, and afforded that city an opportunity to profit by experience. As an example of this, he said that Chicago had formerly considered a subway for surface lines only, while now it was evident that with a unification of the surface and elevated lines, the subway would need to be so constructed as to take care of the through service rapid transit of the elevated system as well. The delay in the Chicago work and study has also shown the necessity of laying out the subway system so that it could ultimately be expanded to make a comprehensive system. In Boston, conditions some time ago were such that it became necessary for the city to handle the constructing of its subways. This had necessitated the building of additional subway lines later at extremely high cost.

The committee was inclined to believe that the Boston situation came nearer than any other to the work that it will be necessary to carry out for Chicago. The members of the Chicago party were very much interested in the Cambridge station of the Boston subway because of the very efficient system of separating the routes of people leaving and entering the system. The Chicago situation in general would be simpler to solve than that in Boston, because the layout of Chicago required less transferring of passengers.

Alderman Capitain thought that Chicago had also been particularly fortunate in the 1907 settlement. He believed that the 1907 ordinances had worked out very satisfactorily and had been a good financial arrangement, except that some charges were made against the nickel which should not be made. In these unwarranted charges he included an item of some $8,000,000 which the companies had been forced to spend in paving. This was capitalized into the physical valuation of the property. He said that when one considered that the street railways increased property value from 100 to 1000 per cent, it did not look reasonable that the car riders should pay this paving bill. If that amount of money had been allowed to go into service to the direct benefit of the riders, it would have meant a great deal to them. The Chicago companies were also forced to repair this pavement, which they did not wear out, and this had also run to several millions of dollars since the 1907 ordinance. They were also required under the 1907 grants to clean 16 ft. of the street and were now paying between $300,000 and $400 000 a year for this. The outlying district and the real estate dealers had been so insistent in having the city take advantage of the ordinance provision for a certain amount of extensions each year that the car riders had paid the price and the property owners reaped the benefit.

The feature of the Chicago ordinances which allowed the companies to earn a certain percentage on their capitalization and after that to divide the net profits with the city Mr. Capitain thought to be a good one, as it furnished an incentive to the companies to scrutinize expenditures carefully. He contrasted this with the Cleveland arrangement, guaranteeing a return of 6 per cent to the railway.

The franchise situations in the cities visited were discussed freely with the various companies and the municipal boards. From these discussions the committee got the general impression that the indeterminate form of franchise was probably best suited to modern conditions. This form of franchise can be written to provide for regulation by a competent commission with some freedom in the exercise of its supervision, but recognizing the underlying principle that a sufficient return on the capital investment as determined by experts must be allowed.

In speaking of the municipal regulation of transportation companies, Mr. Capitain remarked that one of the difficulties had been that the operating company would secure a very high-grade man paying him a salary of $25,000 or $30,000, while the city would retain a man at $6,500 or $7,000 a year to supervise the work of the railway. He thought that the only successful way to meet this situation was for the city to retain as its representative a man fully as capable as any in the employ of the railway. He also remarked that the farther such regulatory bodies could be removed from politics, the better would be the results obtained.

The trip was considered to be a very successful one. Mr. Capitain remarked that everyone who met the committee went out of his way to give the members every opportunity for inquiring into the methods of the various systems, and that the city of Chicago ought to be grateful for these courtesies. He is of the opinion that as a result of the trip, the committee is very much better prepared to receive the report the Chicago Traction and Subway Commission and to recommend more intelligently than before to the City Council as to what ought to be done.

CLEVELAND POWER HEARING CONTINUED

Warren Bicknell Substituted for Joseph Alexander as Arbitrator on Account of Accident—New Bid from Municipal Plant

The hearing on the power contract between the Cleveland (Ohio) Railway and the Cleveland Electric Illuminating Company was held up for some days last week because of an accident to Joseph Alexander, one of the arbitrators, which resulted in a fractured knee. On Nov. 16, however, the hearing was resumed with Warren Bicknell, president of the Cleveland Construction Company, in Mr. Alexander's place.

Peter Junkersfeld, vice-president of the Commonwealth Edison Company, Chicago, was the principal witness that day. He said he considered the contract proposed as very advantageous to the railway because of the low rate. So far as the municipal light plant's bid was concerned, Mr. Junkersfeld said it was a desirable one from the standpoint of price, but there seemed to be no assurance that the municipal plant could give continuous and dependable service. His own company could not take a contract at the prices made to the railway in Cleveland. In his opinion the Cedar Avenue power house of the railway should be dismantled.

F. W. Ballard, former light commissioner of Cleveland, was the witness on Nov. 20. He estimated that the Illuminating Company would have an investment of $1,985,000 in equipment to take care of the contract. On this he declared the company would make a profit of $202,442 a year above the 7 per cent that should be allowed on the investment. Mr. Ballard said the contract was also advantageous to the Illuminating Company because it would reduce the unit cost of production, and because the railway agrees to pay the extra cost of coal above $2.25 per ton. He considered that $2.40 a ton would be a good average price for coal for the next five years.

The Cleveland municipal light plant submitted a second bid for the power contract of the Cleveland Railway to Street Railway Commissioner Sanders on Nov. 20. Light Commissioner Davis said that it is at the rate of 5.02 mills per kilowatt-hour. He said he had figured the rate at 12½ per cent above the cost of production. If the plant received the contract, Mr. Davis said he would recommend the purchase of two 15,000-kw. turbo-generators at once, and if it did not secure the business, one such generator should be purchased any way to take care of the increased domestic business that is awaiting.

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TOLEDO COMMITTEE RESUMES SESSIONS

Franchise Allowances, Fares, the Purchase Fund and Hauling Freight All Considered Before the Street Railway Commission

Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, Toledo, Ohio, met with the street railway commission of that city on Nov. 16 to continue the discussion on the proposal to establish a community company to take over the railway property. The proposed rate of fare was the first question taken up. Mr. Doherty said it would be possible to have a low fare, if that was the supreme object of the city. The aim of the present company had been to furnish good service. One way to reduce the fare was to cut out stops. In Cleveland 1200 stops had been eliminated. Mr. Doherty suggested that if fares were to be reduced, a start should be made with the present fare as a basis. The next step in revision downward could be seven tickets for a quarter, with a 1-cent charge for transfers. In case a further reduction was decided upon, the charge for transfers could be removed.

Mr. Doherty opposed the idea of a stated allowance per car-mile for operation and maintenance. He said that the management would be more efficient if left to operate as cheaply as possible. He also objected to the clause in the proposed franchise making it impossible to sell bonds. If three-fourths of the stockholders favored an issue of bonds, their sale should be allowed.

On the following day the clause fixing a maximum fare at 5 cents was taken up. Mr. Doherty told the commission that the matter should be left open, so that 10 cents could be charged on owl cars. He argued that it might eventually be advisable to adopt the zone system of fares. With such a provision in the contract, this change would be impossible.

Another question was the manner in which the proposed purchase fund should be disposed of, in case the city decided not to take over the road. John Usher, president of the street railway commission, contended that it should go toward amortizing the debt of the company or become the property of the city. Mr. Doherty suggested that it be turned over to the equalization fund and the company allowed to operate at a lower rate of fare for a time.

Judge Emery, in discussing the question of operating freight cars over the city tracks, said he believed that a lower fare could be established through a more economical handling of freight over the tracks. Mr. Usher thought people would object. Mr. Doherty suggested that food prices in the city would be reduced if freight could be hauled over the city tracks by electric power.

On Nov. 20 an agreement was reached between the commission and Mr. Doherty that an equalization fund shall be accumulated automatically in case the rate of fare produces a greater income than is required for operating, maintenance and other expenses, and 6 per cent dividends to the stockholders. When the fund gets below $100,000 the company may increase the fare to the next higher rate and when it exceeds $200,000, Council may order the next lower rate on the proposed schedule put into effect.

It was agreed that the matter of hauling freight should be left to the City Council. The clause limiting the fare to a maximum of 5 cents was discussed, but was left unchanged for the present. It seems that members of the commission do not expect the zone system to be introduced for some time. Commissioner Cochran said that, in the case of men working at night, it would not be right to charge them a fare higher than those who work in the daytime. Mr. Doherty argued that the fare on owl cars should be 10 cents and that employers would help to pay the fare of men who work at night.

Mr. Doherty objected to a clause which would allow the city to grant a franchise to another company in a prescribed territory. Commissioner Cochran supported him in this and said a city had about as much use for two street railways as for two telephone companies. Two companies operating the same kind of service in a community were a nuisance.

As to an amortization clause, Mr. Doherty said he would accept the one used in the Cleveland contract, but believed a clause a little more favorable to the city could be drafted. He was asked to prepare one.

FULL SERVICE IN INDIANAPOLIS

Governor Ralston, Holding Out Little Hope to Union Men, Presents Modified Demands to Company, Which Rejects Them

A committee representing the union street car men who quit work in Indianapolis, Ind., refusing to sign the company's individual working agreement, appeared before Governor Ralston on Nov. 16. They left with him a copy of a proposed working agreement which they wished him to present to Robert I. Todd, president of the Indianapolis Traction & Terminal Company, in an effort to resume negotiations between themselves and Mr. Todd. The modified agreement differed from their original demands which caused the company to break off negotiations, principally in that it did not provide for a closed shop. The rate of wages asked for originally also was reduced.

The Governor discussed the matter informally with the committee of union street car men and business agents of labor organizations. He said he would present the matter to Mr. Todd and they could return for an answer the following day. He held out no hope of being able to accomplish anything for them. During the discussion, the fact that the Governor called out the State militia during the street railway strike in 1913 was mentioned. The Governor then advised the committee that the administration intended to stand for law and order at all times, and that in the case mentioned he had brought the militia to the city entirely on his own responsibility.

Upon the matter being submitted to him in a letter from the Governor, Mr. Todd immediately wrote to Governor Ralston. His letter set forth the situation fully. Mr. Todd said in part:

"This company now has a full complement of employees, who are working under conditions and wage contracts satisfactory to them and to the company. All employees of this company engaged in car service are employed under a uniform agreement covering wages and working conditions. Less than 20 per cent of the car service men in the employ of the company prior to Nov. 9 refused to accept the terms of employment agreed to by more than 80 per cent of their fellows, and left the company. Some of this minority abandoned their cars and passengers in the public streets. They were invited and urged to remain in our service on the very terms accepted by an overwhelming majority of the men. They refused. Although in numbers a small minority, they were determined to dictate terms for a majority, and to force the company to discharge that majority if it did not accede to their demands. It should be very evident to all that the present contracts cannot be set aside or ignored. They are signed by all present employees engaged in car service. Both the men and the company recognize them as valid and binding upon them. It would be intolerable discrimination to have more than one form of contract among our men.

"We manifestly could not for one moment consider the replacing of any of the loyal, efficient and reliable men who are now operating the cars, in order to make places for men who have so little regard for their fellows and the public service that they first demanded the discharge of 80 per cent of the motormen and conductors unless the company forced them into their union, and when they failed in that, deserted their cars, and in some cases left carloads of passengers stranded in the streets. Therefore, as we now have a full force of employees, who by their loyal and faithful service have earned the runs they now hold, and the working agreement with car service men has now been signed by every man engaged in car operation, nothing practical could be expected to result from such a meeting as has been proposed by these former employees."

Otto Ray, president of the Central Labor Union, complained to Mayor Bell of the activities of the police. The Mayor said: "The duty of the police force is to maintain law and order. I do not intend again to permit conditions such as occurred three years ago. The police force will be used to protect the rights of all citizens."

On Nov. 18 at a night meeting of the former employees a strike vote was taken, but the purpose of this vote or the result of same was not announced by the labor leaders until Nov. 20, when printed cards were circulated, stating that a

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"street car strike" would be in effect at 11 o'clock that night. A mass meeting was held at Labor Hall, at which it is reported those who attended were incited by radical speakers to go out on the streets and damage the cars of the company, to be at the carhouses early in the morning and prevent men from taking out their cars. The excellent organization of the police department, however, prevented even the assembling of groups of labor sympathizers on the streets, and the company maintained all its schedules without any interruption or disorder.

The action of Amalgamated Association officials in calling a "strike" of men who had ceased all relations with the company ten days previously, and the reported inciting of these men to interfere with the cars in violation of an injunction of the United States court, was taken the same day that a committee of the American Federation of Labor, in session at Baltimore, reported that "we, therefore, recommend that any injunctions dealing with the relationship of employer and employee, and based on the dictum, 'labor is property,' be wholly and absolutely regarded as usurpation, and disregarded, let the consequences be what they may."

RAILWAY HELPS TO DEFEAT BRIDGE

A bridge proposition was defeated in Pottawattamie County, Iowa, at the general election on Nov. 7 by a vote of two to one.

The proposition involved a bond issue of $200,000 by Pottawattamie County, Iowa, to aid in the construction of a free bridge between Omaha, Neb., and Council Bluffs, Iowa. The promoters of the project asked Pottawattamie County, Iowa, to pay $200,000 and Douglas County, Neb., to pay $600,000.

Douglas County, Neb., was not to vote on the question until next year, on or before June 1, 1917, but inasmuch as the plan failed to carry in Pottawattamie County, Iowa, it is improbable that the question will be voted on in that county.

The project was opposed by the Omaha & Council Bluffs Street Railway. The campaign of the company in opposition to the project consisted of the distribution on cars on the Iowa division of a series of short "talks" to the voters. Each "talk" remained on the cars two days. The company also published these talks and other matter in the newspapers of Council Bluffs, and did considerable advertising, in the form of readers, in the country papers throughout the county. It also arranged with an organization, formed to protest against the bridge bond measure, to mail to every voter in the county a letter giving reasons why taxpayers should defeat the bonds.

The free bridge committee also conducted a campaign. The committee took space in the papers, sent out circular letters and posted cards, and had workers at the polls.

LIBERAL POLICY REWARDED

A decision has been handed down by the Railroad Commission of California establishing rates for the San Diego Consolidated Gas & Electric Company, a subsidiary of Standard Gas & Electric Company, controlled by H. M. Byllesby & Company, Chicago. Existing rates for both gas and electric current were left practically unchanged, but the minimum monthly charge for electric service was reduced from $1 to 75 cents. Minor reductions were made in various rates, but these had been voluntarily offered by the company in submitting its case to the commission, which, in making the decision, upheld the principle of centralized management in public-utility operation. The commission, in handing down the decision, said:

"The testimony shows that the San Diego Company's policy towards its customers has been praiseworthy. The company has voluntarily made reductions in rates from time to time, has been liberal in the construction of extensions at its own expense, and has exerted itself at all times to give to its customers good service. The number of informal complaints against the company which have come to the commission has been relatively very small. A public utility which pursues such a fair and reasonable policy towards the public is entitled to consideration from the public authorities charged with the duty of supervising and regulating public utilities."

CO-OPERATIVE CONFERENCE BETWEEN OFFICIALS AND UNION

Following the signing of the working agreement between the Bay State Street Railway and the local branches of the Amalgamated Association, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 18, page 1072, a conference was held between officials of the company and union representatives at the Quincy House, Boston, Mass., on Nov. 18 to promote mutual understanding. Twenty-nine days were included in the period which the negotiations leading to the signing of the agreement required. At the meeting last week nearly ninety men were present, including many heads of departments in the company, with delegations from each of the local unions on the system from Nashua, N. H., to Newport, R. I.

R. S. Goff, who is vice-president and general manager of the company, presided. Mr. Goff said that the agreement was regarded by both parties as one of the best possible. He believed that the negotiations which led to its conclusion were preferable by far to arbitration, and paid a tribute to the excellent spirit developed during the conferences. J. H. Reardon, for the union, said that the agreement was, in his opinion, the best thus far reached, and that the interests of the parties were identical. He hoped that the members of the union would prove that a contract with the union was as good as any other security on earth. President Sullivan of the company, who was also present, informally discussed the ways in which his hearers could assist in disciplining themselves and the members of their organization, and emphasized the need of rules and regulations in the conduct of a railway system.

INCREASE IN WAGES IN KANSAS CITY

P. J. Kealy, president of the Kansas City (Mo.) Railways, announced to the men during the first public concert by the company band that an increase of wages for trainmen averaging 7 per cent would go into effect on Nov. 16. The new schedule is as follows: First six months, 22 cents an hour; second six months, 23 cents; second year, 24 cents, and so on up to the eleventh year, when the rate is 30 cents. The minimum monthly wage is increased from $45 to $55. The advance for the newer men in the service is 1 cent, while the advances for most of the older men are 2 cents an hour. Men in the street sweeper service are to receive 32 cents an hour. Operators of one-man cars are to receive 2 cents an hour above the standard rate. Previous wage advances on the Kansas City Railways were as follows: April 12, 1907, 1 cent; May 16, 1910, 1 cent; Aug. 7, 1913, 1 cent, and immediately after the granting of the new franchise, on July 29, 1914, 1 cent.

In his address to the men, Mr. Kealy said that the wage increase was one of the items on his announced program of several months ago. He hoped to see the people connected with the company molded into one big family, the men owning their own homes, and permanently located in Kansas City and in their jobs. He said the company desired to see that the employees got a just and equitable part of the earnings, that the investors received a just and equitable return of their investment, and that the people of Kansas City got fair and reasonable service. With reference to safety work, Mr. Kealy said that as the claims against the company for accidents were reduced below a certain average normal figure, the wages would be increased above normal.

The increase of 5 per cent in the earnings of the company since April 1 is attributed partly to the co-operation of the employees, as a result of the welfare and similar work. The welfare program so far worked out includes the *Railwayan*, the monthly magazine; the jubilee, a great gathering at which 11,000 employees and members of their families were present; the organization of the band, whose first concert was the occasion for the wage-increase announcement; the free legal-aid bureau; the loan bureau, and the encouragement of athletics. Parts of the program now under way include the establishment of a savings and building loan fund, and the encouragement of the men to buy or build suitable homes; a pension system, and centralization of car headquarters.

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WAGE REQUEST WITHDRAWN

Wage differences which have been a subject of discussion for several weeks between transportation department employees and the Denver (Col.) Tramway have been settled satisfactorily. The men have agreed to postpone their request for an increase. Herbert W. Joslin, chairman of the committee representing the men, is quoted as having said:

"The company has shown us its position in this matter, so that we believe in fairness the request for raise in wages should be postponed. While the present high cost of living would have made a raise more than welcome, we can see from the showing made by the company that we are not the only ones who have increased expenses to meet. There will be no further demand unless conditions change."

It is understood that investigations made by the men have brought out that Denver conductors and motormen are getting about the same wages that similar employees in other cities of the same size are getting, and with conditions as they are in Denver at present they have decided to let well enough alone. It is also stated by employees of the company that the excellent treatment of the men in other matters besides wages has had a great bearing on the amicable settlement of the question. At the meetings at which the matter was taken up tramway officials invited all the men in to see the figures on their side, and the committee presenting the request received every consideration.

ADDITIONAL GENERATING CAPACITY FOR TOLEDO

Henry L. Doherty, of H. L. Doherty & Company, who operate the Toledo Railways & Light Company, Toledo, Ohio, under contract, announced at Toledo on Nov. 20 that plans are being completed for a new central station for that city, which may have a capacity of 120,000 kw. and cost about $6,000,000. He said that such a plant will be capable of taking care of an increase of 100,000 in population. It is possible that it will be located on the old rolling mill property on the East Side, which is owned by Mr. Doherty, but if it proves that this property is too high for the purpose, the plant may be placed outside the city limits.

It is not the intention to abandon the Water Street plant, the capacity of which has been gradually increased to 80,000 kw. In all probability the city railway lines will depend upon the company for power, however they may be owned. In any event, the interurban roads will need additional power, and both the power and light business in the city is growing rapidly.

Mr. Doherty said he had asked M. R. Bump, chief engineer of the Doherty properties, to come to Toledo with all his plans, and thereafter the two will hold daily sessions until they are fully completed.

Mr. Morse Named as Pittsburgh Transit Inspector.—Edwin K. Morse was named as Transit Commissioner by Mayor Joseph G. Armstrong of Pittsburgh, Pa., on Nov. 6. The Council has confirmed the nomination.

Covington Dismissals Upheld.—Both the company and the men have announced that they will abide by the findings of the arbitration commission, filed in Covington, Ky., upholding the South Covington & Cincinnati Street Railway, Covington, Ky., in its right to discharge six employees charged with drinking while on duty.

Bay State Street Railway to Sell Parks.—The Public Service Commission of Massachusetts set Nov. 24 as the date for hearing a petition of the Bay State Street Railway for authority to sell amusement parks in Freetown, Dighton, Westwood, Methuen, Tyngsboro and Gloucester. In its recent decision in the company's 6-cent fare case, the commission intimated that such parks were not a source of profit to the company and suggested that they be disposed of by the management.

Petition for Abandonment Withdrawn.—In the ELECTRIC RAILWAY JOURNAL for Oct. 7, page 747, mention was made of the fact that Ansel M. Easton had applied to the Railroad Commission of California for permission to abandon the Burlingame Railway. The day before the time set by the commission to hear the application, Mr. Easton withdrew the application, having decided to continue the operation of the line. It is more than likely now that new equipment will be installed at an early date.

Shawnee Strike Ended.—After having been idle since Nov. 1 on account of a strike of motormen and conductors, the Shawnee-Tecumseh Traction Company on Nov. 18 resumed operation of its local cars and the interurban line from Shawnee to Tecumseh. An agreement was reached between strikers and the company through State Labor Commissioner Ashton and Mayor Stearns of Shawnee as a board of mediation. The agreement is a compromise.

Suggests Municipal Ownership for Cincinnati. — Carl Brannin, the manager of the People's Power League, sent a communication to the Rapid Transit Commission of Cincinnati, Ohio, and the conference committee of the Council committee on street railways on Nov. 17, in which he advocated the municipal ownership and operation of the proposed rapid transit loop and the surface lines. Mr. Brannin had been invited to make an address, but sent the communication instead.

Rehearing Asked in Valuation Case.—The Portland Railway, Light & Power Company, Portland, Ore., has filed with Public Service Commission of Oregon a petition asking for a rehearing in the case recently decided by the commission, fixing the valuation of the company's properties. Reconsideration is desired by the company particularly on the findings of the commission fixing the value of the company's working capital, reproduction costs, franchise, water powers, original cost and depreciation annuity.

Amalgamated Organizer Thorpe Dead.—John J. Thorpe, first vice-president of the Amalgamated Association, who conducted the Pittsburgh strike of a year ago and the unsuccessful strike of the Harrisburg (Pa.) Railways last summer, died at Hot Springs, Ark., on Nov. 19 from heart trouble and dropsy. He was forty-three years old, and is survived by his widow. By his tactics at Harrisburg Thorpe drew down upon himself the wrath of Mayor Meals of that city, who characterized him as "a mighty bad man."

Expediting Adamson Law Case.—The Adamson eight-hour law was held on Nov. 22 to be unconstitutional by Judge William C. Hook in the United States District Court at Kansas City, Mo. The court made it plain that the decision was not based on mature consideration of the merits of the case, but on expediency desired by all parties at interest because of the necessity of a final decision by the Supreme Court of the United States before Jan. 1, when the law goes into effect. Electric railways are specifically exempted from the provisions of the measure.

Horses in New York Until April.—The New York (N. Y.) Railways has informed the Public Service Commission for the First District of New York that it has been impossible to secure the storage-battery cars for the Madison Street and Avenue C line as rapidly as the company had expected because of the condition of the car-manufacturing trade, but deliveries would begin early next month at the rate of three to five cars a week. This will enable the company to equip the line with the new cars by April 1, 1917, and by that date the last of the horse cars to be operated on Manhattan Island will be retired. The commission accordingly granted an extension from Dec. 1 to provide such equipment.

Conference on Mill Tax in St. Louis.—City officials of St. Louis, Mo., and officers of the United Railways plan to confer on the subject of the mill tax and the duration of the underlying corporation's franchises. Richard McCulloch, president and general manager, Murray Carleton and A. L. Shapleigh, directors, will represent the railway. It is expected that the discussions of the company's proposals and the city's counter propositions will require several weeks before a bill embodying any compromise that may be reached is introduced before the Board of Aldermen. In a letter written several weeks ago to City Counsellor Daues, H. S. Priest, general counsel for the railway, declared that the company could not pay the mill tax, meet its obligations to bondholders and make improvements.

Springfield Company Appeals for Revision of Excise Tax.—The Springfield (Mass.) Street Railway has petitioned the Public Service Commission of Massachusetts for a revision of its payments to local municipalities under the excise tax law. The company contends that the average annual amounts paid in the last three years as an excise tax under the Acts of 1909, Chap. 490, are in excess of the average

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annual cost to each city and town named of the work done by it under the provisions of this act during the three years. Under the law the money received by the municipality is to be used in track construction and maintenance and in the removal of snow and ice. Fourteen towns are listed, the track mileage ranging from 0.85 to 22.11 and the taxes from $271 to $7,064. The commission will hear the petition on Dec. 4 at Boston. This is the first case of its kind to come before the board.

Legitimacy of Pay Roll and Business.—W. D. B. Dodson, executive secretary of the Portland (Ore.) Chamber of Commerce, addressed members of that body recently on "Legitimacy of Pay Roll and Business." The chamber is endeavoring to show that a part of the depression in the Pacific Northwest is due to lack of support of the community to legitimate business. In concluding his remarks Mr. Dodson said that the Chamber of Commerce was going to try to change public sentiment to an appreciation of the necessity of getting the payroll firmly fixed and not allowing irresponsible elements to come in and attack it with impunity. In this work the members of the Chamber of Commerce and the community as a whole must co-operate, and the success in the plan of encouraging the upbuilding of the payroll depended very largely upon the response to the appeal. The speech was considered very significant, coming as it did on top of the granting of the open shop on the river front at Portland, where the members of the longshoremen's union, when their strike fell through, were compelled to return to work on the same basis as paid by other coast cities and with an open shop, something new to Portland for the first time in many years.

PROGRAM OF ASSOCIATION MEETING

Safety First Federation of America

The convention of the Safety First Federation of America in Baltimore, Md., on Dec. 7, 8 and 9, referred to previously in the ELECTRIC RAILWAY JOURNAL, will be the second annual gathering of the federation, and will be under the auspices of the Safety First Society of Baltimore with headquarters in the Hotel Emerson. Darwin P. Kingsley, president of the federation, will preside at all sessions. The afternoon session on Dec. 7 is to be devoted to street traffic and will be as follows:

Report of the street traffic committee on the standard code of traffic regulations, headlight glare and code of signals. This report will be presented by John Gillespie, chairman of the committee, who is ex-commissioner of police of Detroit, Mich.

Address, "The Necessity of Examining and Licensing All Operators of Motor Vehicles," by Arthur Woods, commissioner of police of New York.

Address, "Baltimore's Recent Contribution to Street Traffic Regulation," by Robert D. Carter, marshal of police of Baltimore.

Address, "The Work of the Traffic Court," by Joseph Sabatch, judge of the superior court of Cook County, Chicago, Ill.

Address, "The Necessity of Distinct Examination for Operators of Different Types of Cars," by E. Austin Gaughman, automobile commissioner of Baltimore, Md.

Address, "Co-operation on Behalf of Automobile Manufacturers," by J. Walter Drake, chairman of the safety first committee of the National Automobile Chamber of Commerce.

Address, "The Pedestrian's View of Traffic," by H. W. Rowe, president of the American Automobile Association.

The morning of Dec. 8 will be devoted to discussions of the trespass problem and the question of reducing accidents upon the right-of-way of railroads. The afternoon session on Dec. 8 will be given over to a discussion of fire prevention.

A number of miscellaneous matters will be considered at the closing session on Dec. 9. At that session, C. Loomis Allen, Syracuse, N. Y., ex-president of the American Electric Railway Association, will report for the committee on city and interurban railways and William A. House, president of the United Railways & Electric Company, Baltimore, will discuss "Safety First Movement from the Street Railway Point of View."

Financial and Corporate

UTILITY ISSUES AS COLLATERAL

Utility Bonds Constitute More Than One Quarter of Number of Issues Deposited Against British Loan

The list of securities serving as collateral for the recent $300,000,000 of 5½ per cent British government gold loan covers two distinct groups of securities aggregating in value $180,000,000 each. One group is made up of bonds and other obligations of the governments of Australia, South Africa, New Zealand, Argentina, Chile, Cuba, Japan, Egypt and India, together with $25,000,000 of British railroad securities. The other group consists of Canadian government bonds and at least $100,000,000 of American securities.

The American securities include 127 stock issues and 615 bond issues. The stock group is divided into fifty-four steam railroad issues, sixteen utility issues and fifty-seven industrial and miscellaneous issues. American Light & Traction preferred, California Railway & Power prior preference, Detroit United Railway and Twin City Rapid Transit common and preferred are among the stocks deposited from abroad. The bond group comprises 437 steam railroad issues, 120 public utility issues (including fifty-two electric railway issues) and fifty-eight industrial and miscellaneous issues. The electric railway bonds follow:

Albany Ry. general M. 5s, 1947.
American Cities 8-year 5-6% col. tr. 1919.
American Pwr. & Lt. 10-yr. 6s, 1921.
Auburn & Syracuse Elec. RR. 1st & ref. M. 5s, 1942.
Broadway & Seventh Ave. RR. 1st cons. M. 5s, 1943.
Brooklyn Rapid Transit—
Secured 5% notes, 1918.
1st & ref. M. 4s, 2002.
5s, 1945.
Brooklyn Union Elev. 1st M. 5s, 1950.
Central Illinois Pub. Serv. 1st & ref. M. 5s, 1952.
Chicago City Ry. 1st M. 5s, 1927.
Chicago Rys. 1st M. 5s. 1927.
Connecticut Ry. & Lt. 1st ref. M. 4½s, 1951.
Dallas Electric 1st. M. collat. tr. 5s, 1922.
Detroit United Rys. 1st cons. 4½s, 1932.
Duluth Street Ry. 1st M. 5s, 4½s, 1932.
Gen. M. 5s, 1930.
Eastern Penna. Rys. 1st M. 5s, 1936.
Eastern Power & Light Corp. convert. 5s, 1918.
Federal Lt. & Trac. 1st lien s. f. 5s, 1942.
Georgia Lt. Pow. & Rys. 1st lien 5s, 1941.
Hudson & Manhattan RR. 1st lien & ref. M. 5s, "A," 1957.
Indiana Ry. 1st M. 5s, 1930.
Int.-Met. collat. tr. 4½s, 1956.
Interborough Rapid Transit—
1st M. 5s, 1966.
1st M. 5s, 1966, reg.
Kings County Elev. RR. 1st M. 4s, 1949.
Lexington Ave. & Pav. Ferry 1st M. 5s, 1993.
Manhattan Ry. cons. 4s, 1990.
Lynn & Boston RR. 1st M. 5s, 1924.
Milwaukee Elec. Ry. & Lt. cons. M. 5s, 1926.
Minneapolis St. Ry. & St. Paul City Ry. cons. M. 5s, 1928.
Nashville Ry. & Lt. ref. & ext. 5s, 1958.
Nassau Electric RR. 1st cons. M. 4s, 1951.
New Orleans Ry. & Lt. gen. 4½s, 1935.
Newport News & Hampton Ry., Gas & Electric 1st & ref. M. 5s, 1944.
Northwestern Elev. Ry. 1st M. 5s, 1941.
Pennsylvania & Mahoning Valley Ry. 1st & ref. M. 5s, 1922.
Portland Ry. 1st & ref. M. 5s, 1930.
Portland Ry., Lt. & Pwr. 1st ref. 5s, 1942, series A.
Puget Sound Trac., Lt. & Pow. 6s, 1919.
Rochester Ry. M. 5s, 1930.
St. Louis, Springfield & Peoria RR. 1st & ref. 5s, 1939.
St. Paul City Ry. cons. cable 5s, 1937.
San Joaquin Lt. & Pwr. Corp. 1st & ref. 5s, 1950, "B."
Spokane & Inland Empire RR. 1st ref. M. 5s, 1926.
Third Ave. RR. 1st M. 5s, 1937.
1st ref. 4s, 1960.
Adjust. M. 5s, 1960.
Tri-City Ry. & Lt. 1st ref. 5s, 1930.
United Light & Rys. 1st & ref. M. 5s, 1932.
United Ry. & Elec. 1st cons. 4s, 1949.
United Rys. Investment 1st lien collat. tr. 5s, 1926.
Washington Wtr. Pwr. 1st ref. M. 5s, 1939.

TRUST COMPANY WANTS BETTER TERMS

The Mercantile Trust & Deposit Company, Baltimore, Md., has addressed the holders of the 4 per cent gold bonds of the United Railroads, San Francisco, Cal., in part as follows:

"As owners of and the representatives of owners of a substantial amount of bonds of the above issue, we have studied the proposed plan of reorganization of the United Railroads of San Francisco.

"It is our opinion, after a careful examination of the financial condition of the company, that a reorganization can be effected which, while fair and just to the holders of the junior securities, insures to the holders of the 4 per cent bonds a more advantageous settlement than that proposed in the present plan. To effect such a reorganization will require concerted action on the part of a large number of holders.

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"We are advised that only $6,000,000 of the total of $23,000,000 of bonds have been deposited as consenting to the proposed plan.

"If the holders of sufficient bonds co-operate with us, arrangements will at once be made looking to the appointment by the holders of a committee who will actively endeavor to obtain more advantageous terms for these bonds in the reorganization."

ANNUAL REPORT

Eastern Pennsylvania Railways

The comparative income statement of the Eastern Pennsylvania Railways, Pottsville, Pa., for the years ended June 30, 1915 and 1916, follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Gross earnings	$901,490	100.0	$825,455	100.0
Operating expenses	529,195	58.7	469,083	56.8
Net earnings from operation	$372,295	41.3	$356,372	43.2
Taxes	20,452	2.3	17,487	2.1
Net earnings from taxes	$351,843	39.0	$338,885	41.1
Deductions—underlying companies	47,453	5.3	47,132	5.8
Balance	$304,390	33.7	$291,753	35.3
Deductions — Eastern Pennsylvania Railways	184,682	20.4	180,651	21.9
Balance	$119,708	13.3	$111,102	13.4

During the last year the gross earnings increased $76,034 or 9.2 per cent and totaled the largest in the company's history. Of this increase only $9,942 was derived from the purchase of new properties operated only a few months. The operating expenses, however, increased $60,111 or 12.8 per cent, so that the increase in net earnings was $15 923, an increase of 4.5 per cent. The increase in operating expenses was chiefly caused by the cost of more power to take care of increased business, a larger expenditure for replacements and renewals, workmen's compensation expenses, increased wages and increased cost of materials and supplies. Taxes increased $2,965 or 16.9 per cent. The balance available for depreciation, amortization and dividends, however, showed an increase of $8,605 or 7.7 per cent after all charges were paid.

MAJORITY STOCKHOLDERS GUARDIANS OF MINORITY INTERESTS

If a decision just handed down by Justice Giegerich of the New York Supreme Court is not reversed, the Delaware, Lackawanna & Western Railroad will have to give up the lease of a little railroad which it absorbed in 1911. This road is the Syracuse, Binghamton & New York Railroad, which has been plying between the two first named cities since it was organized in October, 1850. The road is only eighty-one miles long. It had been paying for many years around 25 per cent dividends on its capitalization of $2,500,000, except in 1912, when it paid 37½ per cent.

Prior to Aug. 19, 1907, the Delaware, Lackawanna & Western Railroad owned 19,389 shares of this stock, and the Public Service Commission of the Second District gave it permission to gather in the remainder of tre 25,000 shares if it could. The road could get hold of only 21,301 of the shares. On Dec. 6, 1911, the board of directors ratified a lease of the little railway to the Lackawanna company. One of the provisions was that the rate of interest paid to the stockholders of the small road would be 12 per cent, to be paid quarterly, beginning Feb. 1, 1913.

The small group of minority stockholders protested against the lease, and suit was begun for an annulment and an accounting. In his opinion Justice Giegerich pointed out that practically every provision of the lease was in favor of the big line. "The case presented," continued the court, "seems so plainly to be one where all the risk of loss is thrown upon the lessor and all chance of gain given to the lessee, that the intervention of the court is required in the interest of the minority stockholders."

Counsel for the complainants explain that one of the important points covered by the court was in deciding that majority stockholders are in a measure the guardians of the interests of the minority stockholders. Any action taken by the majority to the detriment of the minority is, therefore, in the nature of a breach of trust.

Elkins (W. Va.) Electric Railway — J. C. McSpadden, Rockwood, Pa., president of the Elkins Electric Railway, is reported to have sold the road to M. H. Frank, a junk dealer of Pittsburgh. The sale included four cars, all the rails, machinery, copper and other material. Mr. McSpadden retains the franchise within the city and certain real estate of the company.

Fort Dodge, Des Moines & Southern Railway, Boone, Iowa.—On Nov. 1 the Fort Dodge, Des Moines & Southern Railway paid a dividend of 1½ per cent on its common stock. A like amount was paid on Aug. 1. The company has paid dividends on the preferred stock since February, 1916, 1¾ per cent each quarter.

Georgia Railway & Power Company, Atlanta, Ga.—All the interests of the Franklin Light & Power Company, the Broad River Power Company and the J. B. McCrary Company, Hartwell, Ga., have been acquired by the Georgia Railway & Power Company.

Interborough Rapid Transit Company, New York, N. Y.—The last of $160,585,000 of first and refunding mortgage 5 per cent bonds issued by the Interborough Rapid Transit Company to finance the improvement and construction program worked out with the city have been sold, and it is expected that the underwriting syndicate, which was organized four and one-half years ago to handle the issue, will shortly be dissolved. Prior to its inception the largest single issue of corporate securities attempted in this country was $100,000,000. When the syndicate was formed, in April, 1912, an international syndicate with 280 participants was assembled, the members of which will shortly be relieved of their commitments. A selling syndicate was formed by Lee, Higginson & Company, Harris, Forbes & Company and Kissel, Kinnicutt & Company, which recently took over from the original syndicate $24,458,000 of the bonds, which they offered at 98¾. At the same time they took an option on $12,229,000 of the bonds remaining, which they will now exercise. J. P. Morgan & Company have called upon all of the participants to return any unsold bonds which they may have, so that the entire transaction may be wound up.

Northern Ohio Electric Corporation, Akron, Ohio.—The syndicate that offered the preferred and common stock of the Northern Ohio Electric Corporation has been closed and applications have been made to list the stock on the Cleveland, Cincinnati, Columbus and Louisville Stock Exchanges. The Northern Ohio Electric Corporation controls the Northern Ohio Traction & Light Company through stock ownership.

Pottsville (Pa.) Union Traction Company.—The Pottsville Union Traction Company has notified the Pennsylvania Public Service Commission that it proposes to issue additional bonds to the amount of $150,000 to the Eastern Pennsylvania Railways in payment of funds advanced by that company to the Pottsville company and advanced in turn to the Pottsville & St. Clair Electric Railway for use in building the line of the latter company. The Pottsville & St. Clair Electric Railway proposes to issue $150,000 of bonds to be delivered to the Pottsville Union Traction Company in repayment of funds advanced by that company and expended in constructing the road of the Pottsville & St. Clair Electric Railway.

Seattle (Wash.) Municipal Railway.—According to information supplied by the Public Utilities Department of Seattle, Wash., of which A. L. Valentine is superintendent, Seattle's two municipal car lines were operated during the month of October at a loss of $1,985. Division A showed an operating loss of $218, with an interest charge of $1,593, making the total loss for that division $1,812. The revenues of this line for the month amounted to $1,701. The cost of operation was $1,920. Division C, known as Lake Burien line, was operated at a loss of $172. The revenues of the line were $2,264, and the cost of operation $2,436. The city began the operation of these two car lines June 1, 1914, and the loss each month has averaged more than $2,000. As no provision is made in the annual tax budget for these losses, they become a direct charge against the general fund, the lighting fund sharing in the loss to some extent by furnishing electricity at a rate below the actual cost of the delivery of current.

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DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., $1, common.

Central Mississippi Valley Electric Properties, Keokuk, Iowa, quarterly, 1½ per cent, preferred.

Norfolk Railway & Light Company, Norfolk, Va., 75 cents.

Northern Texas Electric Company, Fort Worth, Tex., quarterly, 1 per cent, common.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Sept., '16	$17,285	*$8,352	$8,933	$3,527	$5,406
1 " " '15	16,446	*8,686	7,760	2,192	5,568
12 " " '16	208,123	*103,899	104,224	38,958	65,266
12 " " '15	185,469	*109,269	76,200	25,527	50,673

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

1m., Sept., '16	$12,496	*$9,569	$2,927	$1,102	$1,825
1 " " '15	12,040	*8,537	3,503	1,103	2,400
12 " " '16	120,778	*104,790	15,988	13,240	2,748
12 " " '15	115,735	*98,381	17,354	13,600	3,754

CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.

1m., Sept., '16	$33,804	*$18,190	$15,614	$6,568	$9,046
1 " " '15	33,639	*18,184	15,455	6,594	8,861
12 " " '16	385,443	*225,937	159,506	78,507	80,999
12 " " '15	344,372	*207,270	137,102	79,196	57,906

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Sept., '16	$77,658	*$30,491	$47,167	$28,630	$18,537
1 " " '15	61,827	*28,479	33,348	28,679	4,669
12 " " '16	829,894	*341,144	488,750	344,041	144,709
12 " " '15	703,586	*324,010	379,576	344,888	34,688

DALLAS (TEX.) ELECTRIC COMPANY

1m., Sept., '16	$157,977	*$95,551	$62,426	$36,538	‡$28,031
1 " " '15	148,153	*92,680	55,473	33,459	22,014
12 " " '16	1,913,020	*1,184,003	729,017	433,441	‡314,918
12 " " '15	1,880,820	*1,112,888	767,932	400,844	367,088

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m., Sept., '16	$72,387	*$37,777	$34,610	$8,753	$25,857
1 " " '15	68,914	*33,426	35,488	8,710	26,778
12 " " '16	817,376	*432,879	384,497	106,292	278,205
12 " " '15	679,441	*379,186	300,255	104,940	195,315

EL PASO (TEX.) ELECTRIC COMPANY

1m., Sept., '16	$92,264	*$60,949	$31,315	$5,120	$26,195
1 " " '15	78,367	*42,044	36,323	4,197	32,126
12 " " '16	1,068,260	*622,131	446,129	55,807	390,322
12 " " '15	971,204	*520,935	450,269	50,355	399,914

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Sept., '16	$159,844	*$102,747	$57,097	$36,587	$20,510
1 " " '15	163,018	*90,393	72,625	36,042	36,583
12 " " '16	1,932,169	*1,228,006	704,163	437,883	266,280
12 " " '15	2,007,724	*1,202,492	805,232	433,046	372,186

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., Sept., '16	$26,730	*$15,175	$11,555	$5,240	$6,315
1 " " '15	23,388	*11,799	11,590	5,523	6,067
12 " " '16	317,341	*179,209	138,132	64,760	73,372
12 " " '15	266,195	*160,828	105,367	66,764	38,603

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., Sept., '16	$50,147	*$35,316	$14,831	$15,400	†$569
1 " " '15	46,942	*31,302	15,640	14,685	955
12 " " '16	621,079	*423,758	197,321	181,606	15,715
12 " " '15	623,129	*435,080	188,049	172,502	15,547

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., Sept., '16	$161,044	*$94,256	$66,788	$29,416	$37,372
1 " " '15	142,737	*86,351	56,386	27,675	28,711
12 " " '16	1,862,691	*1,139,551	723,140	343,587	379,553
12 " " '15	1,733,222	*1,035,929	697,293	328,969	368,324

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Sept., '16	$690,475	*$412,714	$277,761	$184,760	$93,001
1 " " '15	609,782	*387,576	222,206	182,823	39,383
12 " " '16	7,855,965	*5,013,664	2,842,301	2,206,485	635,816
12 " " '15	7,690,014	*4,775,166	2,914,848	2,165,431	749,417

SAVANNAH (GA.) ELECTRIC COMPANY

1m., Sept., '16	$70,466	*$48,070	$22,396	$23,570	†$1,174
1 " " '15	64,017	*42,693	21,324	23,126	1,802
12 " " '16	802,270	*540,849	261,421	280,956	19,535
12 " " '15	799,977	*520,752	279,225	278,357	868

TAMPA (FLA) ELECTRIC COMPANY

1m., Sept., '16	$79,285	*$43,303	$35,982	$4,255	$31,727
1 " " '15	78,755	*39,265	39,490	4,370	35,120
12 " " '16	966,673	*526,254	440,419	52,217	398,202
12 " " '15	976,210	*498,553	477,657	52,751	424,906

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

TOILETS ON INTERURBANS OPPOSED

Conference on Subject Before Pennsylvania Commission Brings Out Large Attendance in Opposition

At a conference at the State Capitol in Harrisburg, Pa., on Nov. 17, between Public Service Commissioner John S. Rilling, Herbert F. Snow, chief engineer of the commission, and representatives of electric railways in Pennsylvania, a proposed general order compelling the installation of toilet facilities on interurban electric railway cars was opposed by the railroad representatives present. Commissioner Rilling explained that complaints had been filed against several interurban lines because no toilet facilities were afforded the passengers. He stated that the conference was called merely to obtain the viewpoint of the railways and not with an idea of deciding off-hand what shall be done in the matter.

C. L. S. Tingley, representing the Southern Pennsylvania Traction Company, the Scranton Railway, the Altoona & Logan Valley Electric Railway and the Pennsylvania Street Railway Association, summed up the attitude of the association in the first address of the afternoon. Mr. Tingley pointed out that the Pennsylvania Street Railway Association included more than 60 per cent of the companies operating in Pennsylvania, controlling more than 90 per cent of the interurban as well as urban lines in the State. He declared that such a proposed general order was opposed because most of the interurban cars were run on urban as well as interurban lines; that the use of toilet facilities would be impracticable for much of the distance over which the cars operated; that the installation of toilets in the front and rear of cars would narrow the aisles, retard the loading and unloading of passengers and slow up traffic; that such facilities would work a financial hardship on all companies; that electric railway toilets were seldom used; that townships and boroughs would not tolerate the indiscriminate placing of sewage on their streets and highways, and that such sewage disposal would be a menace to public health and decency. In short, toilets on electric railway cars would be a menace to the general public and a source of great annoyance to the traveling public rather than a convenience.

Mr. Tingley ended with a plea that no general order be issued, but that each case of complaint be dealt with separately by the commission. He also pointed out that the installation of toilet facilities would be almost an engineering impossibility on most cars, because sections of the floor of the car covered intricate machinery used in operation. Mr. Tingley said that he believed most companies would be glad to provide facilities at terminal points, but he opposed comfort stations at points where janitors were not employed.

T. B. Donnelly, claim agent of the West Penn Railways, declared that the toilets on that company's cars were not used more than once a day. The company kept the doors of the toilets locked to prevent their use at points where such usage would be objectionable and to offstay their misuse. Such misuse he declared to be quite common.

Charles H. Bergner, representing the Valley Railways, operating between Harrisburg and points in Cumberland and Perry Counties, pointed out that struggling companies compelled to reconstruct their rolling stock, would be forced to raise the rates of fare to meet the increased capital invested and would then come into competition with the unregulated jitneys operating throughout the State.

W. I. Schaffer, representing the Philadelphia & Westchester Traction Company, pleaded for individual orders covering individual cases as opposed to any general order.

C. B. Fairchild, Jr., executive assistant of the Philadelphia Rapid Transit Company, pointed out how toilets in the cars would hamper loading and unloading, and slow up traffic during the rush hours when the interurban cars were in the city. He pleaded for the greatest convenience for the greatest number.

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Ralph Baker, of the Mahoning & Shenango Railway & Light Company, declared that electric railway toilets would be distinctly unsanitary from the viewpoint of public health.

J. L. Adams, general manager of the Philadelphia & Western Railway, stated that after an investigation covering three months' time, it was found that the toilets in the cars on the lines of that company were used only once in 1562 miles, or about once in every five days.

H. Bingaman, of the Pittsburgh Railways, said that less than 10 per cent of all interurban travel was of the long haul variety, and therefore more than 90 per cent of the traveling public would seldom if ever want such facilities.

J. H. McClure, general superintendent of the Citizens' Traction Company, Oil City, declared that never in the history of the company had there been a complaint because of lack of toilet facilities.

R. D. Sefton, general manager of the Chambersburg, Greencastle & Waynesboro Street Railway, said his company has not received a complaint since it began operations in 1903.

C. A. Emerson, Jr., chief sanitary engineer of the State Health Department, declared that the dumping of sewage on watersheds of the State streams was prohibited by law because often such indiscriminate sewage disposal lead to epidemics of such diseases as typhoid. He stated that no container had yet been invented which was not offensive, especially in the summer time.

Among the railway representatives who attended, other than those already mentioned, were: C. H. Bishop, of the Valley Railways; A. W. Day, of the North Branch Transit Company; Gordon Campbell, of the York Railways; H. H. Aitkens, of the Philadelphia & West Chester Traction Company; R. R. Hull, of the Conestoga Traction, Lancaster; Charles L. Baily, Jr., of the Harrisburg Railways; I. W. Welsh, of the Pittsburgh Railways; E. W. Samuels, of the Shamokin & Mt. Carmel Transit Company; W. R. Adair, of the Pittsburgh & Butler Railway; L. H. Palmer, of the Eastern Pennsylvania Railways, and H. M. Stine, secretary of the Pennsylvania Street Railway Association.

PORTLAND JITNEY ORDINANCE IN EFFECT

Fifty-five jitney drivers were arrested in Portland, Ore., on Nov. 16, charged with failing to take out franchises as prescribed in an ordinance which went into effect on Nov. 15 at midnight. Their automobiles were held as security, and lined the streets for blocks in the neighborhood of the Police Court. The drivers claim the ordinance is prohibitory and plan to fight it.

At a meeting of the City Council on Nov. 15 the jitney franchise ordinance, which the men arrested on Nov. 16 were charged with violating, was approved by a majority vote of the Council, and Mayor Albee was instructed to clamp down the lid on all jitney operators who refused to abide by the regulation. All the members of the Council voted for the action, except Commissioner Daly.

The Chamber of Commerce recently went on record in favor of placing jitneys on the same basis as street railway transportation, and the Chamber adopted a resolution commending the City Council for its position that any public utility using or proposing to use streets for revenue purposes shall be required to operate under franchises which impose responsibilities and service requirement equal to those on other or established utilities enjoying like privileges on public streets. The resolution also urged that the police power of the city be used to prohibit the use of the city streets by carriers which attempt to operate in defiance of ordinances regulating franchises.

The regulations embodied in the franchise approved by the Council provide for service into all well-settled districts; payment of bridge tolls, granting of transfers and furnishing of bond of $400 for each bus in service for protection of persons suffering personal injuries.

Before final action was taken on the ordinance, C. W. Hodson, representing the Chamber of Commerce and business men of the city, urged the Council to afford some measure of relief to the Portland Railway, Light & Power Company from unfair competition. A. I. Moulton, the attorney representing the jitney interests, said: "It will be impossible for the jitney men to continue in business under the regulation ordered. We intend to fight the enforcement of the order of the Council. Jitneys cannot survive on the routes outlined in the ordinance, and they will not be able to provide a transfer system. The franchise ordinance was framed deliberately so that we could not accept it."

Judge Arthur Langguth in the municipal court on Nov. 16 upheld the city ordinance requiring that jitneys shall operate under franchise, when he found guilty W. R. Funk, charged with having violated the ordinance. It was a test case and notice of appeal was given. The other drivers, however, it is reported, agreed not to operate further as jitneys pending determination of the Funk case in the higher court. Some of them declared they would operate their cars as taxicabs.

Mr. Moulton, the attorney for the jitney union, states the contention of the jitney men is that they have paid their license to Dec. 31, and should be permitted to operate under the license, as the license ordinance has not been repealed nor has the Council passed an ordinance to refund license money for the unexpired term. City Attorney Stadter holds that the franchise ordinance for jitneys was passed on July 19 to take effect on Nov. 15, and that the franchise ordinance replaced the old license ordinance.

DES MOINES TO START SAFETY-FIRST WORK

Claim Agent of Des Moines City Railway Outlines Safety Campaign to Start Jan. 1

Dan M. Finch is mapping out the work for the safety first bureau which will be established by the Des Moines (Iowa) City Railway on Jan. 1, 1917. Mr. Finch has been claim agent for the Des Moines street railway system for more than thirty years, and is using his statistics on street accidents as data on which to work for safety first. In discussing the establishment of the new bureau with the representative of the ELECTRIC RAILWAY JOURNAL in Des Moines, Mr. Finch said:

"Our plan is to start on Jan. 1 with educational meetings of our men in all the different departments of the service. Every city railway employee will be instructed along lines best fitted to bring out a maximum of safety for the public.

"One of the most important features of the general educational work with the public will be the production of 1000 ft. of moving picture film to show how accidents happen and how they may be prevented. These will be for display in the theatres and schools of Des Moines and also in cities and towns of Iowa outside of Des Moines whether or not they have street railway systems.

"We are interested in educating the public outside of Des Moines because we find that 20 per cent of all of our accidents involve automobiles from outside of Des Moines. Our records show that we have as much or more grief with out-of-town auto drivers as with our home people. Of recent years we have experienced an increase in automobile accidents with a decrease at the same time in every other class of accidents.

"The moving pictures will be supplemented by instructive lectures to all of the school children of the city by representatives of this department. We shall at the same time appeal to the general public through safety first advertising copy in the columns of the daily newspapers.

"We shall also work for closer co-operation with the city government to bring about a more rigid enforcement of the city traffic ordinances. We shall seek a revision of some ordinances for the sake of uniformity and greater safety to the public. Pedestrians, and especially 'jay-walkers,' give us as much trouble as do automobiles, and we wish to co-operate with the city to suppress the 'jay-walking' evil.

"The city has recently established a traffic bureau with one head, and we are now co-operating with that bureau to secure uniformity of signals at busy corners and other uniform regulations which will tend to decrease confusion at rush hours in the down-town district. This work is to be augmented under the new plans of the safety bureau. Other features of our campaign will be the use of advertising placards throughout the city and the general dissemination of the safety first idea in every possible way. The work will be under the direction of Judge W. H. McHenry, who becomes general counsel for the Des Moines City Railway on Jan. 1, and who will have supervision of the accident and claim department as well."

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TRENTON FARE CASE ARGUED

Argument has been heard by the Supreme Court of New Jersey in the case in which the Trenton & Mercer County Traction Corporation, Trenton, is seeking to sustain its right to discontinue the sale of strip tickets. The company, under a writ of certiorari, brought up for review the order of the Board of Public Utility Commissioners of the State requiring the company not to suspend the six-for-a-quarter tickets. The company contended that the rights granted to the company and its predecessors constituted inviolable contracts by which the rate of fare for each passenger more than five years of age was made 5 cents; that the contracts were impaired contrary to the constitution by the passage of the public utility act and the assumption of power by the utility board; that the proposed ticket withdrawal was not an increase or an alteration of an existing classification, as held by the board, and that the order of the board would have the effect of depriving the company of property without due process of law. The city contended that the Board of Public Utility Commissioners has jurisdiction; that the ordinance requiring the sale of tickets superseded previous contracts, if any existed; that the ordinance of Oct. 22, 1909, compelling the sale of tickets, was valid as an ordinance, if not as a contract; that the company's valuation of its property was excessive; that the company has no right to allowance for franchise value; that the present earnings are ample to provide a reasonable return on the value of property and that the discontinuance of tickets is an increase of fare.

SAFETY DISCUSSED AT PENNSYLVANIA CONFERENCE

At the fourth annual Pennsylvania Welfare and Efficiency Conference held at the State Capitol in Harrisburg on Nov. 21, 22 and 23 the accident problem on electric railways was discussed by Samuel B. Hare, claim agent of the Altoona & Logan Valley Electric Railway, Altoona, Pa., and by P. J. McGrath, financial secretary of Division No. 85 of the Amalgamated Association at Pittsburgh.

Mr. Hare declared that most accidents on electric railways were preventable, and were caused by carelessness, bad habits and thoughtlessness. He declared that the company's part in promoting safety was in selecting good men as employees and then retaining them in the service. All employees should be instructed in safety measures by a competent official. An employee should not be blamed for an accident unless the accident was caused by culpable carelessness. Mr. Hare said that the public should be cautioned against carelessness. Many people were unjustly prejudiced against the railways and would not take advice for their own safety. Promptness in settling grievances between the company and the public would go a long way toward improving the attitude of the public toward the corporation. Statistics showed that the number of accidents since the prepayment type of car was used was only one in every 444,380 passengers hauled, while the ratio was one in every 137,000 hauled on the old-type cars. Mr. Hare said that the public demanded protection from the railways, but was loath to protect itself.

A feature of Mr. Hare's address was his criticism of the State in granting automobile licenses to people without the necessary qualifications. He pointed out that many accidents were the result of incompetent driving of automobiles. Thousands of persons were licensed by the State to run autos that no self-respecting railway would think of employing as motormen. He urged the enactment of a law to prohibit from obtaining licenses those physically or mentally unfit to operate cars. Mr. Hare ended his address with a plea for the teaching of safety first in all of the public schools.

Mr. McGrath said that all street railway employees were interested in the public welfare and tried in every way possible to avoid injuring pedestrian or passenger. Their biggest difficulty lay in the fact that people would not assist them by looking out for their own safety. Mr. McGrath urged, as a measure of safety, that the railways see to it that the men in their employ obtained periods of rest similar to those deemed by employers in other lines to be essential to the highest efficiency.

NEW JERSEY JITNEY LAW UPHELD

The Supreme Court of New Jersey has rendered a decision upholding the constitutionality of the Kates law to regulate the operation of jitneys in municipalities. This measure was passed last winter by the New Jersey Legislature over the protest of the jitney men and their friends that it was a move to put the jitneys out of business. Objection was made particularly to a bonding feature and the payment of part of the earnings of each jitney to the municipality in which it operated, but these provisions were incorporated into the law.

The case just decided was a test suit brought by Joseph West and other jitney owners against the city of Asbury Park. The Supreme Court held that the power of the Legislature to authorize municipal corporations to regulate the use of streets by vehicles even to the extent of excluding vehicular traffic is established in New Jersey. The court also ruled against the contention of the jitney men that the act deprived them of the equal protection under the law. It held that the city was within its rights under the law in prescribing an ordinance regulating the operation of jitneys.

A summary of the provisions of the bill was published in the issue of the ELECTRIC RAILWAY JOURNAL of April 1, 1916, page 670.

New Cars and New Fare System in Bangor.—The Bangor Railway & Electric Company, Bangor, Me., has placed in operation the first of three center-entrance cars of the Laconia Car Company, mounted on Philadelphia Holding Company radial trucks. The railway has also announced its decision to adopt the Rooke system of fare collection. The company operates 65 miles of electric railway in Bangor and vicinity, including among others the towns of Brewer, Old Town, Orono, Milford, Kenduskeag and Corinth.

St. Louis Transfers Burdensome.—In an editorial contained in the last issue of the *United Railways Bulletin*, signed by Richard McCulloch, president of the United Railways, St. Louis, Mo., he intimated it may be necessary to withdraw some of the transfer privileges because of an unequal expansion of the use of transfers in proportion to the increase of revenue. Mr. McCulloch declared that street railway costs were soaring, and that comparing the year 1915 with the year 1901 the total of revenue passengers increased 75 per cent, while free transfer passengers increased 171 per cent. City Counsellor Daues says the present transfer privileges were guaranteed to the citizens of St. Louis in a Circuit Court decision several years ago.

New London Folders.—The ELECTRIC RAILWAY JOURNAL has just received through the courtesy of the Underground Electric Railways of London, Eng., four more recent specimens of posters similar to the ones which this paper displayed in the interest of the railway at the recent convention of the American Electric Railway Association in Atlantic City. All are the design of E. A. Cox. At the bottom of each poster is a legend such as "Edgeware by Tram," "Hampton Court by Tram," "Watford" and "Kingston by Tram." Other than the design this is the only printing they contain. The affiliated company, the General Omnibus Company, has issued a four-page folder 10 in. by 6¼ in. entitled "Ten Little Nigger Boys," in the interest of safety first for children. The folder is in black and red and is illustrated.

Springfield Trolley Mail Pay Increased.—The Springfield (Mass.) Street Railway is to receive 4 cents a mile from Nov. 20 for carrying mail between Springfield and East Longmeadow. This is an increase of 1 cent a mile over the former rate. Improved service will be assured through the co-operation of the company with the postal authorities. Until a few weeks ago East Longmeadow enjoyed two mails a day, but changes in the local steam railroad timetable reduced the service to one mail a day. Numerous complaints were presented to Postmaster Costello of Springfield, who negotiated with the street railway to dispatch a mail-carrying car from Springfield at 11 a. m. at the 4-cent rate. The first mail will be carried by the steam railroad, but the second mail will be followed by a return trolley mail service from East Longmeadow to Springfield at mid-day. It is stated that the increased rate will yield the Springfield company $3,000 a year compared with a former income from mail carriage of about $2,200.

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Personal Mention

B. P. Newton, formerly storekeeper of the Cleveland, Southwestern & Columbus Railway, Elyria, Ohio, has been promoted to the position of traveling auditor of the company.

W. S. Avery, formerly clerk in the auditor's office of the Cleveland, Southwestern & Columbus Railway, Elyria, Ohio, has been promoted to the position of storekeeper of the company.

George Alexander, formerly chief engineer of the Atlantic Shore Railway's generating station at Kittery Point, Me., has been appointed chief engineer of the Worcester (Mass.) Electric Light Company.

S. H. Dailey, Binghamton, N. Y., has been appointed general manager of the Kentucky Traction & Terminal Company, operating the Lexington, Ky., city lines and the interurban lines out of that city. This is a new position with the company. Mr. Dailey's appointment will not in any way affect the present organization.

Joseph Stewart, formerly general and joint agent at Pueblo, Col., for the Denver & Rio Grande Railroad, the Chicago, Rock Island & Pacific Railroad the Santa Fé Railroad and the Colorado & Southern Railroad, has been appointed general manager of the Grand Junction Electric, Gas & Manufacturing Company and the Grand River Valley Railway, with headquarters at Grand Junction.

G. K. Jeffries, general superintendent of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., was operated on for appendicitis on Nov. 22. The attack was very sudden and canceled his plans to join the special car party to the Toledo convention of the Central Electric Railway Association on Nov. 24. Word was received at the convention Thursday afternoon that he was doing well and that no complications were expected.

Simon Bamberger, formerly president of the Salt Lake & Ogden Railroad, Salt Lake City, Utah, was elected Governor of the State on the Democratic State ticket at the recent election. He is the first Democrat and the first non-Mormon to be elected Governor of Utah. Mr. Bamberger has for many years been prominent in business and civic affairs in Utah. He served two terms on the Salt Lake Board of Education and four years as Sate Senator. An extended sketch of Mr. Bamberger was published in the second issue of the ELECTRIC RAILWAY JOURNAL Convention Daily at the recent convention of the American Electric Railway Association in Atlantic City.

John Leisenring, signal engineer of the Illinois Traction System, Peoria, Ill., has just been appointed by the American Railway Engineering Association and the Railway Signal Association, two steam railroad organizations, a member of the joint signal committee of these associations. This joint committee is known as committee No. 1, or that on signaling practice, of the Railway Signal Association, and No. 10 of the American Railway Engineering Association. The appointment of an official of an electric railway to this important committee is an excellent testimonial of the opinion of these two associations of the signal practice of the Illinois Traction System, as well as of the engineer in charge, Mr. Leisenring.

David A. Munro, who has been assistant to the auditor of the Second Avenue Railroad, New York, N. Y., and in addition has had charge of the purchasing of the company, has resigned, and on Dec. 1 will enter the sales department of the J. N. Johns Manufacturing Company, New York. Mr. Munro was born in Scotland. He entered the service of Messrs. Joline and Robinson, receivers of the Metropolitan Street Railway, New York, in the auditor's office of that company on Oct. 8, 1907. On Nov. 20, 1908, he resigned from the Metropolitan Street Railway to enter the service of the late George W. Linch, receiver of the Second Avenue Railroad, as assistant to the auditor. In addition to his work as assistant to the auditor of that company, Mr. Munro later took charge of the purchasing of the company.

L. O. Gordon, who has been appointed general manager of the Jackson Light & Traction Company, Jackson, Miss., entered the power and mining department of the Chicago office of the General Electric Company in 1902, and four years later was sent to the Schenectady works of the latter company. After spending a year in Schenectady, he was transferred to the Minneapolis office, where he remained in the apparatus and motor departments for five years. In the fall of 1912 Mr. Gordon left the General Electric Company to take the position as general manager of the Valparaiso (Ind.) Lighting Company, operating a combination gas and electric property. The property at Valparaiso is owned by the American Public Utilities Company, Grand Rapids, Mich., which also controls the Jackson Light & Traction Company.

Judge W. H. McHenry will become general counsel and head of the claim department for the Des Moines (Iowa) City Railway on Jan. 1, 1917. Judge McHenry is one of the most able and best known lawyers of Iowa. He was born in Des Moines and was admitted to the bar in that city. After nearly a score of years of exceptionally successful practice he was elevated to the district bench in his home city and served there for fourteen years. Following his recent retirement from his judicial duties came the announcement that he is to take up the important legal work of the Des Moines street railway system. He is fifty-five years old, and as the result of his long experience in the practice of law and on the bench he is regarded as admirably fitted for the work he is about to begin. The safety-first campaign of the company, referred to at length elsewhere in this issue, will be under the direction of Judge McHenry, with Dan M. Finch, claim agent of the company, in direct charge of the work.

William A. Driscoll has been appointed general claim agent of the Bay State Street Railway, with headquarters at Boston. Mr. Driscoll was born in Lawrence, Mass., in 1884, and was educated in the public and high schools of Lowell, Mass. At the age of twenty-one he entered the employ of the Boston & Northern Street Railway, being located at the Middlesex Street shops in Lowell. After two years' experience in the shops and in the local supply department at Lowell he went to Boston and for two and one-half years was in the office of the company's purchasing agent. For the last seven and one-half years Mr. Driscoll has been claim agent of the Bay State company in charge of the lines centering in Lowell, and in general extending from Nashua, N. H., to Boston. About 250 miles of track are included in this district. In his new work, Mr. Driscoll will have charge of claims on the whole system, which now comprises about 1000 miles of track. He is a member of the New England Street Railway Club. His appointment as general claim agent dates from Nov. 1.

B. C. Cobb, vice-president of Hodenpyl, Hardy & Company, investment bankers, New York, N. Y., has been elected president of the Northern Ohio Traction & Light Company, Akron, Ohio, to succeed Henry A. Everett, as noted briefly in the ELECTRIC RAILWAY JOURNAL of Nov. 18. Mr. Cobb was born in Boston, Mass., on Aug. 13, 1870. He attended the Boston Latin School and later on went to Andover. Mr. Cobb has been in public utility work for about twenty years. He began his career in the office of the Grand Rapids (Mich.) Gas Company in 1894. He rose rapidly in the firm and in 1898 became general superintendent of the Detroit (Mich.) Gas Company. Three years later he left Detroit to become vice-president and general manager of the Saginaw-Bay City Railway & Lighting Company. In 1906 he became a member of Hodenpyl, Hardy & Company, with headquarters in New York City. At the present time Mr. Cobb is president of the following companies: Michigan Railway, Jackson, Mich.; Consumers Power Company of Michigan; Michigan Lighting Company; Northern Ohio Traction & Light Company, Akron, Ohio; Rockford & Interurban Railway, Rockford, Ill.; Central Illinois Lighting Company, Peoria, Ill.; Evansville Railway & Light Company, Evansville, Ind.; Springfield Light, Heat & Power Company, Springfield, Ohio; Springfield Railway & Light Company, Springfield, Ill. He is also vice-president of the Grand Rapids (Mich.) Railway Company, and a director in the Commonwealth Power, Railway & Light Company, Jackson, Mich., and in the Tennessee Railway & Light Company, Chattanooga, Tenn.

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OBITUARY

Edward H. Gagne, storekeeper of the Bay State Street Railway at Fall River, Mass., is dead. He succumbed to an attack of pneumonia after a few days' illness. Mr. Gagne was thirty-two years old. He was unmarried.

David MacKeen, formerly president of the Halifax (N. S.) Electric Tramway, died on Nov. 13, aged seventy-seven years. At the time of his death Mr. MacKeen was Lieutenant-Governor of the Province of Nova Scotia. He was born in the Province and was identified with many commercial, industrial, banking and electrical interests.

John W. Barnes, who for many years was connected with the Buffalo (N. Y.) Street Railway, now included in the International Railway, and later was general superintendent of the Western New York & Pennsylvania Traction Company, Olean, N. Y., was instantly killed by an Erie Railroad express train at Friendship, N. Y. His wife, who was with him, was also killed.

Charles H. Guckel, formerly general manager of the Springfield (Mo.) Traction Company, is dead. Mr. Guckel retired from the company in Springfield in April, 1915. He had been connected with public utility companies for more than eighteen years. Before going to Springfield Mr. Guckel was engaged in public utility work at Boise City, Idaho. He was also at one time connected with the Swan Falls Power Company and with the Swan Falls Interurban Railroad.

Lawton T. Hemans, chairman of the Railroad Commission of Michigan, died at Battle Creek, Mich., on Nov. 17, in the sixty-third year of his age. Mr. Hemans was born in Collamer, Onondaga County, N. Y., and went to Michigan in early life. He was educated in the high schools, and in 1887-1888 was a student in the University of Michigan Law School, and admitted to the bar in 1888, and practiced law at Mason. In 1892 and for five subsequent terms he was Mayor of Mason; in 1901-1903 he was a member of the Michigan House of Representatives, and in 1907 was a member of the State Constitutional Convention. In 1908 and 1910 he was nominated for Governor by the Democrats, and was defeated. He was appointed a member of the Railroad Commission of Michigan in 1911.

James H. Whitaker, assistant superintendent of distribution of the Puget Sound Traction, Light & Power Company, Seattle, Wash., is dead at the age of sixty-three. Mr. Whitaker was born in Illinois on Feb. 19, 1853. In 1895 he went to St. Paul as manager of the Northwest Engineering Company. He remained in St. Paul for fourteen years. He then joined the electrical engineering forces of the Northern Pacific Railroad, which connection brought him to the Pacific coast. He resigned from the Northern Pacific Railroad to become city electrician of Tacoma and later entered the employ of the Seattle-Tacoma Power Company, with which company he was connected at the time of its absorption by the Puget Sound Traction, Light & Power Company. He is survived by two sons and a daughter.

FRONTIERSMEN WELCOME ELECTRIC TRAIN

The Chicago, Milwaukee & St. Paul Railway is now electrified for a distance of 440 miles in Montana, over two mountain ranges from Harlowton, Mont., to Avery, Idaho. Through Missoula, near the western terminus of the electrified section, all regular freight and passenger trains are being drawn by electric locomotives and nearly all the extra trains are so handled also. A so-called "steamer" shows up once in a while, however, as the Chicago, Milwaukee & St. Paul has not received all of its electric engines from the General Electric Company.

When the first passenger train drawn into Missoula over the Milwaukee arrived there was a good-sized crowd at the station. In that crowd were Granville Stuart, who discovered gold in Montana; E. S. Paxton, famous throughout the country as an Indian artist, and formerly an Indian fighter; Major Catlin, one of the leaders in the Indian wars, and Judge F. H. Woody, who arrived in what is now Missoula in 1856. All of this quartet came into Montana with bull teams, and each marveled at the progress of the age when he saw the first electric locomotive slide out from Hellgate Canyon, pulling its long line of steel coaches.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Panama Traction Company, Jamestown, N. Y.—Incorporated to construct and operate railroads. Capital stock, $60,000. Directors: B. L. Davis, Lakewood; N. M. Sanderson and C. C. Farnham, Buffalo. [Nov. 4, 16.]

***Cheyenne Railroad, Strong City, Okla.**—Incorporated to construct a line from Strong City to Cheyenne, 7 miles. Capital stock, $10,000. Incorporators: J. C. Mytinger, L. T. Cranberry and J. R. Jones, Wichita Falls, Tex.; W. S. Haid and T. A. Cushman, Clinton, Okla.

Waupaca Electric Service & Railway Company, Waupaca, Wis.—Incorporated to take over the holdings of the Waupaca Electric Light & Railway Company, operating the light plant in Waupaca and 5.4 miles of railway.

FRANCHISES

Eureka, Cal.—The Humboldt Transit Company will voluntarily forfeit its franchise for operating cars on T Street. The company discontinued operation owing to lack of patronage.

Evanston, Ill.—The Chicago, Fox Lake & Northern Electric Railway has asked the Council of Evanston for a fifty-year franchise to construct a line in Evanston. [Nov. 4, '16.]

Rochester, N. Y.—The New York State Railways has asked the Council for a franchise to construct a line to connect with the existing double tracks at Clarissa and Exchange Streets, thence through Clarissa Street to Plymouth Avenue and in Plymouth Avenue, connecting with existing double tracks in Clarissa Street and Caledonia Avenue near the bridge over the Western New York & Pennsylvania Railroad.

Elyria, Ohio.—Mayor Rolph has vetoed the franchise recently granted the Cleveland, Southwestern & Columbus Railway by the Council of Elyria.

Philadelphia, Pa.—W. S. Twining, director Department of City Transit, has forwarded to the Public Service Commission in Harrisburg a formal application for a certificate of public convenience for the construction of a double-track surface passenger railway, beginning at Frankford and Oxford Avenues and extending along Oxford Avenue to Castor Road, Bustleton Avenue to Verree Road and thence through private property along a proposed extension of Verree Road to Byberry Road, Worthington Road, Southampton Road, to Byberry and Bensalem Pikes.

TRACK AND ROADWAY

Springfield (Ill.) Consolidated Railway.—Work will be begun on the extension of the Bergen car line as soon as the State Public Utilities Commission of Illinois acts on a petition of convenience and necessity filed by the company. The proposed route will be on Capitol Avenue, east along Cressey Avenue, to Monroe Street, thence east to Eastdale Avenue to the southern line of Washington Street, and thence along Bergen Park. The extension will be about a mile long, of single track, and it is estimated will cost $13,000.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—The General Railway Signal Company has just completed the installation of 11 miles of automatic signaling apparatus on this company's line.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—Plans are being considered by the Grand Rapids, Grand Haven & Muskegon Railway for double-tracking its line. It is proposed to construct about 10 miles during the coming year and add about 3 miles each year until the entire line is double-tracked.

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Fallon (Nev.) Electric Railroad.—This company reports that its line from Fallon to Sand Springs has not yet been completed, but it is expected that the line will be ready for operation next spring. [March 25, '16.]

Albany Southern Railroad, Albany, N. Y.—James E. Hewes, general manager of the Albany Southern Railroad, has notified Mayor Burns of Troy that the company has decided to construct an extension to Troy.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—The Dunkirk City Council has asked the Buffalo & Lake Erie Traction Company to raise its tracks through Doughty Street, which is being repaved.

New York & Queens County Railway, Long Island City, N. Y.—Operation has been begun on this company's new line from Corona to Flushing via Peartree Avenue, Pell Street and Shell Road.

New York (N. Y.) Connecting Railroad.—An order has been placed by the New York Connecting Railroad with the Westinghouse Electric & Manufacturing Company for all the catenary hangers to be used in its construction work.

Ohio Electric Railway, Cincinnati, Ohio.—It is reported that this company will soon extend its North Fourth Street car line in Newark to take in the northwestern part of the city. The line would be extended on Maple Avenue to Channell Street and then to the Mount Vernon road to the new extension of Sixteenth Street to Church Street, where it would connect with the Church Street line at the carhouse.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—It is reported that work will be begun on this company's proposed line from Columbus to Commerce within sixty days. John R. Rose, Oklahoma City, president. [Sept. 2, '16.]

Sand Springs Railway, Tulsa, Okla.—It is announced that the Sand Springs Railway will build an extension of its line from Sand Springs to Pawhuska, about 50 miles. Construction work is expected to begin about Jan. 1.

Tulsa (Okla.) Traction Company.—This company, which is preparing to build an interurban line from Tulsa to Sapulpa, has begun condemnation proceedings in the district court of Tulsa County for the acquisition of a right-of-way through the western half of Tulsa. The proposed interurban line will be built during the coming year, it is announced. It will enter Tulsa over the new concrete bridge spanning the Arkansas River, which is being built by the county at a cost of $200,000.

Toronto (Ont.) Street Railway.—The Ontario Railway & Municipal Board on Nov. 13 gave its decision in the Pape Avenue extension matter, which has been under consideration for many months. An order was issued directing the city to construct and the Toronto Street Railway to equip and operate a line along Wilton Avenue to Broadview, north on Broadview to Gerrard, along Gerrard to Carlaw to Guelph and Pape and north on Pape to Danforth Avenue.

Toronto (Ont.) Suburban Street Railway.—A report from this company states that it has now under construction 46 miles of new track.

Philadelphia, Pa.—Bids will be received by William S. Twining, director Department of City Transit, 754 Bourse Building, until Dec. 7 for the construction of a section of the Broad Street subway about 300 ft. long and 106 ft. wide, embracing four tracks with two station platforms, and including the underpinning of the west side of City Hall and also the Market Street subway.

Montreal Tramways & Power Company, Montreal, Que.—This company will construct an extension on Park Avenue, Montreal.

Carolina Rapid Transit Company, Clinton, S. C.—Surveys of this company's proposed electric railway from Spartanburg to Clinton have been completed by Reid Tull, chief engineer, Spartanburg. [July 8, '16.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—It is reported that the Ogden, Logan & Idaho Railway will construct an extension from Logan through the canyon to Bear Lake.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—This company reports that it expects to double-track its line between Clearfield and Layton, 4 miles.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—It is reported that this company proposes to construct a line from Salt Lake City into the Sanpete Valley at a cost of $1,000,000.

***Richmond, Va.**—Plans are being contemplated for the construction of an electric railway from Richmond to Forest Hill to Bon Air, 7 miles. It is reported that T. S. Wheelwright, president, Virginia Railway & Power Company, is interested.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—It is reported that this company contemplates an expenditure of $1,250,000 for reconstruction and extensions.

***Morgantown (W. Va.) Interurban Railway.**—This company plans to construct a line from Morgantown, W. Va., to Port Marion, Pa., 20 miles. J. McDermott, Price Building, Morgantown, is reported interested.

Wisconsin Valley Electric Company, Wausau, Wis.—It is reported that this company will construct an extension to Stevens Point, and possibly to Grand Rapids.

SHOPS AND BUILDINGS

Kansas City (Mo.) Railways.—It is reported that the Kansas City Railways will construct five new carhouses and will provide gymnasiums and shower baths. The company will also erect a number of dwellings for its employees.

London & Port Stanley Railway, London, Ont.—This company reports that the construction of a one-story addition to the office section of its shops and a 65-ft. addition to the shops are almost completed. The cost will be about $20,000. The company is building a bathhouse at Port Stanley at a cost of $25,000.

Valley Railways, Lemoyne, Pa.—It is reported that the Commonwealth Trust Company of Harrisburg has taken title to the properties on the block bounded by Walnut, River, Fahnestock and Strawberry Streets for the Valley Railways, to be used as the site for a large terminal and waiting station.

Philadelphia, Pa.—W. S. Twining, director Department of City Transit, has filed an application for a certificate of convenience to permit the construction of a station on the Frankford Elevated line at Huntingdon Street and Kensington Avenue. This station will be midway between the stations at Dauphin and York Streets and the Somerset Street Station.

Wheeling (W. Va.) Traction Company.—Installation of new machinery in the machine shop and the laying of new switches, to cost several thousand dollars, will be made by the Wheeling Traction Company at its island shops.

POWER HOUSES AND SUBSTATIONS

Iowa Railway & Light Company, Cedar Rapids, Iowa.—A hydroelectric power plant is being built by the Iowa Railway & Light Company at First Street, East Avenue and River, to cost about $90,000. The Fargo Engineering Company, Jackson, Mich., are engineers.

Albany (N. Y.) Southern Railway.—It is reported that this company contemplates the extension of its electric power lines from Hudson, N. Y., to Pittsfield, Mass.

Columbus Railway, Power & Light Company, Columbus, Ohio.—This company will extend its transmission lines to Centerburg.

Toledo Railways & Light Company, Toledo, Ohio.—Announcement has been made by Henry L. Doherty that plans are being completed for a new central station for Toledo which may have a capacity of 120,000 kw. It is possible that it will be located on the old rolling mill property on the East Side, but if this is too high for the purpose, the station may be placed outside the city limits. The Water Street plant will be used to supplement the new plant. The cost will be about $6,000,000.

Monongahela Valley Traction Company, Fairmont, W. Va.—This company has purchased the property of the Consumers Light Company, and plans to construct 7 miles of high-tension transmission line to permit utilization of power from its central power plant and abandoned present power plant at Mannington. The company will also rebuild and rearrange its distribution lines and change transformers to permit distribution at 2300 volts instead of 1100 volts.

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INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases **Business Changes** **Trade Literature**

WHO SHOULD CARRY THE REPAIR PARTS STOCK, THE RAILWAY OR THE MANUFACTURER?

Small Roads Most Greatly Concerned—Manufacturers Give Opinions—Several Argue for Standardization

It has been pointed out that "the average railway buyer thinks the manufacturer is not fulfilling his obligation to the railway if he sells something to it and then does not always carry in stock, ready for immediate shipment, all parts of that particular device which are subject to wear and breakage." "In fact," a manufacturer of heavy machinery writes, "most of the buyers feel that it is an imposition on the railway to expect it to carry a reasonable stock of repair parts. This feeling is, no doubt, based on the ground that if the manufacturer was really anxious to give service to the road he would carry repair parts so that they could be shipped out on short notice. If the roads' wishes in this respect were fully met, the overhead charges would shortly put the manufacturers out of business."

This question is a problem surrounded by special conditions and, of course, cannot be answered definitely, but there should be some uniform underlying premises which will help decide individual situations. What now seems reasonable to most railways apparently is viewed as an imposition by some manufacturers.

To direct thought to the repair-part-stock subject, this paper addressed a number of manufacturers, asking them how far they thought a manufacturer should go in tying up capital in repair parts. The answers cannot be summarized because conditions vary so greatly in different lines of manufacture. However, the thought prevails that the manufacturer should be prepared to take care of his customers' requirements by furnishing repair parts, but the railway should see to it that enough local stock is carried to avoid the necessity of rush orders for repair parts, particularly those parts which are subject to periodic renewal because of wear. The following statements are abstracts of the replies received:

NIC LE GRAND, ST. LOUIS CAR COMPANY, SAYS REMEDY LIES WITH MANAGER AND STOREKEEPER

"The sale of a product carries with it the implied promise on the part of the manufacturer to take care of his customer's needs for repair parts. However, the railway company must co-operate, and if co-operation is lacking results can only be unsatisfactory. What is said here on this subject refers to the smaller properties only. The large ones take care of themselves. They have their own patterns, and on account of the big volume needed are in position to contract for their yearly requirements. This the smaller companies cannot do.

"In order to 'keep things going' it is necessary to carry some stock of wearing parts. Car and truck parts are here particularly referred to, and our views are based on an experience of fifteen years in 'watching' supply orders. For the manufacturer to carry a large stock of brakeshoes, brake heads, brasses, brake hangers, center plates, side bearings, springs, wheels, axles, etc., is expecting too much. To do this would require an immense investment. And yet in normal times some of us come very near overstocking. On the other hand, to lay in an emergency stock of wearing parts calls for only a small outlay on the part of the railway company. It has been demonstrated that regardless of the investment, this pays. Delays in getting much-needed parts are vexatious and costly; cars are out of service; earning capacity is lost. The public complains about service, or rather the lack of it. The manager has a talk with the superintendent. He 'calls' the master mechanic, who in turn 'takes it up' with the purchasing agent, and the latter may possibly call up the storekeeper. It may turn out that orders were issued 'not to buy a darn thing 'til needed.' In tabloid form the history of the case may be presented like this:

"A two-cent stamp - Telegrams;
"Freight charges = Expressage;
"Efficiency = Passing the buck.

"This is by no means a new discovery. It is only emphasized at this time on account of the unusual conditions.

"Drawing further upon our experience and taking one manufacturer as an example: This one has more than 13,000 patterns for gray iron, malleable, steel and bronze castings, all accumulated during some twenty years. Many of these were provided in the first place to meet the views of the purchaser, when some standard pattern could have been used. And of these 13,000 patterns about 10,000 are alive, being used to fill repair orders. The cost of keeping up these patterns (most foundry work is rough) is considerable. Surely it is hardly fair to expect the manufacturer to carry a stock of all these parts.

"The remedy lies with the railway company's management and the alertness of the storekeeper. The management should permit the carrying of stock, and the storekeeper should be watchful in guarding the best interests of his company. Particularly should intelligent attention be devoted to malleable and steel castings. Two helpful methods suggest themselves. The first is that when new cars and trucks are purchased, a small stock of all wearing parts should be ordered to be shipped with the new equipment. The second is that needs for at least six months should be anticipated and deliveries stipulated as required. This will insure having parts when needed, avoid much delay and expense and often prevent unpleasantness.

"In this day of boasted efficiency and of carefully-kept minute records, master mechanics know what is needed and should be permitted to requisition in advance. This may be done with safety. Permit me to cite one species of fault peculiar to railway buying: The salesman calls on the purchasing agent and runs through the list of his wares. 'Nothing doing to-day.' He calls on the master mechanic. 'Nothing doing to-day.' The storekeeper is called up. 'Nothing doing to-day.' A week, perhaps ten days, later, a telegram comes in pleading for immediate shipment of parts, which must be made, and shipment is wanted by express. Isn't the point obvious?

"This very experience has been mine, not once but more than a hundred times, and it often has happened with properties of considerable size and importance, properties which were wisely and ably managed in all other directions.

"The manufacturer has parts to sell, is concerned about increasing his sales and is doing his level best to make prompt shipments, and it is up to the buyer to co-operate intelligently with him by placing orders ahead and not waiting until cars are pulled into the barn. He should be doing it for his own protection, benefit and advantage."

DEMAND SHOULD DETERMINE STOCK TO BE CARRIED

S. M. Wilson, of The J. G. Brill Company, says that the subject of how far a manufacturer should go in keeping in stock renewal parts for service repairs to his product is an important one and one to which his company has given a great deal of attention, particularly with regard to trucks. He also says:

"The larger railroads, of course, keep on hand supplies of renewal parts, but it is a hardship for the smaller railroads to do so, and as equipment awaiting repair parts is often out of commission during that period, it is highly important to the small system that in buying vital parts of operating equipment, such as car trucks, due consideration should be given to the matter of future replacement of worn

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or broken parts and a standard product be purchased which will insure this.

"The question of just how far we should go in keeping renewal parts actually in stock is determined by the demand for such parts, and this means experience covering a long period. We have a well-organized supply department which makes a study of all such matters and sees to it that stocks of parts that may be called for will be promptly supplied. We believe that the service end of this business is immensely important to the lasting success of any of our products."

STANDARDIZATION AND COSTS WILL BE REDUCED

S. A. Bullock, of the Baldwin Locomotive Works, is of the opinion that the manufacturer should not be called upon to carry finished repair parts in stock, but only such raw material as will enable him quickly to fabricate the parts desired. He also says:

"Should manufacturers add to the first cost the burden of holding in stock parts for periods of time ranging from one to ten years, then the purchaser might as well buy outright such parts and have them for immediate replacement.

"It has been our aim to standardize electric trucks, but the continual changes, due to the improvements in the art and requisition changes on the part of the customer, have radically modified the design of a few years ago. Formerly we carried in stock certain truck parts, and now we have most of this material on our hands. In explanation, we can only assume that the parts were not needed by the customer or that he bought elsewhere.

"We welcome the time when trucks shall be standardized as in the automobile industry, and when this time comes the manufacturer will gladly keep a full stock of renewal parts for service repairs."

HEATING EQUIPMENT STOCK AVAILABLE BUT DELIVERY UNCERTAIN

Elmer J. Smith of the Peter Smith Heater Company says that the heater repair business is always heaviest in the fall. According to Mr. Smith:

"It is simply impossible to carry all the parts needed, owing to the difficulty in gaging the requirements. However, we endeavor to increase our stock to a considerable extent at the time of the year when these parts are most needed and as a rule we are able to make very prompt deliveries.

"When abnormal business conditions exist, such as at present, we are unable to contract for our wants and get the material as fast as we would like to, even though we try to anticipate our wants. We don't think that it is necessary for the railway companies to carry a large stock of heater repair parts, but if they want real service and don't want to hold up their cars, the safest way is to have repair parts in their bins and to anticipate their wants, the same as we aim to do.

"An electric railway is taking great chances these days if it doesn't carry these repairs in stock, for the freight deliveries at this time are unreliable and the purchaser takes all the chances as to when he will get the goods, even though prompt shipment is made."

DEMANDS SMALL FOR STOKER REPAIR PART

The manufacturer of a widely-used type of stoker states that repair parts for non-standard equipment are not carried in stock, but that full stocks of standard parts are carried; first, because the customer is entitled to the service and second, because it is good business to sell the parts. Every standard part can be shipped on the day the order is received. Repair parts are kept in stock in proportion to the total number of stokers in operation. Consequently the amount tied up is growing large.

CRANE MANUFACTURERS ADVISE CUSTOMERS TO CARRY REPAIR PARTS

Three manufacturers of overhead traveling cranes and allied equipment discussed this subject. One says that customers fail to realize the amount of money that is tied up in spare parts of cranes and hoists of different types and voltages. Another crane manufacturer says, "We have made it a point to offer the suggestion to users of our cranes that they carry certain parts in stock, and we supply them with a list showing the parts that under ordinary service will at times require renewal."

Another large manufacturer of cranes writes in part as follows: "While the general design is standardized, practically no two cranes are of the same size, lift, etc. This makes it very difficult to carry spare parts covering every part of the machine, but we do endeavor to carry spare parts of those portions of the machine which are standardized. We have a storeroom devoted especially to that purpose.

"Nevertheless, our advice would be that the customer carry spares for his cranes. Many times, as in the past summer, those who furnish us with castings are unable to supply them as fast as wanted. Sometimes strikes interfere with the supply of this material, and the demand absorbs our available stock before we can replace it. Sometimes, as it happened repeatedly during the past season, makers of electric motors have been unable to furnish us spare parts for their motors as fast as wanted, owing to a scant supply of copper. We, of course, endeavor to anticipate these troubles as much as possible, but in spite of all efforts some delays have been encountered which would have been avoided had the customers anticipated their requirements and carried a stock of standard spare parts.

"The question is a very interesting one. We have gone so far as to send out circular letters to users of our product calling attention to the fact that unavoidable delays are to be expected under the present unusual conditions. Very few customers pay any attention to these letters. Those who pay the least attention to them are usually the first to complain if there is any delay in spare-part service on our part."

STANDARDIZED PARTS SIMPLIFY PROBLEM

Referring to the products of the Stow Manufacturing Company, which have largely been standardized, D. Walker Wear says:

"It is our practice to carry in stock for immediate shipment all repair parts necessary to renew Stow flexible shafts. Whenever possible, however, the customer should return the tool to our laboratory where men familiar with the work can properly assemble and test it before return. We agree with the average railway buyer that he should be able to get from the manufacturer, immediately on telegraphic orders, necessary repairs for his equipment. It is the business of the manufacturer to carry repair parts, as the railway storehouses are filled with all classes of supplies for making repairs, some of which rapidly deteriorate from lack of proper storage facilities. If the manufacturer carries a stock and furnishes it fresh and clean to the railway, it is then up to the mechanical department to apply it. In most cases this will give better service. With standardized products we cannot see where the manufacturer should object to tying up capital in repair parts. In our experience it has not developed that a stock of repair parts becomes obsolete. The manufacturer is in a position to govern his product in accordance with his sales and to adapt his improvements to tools already in use.

"I occupied for several years a position with one of the principal railroad systems operating steam and electric equipment, and there I found it more satisfactory to carry a minimum stock for my storehouse and have the manufacturer carry the repairs for our equipment. There was not a single case where the manufacturer did not desire to co-operate. I found it not only to my advantage but also to the advantage of the manufacturer, to anticipate my requirements by sixty and ninety days on wearing parts. This enabled the manufacturer to make prompt shipment and to save the company money by having the order requisitioned and shipment handled in the regular way, coming forward by freight, wherever possible, over our own lines."

JOHN BENHAM RECITES REGISTER COMPANY PRACTICE

"We feel that we are giving our customers very liberal treatment," says John Benham of the International Register Company. "We bought out the New Haven Register Company thirteen years ago and up to within the past two years we have aimed to be in a position to fill with reasonable promptness all orders for repair parts for New Haven

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registers. We feel now that we have reached the limit, and while we will fill orders for any parts we have, we do not feel called upon to make up parts that we do not have; and anyway these registers should be about worn out now.

"So far as International registers are concerned we commenced the manufacture of the type R-7 single register in 1901 and the type R-5 standard double register in 1902. There have been slight modifications in these registers so that repair parts for the present type in some instances would not be just right for the older types, especially the double registers. Notwithstanding that, we have aimed to be in position to fill, generally upon receipt of order, any demands upon us for repair parts."

TRACK-DRILL REPAIR PARTS NOT A BURDEN

J. McKinnon, Kalamazoo Railway Supply Company, believes that "the railroads should anticipate their wants to a certain extent and carry in stock some of these parts and not expect the manufacturer to make immediate shipment of the few parts that may be needed. For instance: Take our track drills, of which we have many thousands in service. The parts which are liable to wear out are inexpensive, and it would not be a great burden upon the railroad to carry a reasonable amount of such parts, so that the machines would not be out of commission any longer than is necessary to make replacement of the part in question.

"There was a time when the railroads did carry large stocks of repair parts. In fact, I think they were overburdened in this respect. But with the depression in railroad business orders came for retrenchment. This meant a depletion of their stores and as business at that particular time was rather light, the manufacturers made up greater numbers of these parts than usual for the purpose of keeping their men together; so, when the railroad needed anything in a hurry they were able to get it. Now that business is a little more brisk and the roads are buying more freely, we believe they should replenish their stocks, but not to the extent they did previous to the time when they were ordered by the managements to retrench.

"The same comments apply to our hand, push, velocipede, track-laying, and motor cars. The large systems are buying their spare parts more freely than they did some little time since, and we really do not believe it is the intention of the railroads to be unfair with the manufacturers."

SEND NOTICE WHEN DESIGN IS TO BE CHANGED

Irving T. Hartz, Morden Frog & Crossing Works, holds the view that "a concern should have the dies and patterns ready to fill all orders for repair parts of machines within a reasonable time, and for tools, a stock of repair parts for all standard tools in use.

"When a machine or tool is considered by the manufacturer as getting obsolete, a notice to all who have been purchasers of such machines or tools should be sent, advising them that within six months or one year the dies or patterns for such tools would be destroyed and if they have the machine or tool in use and desire any additional parts, to order at once.

"No railroad can expect a manufacturer to carry the repair parts for a great many makes of machines that can be made by any one manufacturer, ready to supply all users, as some might never be called for. This would mean dead stock. The most that should be asked of the manufacturer is to be prepared to furnish repairs within a reasonable time."

RUBBER-COVERED WIRE BUYING CONDITIONS IMPROVING

Manufacturers and jobbers are making a better profit in rubber-covered wire to-day than ever before. The demand is large and the output is not sufficient. Rubber-covered wire, being a staple, never was very profitable. Until quite recently it was sold on a basis of the best price. Thus a buyer would place an order at to-day's prices, say 21 cents, for four months' delivery. If at the delivery date the prevailing price was 18 cents the buyer expected this price and received it, although the contract was made at 21 cents. If, on the other hand, the price had advanced to 23 cents, the buyer held to the contract price of 21 cents. The buyer therefore was protected against any advance in the market, but he also received the benefit of any decrease in market prices.

Under such a scheme it was nothing more than heads the buyer wins, tails the seller loses. With the margin of profit always small it often reached the vanishing point on a rising market. To-day, however, all of this has been changed. Wire is bought at the delivery market price of copper-wire base. The benefits of a rising market are now going to the seller.

A question arises, however, of just how much of this apparent profit can be counted a real profit. Just so sure as more money is made on a rising market just so sure is less money made on a falling market. If stocks are small and the decline very gradual the drop in profits is very small. If stocks are large and the bottom falls out of the market then instead of a profit a loss is taken. If the market recedes in the same manner and rate it advanced and if stocks were the same in both cases then the increase in profit on the rising market would just offset the decrease in profit on the falling market.

BAY STATE STREET RAILWAY TO REMODEL 200 CARS

The Massachusetts Public Service Commission has authorized the Bay State Street Railway, Boston, Mass., to reconstruct 200 semi-convertible cars, the work to include changing to the pay-as-you-enter type by removing the bulkhead and bulkhead doors; installing the National Pneumatic Company's air operated vestibules and steps, with an electrical device to prevent the starting of the car before the doors are closed, equipping the cars with a buzzer system with push-button on each window post; installing fare boxes, etc. At this writing the selection of part of the equipment has not been made, but work has been under way for some weeks on cars in the shops at the south of Boston. One car has been placed in service within the past four days, and it is hoped to push the remodeling as rapidly as possible during the winter and early spring.

ROLLING STOCK

London & Port Stanley Railway, London, Ont., is reported to be in the market for three trail cars.

North Carolina Public Service Company, Greensboro, N. C., has ordered two city cars from the Southern Car Company, High Point, N. C.

Rutland Railway, Light & Power Company, Rutland, Vt., has ordered through the Wendell & MacDuffie Company Eastern agents for the Russell Car & Snow-Plow Company, one Russell wing elevator snow-plow and flanger.

Citizens Railway, Clarksville, Tenn., noted in the ELECTRIC RAILWAY JOURNAL of Sept. 30, 1916, as being in the market for two double-truck closed cars, has ordered this equipment from the Southern Car Company, High Point, N. C.

Connecticut Company, New Haven, Conn., has ordered through the Wendell & MacDuffie Company, Eastern agents for the Russell Car & Snow-Plow Company, one double-truck combination snow-plow and express car and six sets of flangers for double-end ballast cars.

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, agent for Crouse-Hinds headlights, has received an order for 200 12-in. headlights from the Bay State Street Railway.

Philadelphia Holding Company, Philadelphia, Pa., has received an order from the Fishkill Traction Company, Beacon, N. Y., for four radial trucks.

Southern Pennsylvania Traction Company, Chester, Pa., have recently purchased four Westinghouse 512C motor equipments, four GE CP 27 straight air-brake equipments and four pair of Brill 76E double trucks.

Nelson S. Moore has resigned as assistant general manager of the Electrical Engineers Equipment Company of Chicago to enter the employ of Lewis & Roth Company of Philadelphia as sales engineer.

Drew Electric & Manufacturing Company, Indianapolis, Ind., announces the addition of G. R. Miller to its organization as sales manager. During the past eight years Mr. Miller

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has spent most of his time with the Russell M. Seeds Company and with the Schwartz Electric Company of Indianapolis.

E. F. Berger, who has represented the Midvale Steel Company in Chicago territory for a number of years, has been promoted to the position of office manager, and assigned to the Cincinnati office in the Union Trust Building. In addition to his work with the Midvale Steel Company, he will also look after the interests of the Cambria Steel Company and of the Worth Bros. Company.

Holden & White, Chicago, Ill., have been appointed general sales distributors for the Car Lighting Improvement Company of Milwaukee, Wis., manufacturers of the Watson car lighting regulator. This device is designed to give constant illumination of car lights and headlights, irrespective of line-voltage fluctuations. Holden & White have also been appointed general sales distributors for the Anderson Brake Adjuster Company, Omaha, Neb., manufacturers of slack adjusters.

F. B. Gleason, formerly in charge of the Western Electric Company's business in the Far East, with headquarters at Tokio, Japan, has been appointed manager of the southern district of the Western Electric Company, with headquarters at Atlanta, Ga. He will succeed E. J. Wallis, who, on Jan. 1, will take up his new work as manager of the Pacific Coast district, with headquarters at San Francisco, Cal. Mr. Wallis will succeed F. H. Leggett, who returns to the company's executive offices at 195 Broadway, New York City, N. Y.

B. A. Brennan, well known to the engineering and industrial world as contract manager of the Westinghouse Machine Company, and later as sales manager of the power department of the Bethlehem Steel Company, has resigned from the Mercantile Trust Company, St. Louis, Mo., of which he was vice-president, to accept the presidency of the Citizens Company, Inc., Baltimore, Md., to which office he has just been elected. The Citizens Company, Inc., is an investment banking institution, which finances corporations, engages in underwritings and handles complete issues of securities.

Francis A. Vaughn and Hans J. Meyer, of the firm of Vaughn & Meyer, consulting engineers, 1007 Majestic Building, Milwaukee, Wis., have joined in partnership with Chas. L. Pillsbury, of the consulting engineering firm of Chas. L. Pillsbury Company, 805-11 Metropolitan Life Building, Minneapolis, Minn., and 716-20 Capital Bank Building, St. Paul, Minn. Mr. Vaughn and Mr. Meyer will continue to conduct their Milwaukee offices under the firm name of Vaughn & Meyer. The Minneapolis and St. Paul offices will be conducted under the present firm name of Chas. L. Pillsbury Company. The three offices cover a wide range of engineering activities, and the combination of these old and well-known organizations will be able to cover an extensive field.

C. C. Nuckols, who was elected president of the Consolidated Car-Heating Company at the meeting of the directors held in Albany, N. Y., on Nov. 20, 1916, has been connected with the company for the past twelve years. In 1904 he was employed as a salesman in the Chicago office; two years later he was transferred to the New York office as purchasing agent, and in 1908 he was again transferred to the factory at Albany, N. Y., as superintendent and purchasing agent. Since 1912 he has held the position of vice-president and general manager of the company. Mr. Nuckols is thirty-six years old, being born at Versailles, Ky., on Feb. 26, 1880. His education was obtained in the high schools of his native town, at Morgan Park Academy, Morgan Park, Ill., and at the University of Chicago.

Adams-Bagnall Electric Company, Cleveland, Ohio, is now completing an addition to its factory with the installation of a complete vitreous or porcelain enameling plant. The primary object of this addition is to further improve the quality and service of the well-known "Abolite" line of porcelain enameled reflectors for industrial lighting, the porcelain enameled reflectors used in pendent fixtures for street lighting and enclosed arc lamps, as well as some parts used in the manufacture by this company of transformers, electric fans and auto electrical accessory equipment. The steadily increasing demand for these reflectors, as well as faith in the maintenance of this growth, has led the company to make this investment in order to insure increased production facilities and elimination of the extra hauling and handling that is the general practice in the manufacture of enameled steel reflectors. The enameling plant is being equipped for all classes of high-grade vitreous enameling. A battery of four 12-ft. furnaces will be supplemented with complete equipment of mixing vats, smelt furnaces, drying ovens and handling apparatus capable of producing a large output. The plant will be in full operation before Jan. 1, 1917.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, has sent out an illustrated folder demonstrating how the National railroad trolley guard promotes good will.

Laclede-Christy Clay Products Company, St. Louis, Mo., has distributed an attractive folder telling how the problem of making four boilers equal six was solved. This folder is illustrated and has been carefully prepared.

Templeton-Kenly & Company, Ltd., of Chicago, Ill., manufacturers of Simplex car and track jacks, have issued bulletin No. 216, which is a 34-page booklet, illustrating numerous unusual applications of these jacks.

Vanadium—Alloys Steel Company, Pittsburgh, Pa., is distributing a new pamphlet on "Vasco-Vanadium" steel. It also gives data regarding other alloy steels and their use in tools, gears, springs, etc., together with a complete list of carbon steel extras.

E. C. Atkins & Company, Indianapolis, Ind., have issued an illustrated catalog describing their metal saws. These include circular saws for the different standard machines, flexible-back metal-cutting band saws, "Hoosier" extension hack saws and their new Kwit-Kut power hack saw machine. The last ten pages of this thirty-two-page catalog are devoted to useful information of a miscellaneous nature.

Stone & Webster Engineering Corporation, Boston, Mass., construction engineer, has issued the second edition of its booklet, describing and illustrating industrial plants, office and educational buildings, power stations and warehouses constructed by the company. The work includes a wide variety of construction problems, including those met with on the hydroelectric power stations of the Mississippi River Power Company, the new Massachusetts Institute of Technology, etc.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued leaflet 3865 on its HL unit switch control. The control switch, controller box, control resistors and master controller are illustrated and described. In addition a schematic diagram of the general arrangement of the apparatus and wiring is shown. The company has also issued a very elaborate and profusely illustrated circular No. 1516-A covering electric locomotives for freight haulage. Twenty-two of these Baldwin-Westinghouse electric locomotive installations are illustrated. In addition, particular attention is paid to the description and illustrations of locomotive control, to the centralization of equipment, and to the mechanical parts which make up the electric locomotive.

Van Dorn & Dutton, Cleveland, Ohio, has just issued a valuable 40-page booklet on "Facts About Gears." This digest of specialized gear data contains twenty-one sections, a study of which will enable even the non-technical gear user to figure out complete and accurate specifications for any system of gears. The sections treated are as follows: Different Type of Gears, Facts About Gears, Gearing Terms, How to Order Gears of All Kinds, Spur Gear Specifications, Bevel and Mitre Gear Specifications, Worms and Worm Gears, Sprocket Specifications, Lewis's Rule for Strength of Gear Teeth, Diametral-Pitch Formulae, Diametral-Pitch Table, Circular-Pitch Formulae, Circular-Pitch Table, Decimal Equivalents of 113 Fractional Dimensions of One Inch, Decimal Equivalents of Fractions of Millimeters, Metric Pitch Module, Standard Keyways, Comparative Size of Gear Teeth, Weights of Round Steel, Weights of Metals, Circumferences and Areas of Circles from 1/64 in. to 100 in.

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Electric Railway Journal

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ENGINEERING PAPERS AT C.E.R.A. MEETINGS

The meeting of the Central Electric Railway Association in Toledo last week was marked by the intensive interest shown by the managers of the various properties represented. In fact it was almost exclusively a managers' meeting, and the lack of engineering discussion on the technical papers was noticeable. There were only four master mechanics in attendance, so far as we can remember, and only two or three electrical engineers. Real progress was made by the managers, and we believe all went home with a much better perception of the need for giving the public first-hand information on the true conditions in the industry. But the value of the two technical papers was largely lost, due to the absence of men to discuss them from the engineering side of the industry. This suggests the advisability of special sessions or, possibly a separate section, of the association for the engineering side of the industry. True, the principal problems of to-day are managerial ones, but there are still many things puzzling the men who deal with the technical side. We already have the traffic and accounting subdivisions; why not an engineering subdivision of the C. E. R. A.?

RESTRICTING UTILITY STRIKES

Last week we devoted considerable space to the addresses and discussions on the subject of labor disputes before the Academy of Political Science in New York City. We did this not because we believed that the Academy had the power to make either an immediate or a profound impression upon public opinion, but because we thought that the various sessions would serve to assemble the views of government mediator, economist, employer and labor leader and make the public conscious of a possible drift of opinion in any direction. That there really was, in spite of the uncompromising attitude taken by the labor leaders, a basic principle underlying the opinions of the other representatives was quite evident. This principle involved the paramount right of the public to continuity of utility service. It was freely admitted that employees in general have a right to strike, but it was also averred that on public utilities this right should be subordinated to the public welfare and could constitutionally be made to become so subordinated when it created a public wrong. In such an event, however, it was felt that the public should guard employees by scientifically regulating wages, hours and working conditions, at the same time protecting utilities by seeing that increases in wages should be reflected in the rates. While, therefore, the sentiment at the conference was toward a realization of the need for governmental control over utility strikes, it included the idea that a restriction of the right to strike cannot fairly be demanded of labor without some provision for a more scientific method of adjusting labor questions. If the distrust of labor toward capital is to be removed, it would seem that this point should be considered.

RATES AND UTILITY INVESTMENTS

The hope of utility expansion in the future is the real investor and not the speculator. This statement, based on the remarks by Delos F. Wilcox, of which a short abstract is given in our financial department, ably sums up the fundamentals of utility financing, past, present and future. In the old days utilities were financed as speculative enterprises with more thought to a high rate of return than to security of either principal or return. At present, however, rate regulation tends to eliminate the speculative feature of utility securities, and to the extent that it provides security to make up for the lower rate of return, utility issues will increasingly appeal to another class of buyers, the investors. By sad experience, however, capital has learned that the bestowal of compensating security lags behind the removal of the chance for speculative profit. Capital, therefore, is inclined to hesitate in entering the utility field. If utility investments are to have the desired security, the public must fully give up some of its cherished illusions. For instance, as Mr. Wilcox says, the fancied protection of maximum or absolute rates fixed by franchise for a long term of years must be surrendered, and the public must frankly recognize that rate regulation involves the possibility of increases whenever justice so demands. Thus the public has a direct responsibility for the attitude of investors toward utility expansion. The public cannot well afford to bite off its nose simply to spite its face on account of past speculative returns.

A BIRD'S-EYE VIEW OF HEAVY TRACTION

It is often of help to see ourselves as others see us. This point of view is presented in the article on heavy traction affairs in this country, abstracted on another page from a recent contribution to *La Lumière Electrique*. The author, Joseph Carlier, professor of railways at the Belgian university at Liège, spent but a few weeks in this country last summer but seems to have made good use of his time. His views may be said to have been prepared from two angles, so to speak, a wide one including the heavy traction field as a whole, and a smaller one including only that portion operated by electricity. The broader view shows that there is a tremendous field for the electric locomotive and the

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motor car, considered as a factor in increasing the ability of a road to handle traffic, the prime requisite. In electric traction itself the professor sees two big factors which are to settle the question of system. One is the economical contact line voltage which is determined by density of traffic and length of line. A light traffic on a long line calls logically, in his opinion, for a high-tension distribution and therefore involves the use of alternating current on the trolley wire, while, vice versa, heavy traffic calls for the use of direct current. The other point brought out is the natural inclination of the railroad man for the direct-current system, everything else being equal, in spite of his appreciation of the excellent qualities of the single phase. If we get Professor Carlier's idea correctly he thinks that the preference of the railroad man is for the third-rail contact system on account of its simplicity and freedom from overhead obstructions. Consequently there will be pressure to extend the range of third-rail operation by adapting it to higher voltages. In the professor's mind there is no question as to the complete technical success of the two great systems now in vogue. He says so, with the aid of numerous complimentary adjectives. At the same time he sees the larger future for direct current in the light of heavy electric traction economics.

TRUSS-SIDE CONSTRUCTION FOR RAILWAY CARS

That there should be a division of opinion as to the relative desirability of the truss-side and side-girder designs for steel cars is not surprising when one considers the novelty (comparatively speaking) of the whole question. Practice in an industry such as electric railway operation is notoriously conservative. Three years, for example, is hardly enough time for any suggested change to become of general knowledge, and yet it is only three years ago that this journal was combating a widespread opposition to the introduction of steel in place of wood as a material for car construction. Clearly enough the truss-side type of construction, which is a physical impossibility when steel is not available, could hardly arouse any great interest so long as an appreciably large section of the industry held a preference for wooden cars.

At the present time, of course, this situation has been wholly changed. So far as new orders are concerned the wooden car is no longer moribund—it is extinct. And with the passing of the wood-versus-steel controversy, more attention may well be, and undoubtedly will be, devoted to the new principles of design that are applicable with the new material of construction. These, as explained in L. B. Stillwell's Toledo paper, abstracted in our last issue, offer the alternatives of a side-girder construction and a truss-side construction, whose development of the whole car side to carry weight gives a beam height approximately 7 ft. The former was the first type of steel car upon the ground, and, excepting a few disastrous experiments with shallow steel underframe designs, it has until quite recently held the electric railway field exclusively.

However, the truss-side type of construction offers many points of superiority. Among them, as Mr. Stillwell points out, is a collision strength inherently greater than anything possible with side-girder designs, because with the latter there is always the tendency toward over-riding, thus crumpling up the light superstructure. This is, perhaps, of more importance on steam railroads than in electric railway operation, for the reason that one-car and two-car trains are the rule rather than the exception even on the high-speed interurban properties, and where trains are short and light the energy of collision impacts is quite easily dissipated. In fact, it is a long-standing axiom of steam locomotive engineers that in a collision where a light engine or engine and caboose are involved, the safest procedure is to stay in the cab rather than run the risks of jumping.

It would seem, therefore, that the feature of greater impact strength alone would hardly be a sufficient reason for the general desirability in electric service of the truss-side type of construction. Its dominating point of superiority seems rather to lie in its obvious ability to reduce weight and repairs, because the costs of the alternative types of construction are the same, and where one of the two offers the chance to effect a saving in weight, even though this be slight, there is an excellent reason for its adoption. In addition, there is a vastly increased rigidity with truss-side designs, and this prevents "weaving" of the body and working of the side posts at the window sills. Such relative movements in a composite structure like a car body are harmful enough with flexible wooden constructions, but with steel they permit the establishment of localized corrosion at the points where movements, however small, break the paint film or otherwise allow entrance of moisture between adjacent pieces of metal. When the motion is of sufficient amplitude, the great hardness of steel as compared with wood prevents any opportunity for "give" at the joints and may easily start rivets, which when once loose will certainly never tighten up again of their own accord.

Even with city cars, therefore, there is a clear-cut reason for preferring the truss-side to the side-girder design, though the latter may, with short car bodies, provide enough beam height for the required load without necessitating excessively thick plates. All that is required to establish the principle of truss-side construction and to utilize the potential compressive strength of the letterboard and roof—elements that have to be installed whether or not they are required to carry load—is to increase somewhat the longitudinal dimensions for the side posts over those now commonly used. When sufficient strength has been provided to take up the longitudinal shear existing between the top and bottom of the car side, there will have been eliminated the most obvious feature of weakness in steel car construction. This is the working of the posts. That it exists in practically every car with side-girder construction is not difficult to demonstrate, because merely by pressing a finger into the corner formed by the sash, post and window sill of a moving car when it rounds a curve one will find in nine cases out of ten that relative movement is taking place.

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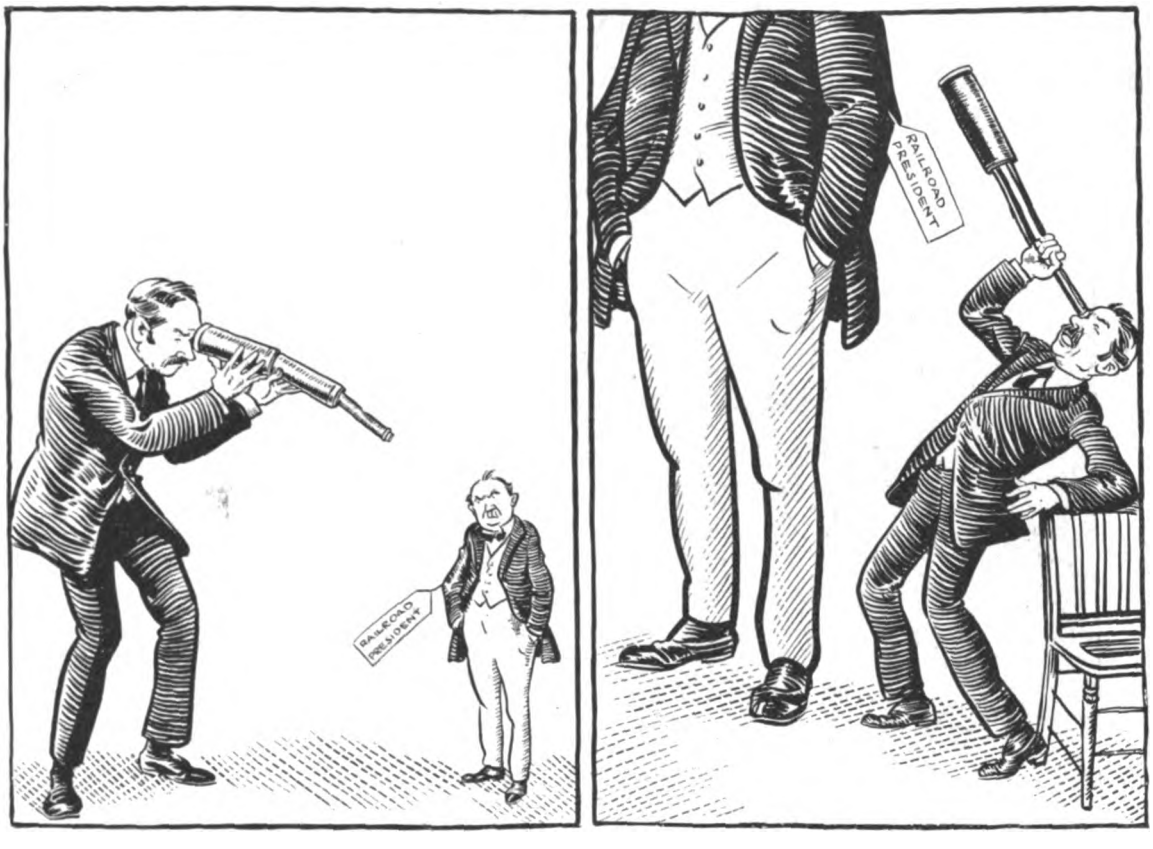
Putting the Railroad Man Right with the Public



Through Which End of the Telescope Do You Want the Public to Look at You?

DO the executives of electric railways loom as large and look as good as they really are?

No; as a general rule, they do not.

They do not lay half enough cornerstones or address enough Fourth of July celebrations and June graduating classes or lead enough of the preparedness parades.

If they did, more people would know them and like them better.

Surely, there isn't anything about running a railroad that makes a man an unsocial individual.

Then why are there not more railway men among those who lead in the civic life of their communities?

One explanation is that more or less general distrust, not to say hostility, has kept railway men at arm's length from public affairs.

A few exceptions do not alter the truth of this general statement.

Railway executives will always be in this position until they take the trouble to show themselves AS THEY ARE—mainly big men who are making the most of a hard job.

Before the Civil War a lot of people in the South thought that Yankees had horns and a tail.

Afterwards it was found that this report was exaggerated, and now the people of North and South even hold each other in considerable esteem.

The same happy condition of affairs will obtain when it is discovered that railway presidents have no horns or caudal appendages.

But to effect this result it is necessary that they should show themselves.

If they are too busy frequently to pose in person, they can at least pose in print.

Where do most people get their impressions of people as well as things? From the newspapers.

Breaking into print, however, is no job for unassisted amateurs.

It is almost pathetic at times to see how small a big man looks in a newspaper statement.

No one would expect a lawyer to make a success as a master mechanic; then why expect a railroad man to be an expert in dealing with the public?

And even if he is, he is too close to his job to see it in its relations to the man in the street.

He overestimates the public knowledge for one thing. "Any idiot ought to know that," is a remark frequently heard when enlightenment of the public is under discussion.

Yet railway executives probably know as little about the packing industry, for example, as packers know about railroading.

Get a publicity man who knows how little the public knows and who thinks about what the public is thinking and feeling.

He can do as much toward PUTTING YOU RIGHT WITH THE PUBLIC as your best trial lawyer can do toward putting that accident case in the right light before the jury.

The two things are much the same; the main difference is in the size of the jury before which the publicity attorney argues his case.

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1500-Volt Substation with Three 750-Volt Rotaries

New Substation of Salt Lake & Utah Railway Contains One Bank of Three Single-Phase Transformers and Three Rotaries—A Feature Is the Provision for Reliability with Reasonable Standby Equipment

BY M. R. LOTT
Electrical Engineer Salt Lake & Utah Railroad

UTAH SUBSTATION—ROUTE OF THE SALT LAKE & UTAH RAILROAD ALONG THE JORDAN CANYON AT THE NARROWS; WASATCH MOUNTAINS ARE IN THE DISTANCE

THE Salt Lake & Utah Railroad is a 1500-volt d.c. interurban line extending some 67 miles south from Salt Lake City, Utah, to Payson, the last section having been completed in June of the present year.* As the line has been extended and traffic increased it has been necessary to add to the number of substations. The Bringhurst substation, which the writer will describe, was the last one to be completed, and while the apparatus used is similar to that at the other substations a different arrangement has improved operating conditions over those existing at the original stations.

The service now consists of thirteen daily passenger trains each way, with considerable freight traffic. The passenger rolling stock comprises 44-ton all-steel cars, each equipped with four 115-hp., 750-volt motors. These are connected in two pairs, the motors of each pair being wired in series for operation on 1500 volts. A change-over switch mounted on the car allows all motors to be connected in parallel for full-speed operation on 750 volts. This connection is used when operating in Salt Lake City, or at times when it is desired to operate cars over the Salt Lake & Ogden Railroad, which is a 750-volt road connecting Salt Lake City with Ogden. They are geared for a free running speed of 55 m.p.h. Frequently two-car and three-car trains are operated, and at times four-car trains are run to care for special conditions.

The other three substations are at Granger, Lindon and Springville, and are respectively 5.8 miles, 38.7 miles and 53.4 miles from Salt Lake City. A No. 0000 copper trolley wire is used and the feeders are of the same size. Under normal conditions of operation all of the substations feed into the trolley wire, which is maintained continuous throughout the entire length of the road. Provisions are made, however, for sectionalizing the line in times of trouble. The normal rating of each substation is 500 kw.

Load conditions were the deciding factor in locating the substation at Bringhurst, 23.4 miles from Salt Lake City, approximately midway between Granger and Lindon substations. This location was also readily accessible for connection with some of the existing 44,000-volt lines of the Utah Power & Light Company, from which company 60-cycle power is purchased for the operation of the entire road.

GENERAL FEATURES OF BRINGHURST SUBSTATION

The building is of brick, 52 ft. x 34 ft. in plan, with walls 18 ft. high. It is fireproof and has steel roof trusses and asbestos-covered corrugated iron roofing.

*See ELECTRIC RAILWAY JOURNAL, July 22, 1916, page 143.

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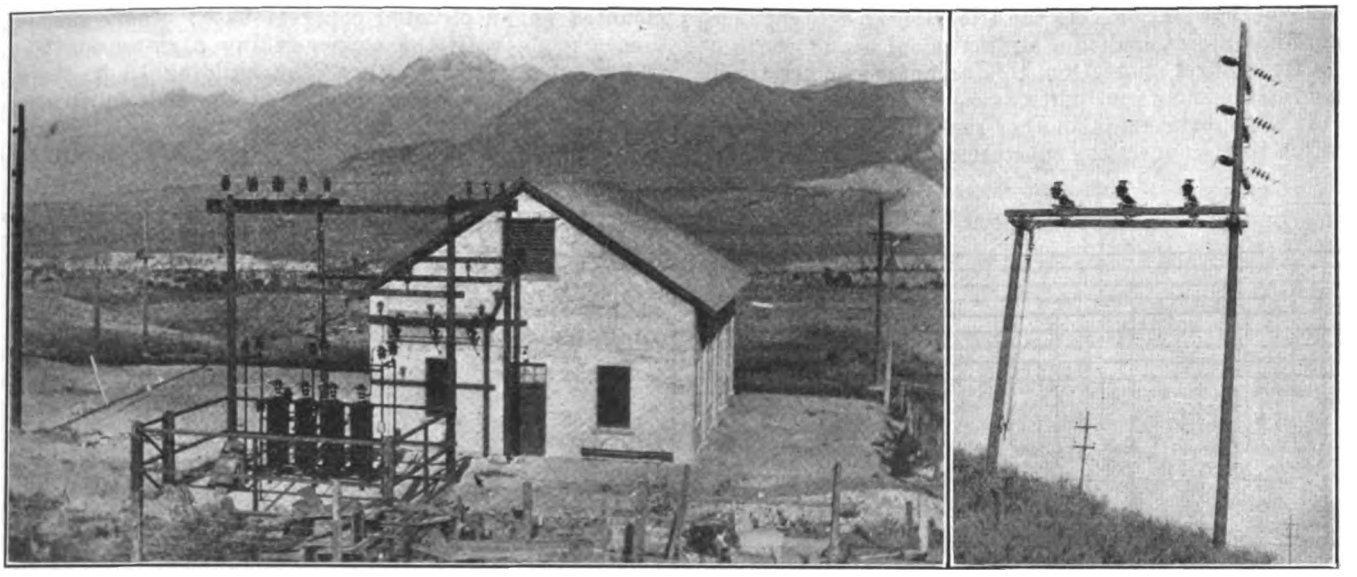


UTAH SUBSTATION—BRINGHURST SUBSTATION OF SALT LAKE & UTAH RAILROAD, SHOWING INCOMING HIGH-TENSION LINES; ALSO THREE-PHASE AIR-BREAK SWITCHES AT POINT WHERE TAP LINE TO SUBSTATION CONNECTS WITH TRANSMISSION LINE

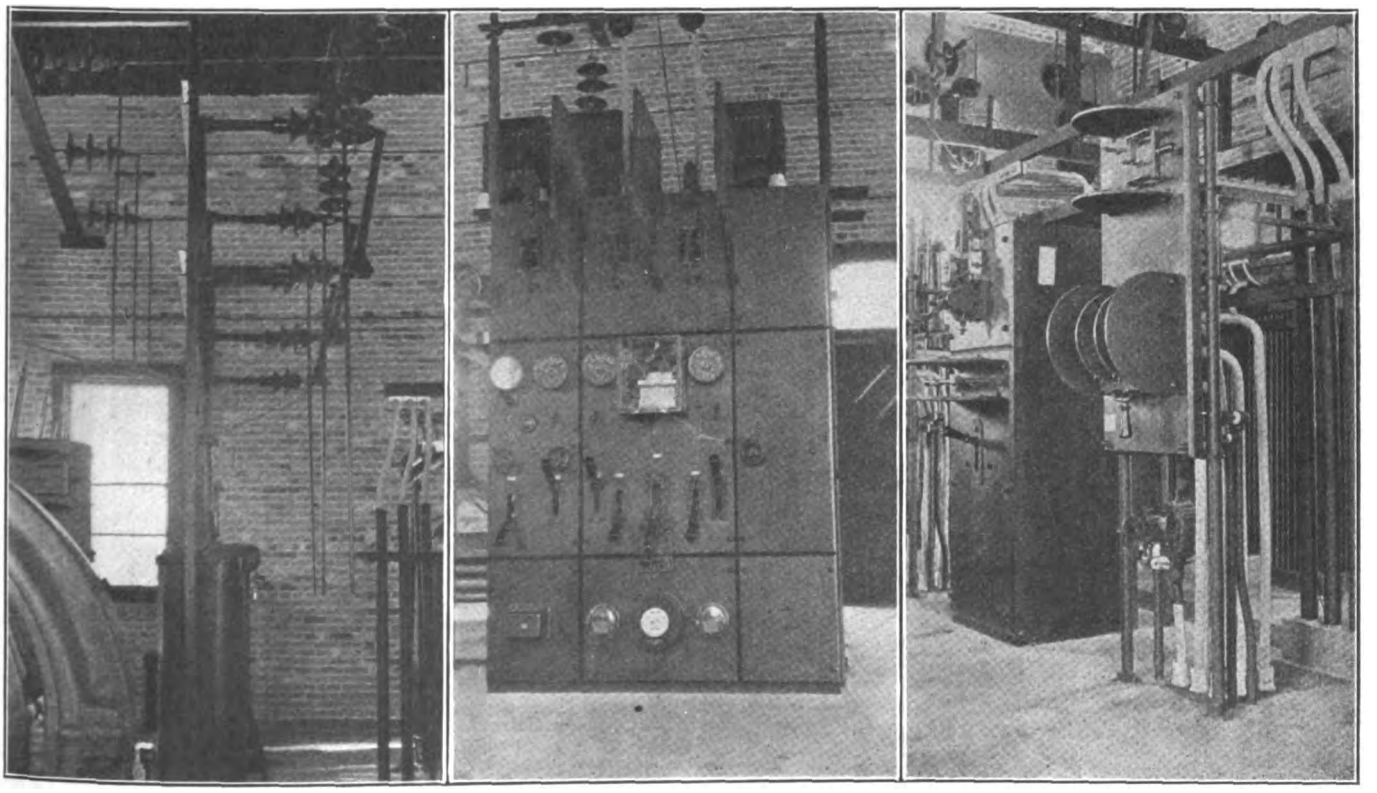
The energy is received from the Utah Power & Light Company's lines at 44,000 volts and delivered to the trolley line at 1500 volts d.c. through two 750-volt, 250-kw. rotaries connected in series. At present there are three rotaries installed with wiring so arranged that any two can be operated together. The station and switchboard will care for two additional rotary converters and the accompanying transformers, which will give the station an ultimate rated capacity of 1000 kw.

Conduits have been laid to care for the equalizing cables which will be necessary when the two sets of rotaries are operated in parallel. In the future installation, a three-pole breaker will be mounted on the negative panel to care for the three equalizer leads, and this breaker will be interlocked with either one of the four circuit breakers, so that on the opening of any of the main breakers the three-pole breaker will open and disconnect the two sets of converters.

All of the apparatus is placed in the one room and on the same floor level, and the operator has a small portable office provided with desk, telephone and an electric heater. An I-beam equipped with a chain hoist extends the full length of the building.

OUTDOOR APPARATUS

The Utah Power & Light Company's transmission line is approximately 200 ft. from the substation building. At the point of connection there is a switch rack equipped with an air-break switch to cut off the south end of the company's transmission line should trouble



High-tension wiring, showing disconnecting switches and instrument transformers. Front view of switchboard, showing rheostats mounted above and at rear of panels. View of negative panel on the left and starting panel on the right.

UTAH SUBSTATION—THREE VIEWS OF INTERIOR SUBSTATION EQUIPMENT

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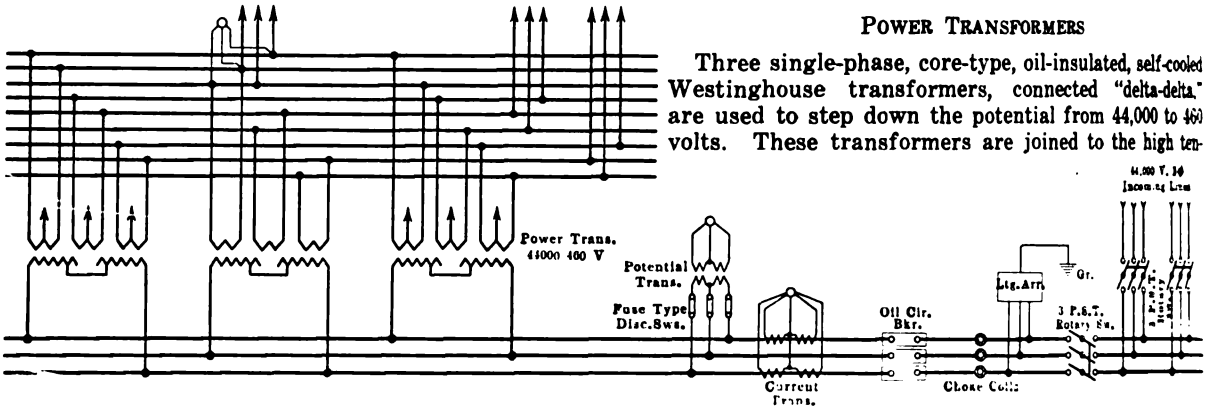
arise on that section. As the Utah Power & Light Company has a sectionalizing station about a mile north of the Bringhurst substation, this arrangement practically insures the same continuity as a loop-line service.

At the substation is another rack fitted with a similar switch to disconnect the substation wiring and lightning arresters from the tap line. Westinghouse electrolytic lightning arresters for the three-phase ungrounded neutral system are mounted on a concrete base and fenced in.



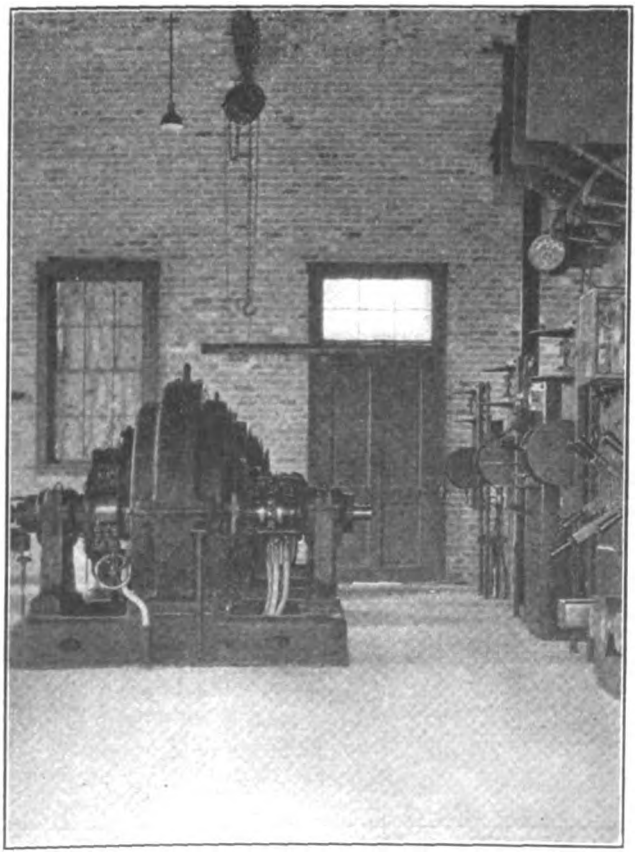
UTAH SUBSTATION—DIAGRAMMATIC LAYOUT OF HIGH-TENSION WIRING OF SUBSTATION

HIGH-TENSION STATION WIRING

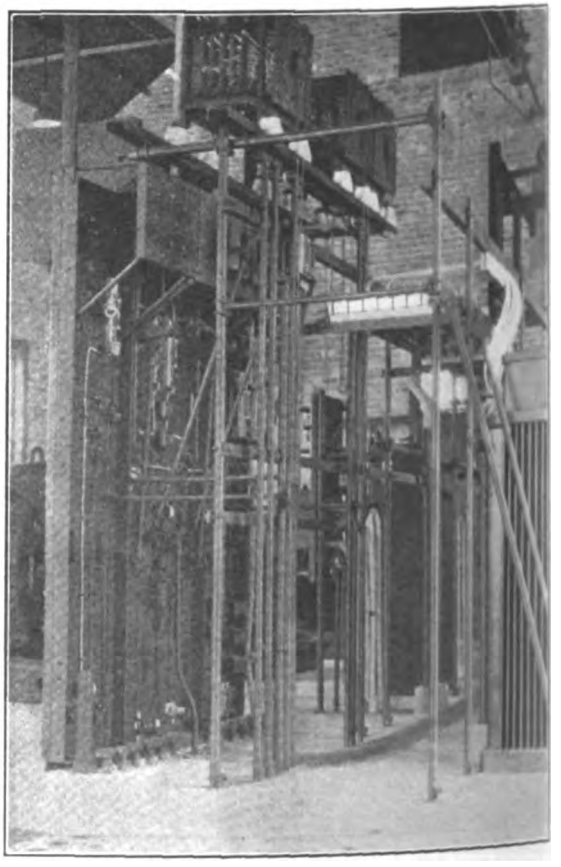
Pin-type insulators, mounted on pipe work, support the incoming high-tension conductors which enter the building through porcelain bushings. Immediately inside are aluminum choke coils connected by ¾-in. copper tubing to type GA hand-operated oil switches mounted on an elevated concrete base. Connection is thence made with the copper-tubing high-tension bus which extends the length of the building 15 ft. above the floor. The bus is supported at the ends by strings of three 10-in. strain insulators attached to structural steel supports, and from the roof trusses by means of suspension insulators.

POWER TRANSFORMERS

Three single-phase, core-type, oil-insulated, self-cooled Westinghouse transformers, connected "delta-delta," are used to step down the potential from 44,000 to 460 volts. These transformers are joined to the high tension bus through Dossert connectors so that a defective transformer may be readily disconnected to permit operation on "open delta." Each transformer has three separate secondary windings, having a capacity of 75 kva. each, one for each rotary. This arrangement provides for the operation of any two rotaries in series on the d.c. side. Adjusting taps are provided on the high-tension side so that full 460 volts low tension can always be secured. Taps are also provided on the low-tension side for starting the rotaries. Use is made of the 300-volt tap in starting the rotaries as induction



UTAH SUBSTATION—INTERIOR VIEW OF SUBSTATION, SHOWING ROTARY CONVERTERS, SWITCHBOARD AND STARTING PANELS



UTAH SUBSTATION—REAR OF SWITCHBOARD, SHOWING MOUNTING OF FIELD RHEOSTATS

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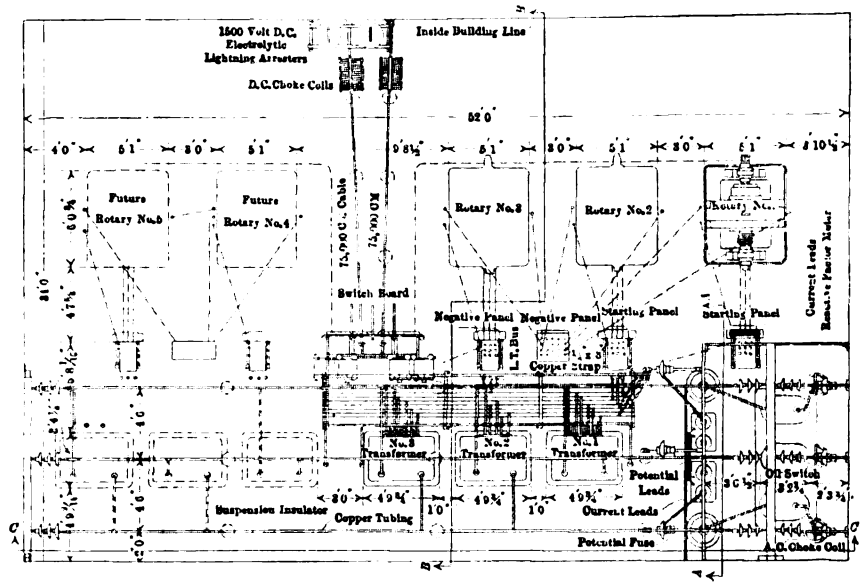
motors. Starting taps are actually brought out from two end transformers only, though connections can readily be made with the middle one should it be desired to use this with open delta operation.

ALTERNATING-CURRENT BUS STRUCTURE—LOW TENSION

Flat bare copper busbars, ⅛ in. x 3 in. in section, used for the low-tension circuit, are supported on a pipe framework 6 ft. 6 in. above the floor level. To provide for the operation of any two of the three rotary converters in series nine copper bars are employed, three for each secondary. Connection is made with the low-tension 500,000 circ.-mil cables by means of clamps. These cables are inclosed in 2-in. fiber conduit. The conduits are reinforced and protected by small concrete blocks extending 6 in. above the floor level. The conduit thus supported at the floor and attached by U-clamps to the pipe structure gives a neat appearance to the low-tension wiring.



UTAH SUBSTATION—PLAN OF SUBSTATION SHOWING LAYOUT OF APPARATUS

ROTARY CONVERTERS

Each rotary has a continuous rating of 250 kw. at unity power factor, and a 50 per cent overload capacity for two hours. The momentary capacity is 300 per cent of normal load. The compound winding is so arranged that the series field tends to hold up the power factor on heavy loads and produce a slight increase in voltage. Since the transformers have high internal reactance a slight control of voltage is obtained through the operation of the field rheostats. Each rotary is provided with the usual a.c. starting panel mounted on a pipework frame.

The connections which place any two of the three rotary converters in series on the d.c. side are made at the negative panel, which is placed between and in line with the starting panels for the second and third rotary converters. This panel is equipped with a triple-pole double-throw oil switch mounted on the back of the slate panel, and a single-pole knife switch mounted on the face. Any desired combination can be effected by means of these two switches. This panel also carries a carbon-break switch placed in the ground connection of the machines for additional protection.

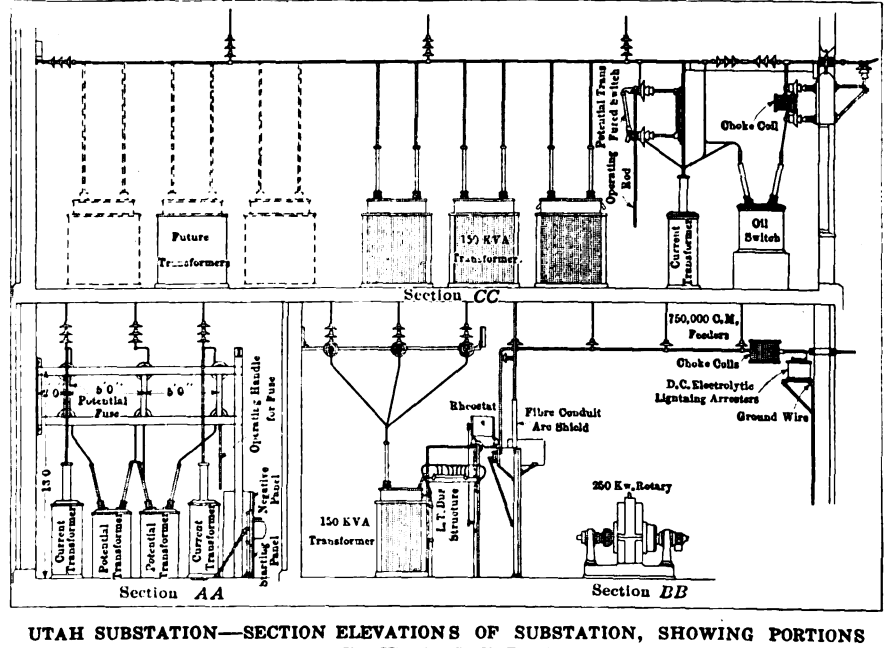
SWITCHBOARD

The main switchboard is made up of three marble panels. The middle one carries the control for the incoming alternating current and outgoing direct current, together with a.c. energy measuring equipment, while the left-hand panel controls the connection to the d-c. bus from the present converters. The panel to the right is reserved for the future converters.

Carbon circuit breakers with adjustable overload trips are provided for the machine circuit, and the two d.c. feeders. The machine breakers have low-voltage release coils, and all these breakers are separated by transite barriers. Each feeder circuit and the machine circuit are provided with d.c. ammeters, and a reactive-factor meter is placed on the machine panel with plug connections. The current transformers for each converter are mounted on the starting panel for that machine, and the field rheostats are mounted on top of the pipe framework which supports the switchboard.

Under present conditions of operation it is aimed to set the rheostats so that the power factor will be unity at about 200-amp. load, as at this setting the power factor stays close to unity and the current is leading for greater loads. The normal rating of the machine is 333 amp. direct current.

A d.c. voltmeter with a 2000-volt scale is provided with connections which permit voltage readings to be taken on each machine as well as on the feeder circuits.



UTAH SUBSTATION—SECTION ELEVATIONS OF SUBSTATION, SHOWING PORTIONS OF THE A. C. WIRING

As the payment for power is based on maximum demand as well as energy consumption, both integrating and graphic wattmeters are provided. The instrument transformers are placed in the 44,000-volt bus between the oil switches and the power transformers. The current transformers have each two secondary windings, one for the integrating wattmeter and the other for

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the graphic wattmeter and overload relay coils on the a.c. oil-switch circuits. All instrument wiring is of multi-colored cables placed in 1-in. iron conduits.

The d.c. feeders are 750,000 circ.-mil in cross-section and are suspended with Marlin hangers from a steel messenger wire. The d.c. circuit is protected by reverse current relays. Choke coils and electrolytic lightning arresters are installed on feeders at the entrances to the building. A summary of the a.c. protection apparatus is as follows: Lightning arresters with charging resistances and choke coils; condensers on low-tension busbars; overload relays acting on main oil switch, low-voltage on 44,000-volt oil switch; spark gaps on 44,000-volt current transformers, and fused disconnecting switches on 44,000-volt potential transformers.

LIGHTING

A 5-kw., 440-110-volt lighting transformer is installed to light the station, grounds and operator's cottage and to heat the operator's office. Four 200-watt units placed in deep-bowl reflectors are suspended 14 ft. above the floor over the rotary converters. The high-tension section of the building is lighted by five 60-watt bracket lights placed 12 ft. above the floor. Each lamp in this section is protected from static charges by means of a grounded wire lamp guard.

EQUIPMENT AND INSTALLATION

All of the equipment was supplied and erected by the Westinghouse Electric & Manufacturing Company according to plans prepared under the supervision of the writer. The total cost of substation building and equipment for the present installation was $58 per kilowatt of normal rated capacity. When the future installation is completed the cost will be about $39 per kilowatt.

Mayor Curley of Boston Issues Reasonable Orders Relating to Safeguarding at Drawbridges

Warning Devices Rather Than Foolproof Automatic Stops Are Specified for Immediate Installation—Study Is to Be Continued

FOLLOWING the preliminary conference on safeguarding at drawbridges held under Mayor Curley's auspices on Nov. 16, as described in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 25, 1916, page 1102, a second conference was held in the Mayor's office on Nov. 27. Representatives of the Boston Elevated Railway, Bay State Street Railway, Massachusetts Public Service Commission, Public Works Department and other bodies were present. Prof. Charles M. Spofford of the Massachusetts Institute of Technology, chairman of the engineering committee named to investigate safety methods, presented a preliminary report. As a result of its investigation the committee recommended the following immediate precautions, which Mayor Curley ordered placed in effect at once, following a unanimous vote in their favor:

1. That gates at all highway drawbridges be painted white with transverse black stripes maintained conspicuous at all times.

2. That on all highway drawbridges signs not less than 18 in. x 24 in., bearing the word "Stop" be installed, with black letters on a white background.

3. That at a proper distance from all highway drawbridge gates, lights be installed with reflectors so arranged that gates and signs shall be brightly illuminated when gates are closed.

4. That there be installed on all gates of highway drawbridges over which electric cars operate, at a proper distance above ground, powerful red lens lanterns, so located that when the gates are closed lanterns will hang at a proper elevation above the ground, directly between the two rails on each track, and drawtenders are to be required to keep these lamps burning from sunset to sunrise. Displaying sufficient warning lights for all other vehicular traffic is to be continued.

5. That at all highway drawbridges large gongs at a distance of not less than 100 ft. from each end of the draw span be installed, so interlocked with the drawbridge operating mechanism as to make it compulsory on the part of the drawbridge tender to close the circuit which causes the gong to ring before he can open the drawbridge, the gong to be designed to ring continuously while the draw is open.

6. That existing gates at highway drawbridges be substantially braced, guyed and strengthened and provided with such fastenings in the form of chains, cables or other devices, that when closed they will offer their maximum of resistance to vehicles colliding with them.

7. That on all highway drawbridges traversed by electric cars signs be installed directly over the car tracks, at a distance of approximately 100 ft. from the draw opening on each side, reading, "Slow Across Draw," such signs to be not less than 12 in. x 36 in., with black letters on a white background.

8. That an illuminated sign, not less than 12 in. x 36 in., reading "Stop When Draw Is Open," be installed at a distance of approximately 200 ft. from each highway drawbridge and the illuminating mechanism interlocked with the drawbridge and gong-operating mechanism.

No recommendation was made relative to the relocation of gates, as the committee asked for and received further time in which to study the advisability of establishing at each highway draw span a positive barrier that will absolutely stop all vehicles which may disregard such warnings as may be provided.

The committee has given careful consideration to the wisdom of installing derailing devices, and has concluded that the danger from derailment of electric cars to other vehicles standing at the side of the tracks, to foot passengers on sidewalks, and to passengers in the car which might thus be forced off the side of the bridge, is so great as to make such devices dangerous and impracticable. It has also considered the wisdom of automatically cutting off the power from electric cars at a reasonable distance from the draw span before the latter is opened, but feels that this might prove dangerous in case of failure of the brakes, as the motorman would then have no opportunity of controlling the car with his reverse. Copies of the committee's report are to be sent to all state bodies having charge of maintenance and operation of highway bridges. The report was also signed by Matthew C. Brush, president Boston Elevated Railway; T. T. H. Harwood, assistant engineer United States Engineer's office, Boston; John R. Rablin, chief engineer Metropolitan Park Commission, Boston; James D. Andrew, superintendent of station construction Edison Electric Illuminating Company of Boston; David Curtin, engineer maintenance of way Bay State Street Railway, Boston; and John E. Carty, secretary to the division engineer of the bridge and ferry division, Public Works Department, Boston.

In the first-aid cabinet used by the Beaver Valley Traction Company, New Brighton, Pa., individual brushes inclosed in sealed envelopes are provided for use in applying iodine. W. H. Boyce introduced this feature as an extra sanitary precaution.

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C. E. R. A. Meets at Toledo

At the November Meeting of the Central Electric Railway Association Papers Were Presented on Headlights, Relations of the Public and the Electric Railways, Safety Campaigns, Freight and Express and Steel Car Construction

THE fall meeting of the Central Electric Railway Association, with about ninety railway officials and thirty manufacturers' representatives in attendance, was held at the Secor Hotel, Toledo, Ohio, Nov. 23 and 24. One of the features of the opening session was the response made by Henry L. Doherty to the address of welcome delivered by C. T. Laughton, in the absence of Mayor Charles M. Milroy. Mr. Doherty said he had had the pleasure of receiving many kinds of welcome from the city of Toledo, and had found that the people of the city had never welcomed or appreciated their street railway service until they were forced to do without it. He thought it was to be regretted that the people could not be made to realize their interest in the railways without having first to suffer their loss or a depreciated service. He told Mr. Laughton he was facing a group of the gamest men that could be found, because in the face of enormous increases in the prices of all supplies and materials and labor, they were still able to attend the convention with smiling faces, the only thing they feared being a rise in the price of red ink.

The public seems generally to think, Mr. Doherty continued, that the railways, steam or electric, are entitled to no profit outside of a certain limited return on the investment, but he asked what provision has been made to take care of the losses. With the public taking all the profits and the companies standing all the losses, there appears a reason why there has been no independent building of railways the last several years. The losses have been great. The railways have not been financially able to open up new country as fast as the population has grown, and the result is that the farmer in the great new areas under cultivation is able to market his produce only at a high cost. The public pays for the forced low transportation rates in high prices for food. What the industry needs is big men to put these matters before the public in the right light and make them see that the problems of the railways are their problems. The railway men should talk more and write more to bring about this proper enlightenment. There must come a change in public sentiment, and the man who sees it and leads it will indeed be the great leader. This thought Mr. Doherty submitted for all the politicians. The big problems of the railways, he said, are not in the technical side, but in the public relations side, and there is great need for some comprehensive joint and individual effort to bring about better relations.

Mr. Doherty then remarked that once he had been unable to get even a hearing at public meetings in Toledo, but that the people had come to understand through their personal experiences that railway problems were of vital importance to them, and his statements were now heard with interest. These, he said, are times when the government should not only refrain from further regulation, but should come in with a helping hand.

After Mr. Doherty's remarks, upon call of President Benham, the minutes of the previous meeting were read by Secretary Neereamer, and they were approved as read. An amendment to the constitution was passed to the effect that the president and two vice-presidents shall each be elected from different states.

Discussion on Headlights

A paper on headlights by K. W. Mackall and discussion on the subject occupied the balance of the morning session. This paper is published in abstract on another page. The discussion was opened with an inquiry about the relative properties of the parabolic reflector and the semaphore lens, to which Mr. Mackall replied that the former should not be used at all with the luminous-arc type of headlight, because the fumes from the electrodes were kept almost wholly within the parabolic reflector, which extends almost completely around the arc. Semaphore lenses may be put in headlights formerly using reflectors by simply substituting the lens for the glass in the door in one type and in another type by putting on a new door to bring the lamp and lens in proper position for focus. While the lens utilizes only a sector of the light flux as compared with almost total utilization of all the light with the parabolic reflector, yet a lens placed 7 in. from the light source projects a narrower beam of greater intensity than given by a reflector. With equal amounts of light flux used for both types of headlights, the intensity of the beam down the track is two to one in favor of the lens, because the concentration of the rays is more perfect than with the reflector.

S. R. Dunbar, Anderson, Ind., said that the type of headlight which should be used by a road depended on whether one wanted concentration, spread or distant projection. He thought it essential to have more or less spread of light, particularly on curves, as a means for attracting attention of vehicles approaching from the side of the track. Few accidents occur from objects lying on the track; most of them are caused by people going across the track.

Mr. Mackall said that the optical semaphore lens illuminated the whole roadway at a distance of 1000 ft. This, he thought, constitutes sufficient spread, and the intensity is retained. It is impossible to have both spread and distant lighting. The choice is a matter largely to be settled by personal preference and by the character of the particular road.

The best location for the headlight, whether above or below the motorman's plane of vision, was then discussed at length, but the arguments and experiences expressed seemed to be as conclusive for one way as the other. C. L. Henry summed the matter up with the conclusion that at distances of 1200 ft. or 1500 ft. a headlight location 3 ft. above the motorman would be practically equivalent to one 3 ft. below him, because the rays would be practically parallel from the two positions. This matter was discussed also by Mr. Mackall, F. N. Norviel, F. W. Coen, H. A. Nicholl, G. H. Kelsay, S. R. Dunbar, President Benham and J. H. Drew.

The afternoon session was devoted to the presentation and discussion of papers entitled "The Electric Railway Industry," by F. R. Coates, president Toledo Railways & Light Company; "Safety," by Harold W. Clapp, general superintendent Columbus Railway, Light & Power Company, and "Electric Railway Freight and

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Express," by Nathan Rumney, general freight and express agent Detroit United Railway. After giving a short history of the industry, Mr. Coates referred to the recent increase in the cost of materials used by railway companies. The three principal items in electric railway use, according to Mr. Coates, are labor, copper and coal, but, in the past twelve months, on an average, labor has increased in price 20 per cent, copper 100 per cent, and coal, when bought in the open market, 200 per cent. Mr. Coates then called attention to the dependence of the public upon the continued operation of the utilities and suggested that these utilities and the steam railroads should be preferred, for this reason, when shipments of coal are being considered. He then read a paper on public relations, which was the same as that presented by him at the Doherty Managers' Meeting in Toledo last October and contained the ten basic principles of public relations, as he understood them. These principles were published on page 867 of the issue of this journal for Oct. 21, 1916, in connection with a report of the Doherty meeting, but the full paper is given in this issue. An abstract of the paper by Mr. Rumney on freight and express traffic is also published.

The discussion was opened by Terence Scullin, Cleveland, Ohio, who said, in commenting on Mr. Coates' paper, that the citizens of Toledo are to be congratulated because their railway company is now putting into service a large number of cars of the best type in existence to-day. He referred to the new, front-entrance, center-exit cars just placed in service.

SAFETY CAMPAIGNS

E. R. Kelsey, Toledo, Ohio, then told how the safety work in Toledo is carried by two safety supervisors, of whom one is responsible for the safety of the employees and the other for the safety of the public. The company has been doing a great deal of work in the schools and started out last year to have a talk on safety given in every schoolroom. A film, named "The Price of Thoughtlessness," had been shown very widely also, and the result of this work in the schools has been that accidents to children have been almost eliminated. At present, however, the company is disturbed over the number of automobile accidents, having had an increase of almost 80 per cent in this kind of accidents during the last year. A campaign is being conducted by using the window space in the cars for a series of photographs showing actual accidents and indicating the losses due to them. The results of this particular work are not yet known.

In general, the work among the children has fostered a friendly spirit between the parents and the company and has greatly improved the sentiment of the whole community toward the railway. As evidence of this, as well as the value of taking the public into the confidence of the railways, Mr. Kelsey remarked that 67 per cent of the public of Toledo, after one city administration had passed a 3-cent fare ordinance to embarrass its successors, had chosen to pay a nickel rather than ride for nothing. This was after the company had put squarely up to the public through purchased newspaper space why it could not carry passengers for 3 cents and had offered to carry anyone free rather than accept less than a 5-cent fare. Mr. Kelsey also pointed out the importance of having the highest officers easily accessible to the public and said that, as soon as the public finds the doors open to complaints, there is no longer a desire to kick. He considered that car window advertising is the most valuable tool a company has.

H. A. Nicholl, Anderson, Ind., then described briefly the work of the Union Traction Company of Indiana in promoting safety. This had been confined very largely to the employees, where a splendid showing had been made, the company having been awarded the Brady safety medal last year. Efforts are being directed especially toward keeping up the interest in the movement, and the enthusiasm of the employees in safety work, which was somewhat inclined to waver, was maintained by two safety banquets a year. At these banquets contest papers are read and speeches are made by the men and officers of the company. At the next banquet, for example, H. L. Brownell, safety engineer, is to give one of his safety lectures illustrated with motion pictures.

Following this, Mr. Clapp was asked how he had been able to bring about the 33-per cent reduction in insurance rates that was cited in his paper. In explanation he stated that the original rate had been 75 cents and the company was facing an increase to $1.05. In consequence, a proposal for co-operative action was made to the Ohio Inspection Bureau with the aim of finding a way to cut the increased rate, which the company did not propose to pay. Two of the bureau's experts and two department heads of the company then went through the company's plant, and as a result, in a year's time the company spent $9,500 in placing its property in shape to meet the recommendations and requirements of the bureau. Fire walls were built higher, fire doors installed, sand and water buckets provided wherever they were wanted, and all wiring strung in a way that inspectors would pass without penalizing. The head of one department was appointed to make a monthly inspection of the property to see that every nook and corner was kept absolutely free from rubbish. Also, four surprise inspections each year by the Ohio Inspection Bureau were requested. The result was a lowering of the rate to less than 50 cents per $1,000. A company, Mr. Clapp continued, must first put its house in order and train its own employees and after that go out and talk to the public. The bonus system seemed to be the answer to keeping up the interest of employees in safety work. He had used $1,000 for this purpose last year and intended to go in for bigger bonuses next year. The way to reap best results from the safety endeavor was to work from the inside out.

Regarding public relations, Mr. Clapp said that if a company treats the public right it will get suggestions rather than kicks. That is what the company is getting in Columbus. To make it easy for the public to receive attention and gain ready access to the office of the general superintendent, he has a push button in his outer office and a sign reading: "If you don't receive prompt attention, push this button." This rings a bell in his office, and as a result callers received prompt attention. No conference, he said, is too important for him to leave to meet any of the public.

ELECTRIC RAILWAY FREIGHT

Charles L. Henry, Indianapolis, Ind., was then called upon by the chair. He said there was no question but that electric railways must look to freight traffic rather than passenger traffic for any large increases in volume of business, and recalled that in the year 1893, when he had made a contract for carrying carload freight into Indianapolis, it was prophesied that the time would come when a large amount of the transportation of farm products into the cities would be by electric lines. The railways have had to face a prejudice against the bringing of freight over the city streets although they use clean, closed electric cars, whereas evil-smelling, littering wagons are permitted on the same streets at all hours of the day. The electric railways could save the communities they serve thousands of dollars if the people could be made to view the matter in the right

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light and see the great economic value of permitting the movement of freight cars over the streets during the night. If produce could be brought into the Indianapolis markets by trolley it would not disturb traffic one-tenth as much as to bring in the same produce by wagon.

The papers of the afternoon were also discussed briefly by F. D. Carpenter and J. F. Starkey. Prior to the conclusion of the session the executive committee stated that it had been decided to hold the annual meeting in Indianapolis in February.

On Thursday evening the delegates attending the meeting were made the guests of F. R. Coates, president Toledo Railway & Light Company, at a theater party.

At the opening of the session on Friday morning Mr. Kelsey displayed the previously-mentioned film entitled "The Price of Thoughtlessness," which the Toledo Railways & Light Company had shown in conjunction with a lecture in every schoolroom in Toledo, and which had resulted in almost complete elimination of accidents to children. Mr. Kelsey gave part of his talk as ordinarily delivered to the children and said that while the company was showing this film in the schools, volumes of letters had been received from parents thanking the company for the lesson that was being conveyed to their children. One of these letters was from a man who had four children, each of whom without exception had come home and told him the complete story of what they had seen and warned him against the dangers of the street. At these lectures a safety button was given to each child, and added interest was created in the buttons by numbering them and having a few duplicate numbers. Then if any child found another button with the same number as his own, the company gave a reward of $1 when the two buttons were presented by the two children.

After this F. W. Coen read a paper, saying when introducing it, that it was also on safety first, but from another viewpoint. This was published in abstract in last week's issue. At the conclusion, L. B. Stillwell's paper on car construction, which was abstracted in last week's issue, was read by F. M. Brinckerhoff of the firm of L. B. Stillwell, consulting engineers. A joint discussion of both the foregoing papers then took place.

F. D. Carpenter, president, Fostoria & Fremont Railway, discussing Mr. Coen's paper, pointed out the necessity for properly posting the lawmakers on matters which concern the railway properties. He thought that the passing of some of the laws which are injurious to the railway companies was due largely to the ignorance of the legislators and that the railway men ought to be very active in making sure that the proposed bills are read by the men affected as well as that the legislators understand the full significance of any proposed measure. There was need for work in this direction. Railway men in general had been lame in not undertaking to educate the public as to the actual operation of the railway properties. He entreated everyone to go home and create some more favorable sentiment.

Mr. Coates suggested that the executive committee of the association appoint a committee to consider the advisability of having a series of talks given to the public, and of distributing suitable posters and carrying car advertising for the education and information of the public, the plan being to have the same thoughts expressed simultaneously throughout the Central Electric Railway Association territory. President Benham thought this was a good suggestion and said he would put the matter before the executive committee.

In the discussion of Mr. Stillwell's paper, G. H. Kelsey, Anderson, Ind., asked about the relation of car weight to ease of riding, stating that it is common to hear the expression that a heavy car is easy riding. Mr. Brinckerhoff answered by saying that it was to a certain extent true that the heavier car rode easier, due to the fact that the inertia of the great mass was, of course, harder to overcome and hence less susceptible to the quick motion of the trucks. These same easy-riding qualities can be obtained, however, with the lighter weight car by using long soft elliptic springs. He said that the all-steel, truss-side construction cars described in his paper weighed 10,000 lb. less than the old steel-underframe wooden cars of the same dimensions, and were lighter per seated passenger, per foot of length, or under any basis of comparison. Yet particularly good riding qualities had been obtained through the use of a special truck frame permitting of the mounting of 42-in. elliptic springs. In the ordinary truck only 34-in. springs can be installed. He said that great mass in a car did not necessarily signify strength, but that strength was obtained through the proper association of members rather than weight of members.

Clarence Renshaw, Westinghouse Electric & Manufacturing Company, asked Mr. Brinckerhoff if he had ever arrived at any particular relation between car weight and speed of operation. Mr. Brinckerhoff thought there was no reason why a car should leave the track because it was light, and said there was a more direct relation between the weight of a car to carry a certain weight of equipment. Mr. Renshaw said there seemed to be a general impression for ordinary track conditions that a car for operation at 50 m.p.h. or 60 m.p.h. should have a minimum weight between 35 tons and 40 tons.

Mr. Brinckerhoff said the light car could be run at high speed more safely than the heavy car, basing his opinion on the consideration that, once a moving, spring-supported mass is seriously disturbed, the resulting oscillation is more serious with a heavy car than with a light weight car. There is always a close relation between truck-center distance and riding qualities, the longer truck centers tending toward steadier riding. He cited an instance of some cars on one road which were 33 ft. long between truck centers, and although these had a very bad nosing characteristic at 30 m.p.h., they rode smoothly at 40 m.p.h. and nosed badly again at 54 m.p.h. These cars weighed 70,000 lb. The phenomenon was partly due to wrongly-hung swing links. When asked how much weight would be added to a steel car by increasing its length from 48 ft. to 60 ft., Mr. Brinkerhoff said that 10,000 lb. would probably cover the difference.

C. L. Henry, president, Indianapolis & Cincinnati Traction Company, was very firmly of the opinion that the greater mass would tend to keep the car on the track, the greater inertia holding the wheels more firmly to the rails over track inequalities. His cars, he said, are heavy—undoubtedly too heavy—but he had never had a car derailed, exclusive of collisions and derailments at switch points, in twelve years of operation. He did not believe it possible to derail a heavy car as easily as a light one.

Walter Evans, United States Metal & Manufacturing Company, pointed out that Mr. Stillwell's paper dealt very largely with car construction for train operation and that a car running individually had very different riding characteristics than when operating in a train. He said the electric railways had adopted a good many features from the steam roads which added materially to the weight without adding to the comfort. Referring to the all-steel truss-side construction cars shown by Mr. Brinkerhoff, he said they gave him the impression of being rather top heavy, or the bottom too light for the balance of the car body. He said they used to load the bottom of steam-road coaches with steel rails in order

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to make the center of gravity lower. This tended toward easy riding and also resisted telescoping of the cars in collisions.

Mr. Evans, in commenting on Mr. Coen's paper, said that in his experience legislators were for the most part open-minded in receiving information regarding proposed legislation from the electric railway men. He thought it very advisable that individual effort be made to become acquainted with the members of the legislature, and that this personal effort would go a long way toward correcting unfavorable regulation.

Mr. Henry then asked about the durability of all-steel cars and the likelihood of rusting becoming a serious matter in the life of all-steel equipment. Mr. Brinckerhoff answered that this was a matter of maintenance; that the life of a car is the life of the joint which must be developed in excess of the strength of the members it connects. If motion is once started in a joint, the car will very rapidly deteriorate, since it is impossible to get at the rivets and tighten them up again. To prevent rusting in the joints they must be thoroughly painted when put together, and hence the matter is largely one of workmanship. Then the steel, and especially the joints, must be kept painted, or corrosion will take place. Some metals such as ingot iron are more resistant to rust than others, and if the metal is properly selected there need be no great difficulty in eliminating rust. The extra money spent in the material is more than compensated for by the added life.

Referring to Mr. Evans' comments on the top-heavy appearance of the cars, Mr. Brinckerhoff said that the center of gravity had been raised by this side girder construction only 2 in. The company for which these cars were built, figured a resultant saving of $800 a year per car in coal bills, and found also that there was a saving of one new locomotive for every ten cars built, since the old locomotives which were in operation were large enough to haul a ten-car train of these cars, but would not have been for ten cars of wooden construction. Hence, with locomotives costing $25,000 each, the use of wooden cars would have added an indirect charge of $2,500 per car for locomotives alone. Keeping the weight of the car down, therefore, also kept down the first cost.

Some comment was then made on the relative cost of all-steel and steel-underframe wooden cars. Mr. Coen said that his company had some all-steel, 60-ft. interurban cars equipped with 100-hp. motors and train control, weighing 80,000 lb. and having a seating capacity for sixty-four people, and that when these cars were purchased one year ago the price was considered to be less than the cost of the same car in wood.

At the close of the meeting President Benham appointed the following nominating committee to nominate a president, vice-president and members of the executive committee, and to report at the annual meeting to be held in Indianapolis, Feb. 22 and 23: F. D. Carpenter, chairman, and C. L. Henry, C. E. Morgan, S. D. Hutchins and W. H. Bloss.

Special Car from Indianapolis to Convention

A party of fifteen railway men, including C. L. Henry, E. B. Peck and A. L. Neereamer, made the trip to the meeting from Indianapolis through to Toledo on a special car. The group was augmented by other railway officials at various points along the route, so that some thirty-five members stepped from the car at its destination. The trip was made by way of the Terre Haute, Indianapolis & Eastern Traction Company to Richmond, the Ohio Electric Railway to Dayton, the Dayton & Troy Electric Railway to Piqua, the Western Ohio Railway to Lima, and the Ohio Electric Railway to Toledo. Luncheon was served from Richmond on. At Toledo, one of the Toledo Railways & Light Company's new front-entrance, center-exit, low-floor cars served as the special car to take the delegation from the interurban station to the Secor Hotel. The 262-mile run from Indianapolis was made in 9 hours and 30 minutes, the car leaving Indianapolis at 9 a. m. and arriving at Toledo at 6.30 p. m. A special car from Toledo to Indianapolis made the return trip Saturday morning and Mr. Coates provided a special city car to convey the members from the hotel to the interurban depot.

Freight and Express Traffic*

Increased Freight and Express Service Will Make Electric Railways More Useful

BY NATHAN RUMNEY
General Freight and Express Agent Detroit (Mich.) United Railway

WITH most lines the development of the freight and express business was somewhat slow. The lean years following the efforts of those who undertook to build it up were most discouraging, but persistent efforts were finally rewarded. It can now safely be stated that this branch of electric railway service has proved to be a valuable asset to the community, if not an actual necessity in the development of present-day commerce.

While at first the attention of the railways was confined solely to the development of the local business along their own lines, the addition of connecting electric lines at various points brought about an interchange of freight between these lines, and through routes and rates were eventually established. In this the various associations of the electric lines played a prominent part, and to them the present free interchange of both passenger and freight business can be largely accredited.

On many of the lines, particularly those having access to a large city, the transportation of milk and cream has been extensively developed. For obvious reasons this should prove to be a particularly desirable class of business, although to make it successful it is absolutely necessary that a regular schedule be maintained. Experience has demonstrated the desirability of cultivating the dairy industry as far away from the large centers of population as possible. At the rate of present-day development the lapse of a few years may largely increase the area of a city, making the land immediately adjoining too valuable for dairy purposes. In some cases refrigerator cars are now being operated, and it is not improbable that this method of transporting milk will be more generally adopted in the future.

Different views have been, and still are, held as to whether the traffic was more profitably handled as a purely freight business, or on the old-line express basis. In general, the electric lines are committed to the freight business, and this field appears to hold out a greater opportunity for future development. Between large cities or industrial centers, however, there seems to be no good reason why an express business should not be a paying investment, but a freight business would undoubtedly also prove successful.

The freight business on electric lines has been looked upon largely as a package or less-than-carload business, and this is still true to a large extent. To take proper care of this class of business adequate warehouse facilities are essential. At the larger terminals a number of the lines have entirely outgrown

*Abstract of paper read at Toledo meeting of C. E. R. A. Nov. 23-24.

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their facilities, and as a result are experiencing a continual congestion. Just what this means in additional cost for labor and claims for loss and damage, many know. In dealing with these congestions, electric lines are confronted with entirely different conditions than those encountered by their steam road contemporaries. The latter with their larger freight car equipment are in a position to keep their loaded merchandise cars outside until such time as room is available in the warehouse for unloading them. On the other hand, freight cars on most electric lines are usually at a premium, or at least they have been in the past. The cars which enter a station with inbound merchandise or less-than-carload freight must be immediately unloaded in order that they may be available for loading outbound freight.

The despatch afforded freight business on electric lines approaches more nearly the service of the old-line express companies. In fact, as far as the less-than-carload business is concerned, it may properly be classed as express service, minus the pick-up and delivery features. An example of this is furnished in two-carrier service between two cities separated by a distance of more than 200 miles. The merchandise run leaves one terminal about 2 p. m., and cars arrive at the other terminal in time to effect delivery of freight by 9 a. m. the following day. This may be exceptional, but points located on the same line are invariably served with over-night delivery.

By reason of the nature of the freight business conducted by electric lines and the conditions under which they operate, much discussion has been provoked among the lines themselves as to the proper basis of rates applicable to the traffic. Without venturing too far into a discussion of the merits of the question at this time, I desire to express the hope that in addition to the usual items of value, weight, bulk and risk, the service rendered by electric lines may be seriously considered as a factor in determining the rates.

Reference has been made from time to time to the competition afforded by electric lines to the steam roads. There may even have been some animosity existing between the two factions at first, but if such feeling did exist it has gradually been eliminated. The freight departments of the electric lines have a field distinctly their own, and the day is not far distant when they will serve as valuable feeders for the steam roads. At least the friendly relations which now for the most part obtain between the officials of the steam and electric lines augur well for the future.

With the express or less-than-carload freight business well under way, as it is at present on most lines, the tendency should be toward the development of traffic in car lots—not only that which is to be secured in local movement, but also that which moves in interchange with connecting electric and steam lines. Bulk commodities such as sand, gravel, stone, brick, ice, etc., also offer a means of increasing revenues. Even city lines under proper franchise conditions may participate in transportation of certain bulk commodities which could be moved at night, and thereby utilize equipment now called into use for the most part during the daytime only. In many cases refuse, garbage, etc., might be transported through arrangement with the civic authorities.

Even if the passenger business on most electric lines is of paramount importance, it is but fair to say that the freight and express business in some form or other can be made a valuable adjunct, the extent to which it can be developed depending largely upon the financial and operating conditions. With the attainment of full development the usefulness of electric railways in the community will be manifestly increased, and to this development the express and freight department will contribute in no small measure.

Headlights*

A Comprehensive Survey of the Practice and Theory of Illumination as Applied to This Phase of the Subject

BY K. W. MACKALL
Electrical Engineer Ohio Brass Company, Mansfield, Ohio.

HEADLIGHT service is divided into three classes, each marked by different service requirements as follows: City service, slow speed; city and suburban service, moderate speed, and interurban service, high speed. Each class of service requires a different type of headlight.

In ordinary city service cars as a rule operate on well-lighted streets and a powerful headlight is not

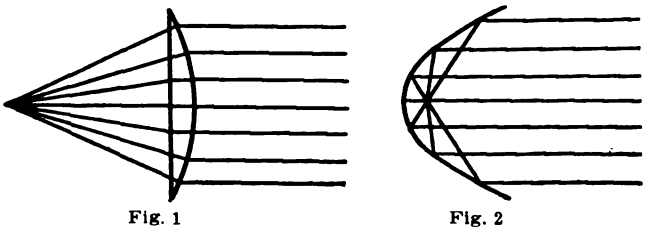

Fig. 1 Fig. 2

LIGHT RAYS UNDER IDEAL CONDITIONS—FIG. 1, WITH LENS; FIG. 2, WITH PARABOLIC REFLECTOR

required. The prime objects of the headlight for this service are to warn of the car's approach and to illuminate switch points. For these purposes the dash-type headlights are entirely satisfactory.

Cars which run from the main business centers to outlying suburban districts require more powerful headlights. For this service a small 2-amp. luminous arc headlight or an incandescent headlight with about a 9-in. reflector equipped with a focus-type Mazda lamp gives the desired results.

For interurban service it is desirable that the headlight illuminate the track a sufficient distance ahead of the car to enable the motorman to see an obstruction

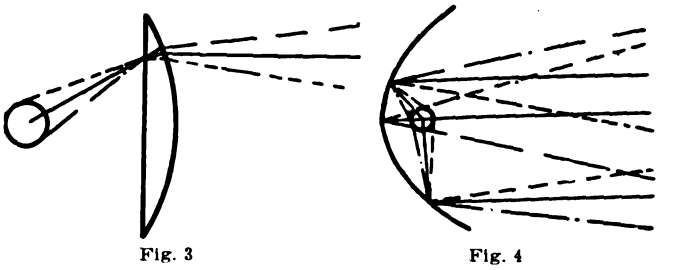

Fig. 3 Fig. 4

LIGHT RAYS UNDER PRACTICAL CONDITIONS—FIG. 3, WITH LENS; FIG. 4, WITH PARABOLIC REFLECTOR

and stop the car before striking it, and also to warn vehicle drivers and pedestrians approaching on intersecting highways. For this high-speed service the luminous-arc headlight is perhaps best suited owing to its high power, reliability and low maintenance cost. The carbon-arc headlight is also used extensively, and within the past year or two the incandescent headlight has gained some prominence in this field. The last-named is, however, subject to the limitation that it does not operate satisfactorily on widely fluctuating voltages. Storage-battery headlights have also been tried out, but

*Abstract of paper read at Toledo meeting of C. E. R. A., Nov. 23-24.

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have been abandoned in all but a very few isolated cases owing to the high initial and maintenance cost of a satisfactory storage-battery equipment.

CHARACTERISTICS OF THE SEVERAL TYPES OF HEADLIGHTS

The luminous-arc headlight is the most efficient of all types available. Its maintenance cost is very low. By simply reversing its polarity, an inefficient light is produced which permits the use of this headlight on city streets. Sometimes it is provided with an auxiliary circuit of two incandescent lamps in series with resistance for operation on city streets. As the upper electrode is practically non-consuming, the arc is always maintained at the focal point of the lens or reflector.

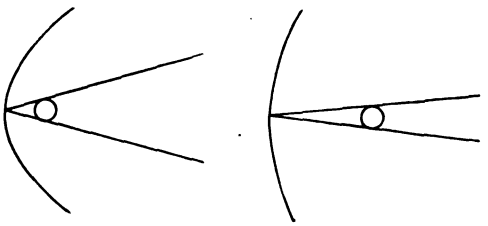

Fig. 5 Fig. 6

DIAGRAMS SHOWING EFFECT OF FOCAL LENGTH ON DIVERGENCE OF LIGHT BEAM—FIG. 5, SHORT FOCUS; FIG. 6, LONG FOCUS

The luminous-arc headlight has the disadvantages that fumes are given off from the arc; that it is not quite as simple as an incandescent headlight, and that the natural travel of the arc around the electrodes causes the beam to wander slightly from side to side. However, its many advantages more than offset these disadvantages. Poor illumination from luminous-arc headlights is caused by lack of proper care of the upper electrode, which should be adjusted every two or three months.

Carbon-arc headlights are of low initial cost and no fumes are given off by the arc to cloud the reflector or lens. Dimming for city service is accomplished by using an auxiliary circuit of incandescent lamps or a screen dimmer. They are reliable and require little attention to the operating mechanism. However, the efficiency is low and the maintenance cost high as compared with the luminous-arc headlights.

The incandescent headlight is simple and steady, and in the smaller sizes the maintenance cost is somewhat less than the arc headlights. An incandescent lamp, whether it is used in a headlight or not, is very susceptible to fluctuations in voltage since the illumination varies as about the cube of the voltage.

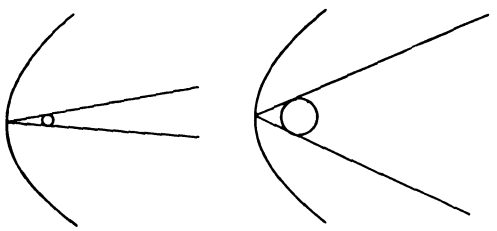

Fig. 7 Fig. 8

DIAGRAMS SHOWING EFFECT OF SIZE OF LIGHT SOURCE—FIG. 7, SMALL SOURCE; FIG. 8, LARGE SOURCE

It is out of the question to use high-powered incandescent headlights in series with resistance on 1200-volt trolley circuits, because when a lamp fails an arc will be established between the leading-in wires of the lamp and burn down into the base and receptacle with a strong possibility of starting a fire. The incandescent headlight is considerably more fragile than an arc headlight, and the constant vibration to which incandescent lamps are subjected in actual service makes their operation uncertain in interurban work.

THEORY OF HEADLIGHTS

A headlight consists of two principal parts, a primary light source and a reflecting or refracting medium. For redirecting the rays of light to form a beam, we may use either a parabolic reflector or a refracting lens. Under the ideal conditions of the light emanating from a point and the lens or reflector being perfect, the actions of a lens and a parabolic reflector are as shown in Figs. 1 and 2 respectively.

Figs. 3 and 4 show respectively the actions of a light source of appreciable size on a lens and a parabolic reflector. A cone of light strikes each small surface of the lens or reflector and is reflected or refracted as a cone of light, the angle of divergence of which is exactly equal to the angle subtended by the light source itself. The effect of focal length upon the angle of divergence of a beam is shown in Figs. 5 and 6, which represent two parabolic reflectors of equal diameters but different focal lengths.

The intensity of illumination given by any headlight depends upon the following: Concentration of the primary light sources at the focal point of the lens or reflector; shape and condition of the reflecting or refracting medium, and candle-power of the light source.

Figs. 7 and 8 illustrate the effect of concentration of the light source. These represent two reflectors of equal diameter and focal length, but in one case a small light source is used, resulting in a narrow beam of light, while in the other the large light source produces a beam of considerable divergence.

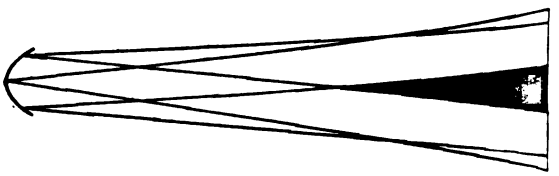

FIG. 9—DIAGRAM SHOWING CONCENTRATION AND DIFFUSION OF LIGHT RAYS BY REFLECTOR

If the reflector is tarnished or the lens is dirty light which would otherwise be transmitted is absorbed. If the reflector or lens is not true, the beam will be more divergent and of less intensity. It is also perfectly obvious that if the reflectors are equal in efficiency and have the same dimensions, the higher the intensity of the light source the higher will be the intensity of the projected beam.

Fig. 9 shows how the entire beam of a headlight is made up. The center of the reflector is the most inefficient part, while the main beam (the shaded section), which is useful for long-range illumination comes from the outer portions of the reflector. If it is desired to use a combination lens and reflector a spherical reflector should be used.

MERITS OF DIFFERENT REFLECTORS

From the standpoint of efficiency for light projection, reflectors can be arranged in the following order, that having the highest coefficient of reflection being placed at the top of the list: Silver-plated copper, clear plate-glass mirror, canary glass mirror, nickel-plated copper and polished aluminum.

The coefficient of reflection, however, is not the only element to be considered in selecting a reflector. The following order is that of relative permanency of reflecting surface: Clear glass and canary glass, nickel-plated copper, silver-plated copper and polished aluminum.

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Arranged in order of initial cost the list appears thus: Polished aluminum, nickel-plated copper, silver-plated copper, clear glass and canary glass.

MERITS OF DIFFERENT TYPES OF LENSES

There are three types of semaphore lenses which are used in headlights, for the most part in connection with luminous-arc headlights. So far as I know no carbon-arc headlight is in use to-day with anything but a parabolic reflector. The three types are optical semaphore, or "bull's-eye," inverted semaphore, and "spreadlite."

When the optical semaphore lens is used with ordinary luminous-arc headlights, the horizontal spread of the beam is 2½ ft. per hundred. It produces a long, narrow beam of light ideally adapted for cars operating at very high speeds on straight rights-of-way, but the wandering of the beam, due to the travel in the arc, is more pronounced than with other types of lenses.

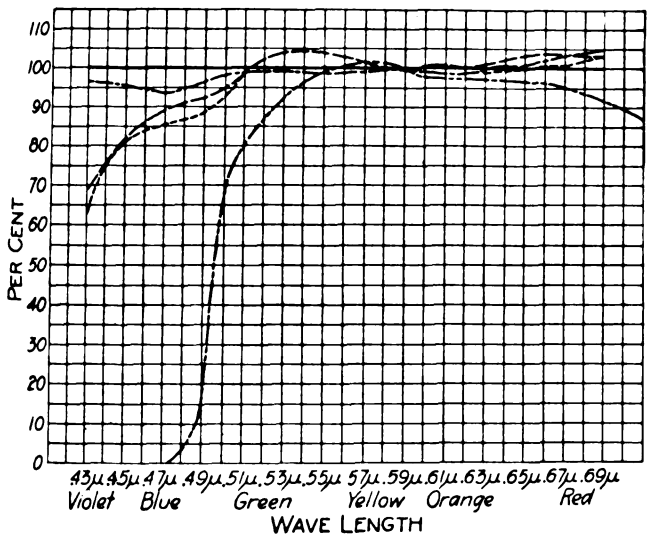

FIG. 10—CURVES SHOWING COLOR VALUES OF SEVERAL HEADLIGHTS

Since the facets of the lenses are on the side nearest the arc, a lens of this type is somewhat more difficult to clean than one of the inverted or the "spreadlite" type.

The inverted semaphore lens is very widely used, since it produces a beam of light slightly wider than the optical semaphore lens. The horizontal spread of the beam is about 6 ft. per hundred, and is adapted to high-speed roads where the right-of-way is somewhat crooked. It affords ample protection to the car and illuminates not only the track, but to a certain extent illuminates the entire right-of-way. Owing to the somewhat greater spread, the inverted lens will not project the light as far down the track as will the optical semaphore lens. Since the facets of the lens are on the outside and a smooth surface is next to the arc, the lens is more easily cleaned.

Where there is a demand for a semaphore lens to throw a very wide beam of light, the "spreadlite" lens is available. The horizontal spread of the beam is made 26 ft. per hundred, but that in the vertical direction is not changed. A lens of this type is particularly adapted to cars that operate at moderate rates of speed on very crooked rights-of-way with numerous intersecting highways. It is also easily cleaned.

FOCUSING

In all headlights it is of the utmost importance that the primary light source shall be located as near the focal point of the reflector as possible. To illustrate this a test was made by L. C. Porter (see *Proceedings* I. E. S., 1915), using a 6-volt, 36-watt, focus-type Mazda lamp in a reflector of 16-in. diameter and 3-in. focus. With the lamp 1/16 in. ahead of the focal point, the intensity of the beam was reduced to 54 per cent of the original intensity, while with the lamp ⅛ in. ahead the intensity was reduced to 34 per cent and at ¼ in. ahead it was only 6 per cent of what it would have been if the filament had been located at the exact focal point. In ordinary railway work it is impracticable to use light sources of the small dimensions of that used in the test, so that the case above cited is somewhat exaggerated, but it serves to bring out the general principle clearly.

Another example will serve to illustrate the effect of filament concentration on the apparent beam candle-power of the headlight. Five incandescent lamps were manufactured, each having the same candle-power, but with the filament wound in different sizes. Using the same reflector with the five lamps in turn the results tabulated below were obtained.

	Relative intensity in center of the beam
240-volt carbon, regular filament	1
240-volt carbon, stereopticon	2
120-volt carbon, stereopticon	5
40-volt Mazda, focus type	12
6-volt Mazda, focus type	60

YELLOW LIGHT

There is much discussion at present as to the value of yellow light. The sum and substance of all of the papers so far presented has been a conglomerate mass of conflicting and personal opinions. At this time there is no absolutely authoritative information on the subject. It must be borne in mind that the subject of yellow light for headlight work is not the same as yellow light for general illumination.

Fig. 10 shows a set of spectrophometric curves made by the Electrical Testing Laboratories, New York, which represents the color value of several headlights. These are all compared with the same 100 per cent standard, a 56-watt focus-type Mazda vacuum lamp. The dot-and-dash curve is for an ordinary crystal glass mirror reflector. The short-dash curve and the long-dash curve are for samples of uranium or canary glass reflectors of different manufacture. These curves are practically coincident. The other curve is an analysis of a piece of "Noglare" glass. Evidently if a real yellow light is wanted this glass will produce it.

I have made many tests of various headlights which produce yellow light, but find no reduction in glare except that directly traceable to the lesser intensity of the headlight, due to the absorption of the glass. So far as my tests are concerned I cannot find that there is any basis for the claim that a light of this characteristic will penetrate fog, dust, smoke or mist to any greater degree than will a white light of equal intensity. There is this about yellow light which appears to be advantageous, and that is, when driving a car through a rainstorm or a heavy fog, the diffractive halation or back glare is somewhat reduced. There are, however, no scientific data on this point.

On this subject the manufacturers of headlights must look to the operating men for definite data. Several manufacturers are putting out headlights with uranium glass reflectors or a combination clear reflector and yellow front glass in response to a demand of the railways. In a matter of this kind any elaborate theory which may be evolved may or may not hold good under actual operating conditions, and the question can only be settled by the co-operation of the railways and headlight manufacturers.

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How to Improve Public Relations*

The Matter Is in the Hands of the Company Management and Employees—The Ten Basic Principles Enunciated

BY F. R. COATES
President Toledo Railways & Light Company

SERVING the public is a problem that is always uppermost in the mind of the public utility operator. It is a complex study that requires the deepest thought. The average patron of the street railway system knows the company by the men with whom he comes in contact, namely, the motormen and conductors. They are makers of public sentiment toward the company. If the employees are honest, courteous, neat in appearance and always on the alert to look after the safety of the patrons, it is an axiomatic fact that that company will be in high standing in the its community.

The critic might say: "How about the public policy of the company affecting the employees?" The reply is, those organizations, if there are any, which have an antagonistic policy toward the public, do not have such a class of men as those just described. The reason is that the tendency will be that this ill-feeling will permeate through the different members of any organization with the consequent abuses that will go with it.

Public sentiment should be molded in the board of directors' room of each and every company.

It is immaterial whether one is selling newspapers on the streets or selling street railway transportation, the thought always to be borne in mind is—serve your customers in the best possible manner.

There has been in the recent past a decidedly unfriendly feeling by the public toward public utilities in general. "Isms" of all kinds have been advocated, but these explosions of the dreamers are getting less frequent, sentiment in this direction is returning to normal and in a great many cases to actual boosting for the utility.

There must have been a reasonable cause for this. This condition of the public mind was created originally by the feeling generated by certain kinds of people who can see no good in anything or anybody and are destroyers of things tangible and intangible. The tendency of human nature is to fight back, and in a number of instances in the past, policies have been put into effect by corporations that were to a great extent interpreted by the public as indicating a rupture of the friendly feeling that had previously existed.

Some companies fought this "ismatic" enemy with consideration and forethought. They plodded along, always serving the community to the best of their ability, and others, seeing confidence being restored, adopted the same tactics. To-day we see the pendulum swinging the other way. The corporation is being treated more nearly as it should be and both sides are the gainers.

Suspicion has been the undoing of a great many beings and corporations. The root of all antagonism to the utility is suspicion. Remove this, and we have more idealistic fields of labor. To accomplish the desired result, the public must be taken into our confidence. Keep them advised in advance of all contemplated improvements, methods of operation, etc. If objections are raised, hold conferences with your public and listen to their opinions pro and con, always remembering in your final decision to do the greatest good for the greatest number.

Service is an essential element in making friends. Make certain that your schedules are adequate to care for your patrons. Constancy is a virtue. A well-maintained and regular schedule, one that is dependable, is a pleasing factor to the public.

Clean cars, up-to-date equipment are always appreciated. It may not always be possible to have equipment that is the latest model, but what you have should be neat, kept clean and well painted and always maintained at the highest degree of efficiency.

The employees should be neat in appearance, polite and courteous. A smile at the front end of the car and one at the rear end, as the conductor collects the fares, are well worth while. Pause a moment to think how a "Thank you" is appreciated as one pays his or her fare.

If the employee notices a passenger acting contrary to the rules of the company, have him explain the situation in an agreeable manner instead of gruffly advising the patron of the fact. In order to secure these results, courtesy and politeness must be practised by the officers in dealing with their subordinates. In personal talks, in telephonic communications, in written correspondence, the same politeness should prevail, and it should be of the highest order. Many a friend is lost to the company by an officer or other representative answering curtly and gruffly on a telephone. Always take the time, in a pleasant voice, to explain in detail any misunderstanding.

Volumes could be written on this subject, but it all simmers down to a few basic principles, which are herewith enumerated:

1. A kind word quietly spoken will make friends.
2. Take the public into your confidence and lay all your cards on the table face up.
3. Give service that is everything that the word implies.
4. Treat your employees and the public as you would want to be treated yourself.
5. Remember we are all human and likely to err. Be patient in your dealings with everyone.
6. Keep your property maintained as nearly as possible to 100 per cent standard.
7. Corporation officers should become connected with all bodies in their community that tend toward civic uplift. Be an active member. Do your share of the work. Do not hesitate to let the public know you. Be one of them.
8. The corporation office should be devoid of red tape. The company representative should always keep his door open to the public.
9. Do not keep callers at your office waiting too long before attending to them.
10. Keep your promises. Do not make any that cannot be kept.

Always remember that you will do more toward furthering the public relations of your corporation if at all times you carry out, in its strictest sense, the motto, "He profits most who serves best."

*Abstract of paper read at Toledo meeting of C. E. R. A., Nov. 23-24, 1916.

Experiments conducted at the Engineering Experiment Station of the University of Illinois have established a relationship between the ash content of bituminous coal and its specific gravity which makes possible rapid estimation of the ash and moisture content. These tests have also shown that a knowledge of the specific gravity of coal simplifies the problems of estimating tonnages underground and in storage, and of determining the adaptability of coal to treatment by the washing process. The experiments were made by M. L. Nebel and the results are published as Bulletin No. 89 of the Engineering Experiment Station.

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A Belgian Engineer's Ideas of Heavy Electric Traction in America

Recently Returned from an Inspection of Important Electrifications in the United States, Prof. J. Carlier, of the Faculty of the University of Liége, States That High-Tension Direct Current Is Now Leading and Compares It with Single Phase

JOSEPH CARLIER, assistant professor of railways at the University of Liége, Belgium, recently returned to England from a trip through the United States, where he studied particularly the progress of steam railroad electrification. He has contributed his impressions to *La Lumière Electrique*, Paris, in the form of an article under the caption "Single-Phase Traction and High-Tension Continuous-Current Traction." This contains the results of conferences with a number of railway engineers and observation of several steam railroad electrifications. His comments upon the tendencies in this country are, therefore, based upon first-hand information.

"MONOPHASISTES ET CONTINUISTES"

Referring to the difficulties which American engineers have had to meet in applying electric traction on steam roads, Professor Carlier says that the American engineer knows perfectly well that each time he embarks on a new enterprise uncertainties must be expected, but he is not discouraged by difficulties and solves his problems one by one. As examples the professor cites some of the difficulties which have been met in developing the single-phase system. He refers humorously to the division of opinion among American engineers as to the best system, denominating the extremists on one hand as "monophasistes" and on the other "continuistes." He says that we must admit with the former that excellent progress has been made in reducing the weight of single-phase equipment and in making it flexible. For example, it has been possible to operate three-phase and d.c. motors from a single phase line. This, however, results in greater complication, and the sole advantages which a combined system yields as compared with the high-tension d.c. system are that a line voltage higher than 5000 can be used and dynamic substations are unnecessary. On the other hand in most cases there is no economic advantage in having a very high line voltage and the mercury vapor converter promises simplification of substations to the advantage of the d.c. system.

ELECTRIFICATION SYSTEM ECONOMICS

Taking up the general situation, Professor Carlier says that while the two systems of traction are in use and developing in this country the high-tension d.c. system is making most rapid progress for two reasons. The first is the preference of engineers connected with the companies, and the second is the matter of relative total expense. The last-named item, however, has less weight than in Europe. The American railway man is primarily concerned in developing traffic and he is not so much concerned with the cost of the motive power. In his mind the essentials are to secure simplicity and low capital cost. The consumption of coal or electrical energy in the locomotives is secondary. An example of this is seen in the lack of compound steam locomotives, the powerful ones of the Pacific type of the Pennsylvania Railroad having but two cylinders. While it is true that coal is cheap in the United States, on the other hand labor is expensive, and it is the latter which particularly concerns the engineer. The result of this state of things, which may change later with increase in the price of coal, is that the greater consumption of electric energy in the single-phase system as compared with the d.c. system does not interest the American engineer to the same extent as it does those in European countries. On the other hand he appreciates the greater simplicity of the equipment as a whole and the non-existence of dynamic substations which require constant attendance. His attitude toward the single-phase system for long-distance lines is sympathetic because its principal advantages lie in the net cost factors which interest him most.

Summarizing the qualities of single phase as compared with direct current, Professor Carlier gives the following: the energy consumption is greater; there is less labor required (in substations); it is simpler, and the required investment is less. But when the traffic is considerable the extra expense of electrical energy exceeds the reduction in capital and labor cost, to the extent that the advantage rests with the direct current. Since high-tension direct current (3000 to 5000 volts) has become practicable the single phase has less interest. It is significant that the Westinghouse Company, which has virtually monopolized the single phase, has for more than a year been experimenting with 5000 volts direct current, from substations equipped with mercury vapor rectifiers.

SINGLE PHASE STILL ACTIVE

The two systems operate very well in the United States and in spite of special difficulties which the New Haven Railroad, the first important single-phase electrification, encountered in the early years, there appear now to be no special operating difficulties. The Philadelphia-Paoli line has shown very regular operation. That the single phase still enjoys great favor is evident from the fact that the Pennsylvania Railroad is planning to electrify a section of its main line between Altoona and Pittsburgh at 11,000 volts single phase, with an overhead contact line similar to that between Paoli and Philadelphia. This part of the line is quite broken and it carries an important freight and passenger traffic. Increase in capacity of the line rather than economy in cost is sought in this case. This railroad is also considering the electrification of the New York-Philadelphia line at 11,000 volts. The New York terminal of this has been electrified since 1900 at 600 volts direct current, with third-rail, and has operated admirably.

ADAPTABILITY OF ELECTRIFICATION

Professor Carlier considers that the Pennsylvania Railroad, which is considered as in the forefront of progress, has taken up the electrification problem resolutely. He quotes J. T. Wallis, general superintendent of motive power, to the effect that while electric traction on heavy lines is still in the experimental stage, the systems available are in such a state that there is

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no risk in adopting them for a period of twenty years at least. The Pennsylvania does not consider its selections final, but expects to apply the latest developments in electric traction.. Professor Carlier points out further that progress is to be expected, but it would be ridiculous to delay electrification until the realization of this progress, for the same situation exists and has existed with respect to the steam locomotive.

The selection of contact system, overhead line or third-rail, and form of current (he evidently eliminates consideration of three phase) is a perfectly simple problem and there are numerous solutions. It is possible to pass from one form of current to another and from one kind of contact system to another, as in the case of the New Haven operation into the New York Central terminal in New York. In the future it will be necessary to remodel an existing steam road electrification from time to time, introducing new types of rolling stock and contact system and changing the form of current. Electrical equipment is well adapted to this process.

MERITS OF HIGH-TENSION DIRECT CURRENT

Summing up the situation the professor admits that the reliability of the systems of electric traction in present use is such that the future holds great possibilities. In the light of the experience with the traction systems in use in the United States and in Europe, for railroad lines now operated by steam and approaching the limits of capacity and which are not of considerable length, the direct-current system at high tension (3000 volts or even 5000 volts) with aerial equipment is most economical. The General Electric Company has equipped in the United States a number of lines with direct current at high tension, including an important road which has been operating regularly at 3000 volts for many months.

While it is true that the high voltage has its place, it is also true that the more intense the traffic the lower can the voltage be. Thus for underground roads in cities, with close headways, the use of third-rail with the moderate voltage of 600 is quite economical. But to the extent that the distance increases and at the same time the traffic diminishes, the contact line voltage must be raised. If the traffic becomes comparatively light, the advantage of very high tension, and therefore of single phase, appears.

Between the two limits of contact line voltage, 600 and 11,000, there is an economically mean tension corresponding to a traffic sufficiently intense on relatively short lines, namely, 3000 volts to 5000 volts, permitting the use of direct current with all of its inherent advantages.

THIRD RAIL AND AERIAL LINE

Third rail electrification of the New York Central Railroad (32.3 miles) and of the Pennsylvania Railroad at New York (9 miles), as well as of the subways, the Hudson & Manhattan Railroad and the elevated railroads in New York has been successful for many years. We must look also to the electrification over long distances with third-rail at higher tension, 2400 volts. Up to the present this line of development has not progressed very far, but such progress is desirable, and great improvement must be made in the future in this direction.

Unfortunately the economical voltage is not always compatible with the use of third-rail. Under these conditions, in spite of the sentiment of the railroad engineer for a system in which there is no clumsy and complicated superstructure, he must accept the aerial equipment. In time the third-rail with 2400 volts and even 3000 volts will become practical, but to use third-rail at this tension economically, a certain density of traffic will be necessary. It should be added also that in certain installations, such, for example, as that of the Philadelphia-Paoli line, the overhead construction has been made more sightly than that of previous installations through the use of cross supports and posts which are comparatively light while still sufficiently strong. The railroad engineer is thus partially satisfied.

It should be emphasized, however, that both high-tension direct current and 11,000 volts single phase are entirely practical and operate with entire reliability. While the former seems to be in more favor, the single-phase system is still developing, although, as explained, the trend of progress tends to render competition with the direct current more difficult.

MECHANICAL FEATURES OF ROLLING STOCK

In the United States the locomotives most favored are those with jackshafts geared to the motors or connected with them by rods and cranks. The Pennsylvania Railroad has combined these drives in a locomotive for heavy freight train service from Altoona toward East Pittsburgh. This locomotive consists of two similar units each with three driving axles connected to a jackshaft, which in turn is driven by two motors through connecting rods. Between the electric motors and the jackshaft is an elastic coupling containing powerful springs which absorb in part the variations in the driving force.

The locomotives used at the Pennsylvania Railroad terminal in New York, from Manhattan Transfer to New York, contain jackshafts driven by the motors through connecting rods and cranks. They are very stable at high speeds, and Professor Carlier was able to state from personal recent observation that the stability and other operating characteristics were absolutely perfect at a mean speed, including starting and stopping, of 45 m.p.h. and a maximum speed of nearly 70 m.p.h. The railroad management is justly proud of these locomotives, which, it appears, are also able to operate on long runs satisfactorily. However, there is as yet little experience along the latter line and further information as to the durability of electric locomotives on long runs at high speed is desirable.

The New York Central locomotive with motors mounted directly on the axles, and the New Haven locomotive with motors driving the wheels through elastic couplings are giving regular service with important trains. It seems, however, that the New York Central plan with armatures mounted directly on the axles requires a track perfectly constructed and maintained, a condition which appears to exist on the electrified section between New York and Harmon. Nevertheless this installation furnishes valuable data for reference, and it must be admitted from an inspection of the motors after long use that they have surprising mechanical as well as electrical qualities. This example, however, has not been followed by other companies. In this arrangement the center of gravity of the locomotive is low with a corresponding tendency to strain the track, and the gyroscopic effort developed on sharp curves at high speed is apt to produce a reaction inimical to the stability of the railway.

In the United States the tendency on the whole is to use multiple-unit cars when possible, wherein the motor equipments are arranged under the cars to provide the maximum passenger space. Locomotives are only employed for through trains and freight trains. There is as yet little experience with these cars at high speeds, say 75 m.p.h., or more on long runs. The use of steel passenger cars is extending very rapidly. In the case

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of motor cars this has been brought about to secure absolute insurance against fire.

SUMMARY AND CONCLUSIONS

In Professor Carlier's opinion we shall see in the United States before many years the electrification of a truly high-speed line with heavy traffic on which the electric locomotive and also possibly the multiple-unit car will be subjected to speeds of 75 m.p.h. or more for an hour or two. The Pennsylvania Railroad, always in the forefront of progress, seems to desire to undertake an electrification of this kind on the New York-Philadelphia Line.

Summing up in résumé the results of his observations in the United States, Professor Carlier says that this country affords abundant and instructive examples of the electrification of railroad lines in which complete success has been achieved. It is important for European countries to investigate these, although to copy directly the practice in this country is not advisable. It is necessary intelligently to adapt American systems and methods to European conditions. The choice of system with all of its possible variety must depend upon the numerous and complicated characteristics of the railroad to be electrified.

The Future of the Street Railway

New England Street Railway Club Hears Address on Regulation, Valuation, Fares, Public Relations and Other Future Factors

AT a meeting of the New England Street Railway Club in Boston, Mass., on Nov. 23, with President C. V. Wood in the chair, Edwin F. Jones, counsel Manchester Traction, Light & Power Company and allied electric railways recently concerned in fare increase proceedings before the New Hampshire Public Service Commission, delivered an address on "The Future of the Street Railway," which was received with unusual enthusiasm. After a comprehensive survey of street railway development, the penalties of early overconstruction and financial mistakes, the influence of electrification upon traction expansion and the increasing demands of the public, Mr. Jones took up the points of regulation, valuation, fare units, tax abatements and jitney competition.

THE FUTURE OF REGULATION

Regulation, in Mr. Jones' opinion, is probably more essential to the future welfare of public utilities than to the public itself, for it includes governmental protection to the properties and to the securities issued under public authority. Provided good judgment has been used in selecting the locality in which to operate and the community has need of the company's service, the security holder of the future under regulation may rely upon the fact that in the end such charge for the service rendered as will make his investment reasonably profitable will be sanctioned by the authorities. A commission cannot under the law authorize a stock issue by a street railway for money actually invested in the plant and then afterward refuse the company the right to charge such a fare as will assure a reasonable dividend upon that stock. The necessary increases in fare may come step by step, one at a time, but in the end the desired result is bound to be attained. Utilities, Mr. Jones said, must realize that the public service commissioners generally represent the average public opinion, and that they desire to be fair to the companies as well as the public. If they make mistakes in the law, the courts will afford a remedy.

Mr. Jones stated that the determination of the value of the property devoted to the service of the public is the first and fundamental requirement for future business. Every street railway ought immediately to welcome and prepare for the official determination of the value of its property devoted to the use of the public. Fares cannot be raised on any road until the supervising commission is satisfied that the increase is necessary to afford a reasonable return upon the value of the property after the payment of all allowed charges against revenues. A certain value is better for the security holder than a higher estimated one. When once fixed by a commission, the valuation is not likely to be reduced, as under official regulation provision for renewals will be required and all future additions will perforce be accurately recorded. In future rate hearings or in refinancing, therefore, the difficulties of the present situation will be avoided. To Mr. Jones' view it would be better for the business to start over with a clean balance sheet approved by the public authorities to be used as a basis for all future operations. It would be better to have securities scaled and be able to charge rates which would give at least a 6 per cent dividend, whose permanence might be relied upon, than to go on with existing uncertainties as to value and income. A small certainty is a better basis for business than a doubtful proposition of estimated but undetermined larger value.

SEVEN AND EIGHT-CENT FARES ARE PRACTICABLE

The public, Mr. Jones averred, ought constantly to be reminded of the advantages that American street railways afford as compared with those in foreign countries. The length of ride for a single fare, the system of free transfers, the speed of the cars and the higher wages paid should all be kept constantly in the public mind by judicious advertising or otherwise. More important than almost anything else, the public must be taught that there is nothing sacred about a 5-cent fare. A 6-cent fare is just as pure, just as holy, if the investment needs of the railway warrant the increase. Since the recent increases from 5 cents to 7 cents and 8 cents were granted on lines outlying the Manchester and Nashua districts, the public has seemed to ride as freely as before and no great complaint has been registered. With the great rises in wages and in operating and construction costs generally, street railways are justified in raising the selling price of their product. Every increase thus authorized will help in every other application for the approval of fare increases. The public, Mr. Jones believes, will be reasonable when all the facts are before it.

BETTER PUBLIC RELATIONS SUPREMELY IMPORTANT

Continuing, Mr. Jones stated that every effort ought to be made by street railway managers to mold public opinion so that some of the undue burdens and restrictions now imposed by law may be eliminated. There is no fairness, for example, in requiring an electric railway to maintain street paving between its tracks and for a distance of 18 in. on either side. The reason for the requirement vanished with horse cars. Besides, a street railway pays its proper proportion of the cost of building and maintaining highways when it pays its taxes.

Moreover, the unjust and damaging competition of jitneys must be curtailed if street railways are to have a cheerful future. Here again only a change of public opinion can bring due relief. The public must be made to realize that within the last twenty-five years street railways have been one of the greatest factors

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in the growth and improvement of American cities, and that future growth is in large measure dependent upon street railway extensions. Jitneys should be made common carriers and subjected to the same public regulation as other agencies of local or inter-community transportation. Bonding against accidents is equally essential. Unless properly regulated, jitneys are a very serious menace to the street railways, and public opinion should be turned toward the inevitable results which will follow to both the railway and the community welfare if regulation is not imposed.

Regardless of protective laws, however, the greatest and most important thing for the present and for the future, in Mr. Jones' estimation, is to increase the number of passengers carried on street railways. If this cannot be done by bringing the service to the highest state of efficiency and keeping it there, it cannot be done at all. Each successful company must have a pleased clientele, a satisfied lot of regular patrons who will recognize the needs of the railway and the advantages which the railway affords to the community.

The co-operation of organized employees in securing jitney legislation may be a great help in meeting that particular problem. Employees must be so treated that they will be satisfied and loyal and that by their conduct and manners they will attract and not repel the public. Wages and general conditions must be such as to attract and retain a superior class of employees. The necessary increase in operating cost due to such conditions will be recognized when fares are regulated.

Fair treatment of claimants, also—prompt adjustment of cases where the liability of the railway is clear and generous compromise where it is doubtful—will bring better results than the policy of the old-fashioned claim agent who always denied liability and took every advantage in making settlements. Companies should always be ready to fight to the finish, however, claims which are known to be unfair or faked. Nearly everyone in a town knows about the verdicts which juries award against street railways, for the newspapers publish them prominently. Such involuntary advertising ought to be reduced to a minimum and few cases should actually be sent to a jury unless a defendant's verdict may confidently be expected. The less notoriety there is about the handling of the claims department the better.

Safety Cars and Accident Claims Occupy Attention of I. E. R. A.

Higher Wages and Better Service Result from a Complete One-Man Car Installation on One Fort Worth Line—Waterloo Installation Also Successful—Harmony and Co-operation Keynote of Addresses on Claims

ONE of the principal features of the Nov. 28 meeting of the Illinois Electric Railway Association, held at the Hotel Sherman, Chicago, was the address by Samuel Insull on the subject of "Economies in Power Supply" which was made at the noon luncheon. This appears on another page in this issue. Aside from this address, the association devoted the one-day meeting to the subject of the operation of one-man cars at the forenoon session and to a discussion of personal injury and damage claims at the afternoon session. Two valuable papers, by Carl Beck, Westinghouse Traction Brake Company, St. Louis, Mo., and C. D. Cass, general manager Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, respectively, were read on the first subject and the latter was presented by address. Abstracts of these papers will appear in a later issue. The meeting was presided over by President J. R. Blackhall, general manager of the Chicago & Joliet Electric Railway, and there were about 100 in attendance at the luncheon to hear Mr. Insull, and about fifty at the other sessions.

At the end of his paper, Mr. Beck gave some figures to show the results of operating one-man cars on one line in Fort Worth. During the first twenty days in November, 1916, the total number of passengers hauled was 90,600; while for the first twenty days in October, 1916, with two-man cars the number was 78,000, and for the first twenty days in November, 1915, 75,000. In the first comparison the increase was 13.2 per cent and in the latter 20.6 per cent. The car-miles operated with the one-man cars was an increase of 54.3 per cent over that with the two-man cars. The receipts per car-mile showed a decrease of 23.4 per cent but the cash received, exclusive of tickets, showed an increase of 22.2 per cent for the twenty days in November over the similar period in October, and 22.3 per cent over the first twenty days of November last year. The figures covered a period long enough to show that the increased riding was not due to curiosity seekers, but rather to the fact that automobile owners were induced by the frequent service to use the street cars instead of their own automobiles or the jitneys to go down town.

The papers by Messrs. Cass and Beck were both read and then discussed jointly. President Blackhall was interested to know if much trouble had been experienced in placing the one-man cars in operation and whether or not the car men were organized in Waterloo. The question was also asked as to whether or not more money was paid to the men.

Mr. Cass answered that the men on his property were not organized and that some trouble was experienced in placing the cars in operation, due principally to the fact that a municipal election was in progress at the time and the new cars gave the politicians a good talking point. The company had considered paying the men more money, but finally had decided not to do so, and as a larger number of cars were placed in operation, none of the men were displaced. He said the men preferred the two-man car because it was natural for men to get out of as much work as possible. Mr. Cass also pointed out that at the present time the American Federation of Labor is actively at work in Iowa in an attempt to get a State law against the use of one-man cars and that this may be one of the serious problems in connection with their use.

F. E. Fisher, general superintendent Chicago, Ottawa & Peoria Railway, noted that the two papers differed as regards the schedule speed, this having been improved in Fort Worth and made slower in Waterloo. This was explained by Mr. Cass as being due to the fact that the

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Fort Worth cars were of the very latest type, while those in Waterloo were equipped with manually operated brakes and doors. This had made it necessary to add a few minutes to the schedule to give the men time to make out their reports.

Mr. Beck said that the higher schedule speed with the one-man cars in Fort Worth was partly due to the high rate of acceleration and braking of the new cars, but that the principal advantage had been realized through the more frequent service which had made necessary the handling of fewer people at each stop.

The matter of wages, he said, had not been settled in Fort Worth and thought that some companies might feel that the Fort Worth company had too broad a view on the subject. Upon putting the one-man cars in operation they had increased the wages 2 cents an hour, but now felt, after having seen the possibilities for operating economies, through the use of these cars, that they could afford to go still further. They analyzed the question by noting that the seniority men were always anxious for the longer runs, because of the greater compensation from them and had concluded to put the men on a ten-hour-a-day basis as beginners, and arrange enough increase in wages to give the men the same wages they now receive for twelve to fourteen hours' work. Future laws may force them to go to eight hours a day labor schedule, but they feel that the economy of the one-man car will still take care of this. They are willing to divide the increased net returns in three ways; giving the men their share, thus making them glad to operate the one-man cars, and giving the people better service and the company better returns.

In regard to the acceptance of the one-man cars by the public, Mr. Beck said that after they had been operated on the one line for a few days, rumors were circulated that the company was planning to extend the system to other lines and the officials began to get suggestions from individuals to put these cars on their particular lines. Later these suggestions became direct requests and came in by letter and personal visits to such an extent that the officials made the remark tnat they wished they had fifty cars to put in operation. Mr. Beck said that the officials of the Houston (Tex.) property had made a visit to see the Fort Worth cars in operation, and although they had previously been skeptical, after seeing them in operation and how the people accepted them, that they were now planning to place an order for fifteen.

Mr. Fisher also called attention to the disagreement of the two papers, one advocating small platforms and the other large. Mr. Cass answered that in his own case, the narrow platform had been the cause of greatest complaint on the part of the public, but said that they were really trying to find something to complain about, as this was just at the time of a municipal election. They made no objection to the two-man cars with similar platforms which necessitated that passengers wait for others to get off before they could get on. It had also been his observation in other places, where the one-man cars are used, that the large platform facilitating loading and unloading simultaneously had been one of the features which had appealed to the public and about which they had expressed commendation.

Mr. Beck defended the narrow platform on the ground that few passengers get on at each stop owing to the frequent headway. He said he had been impressed by the tendency of the narrow passage to cause the passengers to line up and enter the car in an orderly manner and with less confusion than results with the large platform where all get on at once and cause a momentary congestion while paying fares and making change. He said with a single line of passenger movement he had noticed many times that the passenger who presented a bill or did not have exact change, would be pushed one side while the others paid the exact fare and passed on into the car; and that this had the advantage of discouraging the practice of not having the exact fare ready. On the Fort Worth cars the door opening is 30 in. with no separation or stanchion rails. He said it had been remarkable how the people had showed to a great degree a desire to promote the rapid transit which the company had inaugurated. He said he had seen a car loaded up with thirty-five passengers, every one of whom had presented the exact fare. They had also shown a tendency to be ready to get off as soon as the car came to a stop.

Address by George Whitmore

At the afternoon session George Whitmore, claims attorney Illinois Traction System, addressed the association on the organization and operation of the claim department of his company. The keynote of this talk was to point out the great value of harmony and co-operation between the claims department and the operating officials. The claim department of the Illinois Traction System is a separate organization known as the Western Illinois Accident Association, which is operated in the nature of a mutual benefit association for all the companies of the Illinois Traction System. The system of financing, which is claimed to be satisfactory and economical, is very unique and provides that each company contribute a certain per cent of its gross income to the association. This percentage varies according to the nature of business and hazards under which the various companies operate. The work of the association is directed by an executive committee and administered by a board of trustees. Payments for claims are made by draft or voucher and each claim agent carries a draft book with him for prompt settlement wherever possible. The operating officials of the company have no direct authority over the activities of the claim department, but their recommendations receive careful consideration. In this connection, Mr. Whitmore said that there was no conflict of interest, and that closest co-operation and harmony existed between the operating and claims officials.

The local general superintendents are made personally responsible for the handling of accidents and settling of claims. They generally have some man who makes out the reports and secures the details through investigation. These superintendents are authorized to pay small claims out of their operating funds and then request payment from the Western Illinois Accident Association. If large amounts are involved, they are taken out of the association direct and the case handled very largely by the general attorneys. As a result of this close working between the superintendents and the claims department, a general feeling of confidence and co-operation is fostered and a most harmonious coworking of the two departments follows.

The Western Illinois Accident Association is headed by the general claim agent who has under him four district claim agents located at Peoria, Decatur, Springfield and St. Louis. These district agents are responsible for the handling of all claims in their respective districts and keep in close touch with the operating department. For all except very important cases, they use their own best judgment in making settlement and the draft and release are forwarded to the general claim agent's office, who maintains a complete file on every accident. By this means the latter can check over the judgment of the various district agents and also guard against fraud by having the broader information available.

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It is the policy of the department to dispose of all accidents in which the company is responsible as soon as possible, for it has been its experienec that the longer a case drags out the more expensive it becomes. They aim to be absolutely fair and just and to impress on the people the fact that the company wants to be fair and just as liberal as possible.

Mr. Whitmore described the method of handling an accident. The motorman or conductor or other employee telephones the dispatcher all the details. The dispatcher telephones these to the superintendent of transportation and he telephones them on to the claim department. The train dispatcher also gives the details to the district claim agent and he makes out the written form for the general office. Finally the personal statement of the crew is taken, but in serious accidents the claim department makes this record in order to bring out all possible details.

The operating department holds schools of instruction for the trainmen at which various phases of the company's business are discussed, and every endeavor made to promote careful operation, and it is believed that great good is accomplished from this source.

ADDRESS BY CHARLES H. PEGLER

Charles H. Pegler, general attorney Aurora, Elgin & Chicago Railroad, following Mr. Whitmore, addressed the association along much the same lines, bringing out some of the details of how claim work is handled on the Aurora, Elgin & Chicago. The company is striving through safety-first work to avoid accidents as far as possible by working with both the employees and the public. One feature of the settlement of claims which Mr. Pegler had found valuable was the manner of calling train crews in after claims had been paid and letting them know just how much they cost the company. Some of these accidents which appeared very trivial to the men, in many instances surprised them greatly by the large amount required to settle, and impressed upon them the great importance of avoiding even minor accidents. They are made to feel how serious these matters are and even if they are not at fault, the case may at least serve as an important lesson.

The principal problem of the claim department is how to gain the co-operation of the public. As business grows, the dangers are increasing constantly due to the good roads which make vehicle travel faster and more dense. More than one-half of all accidents are due to collisions with vehicles and to boarding and alighting. To avoid either class requires the co-operation of the public. To this end, the company is making addresses to automobile clubs, to the school children, to the civic clubs, etc., but is somewhat limited in the extent to which it can carry on this work by the cost of flooding the country with signs and newspaper advertisements, etc., which would be very valuable.

In payment of claims, Mr. Pegler said that he always took particular pains to see to it that persons to whom claims were paid were thoroughly satisfied, as he is very anxious that they do not go away and "knock" the road and tell how the company robbed them, etc. He always informs them that unless they are perfectly satisfied with the amount, that he would much prefer to litigate the whole matter rather than to pay them any amount and have them go away dissatisfied. He always maintains a frank and truthful attitude toward these people, as the company has nothing to conceal from the public, and finds it is always best to be open and above board.

President Blackhall read a communication to the members relative to the advocation of a law requiring automobiles to come to a full stop at railroad crossings, applying more especially to unprotected country crossings. It was voted to refer this to the executive committee with instructions to mail copies of the communication to all the member companies.

President Blackhall said that in answer to the A. E. R. A. circular letter sent out regarding crossing protection and asking for suggestions, that he had suggested that a series of bumps or waves in the road surface should be placed on either side of railway crossings for about 250 ft. or more, beginning with small bumps and increasing in size near the track. He said that while this seemed like a joke in one way, that he believed it would be effective in bringing about the desired results.

H. B. Adams, safety supervisor of the Aurora, Elgin & Chicago, suggested that it would be a good thing to put a card in every garage with the following two safety admonitions: "Equip Your Automobile with Brains" and "The Best Safety Device for an Automobile is Common Sense."

Samuel Insull on Interconnecting Power Supply Systems

In I.E.R.A. Address He Recommends That Interested Associations Gather Data to Show Possible Operating Economies to Be Secured Through Co-operation

SPEAKING before the Illinois Electric Railways Association at Chicago on Nov. 28, Samuel Insull, president Commonwealth Edison Company, Chicago, said electrical people had spent energy, time and money in perfecting economical apparatus, but had neglected to some extent to study the conditions of supply through which great economies could be effected. At one time, said Mr. Insull, less energy per capita was sold in Chicago than in any other large community. But since a study has been made of methods for taking advantage of the different demands and the diversity factors of all classes of business, and since steps have been taken for the massing of production, the Commonwealth Edison Company now supplies more energy per capita than any other company in the world operating on steam power. But even with this record the company supplies only about one-third of the possible energy consumption in Chicago. Down-State companies, according to the best information available, are supplying only about one-fifth or one-fourth of the possible energy production.

The most neglected point in economic power supply is the study of conditions governing the use of electricity. Too few are taking advantage of everything to prevent duplication of investment. Too little attention has been given by most people to the seasonal diversity that exists, and there has been not enough marshalling into one vast system of distribution with the idea of preventing duplicate investment to reduce the average over-all cost per kilowatt-hour of supply.

As an example of this, two great companies, recently at swords' points, were much surprised to learn that both could make a great saving by combining their loads. They were doing approximately a $15,000,000 business, one being largely occupied with urban and the other with interurban transportation and power supply. It was learned that the peak load for one came in the forenoon while the peak of the other occurred in the afternoon. There was a duplication of equipment to the extent of 8000 to 10,000 kw. capacity, and each was striving to get business to enable it to pay interest on this investment, when, by combining the loads, the investment which served one in the forenoon could easily serve the other in the afternoon.

In seeking to obtain data on such conditions the use

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of instruments of precision is very necessary. A few years ago these were not available and men in the industry had only a hazy idea of the maximum requirements of any business and the time in which the maximum occurred. Instruments now record not only the maximum requirements, but the exact time at which the maximum occurs.

As an instance of what may be learned through studying diversity, Mr. Insull told of a community around Wilson Avenue, Chicago, in which the inhabitants were all in about the same class, with approximately the same habits, and same buying power. In one block, with 200 possible customers, the separate demand of each showed an average load factor of about 5 per cent. As a group, however, the load factor, as the result of diversity, was about 20 per cent. Adding the other blocks in the neighborhood containing stores, picture shows, etc., the result showed a neighborhood load factor of about 30 per cent. Going still further into the situation it was shown that the maximum demand of the neighborhood as a whole occurred at about 8 o'clock in the evening, while the company's peak occurred at about 4.35 p. m.

Considering supplying energy on the basis of the individual 5 per cent load factor, the condition would spell bankruptcy for a company. The business at a 20 per cent load factor would put the company in the class struggling for existence, just as most companies were doing twenty-five years ago. With this business at a 30 per cent load factor the return is such as was considered ample before the wholesaling of energy became the order of the day. Under present conditions, however, this class of business grouped with industrial power, heating, railway and various industrial demands in Chicago produces a load factor of between 40 and 50 per cent. Some may think, Mr. Insull said, that these conditions apply only in Chicago, but in reality they apply just as truly to the densely settled agricultural and manufacturing territory throughout the State of Illinois, and he was confident that studies of these methods applied by one or a dozen organizations in the production and distribution of energy throughout this State, or any State east of the Mississippi River, would greatly reduce the average energy cost.

Engineers of the Insull companies are now engaged in working out a map of the transmission lines of the State of Illinois and securing as far as possible the maximum demands of the different systems and the times at which these maximums occur in order to determine the diversity between the various systems. It is not the idea that energy produced in the Illinois coal fields can be used on the northern border of the State. But if all electrical properties of the State were feeding into one vast network of transmission lines, the electricity supply companies would have contributed more to the conservation of the resources of the State than even the high-sounding promises of politicians in this direction. There would be an enormous saving in investment and in operating expenses; and if the interconnections were extended to include steam railroad supply, it would be possible to effect an economy in energy distribution that cannot be hoped for through increasing the efficiency of generating and distributing apparatus. Just now the world is being taught great lessons in marshalling the forces of men, and the producers and distributers of electrical energy should see to it that they get the greatest possible return from every dollar of investment.

Mr. Insull said he was very much interested in the production of power at Keokuk, Iowa, and in discussing the project with Messrs. Stone and Webster had ventured the statement that energy-producing enterprises of Iowa and Illinois, owing to lack of co-operation, are throwing away more energy annually than can be produced at Keokuk. He also expressed himself as anxious to secure the co-operation of the Illinois Electric Railways Association and other similar bodies in getting records for the benefit of all to show what it is possible to do by interconnecting systems.

Taking such steps means greater economy of capital, lower cost, and lower selling price. The regulatory bodies at present are most interested in low selling price. Mr. Insull said he, too, was interested in a low selling price, but believed that the time would come when regulatory commissions would be interested in a company's method of distribution as much as in its methods of financing.

In closing, Mr. Insull called attention to the possibilities, through interconnected systems, for the small-town manufacturer to purchase power at prices as good as he would be able to obtain in the large cities. This would tend to develop the small community far more rapidly than is now possible and would also arrest the concentration of population and industry in the great centers. The men of the electrical industry, co-operating to conserve the resources of the State, will be able to feel that they are doing a large share in uplifting their fellowmen and contributing to the security and prosperity of the State.

COMMUNICATION

More About the Automatic Stop

VIRGINIA RAILWAY & POWER COMPANY
RICHMOND, VA., Nov. 28, 1916.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 25, page 1121, you published an article describing the automatic car stop which we have been using for the past two years on the lines of the Virginia Railway & Power Company. I think that your readers would be interested in another fact regarding this system which probably occurred to them in reading the article, namely, that the automatic stop can also be operated very nicely in conjunction with a block signal system, in which case the switches which are used to de-energize the overhead channels would be operated by the signal semaphores.

I have also just been granted a patent covering the application of the general plan described in your article to single-truck cars or to double-truck cars not equipped with air brakes. In such cases a small reverser takes the place of the electropneumatic valve. The reverser is in circuit with the contacts on the top of the car and, when these engage the energized stationary contact, the motor connections are reversed and the motors tend to operate as short-circuited generators, bringing the car to rest. While this device has not been developed as fully as the others it has been tried out on our lines and has proved absolutely practical.

A. TAURMAN,
Superintendent of Rolling Stock.

Statistics compiled by one of the large Eastern Railway companies recently developed the fact that in the renewal of 369 miles of trolley wire of all gages from No. 0 to No. 0000, but mostly 00, the average return for the old copper was 74 per cent of the original weight of the wire.

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MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

President Boylan of the Accountants' Association Announces Committee Appointments—At the Connecticut Company Section Meeting on Nov. 14 Addresses on Timely Topics Were Made by Speakers Prominent in the Industry—Reports of Chicago and Washington Section Meetings

Accountants' Association Committee Appointments

President M. R. Boylan of the Accountants' Association has made the following appointments to date. There still remain to be completed the following: The committee to represent the Accountants' Association at the 1917 convention of the National Association of Railway Commissioners, the committee on education, the committee on passenger, express and freight accounting, and the joint committee on life of railway physical property.

Accounting Definitions—John J. Landers, York, Pa., chairman; George A. Harris, Gloversville, N. Y.; S. C. Stivers, New York, N. Y.; J. Gerry Dobbins, New York, N. Y.

Standard Classification of Accounts (standing committee)—H. L. Wilson, Boston, Mass., chairman; W. F. Ham, Washington, D. C.; W. H. Forse, Jr., Anderson, Ind.; R. N. Wallis, Fitchburg, Mass.; P. S. Young, Newark, N. J.

JOINT COMMITTEES

Claims-Accounting-Accountants' Association—H. J. Davies, Cleveland, Ohio, chairman; George B. Cade, Asbury Park, N. J.; H. S. Swift, Pittsburgh, Pa. (Claims' Association members not yet announced.)

Engineering-Accounting-Accountants' Association—F. H. Sillick, New York, N. Y., vice-chairman; B. E. Bramble, Champaign, Ill.; Charles H. Lahr, Akron, Ohio; J. C. Collins, Rochester, N. Y.; H. A. Gidney, Boston, Mass. (Engineering Association members not yet announced.)

Transportation-Accounting-Accountants' Association—A. D. Dedrick, Youngstown, Ohio, chairman; George E. Kalweit, Milwaukee, Wis.; W. O. Ingle, Rochester, N. Y. (For T. & T. Association members see ELECTRIC RAILWAY JOURNAL, issue of Nov. 25, page 1115.)

Annual Meeting of Connecticut Company Section

On Nov. 14 Section No. 7 held its annual meeting in New Haven with an attendance of 147 members and guests. The meeting was preceded by the usual dinner, both being held at the Hotel Garde. The company section orchestra played during the evening and other entertainment features were provided. The serious part of the program included the presidential address of W. J. Flickinger; an address on "County Bureaus to Encourage Agricultural Development as They Relate to the Street Railway Industry," by R. W. Perkins, president Shore Line Electric Railway; an illustrated talk on "Railway Traffic Problems," by Edward Dana, superintendent of traffic Boston Elevated Railway; a talk on "The Cost of Maintenance and Operation of Electric Railway Properties To-day Compared with a Year Ago," by L. S. Storrs, president The Connecticut Company; and remarks by C. V. Woods, president Springfield Street Railway, in the course of which he said that he hoped to install a company section on the Springfield properties some time in the future.

The result of the election of officers was as follows: W. J. Flickinger, chairman efficiency committee, president; I. A. May, comptroller; W. E. Jones, statistician, and G. H. Cresson, chief clerk treasurer's office, all re-elected, and H. L. Wales, superintendent, Waterbury, director for three years.

President Flickinger reviewed briefly the short history of the section, which was organized on Dec. 7, 1915, stating that the present membership is 240, that there have been nine meetings with an average attendance of 75 per cent of the membership, that nine papers have been presented by members and eight talks on live subjects given by men of high standing in their professions. He expressed satisfaction that the American Association committee on award of the medal for the best paper read before a company section had made honorable mention of papers prepared by H. Bates and H. N. Balfour, and said that the section hoped to give this committee a great deal more work next year in its effort to select the medal winner.

Chicago Section Hears Travelog by Claim Adjuster Scholz

The regular meeting of the Chicago Elevated Railway Company Section was held on Nov. 21 with about 100 members and visitors present. President E. J. Blair announced the appointments to the program and membership committees. An important amendment to the constitution was passed providing for the membership of the outgoing president in the executive council, to provide continuity of administration.

The speaker of the evening was A. F. Scholz, chief claim adjuster, who described a trip around the world, and illustrated his lecture by more than 200 slides from pictures mostly taken by himself.

Clarence P. King Addresses Section No. 4

At a meeting of the Washington Railway & Electric Company Section, held in Washington on Nov 25, the Electrical Week Appliance Show which begins to-day was the feature of interest. The section is to be represented in the automobile parade next Tuesday evening by a decorated car driven by William L. Clark, vice-president of the section.

The feature of the meeting was an informal address by President Clarence P. King of the Washington Railway & Electric Company, who showed how electricity is the twin brother of prosperity. Addressing the railway men he said, "Whether you occupy the position of conductor, motorman or director of the company you will play your part in the city's prosperity through your 'electrical connection,' so to speak." President J. T. Moffett of the section announced that at the regular meeting to be held on Dec. 11, Warden J. H. McKenty of the Eastern Penitentiary, Pennsylvania, would speak on "Recent Activities in Prison Reform."

In the abstract of the address delivered on Nov. 16 by ex-Senator Edmund W. Wakelee before the Public Service Railway company section, which was published in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 25, page 1095, Mr. Wakelee's name was incorrectly printed. It should have appeared as in this note.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Superintendent Montreal Tramways Traces History of Prepayment Cars in That City—Way Engineer Finds Gasoline Roller to Compare Favorably with Steam—Equipment Engineer Discusses Some Elements of the Gear Case Situation—Two Articles Treat of Recent Track Practice in Kansas City

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Rolling Subgrade with Gasoline Motor-Road Roller

The Cost of Rolling Has Proved to Be About 2 Cents Per Foot of Track

BY R. C. CRAM
Assistant Engineer Way and Structure Department
Brooklyn Rapid Transit System

While subsoil conditions in Brooklyn are generally such that the rolling of subgrade has not been considered necessary, the conditions created by various sewer failures and the many cuts made under old track structures during their life made it seem advisable to adopt the practice of rolling the subgrade in many cases. Before deciding upon the type of roller to be purchased, an investigation was made of both the small steam and

ROLLING SUBGRADE WITH GASOLINE ROLLER IN BROOKLYN

gasoline rollers with particular reference to operating and maintenance costs.

It appeared from estimates based on actual cost of operation of several similar rollers of the steam type, taken from the records of one railway company, that the gasoline machine would be the more economical. An eight-ton tandem gasoline machine was accordingly purchased from the Austin-Western Road Machinery Company of Chicago. The accompanying illustration shows the roller in operation. Its use has proved satisfactory and another one has been ordered for next season.

TABLE I—OPERATING COSTS PER DAY OF ROAD ROLLERS

	Gasoline Roller	Steam Roller
Engineer's wages	$2.75	$3.60
Coal	...	1.10
Oil and gasoline	.99	...
Oil and grease	...	.25
Watchman's wages	1.50*	1.65
Water	...	.10
Totals	$5.24	$6.70

Repair cost for steam roller was stated to be about $100 per year. There has been no repair cost in 1915 on the gasoline roller except for batteries.

*Time of watchman was included in total, although only a small part of the time of one man was required, and this is charged against the job.

TABLE II—COST OF ROLLING SUBGRADE FOR 1322 FT. OF SINGLE TRACK

Operator's labor		$19.25
Fuel and lubricants		6.94
Total		$26.19
	Cost per Foot of Track Unit, Cents	Total, Dollars
Labor:		
Moving roller to and from work	0.041	$0.55
Rolling subgrade	0.707	9.35
Detentions	0.707	9.35
Material:		
Gasoline	0.508	6.72
Lubricants	0.016	.22
Total	1.979	$26.19

The actual operating costs per day averaged for one year for a gasoline and a steam roller are given in Table I.

The cost per foot of single track for rolling subgrade is found to be about 2 cents, with no allowance for interest and depreciation of the machine, as it is indicated in the statement of rolling costs for one job, which are given in Table II. The cost included in this table covers the use of the roller under heavy operating conditions and the actual rolling time available was from 9 a. m. to 3.30 p. m. daily. This accounts for the item of detentions shown in the table which indicates time in which the machine could not be used.

Rolling Stock Progress in Montreal

Author Traces Steps in the Development of the P.A.Y.E. Car in That City from Its Origin to Date

BY A. GABOURY
Superintendent Montreal (P. Q.) Tramways

That the prepayment system has revolutionized the methods of fare collection is beyond question, and that the Montreal Tramways Company, with which the car criginated, is to-day proud of its achievement is also beyond any doubt. It feels that every operating man should have some kind thoughts for the company that through this discovery has helped him out of some of his troubles and the fact that this car is now almost universally used is some recognition of the service it has rendered.

This type of car saw the light of day in 1905 and one made its trial trip on one of our main thoroughfares, St. Catherine Street, on March 30. The first car was of the class shown on the accompanying plate, as Fig. 5. After some opposition the public was soon clamoring for cars of this type, so that they could not be built fast enough to meet the requirements. Some fifty center-entrance cars, ordinarily known here as Scotch cars, were, therefore, immediately remodeled, as shown in Fig. 4. The center entrances were closed and P.A.Y.E. devices were installed on rear and front ends.

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Evolution of Pay-as-You-Enter Cars in Montreal

(SEE ARTICLE ON PAGES 1163 AND 1165.)

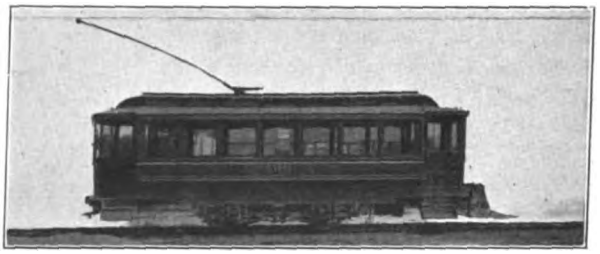

Fig. 1—Old Type Remodeled to P. A. Y. E. Type in 1905, Withdrawn from Service in 1912

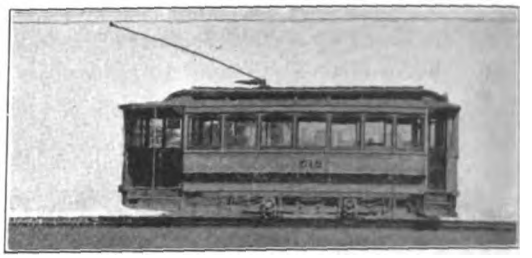

Fig. 2—In Operation from 1896 to 1900, Remodeled in 190[illegible] Withdrawn from Service in 1912

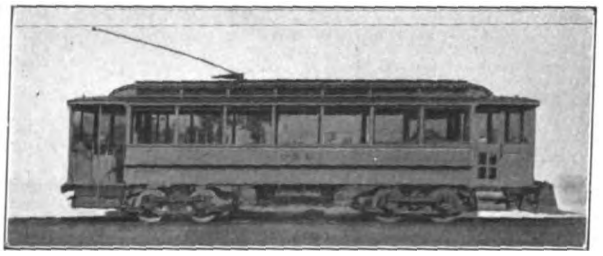

Fig. 3—Built in 1902, Remodeled in 1904

Fig. 4—Built in 1900, Remodeled in 1904

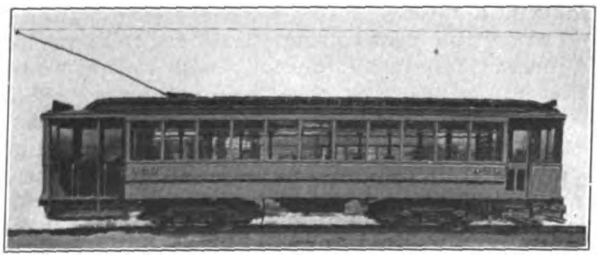

Fig. 5—Built in 1904

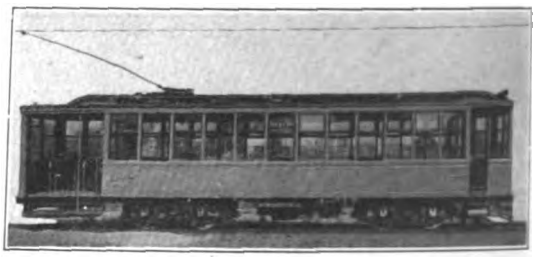

Fig. 6—Built in 1910

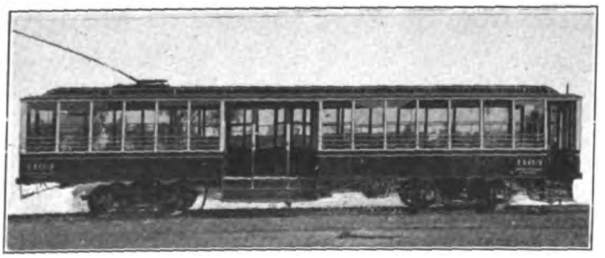

Fig. 7—Suburban Car Built in 1911

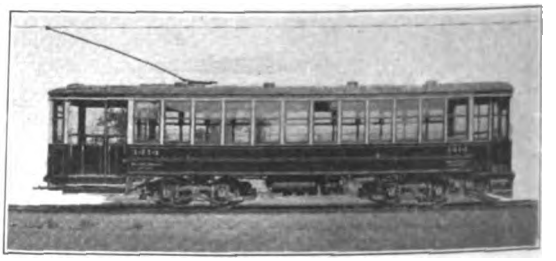

Fig. 8—Built in 1913-1914

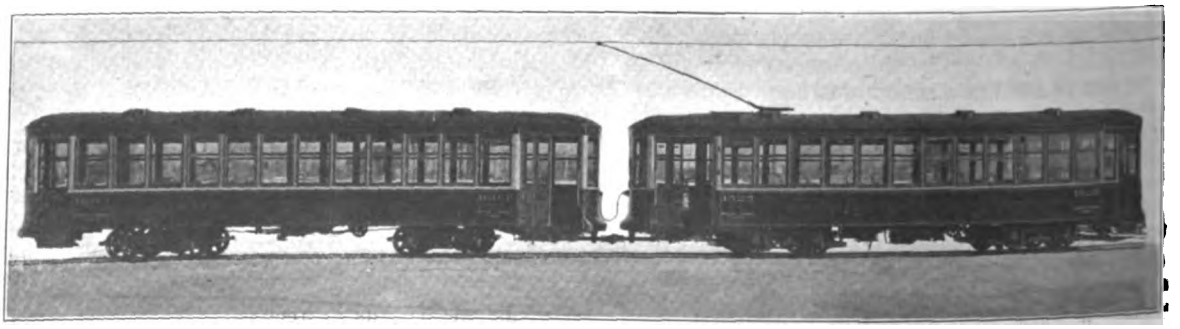

Fig. 9—Built in 1914

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Immediately after this, fifty more cars of the type shown in Fig. 3 were also remodeled, and the following year all of our single-truck cars of latest type "went through the mill." Since then they have been replaced by double-truck cars. In a very short period after the first car had made its appearance there were none but P.A.Y.E. cars to be seen in Montreal. But Montreal was expanding rapidly and the demand for cars was increasing in proportion, so that the 701-801-901 classes of cars were built and purchased, the latter two types being of steel construction. A car of the 901 class is shown as Fig. 6.

The large platform of the P.A.Y.E. car, as compared with that of the small cars, was conducive to congestion. The smokers among our patrons preferred to stand on the platform and smoke rather than be seated in comfort inside. We were confronted with a serious problem for this reason, but the city authorities came to our assistance and passed an ordinance in 1913 forbidding smoking on street cars. From that date congestion at the rear ends of our cars disappeared.

Next came the question of adopting the P.A.Y.E. system on suburban cars, where a smoking compartment was a necessity. Cars of the 1100 class, Fig. 7, were designed for this service.

Our summer-service suburban cars of the double-truck 13, 14 and 15-seat open type were also remodeled by closing up the open side, cutting an aisle through the center, closing the vestibules and adding the P.A.Y.E. devices on front and rear platforms. This removed the danger of accidents which existed on account of the running board of open cars. The cars were rendered suitable for summer service as suburban or city cars, while in the winter window sash and heaters were added.

The demand for city service continued to increase and cars of the 1300 and 1400 classes, Fig. 8, were purchased. Then came the last but not the least of our cars, those for operation in two-car trains, Fig. 9. Fifty of this type were purchased. The trains are made up of two different types of car, the motor car being of a pay-within type and the trailer of the near-side type. This gives a double-width loading platform at the point of embarkation.

Folding steps and folding doors are part of the car's equipment. These cars have been in operation for the past two years on our St. Catherine Street, a 16-mile round-trip run, and have proved decidedly popular. This is a trunk line running east and west, fed by all our cross-town lines, running through residential districts in the west end, the main shopping district in the center and residential and manufacturing districts in the east and far east.

All our cars have four-motor equipments, with 50-hp. motors. This is necessary owing to the hilly topography of the city and to the severity of our winter climate.

Rearrangement of Current Collectors for Maintenance Saving

K. L. Wilcoxon, late master mechanic of the Chicago, Lake Shore & South Bend Railway Company, recently began the rearrangement of the current collecting equipment on his passenger cars to minimize the trouble and maintenance on these parts. The passenger cars were formerly equipped with a trolley stand over each truck and a pantograph trolley in the middle of the car. One trolley stand is taken off in the rearrangement and the pantograph moved to the better position over the truck. This has a tendency to make the pantograph follow the wire in better shape. The jumper cable between trolley stands is cut out altogether, thus eliminating 65 ft. of 6600-volt cable and conduit on the roof of the car. With the position of the pantograph over the truck a much shorter air line to operate it is required, and hence it responds more readily to the air lifting and lowering, and the maintenance on one trolley stand is eliminated.

Protecting Rail Bonds from Theft

The Author Discusses the Difficulty of Preventing Theft of Long Bonds and Recommends a Certain Form of Staple for Fastening Them to Ties

BY G. H. McKELWAY
Line Engineer Brooklyn Rapid Transit System

The problem of preventing theft of unprotected cable bonds is emphasized by the present high price of copper. There are some types of bond protectors so made as to cover bonds of the shorter types but the writer has never seen any made for long bonds, and even the ones for the short bonds are not wholly satisfactory as they are bolted on with the same bolts that hold the joint plates. If they are removed to permit of repairs to the bonds the plates are loosened and cannot be made to fit as tightly to the rails as before.

The most satisfactory form of protection would appear to be the placing of the entire bond under the splice plate far enough away from the ends of the rail or the bolt holes to avoid weakening the rails, and with

No. 1 No. 2. No. 3 No. 4

TYPES OF STAPLE FOR USE IN ATTACHING LONG BONDS TO TRACK TIES

the bond long and flexible enough to prevent the breaking of the strands and the loosening of the terminals. While this type of construction may be slightly more expensive than others, the bonds so installed should last as long as the joint.

Long bonds may be installed under the joint plate, the plate being made with sufficient clearance to prevent the crushing of the bond even after long service when the plate has been drawn closer to the web of the rail than when first installed. Although few rail and joint sections will give this clearance, yet it will be found in some, including the present American Electric Railway Association standard.

Sometimes to avoid the drilling of the bond holes between the holes for the bolt holding the joints, or to render easier the renewal of defective bonds without disturbing the plates, long bonds are installed under joint plates with the terminals outside. This affords very little protection because, as soon as the terminals are cut off, the bonds can be withdrawn from under the plate. The bonds should be installed with the terminals as well as the strands protected.

Where long exposed bonds are used, many companies have adopted the plan of stapling the bonds down to

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the ties. The accompanying illustration shows four types of staple which have been tried out carefully by one company. Although no staple was found to be perfectly satisfactory, the best results were obtained from the type marked No. 4. All the staples were 3½-in. long and their price varied from 40 to 95 cents per gross when prices were normal.

Type No. 1 made a satisfactory job but did not drive well into the tie. Type 2 was easily driven but not strong enough to hold the bond when the latter was pulled vigorously. The only fault to be found with type 3 was in the short leg which was not long enough to enter the wood to a sufficient distance, and the bond was apt to be damaged in the endeavor to bury the short leg in the wood.

The trouble with a staple is that unless it is driven down far enough to bind the bond to the tie, the bond can be stolen by cutting off or knocking out the terminals from the rail and then pulling the bond through the staple. If the staple is driven down so far as to prevent the movement of the bond it is liable to cut into or through some of the strands. Even if this does not happen it will be necessary to hold the bond so tightly that it will be affected by vibration and the strain will be broken off in the neck of the terminal in the course of time. Of course this will not happen if the bond is fastened to the tie by only one staple at the center, but then it is not greatly protected. It is evident then that the practice of stapling long bonds may reduce danger from theft but is apt to shorten the life of the bond. As mentioned earlier, the best plan is to protect the bond completely by means of the splice plates.

Sheet-Steel Gear Cases

The Author Discusses the Points Raised in Article Published by "Vulcan" Last Week

BY C. W. SQUIER

I have read with much interest the article by "Vulcan" on "Gear Case Maintenance" which appeared in the ELECTRIC RAILWAY JOURNAL of Nov. 25, page 1116. From this I infer that the sheet-steel gear case has not proved entirely successful when installed on surface roads in England, due to rivets working loose and seams opening up with excessive vibration and other damage caused by small clearance from the roadbed. I have found track conditions in England to be much better than those on the average surface lines in this country. It is a striking fact that a great many English roads operate electric track brakes with but a clearance of ¼ in. above the track rails.

Operation with any such clearance as that indicated would be impossible on most roads in this country. It is not to be wondered at then, that the experience of operating engineers here was much the same as outlined by "Vulcan," with the first types of sheet-steel gear cases brought out. Cases with rivets and welded seams soon fell apart and many of the dissatisfied operating officials who tried out the built-up riveted and welded cases returned to the use of the malleable iron types. Manufacturers of motors were anxious to comply with their customers' demands for lighter equipments and they realized that gear cases offered a fruitful field for reducing weight. As a result seamless drawn-steel gear cases became popular and are now supplied with the late types of both Westinghouse and General Electric motors. Large numbers of these cases have now been in service for upward of three years and a number of the roads using them report that satisfactory results have been obtained.

The obtaining of satisfactory service from gear cases depends on several factors besides their construction, so that the results obtained on different roads show a wide variation. As already stated the condition of the track plays a very important part in the life obtained, and another important factor is the securing of proper clearance from the roadbed. With the advent of the low-platform and low-step cars, the use of small diameter wheels has been necessary. This has unduly reduced the clearance between gear cases and roadbed in some cases.

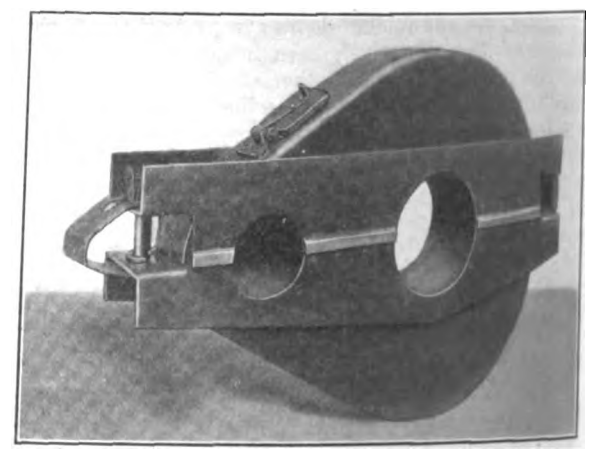
In comparing results obtained with sheet-steel gear cases I find without exception that subway, elevated and other roads operating on T-rails are obtaining satisfactory service, and another road operating new cars

TONGUE-AND-GROOVE JOINT IN SHEET STEEL GEAR CASE

with new equipment on the surface reports very little gear case trouble. This may be due partly to the fact that the wheels are still near their maximum diameter and the clearance has not been reduced to the allowable minimum.

The method of suspension also has an important bearing on the life of the gear case. The two-point end suspension throws less strain on the gear case and its supports than the older type of side suspension. As pointed out in the article by "Vulcan," vibration causes a crystallization of the iron used for hangers and suspension brackets, and these then break when a severe strain is thrown on them. The two-point suspension prevents excessive lateral vibration and strains and provides an increased flexibility for the case should it strike an obstruction. This type of suspension has been used by the Westinghouse Company on its motors for many years.

An accompanying illustration shows the latest type of pressed-steel gear case now being supplied with the motors provided with this suspension. The channel shaped supports at either end of the case are



SEAMLESS DRAWN-STEEL GEAR CASE WITH TWO-POINT END SUSPENSION AND SAFETY STRAPS

in turn supported by large sheet steel plates running the entire length of the gear case and spot welded to the sides of it. Safety straps are provided, which support the lower half of the gear case should the nut come off the connecting bolt. This feature will prevent many cases from being damaged.

The pavement over which surface cars operate is another factor in the damage done to gear cases. Paving

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stones are loosened by thawing and freezing conditions and forced above their normal surface. Ice and snow also forms an obstruction for damaging the case and throws additional strains on the gear case supports.

A source of annoyance in connection with the maintenance of gear cases is the working out of gear grease at the openings provided where the case clamps the wheel hub, the axle bearing and the armature bearing, and also where the halves of the case join. The usual method of providing felt rings to close the openings aids to some degree, but these are sometimes torn off or become damaged or worn so as to lose their value. The sketch on page 1166 illustrates the tongue and groove method of closing the joint along the split of the two halves of the case which forms an effective barrier to dust, moisture and grease. Some engineers are advocating the manufacture of an oil-tight gear case so that the gears can be flooded with oil instead of using a grease which is usually found in the bottom of the gear case instead of on the gears. The clearances provided with the present design of motors for the gear case are so small that an oil-tight case appears impossible. On new designs of motors, however, some method of combining the bearings on the gear case end with the gear case might be advantageously worked out.

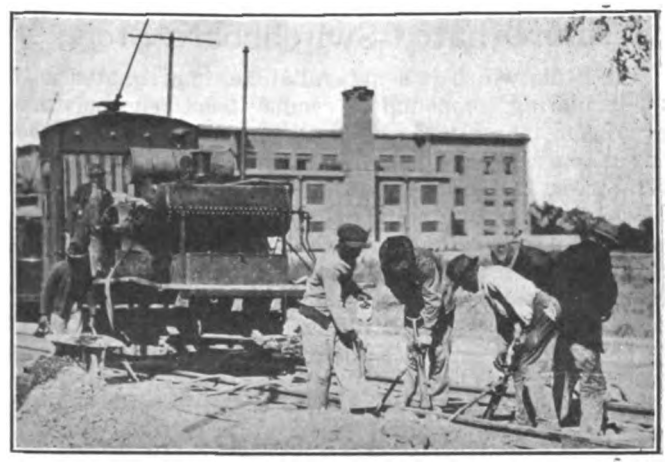
The principal advantage of sheet-steel gear cases is their lightness. This saving in weight is not so great with small motors as with large ones. The pressed-steel gear case supplied with the Westinghouse No. 333 motor of 150-hp. capacity weighs 115 lb. as against 195 lb. for the wrought-iron type, saving in weight of 80 lb. The pressed-steel case for the Westinghouse No. 306 motor of 60-hp. capacity weighs 95 lb. against 130 lb. for the wrought-iron type, or a saving in weight of 35 lb.

Gear cases should be of sufficiently rugged construction so that they will not shake apart due to vibration, but we must expect a certain amount of damage to light cases by striking obstructions. Of the types of sheet-steel gear cases now being supplied the seamless pressed steel type has proved the most satisfactory.

Tamping a Tie a Minute with Air Tampers

With labor particularly scarce and the need to push the extension of a line to completion, the Kansas City (Mo.) Railways resorted to a scheme for speeding up the work with machinery. An Ingersoll-Rand pneumatic tie-tamping outfit was brought into use and has proved to be very successful. The equipment complete consists of a 100-cu. ft. capacity, triple cylinder, upright air compressor, producing 90 lb. pressure, electrically driven by a 550-volt, 18-hp. motor. The compressor, the air-storage reservoir and a tank for cooling water for the compressor are mounted on a single-truck car to facilitate moving from place to place. The outfit includes four pneumatic tamping hammers which in reality are the ordinary riveting handles used in structural steel work with the rivet head replaced by special steel tamping heads. These in appearance and construction, are much like the old-fashioned heads in use on tamping bars and tamping picks.

The compressed air is carried from the storage reservoir to each tamper by a ½-in. rubber hose and is controlled by the usual valve located near the hand grip of the tamper. Using these machines on the new Marlborough line during the last four months, four track workers made a record for a day's work of 600 ties tamped



TIE TAMPING EQUIPMENT IN USE ON THE KANSAS CITY (MO.) RAILWAYS

in ten hours, equivalent to one tie a minute. The average day's work with this same force was 500 ties every ten hours. The ballast used on this track work was crushed limestone. A. E. Harvey, superintendent of way and structures, states that he had experimented with no other kind of ballast, but felt positive that the air tampers would work satisfactorily with any kind of ballast.

Portable Battery Equipment for Bond Tester

The Roller-Smith Company, New York, N. Y., has just placed on the market a portable storage-battery equipment for use with its bond tester. The containing case, as shown in the illustration herewith, is 12 in. wide by 7 in. deep by 15 in. high and weighs approximately 45 lb.

This equipment comprises an Edison A-5 storage battery of 187.5 amp.-hr. capacity, as the source of current; an ammeter, range 60-0-60 amp., to show the rate of battery charge or discharge; a rheostat the first step of which is an open-circuit step, the succeeding steps being used for establishing and bringing to correct value the rail current; and a knife-blade switch for interruption of the circuit while moving the tester from joint to joint. A compartment for carrying the cables and clamps is also provided.

PORTABLE BOND TESTING STORAGE BATTERY

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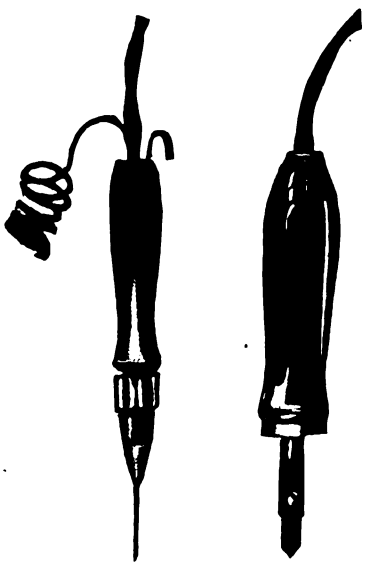
Impregnated Switchboard Stone

Lin-Stun, which is a natural stone, impregnated with an insulating compound to render it entirely moisture-proof and increase the insulating resistance, is now being manufactured by the Lin-Stun Company, 5010 Gloster Street, Pittsburgh, Pa. The maker states that tests have been made with 125,000 volts on pieces 1 in. thick without puncturing the stone. This material is especially adapted for switchboards, panelboards, barriers, insulated walks and such other uses as require a board to resist moisture, high voltage and large currents. It is being made in all commercial sizes and thicknesses and in several colors.

A Recent Type of Soldering Iron

The generation of heat at the point of contact and at the spot where the heat is needed for soldering, brazing or annealing purposes, is the basis for the design of an electric soldering iron now made by the Clemens Electrical Corporation of Buffalo, N. Y. Another feature claimed for this iron is that the operator need not wait for the iron to get hot, since the instant the object to be soldered or brazed touches the two high-resistance heating points, these points glow with a white heat directly at the tips where the heat is needed. The moment the tool is taken from the work, after the object is soldered, the current ceases to flow, as the circuit between the high-resistance points is opened. The high-resistance points when they become used can be readily renewed at a small cost. The prongs are made of solid bar brass with nickel-plated finish and accurately machined. In the two-prong iron, the bushing that holds



LOW VOLTAGE SOLDERING IRON WITH HIGH RESISTANCE TIPS

and separates the prongs is made of molded asbestos. The handle is made of bakelite, compressed under 600 deg. Fahr.

This soldering iron operates on low voltage, the range being from 6 to 15 volts. The high-resistance points are made to carry current according to a rating of 150 watts, 250 watts and 500 watts.

A two-handle portable outfit is made which consists of a single-prong soldering tool attached to one wire of the secondary side of a transformer, and a soldering feed tool attached to the other secondary wire of the transformer. The single-prong point is brought to bear upon the object to be soldered and solder-feeding tool is placed on the spot when needed. This outfit is especially adapted for special jobs of soldering, such as big wires behind switchboards as well as for general repair work.

Rebuilt Concrete Mixer Makes Good Device for Cleaning Old Ballast

With the prevailing high cost of ballast rock a neat saving is to be had through the cleaning of old ballast and reusing it. For this purpose, the Kansas City Railways have devised a portable rotary screen from a made-over obsolete continuous concrete mixer, with a revolving screen substituted for the mixing trough and blades. This old rotary grout mixer was dismantled and the ends of the circular screen attached to the mechanism which formerly rotated the blades and mixer. This screen is about 6 ft. in length, and tapers

OLD CONCRETE MIXER BUILT OVER INTO SCREEN FOR CLEANING BALLAST

from 18 in. in diameter at the motor end to about 3 ft. at the discharge end. The same gasoline engine which formerly drove the mixer now serves as motive power for the circular screen. The ballast, salvage from track under reconstruction, or other material to be screened, is thrown into a wooden hopper built in at the small end of the screen, and carried by gravity, as the screen turns, down toward the discharging end. In passing over the meshes of the screen, the dirt and foreign matter is loosened from the rock and sifts through to the ground below where it is taken up by workmen and carried away. The rock discharged at the end of the screen is clean and of good quality for concrete grout purposes.

The whole machine is mounted on a portable steel-wheeled truck, making it possible to transport it easily from one job to another. The company has used this home-made device on various parts of the system, and has found it to be very satisfactory and to have saved its cost many times.

Chicago Elevated Steel Cars Show No Deterioration After 100,000 Miles

The all-steel cars of the Chicago Elevated Railways, which were ordered in December, 1913, and received beginning in July, 1914, are now being put through the shops for the first general overhauling after having been run 100,000 miles. In speaking of this, H. A. Johnson, master mechanic, said that the cars were being taken down and carefully inspected, but that the men were finding practically nothing to do on the body, trucks, or any of the equipment.

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LONDON LETTER

Efficiency Meetings in London—Belfast Earnings for Six Months Reviewed—Edinburgh Experts Report

(From Our Regular Correspondent)

The first of the London Underground and the London General Omnibus Company's operating department efficiency meetings for the season 1916-1917 was held on Oct. 30, in the London General Omnibus Company's training school at Chelsea, with H. E. Blain, the operating manager, presiding over an audience of about 200 officials. An address on "The Camera and the Cinema in the Operation of Transit Companies" was delivered by Capt. A. Rozier, superintendent of training and employment of the London General Omnibus Company, who contrasted the haphazard and inefficient training in operation in the horse vehicle days with the scientific and practical instruction received now by all those who deal with passenger transit. The effect of this training was clearly shown by the reductions constantly taking place in the number of accidents, notwithstanding the present abnormal difficulties in connection with street lighting, etc. The use of the camera and the cinema in this instruction is very prominent in the company's school, and many slides and films were exhibited.

The working of the Belfast city tramways for the first half of the present financial year, namely, from April to Sept. 30, has resulted in a surplus profit of £3,883. For the same six months of last year the surplus was £8,380. The revenue for the six months was £151,980, as compared with £141,580 for the corresponding period of last year. This is an increase of £10,400 earned without any appreciable increase in the car mileage. The car-mile unit of receipts for September, 11.93**d.**, was the highest in the history of the undertaking. On the other hand, the working expenses, 7.03**d.**, reached the highest point also. For the six months ended Sept. 30 the receipts per car-mile were 11.58**d.**, as against 11.01**d.** for the same six months of 1915. Working expenses during the six months increased from £78,189 to £89,723, or more than £11,000. This more than wiped out the increase in revenue. There was an increase of more than £1,800 in net revenue charges and of nearly £2,000 in sinking-fund charges. These increases, which are due partly to additional capital expenditure and partly to additional income-tax charge, reduced the surplus profit to £3,880. The heaviest item of increase in the working expenses was in power, for which the charge was £20,824, as against £14,649, an advance of more than £6,000 in the six months. Traffic wages increased £2,000, war pay increased from £3,700 to £4,400, the car works cost £1,800 more, and the permanent way and electrical equipment £1,300 more. Mr. Moffet, the new general manager, has now taken charge of the undertaking. He assumes control at a period when financially the concern is anything but flourishing, although the traffic is steadily expanding.

The full report by the experts selected to advise the tramway committee of the Corporation of Edinburgh, namely, J. A. Brodie, city engineer of Liverpool; J. B. Hamilton, general manager of the Leeds Corporation Tramways, and A. H. Campbell, city engineer of Edinburgh, has now been submitted to the Edinburgh Town Council, and differs very little from the curtailed statement published a month or two ago. The report shows that there was possible of adoption electric traction by overhead, the conduit, the surface system, the self-propelled petrol or petrol-electric cars, the electric storage battery car, and the motor 'bus. It is pointed out that overhead wires are not an innovation in Edinburgh, and that cities like York and Chester, and pleasure resorts such as Bournemouth and Southport, have adopted the system with good results. As applied to Edinburgh the experts estimated that the cost of installation of the overhead system, restricted to the existing tramway routes, would be £400,000 for permanent way and electrical equipment of the tramway. The cost of installation of the conduit system, restricted to the existing cable routes, would be £850,000 for street work only. In regard to the self-propelled car, it is thought that it would not provide a satisfactory or economic service for the entire city. The motor bus might become a serviceable and suitable auxiliary to the tramway system. The experts do not think it advisable or necessary to retain the cable for any route in the city. In recommending the overhead electric system it is suggested that the conduit system should be applied to Princess Street from the Register House to the West End. In the event of that system being adopted, it is further suggested that an alternative line be provided in Queen Street. In a summary the report states that, independent of the existing tramway conditions of the city, the overhead system offers the best, most reliable, convenient and economical solution of the transit requirements of the city and suburbs.

In a recent interview, Mr. Blain, the operating manager of the London General Omnibus Company, stated that several hundred more girl bus-conductors were wanted by the company. The company had to contradict several reports that the girls were unable to stand the strain of the work and were leaving the employ of the company. The actual position was that every week the company put on about eighty new conductresses, and would increase the number if it could. In the service at the present time there are more than 1150 girl conductors. Each pupil receives not only free tuition for a period of two or three weeks, but is paid 2**s.** a day for her time. After the girls have qualified the average earnings run to about £2 a week. There is no abnormal sickness among the girls. They like the work and benefit in physique and complexion by the open-air life. They are all under the care of a woman physician. Since March the company has interviewed 16,000 applicants. Among the ranks of the women seeking employment almost every class is represented. Owing to the careful training of the men drivers and the company's safety first campaign, there were 25 per cent fewer accidents in the streets than before the war. Nearly half the drivers were trained during the war, so that their record is a splendid one, considering the condition of the streets at night.

The proposal that Glasgow should proceed with the erection of a new electric generating station gives further proof of the enormous and growing demand all over the country for power purposes. While no local authority in England has been allowed since the early days of the war to raise fresh loans or incur large capital expenditure without the consent of the Local Government Board, the necessity for additional electric power has become so urgent and widespread that for some time the department has been granting to many English municipalities authority to borrow money with which to extend their electricity undertakings.

The British Electrical & Allied Manufacturers' Association announces that the department of import restrictions (Board of Trade) has granted to the association a special license to import insulating materials in certain classes which are included in the list of prohibited imports. Electrical manufacturers, whether or not they are members of the association, can avail themselves of this license by making application to the secretary of the Manufacturers' Association.

The numerous stoppages on the Birmingham tramways received special consideration at a recent meeting of the electric supply committee of the City Council. The inconvenience to the public of stopping the cars suddenly and for prolonged periods was fully recognized, and the matter had been discussed at an interview between Mr. Chattock, the engineer to the electricity department, and Mr. Baker, the manager of the tramways. The conclusion arrived at by these gentlemen was that it would be better not to issue any definite notice as suggested. The reason for this was that it was certain there would be a sufficient supply of current to enable the cars to run until 9.30 a. m., and again from 6 p. m. onward, as well as during the dinner period from 12.30 p. m. or thereabouts until after 2 p. m. Another matter which occupied the attention of the committee was the general question of the supply of current throughout the city. Deliveries of plant have been delayed, and this, with a depleted staff, is largely the cause of the inability of the department to cope with the demands made upon it. Steps are being taken to secure additional equipment before Dec. 15. When that has been accomplished it is hoped that the difficulties of the committee will come to an end.

A. C. S.

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NEWS OF ELECTRIC RAILWAYS

Traffic and Transportation

Financial and Corporate **Personal Mention** **Construction News**

COMPROMISE OFFER TO ST. LOUIS

Company Acknowledges Its Liability for the Mill Tax, But Asks City to Withdraw Its Franchise Contention

The United Railways, St. Louis, Mo., through its committee appointed to confer with an official city committee to discuss a settlement of the mill tax and franchise problems, at a meeting in Mayor Kiel's office on Nov. 22, made a definite proposition of compromise to the city. The proposal was offered by Richard McCulloch, president and general manager of the United Railways, and contained the following plan of settlement:

1. The United Railways, in settlement of its differences with the city, will acknowledge liability for the accrued mill tax up to and including Dec. 31, 1916, aggregating about $1,500,000.

2. The city to accept payment of the accrued mill tax in annual payments. The amount of the yearly payments to be decided on by the joint conference committee. The first payment to be made Dec. 31, 1916.

3. The city to reduce the present mill tax to an equitable amount, taking into account present operating conditions, to become effective Jan. 1, 1917.

4. The city to withdraw its attack on the validity of the franchises of the United Railways lines, and to confirm the terms of the franchises to extend to April 12, 1948.

5. The joint conference committee, when the details of the compromise are agreed upon, to recommend to the Board of Aldermen the enactment of the necessary legislation to accomplish these results.

The United Railways was represented at the conference by President McCulloch, Murray Carleton and A. L. Shapleigh. The city was represented by Mayor Kiel, President-elect Aloe of the Board of Aldermen, Acting President Nat Hall and the public utilities committee of the Board of Aldermen.

A subcommittee composed of Messrs. Aloe, McCulloch, Carleton and the seven members of the public utilities committee of the Board of Aldermen was appointed to verify the statistics presented by Mr. McCulloch as to the company's financial condition and report back to the joint committee.

No date for the next meeting was set. Mayor Kiel suggested that the subcommittee should report in about two weeks. Alderman Gregory, chairman of the public utilities committee, which dominates in numbers the subcommittee, indicated it would take much longer than two weeks for a report.

Mr. Gregory said after the meeting that the subcommittee would not make a report until after it has held a series of public hearings to determine the sentiment of the public and that these hearings will not begin until after Jan. 1.

The company published in the St. Louis papers of Nov. 23, in the form of a full-page advertisement, the complete plea for a settlement as presented to the city. In explaining its purpose the company said:

"We are not coming to you with a legal argument; we are not pleading for this settlement as a matter of legal rights, but we are pleading for it as a matter of good business policy, both for the city of St. Louis and for the United Railways. There is nothing technical in the arguments which will be submitted and there is nothing at issue which may not be passed upon by business men without the aid of technical experts."

The company said that the differences between it and the city were two in number. These it stated as follows:

"1. The mill tax matter. The city is attempting to collect a 2 per cent tax on each cash passenger originating in the city limits in addition to all other taxes now paid. Judgment was obtained and affirmed by the Missouri Supreme Court and the United States Supreme Court for the taxes up to 1910, amounting, with interest, to $1,839,205. This sum was paid the city on June 16, 1916. The city has brought suit for the accrued taxes since 1910, amounting, with interest, to date to about $1,500,000. The annual tax on present earnings is about $240,000.

"2. The duration of the franchises. The city contends that the franchises expire as specified in the original ordinances. The company contends that all these franchises were extended to 1939 by the St. Louis Transit franchise and to 1948 by the Central Traction franchise. The railways company has won its contention in the Circuit Court and the matter is now pending on appeal in the Missouri Supreme Court."

In its plea the company said that "it is our earnest desire to reach a settlement with the city by which both of these differences may be adjusted in a manner fair and equitable to both parties."

Among the subjects other than those mentioned upon which the company touched in its advertisement were taxes, service, rate of fare, duration of franchises, necessity for new capital, bond issues maturing, necessity for refinancing maturing bonds, possibility of receivership, value of transfer system, and service. These were followed by the five proposals mentioned at the outset of this article. In conclusion the company said of its proposal:

"We consider this proposition fair and reasonable.

"We ask the city to withdraw its contention as to the expiration of our franchises because this contention casts a cloud upon the franchises and prevents the financing which is necessary for our continued existence and progress. It is becoming more and more difficult to get capital to invest in street railway enterprises, and it would be greatly to the advantage of the city of St. Louis if capital would be attracted to this city.

"We propose to acknowledge our liability for a tax which we have heretofore fought as unjust and unreasonable.

"We are not asking to be relieved from the payment of 1 per cent of the accrued taxes, but we do ask for time in which to make this payment.

"We ask relief from the payment of a portion of the future tax, because the payment of the full tax will affect our service, and we consider the maintenance of this service our first duty to our patrons. Furthermore, the payment of the full tax is not justified in comparing our taxes with those paid in other cities."

DALLAS VOTE IN FAVOR OF FRANCHISE

The straw vote on the indeterminate franchises to be granted J. F. Strickland and C. W. Hobson, who are to take over the electric traction and electric lighting properties of Dallas, Tex., is reported to be going overwhelmingly in favor of the franchises. The vote so far tabulated when this account was mailed by the correspondent of the ELECTRIC RAILWAY JOURNAL in Dallas amounted to more than 60 per cent of the number of postcards sent out, and probably more than 90 per cent of the total vote to be cast. It showed about 97 per cent in favor of the franchises. Of the other 3 per cent, fully one-third are not counted because of defective ballots, leaving but a very small percentage of negative votes.

While the franchises will undoubtedly be approved in the straw vote, Mayor Henry D. Lindsley and members of the Board of City Commissioners have indicated that they will not formally pass the franchises until there has been a referendum vote on the franchises, as provided in the City Charter. It will perhaps take several months for this referendum vote.

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CITY ENGINEER ON SAN FRANCISCO SITUATION

In the annual report just issued by the city engineer of San Francisco, Cal., considerable space is devoted to the municipal railway. After reviewing briefly the history of the municipal railway project and recent earnings, the report mentions the several extensions that have been constructed and others that are contemplated. The most important of the latter is referred to as follows:

"Upon the recommendation of this office, the supervisors have appropriated $275,000 from the surplus earnings of the municipal railway system for the purpose of constructing the track and overhead work through Twin Peaks tunnel from Seventeenth and Market Streets to the junction of Sloat and Junipero Serra Boulevards."

In conclusion the report states:

"The street railway situation in San Francisco presents a number of serious problems. The track mileage in the city is more than five years behind the needs of the present population. It is difficult to extend the street railway facilities logically or economically because of the fact that all of the railway lines are not under a unified control. The city cannot force the United Railroads to make any extensions, nor will the United Railroads make any extensions of its own volition under existing charter conditions. Many extensions are at present desirable, but without suitable connections or transfer arrangement with both the Municipal Railway and the United Railroads system would be of little real benefit. The more carefully the situation is studied the more urgent appears the necessity for the unification of control of all the existing lines, and until this has been accomplished San Francisco will have to put up with a more or less inadequate transportation system.

"This office at the present time is studying the problem and expects to make a report shortly outlining a logical program for future extensions of the existing Municipal Railway System, but at best the construction of these extensions will fall short of solving the transportation question in San Francisco, for the solution of this problem requires consideration on broader lines. The time is fast approaching when a rapid-transit system must be considered. This would be either of subway or elevated type, preferably the latter at this stage of our development, the comparative costs being about $800,000 a mile for the elevated as against $3,500,000 a mile for the subway construction. The first link in a rapid-transit system naturally should parallel Market Street, connecting with the Twin Peaks tunnel and with a branch extending south through the Mission in the vicinity of Capp Street."

HEARINGS PROPOSED ON STRIKE PREVENTION PLAN

Chairman Oscar S. Straus of the Public Service Commission for the First District of New York, will preside at a series of public hearings to develop a plan to eliminate strikes of employees of public service corporations and to formulate a plan of pensions. Mr. Straus says that in order to perfect certain details that would have to be known before a proper bill could be drafted for submission to the Legislature the views of all of the persons concerned ought to be heard in as public a fashion as possible. The main feature of the idea is to have enacted a law for the appointment of a wage commission that should have absolutely the last say in all disputes between employers and employees. The rate of pay fixed by the commission should be the rate each corporation would have to pay to its employees, and the employees would also have to accept the decision of the commission. Some plan of penalizing both sides in a controversy that resulted in the violation of the commission's order would have to be worked out later. If a corporation should protest against the rate on the plea that it could not afford to pay it, then the Public Service Commission in the district where the corporation was located would have to find out whether the rate fixed was too high for the earnings of the company to pay and still provide the stockholders with reasonable dividends. In case the corporation was an interstate concern then the Interstate Commerce Commission would be called upon to make this investigation. If the investigation resulted in proving that the corporation could not afford to pay the wages set by the wage commission, then the Public Service Commission or the Interstate Commerce Commission, having control over the corporation, should permit it to increase its charges to a point where it could pay the wages set.

REPLIES TO ITS TRADUCERS

The Public Service Corporation of New Jersey, in Unusually Direct and Forceful Manner, Spreads Its Cards on the Table

The election over, the Public Service Corporation of New Jersey has addressed a statement signed by Thomas N. McCarter, president of the company, to the people of New Jersey. This statement, as it appeared in the form of a four-column, page-deep advertisement in the Newark *Evening News* of Nov. 23, follows in full:

"During the recent campaign a number of the candidates for office, including one of the candidates for Governor, one of the candidates for Mayor of Newark, and one of the candidates for the State Senate in Essex County, went up and down their respective constituencies seeking political capital for themselves by attacking this corporation.

"They did not confine their malicious attacks to their public speeches, but the newspapers of the State were filled with paid advertisements of the same general character, either inserted or promoted by them. One of the chief bases of their attack was the allegation that this corporation maintains at Trenton during the legislative season a pernicious and corrupt lobby for the purpose of improperly influencing legislation. This corporation does no such thing.

"As long as conditions remain as they have existed in the past, and as they are at present, the corporation will, if I can control it, send its officers to Trenton to represent it in a legitimate, straightforward way, in the light of day.

"The corporation is seldom interested in any affirmative legislation. When it is so interested it goes about the matter in precisely the same manner that any other company or individual would do under similar conditions, but every year more than 10 per cent of the bills introduced in both houses of the Legislature are bills which, intentionally or otherwise, directly affect the property and rights of Public Service. There are tax bills, there are rate bills, there are confiscation bills, and there are strike bills, in all more than 100 every year.

"Those of us chargeable with the responsibility for the management of the affairs of this corporation would, indeed, be recreant to our trust if we did not exercise the American right of free speech in reference thereto. It is a matter of every-day experience for delegations of the public, of all kinds, to go to Trenton to exercise their influence in favor of or in opposition to this or that measure pending before the Legislature. It is frequently an act of patriotic service for one thus to participate in legislative councils. According to our traducers, when we seek in the same manner to protect ourselves from the character of legislation above referred to it is not an exercise of right but an act of scandalous lobbying.

"When the theorists, the demagogues and the fakers cease attacking the corporation in the manner above indicated we shall be only too glad to be relieved of the vexatious burden of self-protection.

"This corporation is honestly trying to carry on a great work of upbuilding development throughout this State, from which it is only seeking a reasonable return commensurate with the risks and effort involved. This, I believe, the people of the State are rapidly realizing to be the truth. At all events, it would not seem as if the making of Public Service the feature of their campaigns had been particularly successful, as two of the three gentlemen above referred to were overwhelmingly defeated for the offices they sought, and the third, while elected, ran many thousand votes behind his ticket. Throughout the campaign this corporation remained altogether silent on the subject.

"In all fairness, is it not about time that this kind of thing stopped, and that politicians who seek to ride into office through attacks on this corporation should at least make statements of fact, and not reiterate false insinuations?"

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REASSURANCES ON CLEVELAND RAPID TRANSIT PROJECT

W. R. Hopkins, president of the Cleveland (Ohio) Rapid Transit Company, has written to the City Council of that city in regard to the prospects for building the proposed road, construction rights for which were granted some time ago. The substance of the letter of Mr. Hopkins follows:

"At the time the matter was last brought to your attention, we requested and you granted modifications of the ordinance to meet the requirements of parties to whom we had committed the financing of our project and who had assured us that these modifications of the ordinance would remove the last obstacle in the way of the financing of the first two lines. We had previously met all other requirements and, with your co-operation, the last requirement was met fully and promptly, but the assurances then given us and the others subsequently given were not made good. We have therefore terminated all previous arrangements and negotiations, adopted a new plan of financing and are proceeding upon new lines, with excellent prospects of success. At this moment the most serious obstacle in the way of proceeding with construction work at an early day lies in the great increase of construction costs. Our latest estimates of cost for the first line exceed by upwards of $3,000,000 the price at which responsible parties were prepared to do the work at the time the ordinance was last amended. Such an increased cost, although due in large part to temporary conditions, involves a large permanent increase in the fixed charges which would have to be carried by a line constructed at such cost.

"However, Cleveland's need of real rapid transit is now so evident and the city's growth so assured, we are convinced that the project can, if necessary, carry even these increased burdens and so justify the increased investment. Acting upon this faith, the company is more determined than ever to proceed with its efforts to provide a system of subways for the city of Cleveland, in accordance with the plans embodied in the legislation hitherto passed by your honorable body, and we beg to assure you that we shall continue our efforts in this direction until we have accomplished the result or you shall determine that the city can secure it more quickly by other means."

TOLEDO CONFERENCES ADJOURNED TO DEC. 5

The street railway commission of Toledo, Ohio, adjourned on Nov. 22 to Dec. 5, after failing to agree on the amount that should be paid down in case the city decides to take over the street railway property of the Toledo Railways & Light Company at the expiration of five years. The tentative franchise provides for an initial payment of 15 per cent. Henry L. Doherty, however, refused to consider so small a payment. He said 25 per cent was the smallest amount to which he could agree, and, for the safety of the city in an undertaking of this kind, it should be more. John Thurston, president of the commission, contended for 15 per cent, but finally offered to compromise at 20 per cent. Mr. Doherty refused.

N. D. Cochran, of the commission, said that 25 per cent was a much smaller sum than he ever dreamed Mr. Doherty would be willing to accept. He thought the city was fortunate in receiving an opportunity to participate on so liberal a basis. Commissioner Wright agreed with him, but Commissioner Usher objected.

Mr. Doherty explained that a profit of 1 cent a passenger would in five years yield $3,600,000 for making an initial payment, while only $2,500,000 would be required for such payment. Judge Emery expressed the belief that the city charter could be so amended as to allow the issue of bonds for this purpose, but the matter had not yet been tested in the courts.

An agreement was reached on Nov. 21 to the effect that the city may relieve the company from the cost of paving streets between the tracks, but the money must be used as part of the purchase fund.

Commissioner N. C. Wright proposed that the sliding fare clause be changed so that the fare would drop automatically to the next lower figure when the equalizing fund reached the maximum without action of Council, since it advanced automatically when the fund reached the minimum. John Thurston, president of the commission, contended that municipal ownership was of more consequence than low fares. Low fares might prevent the accumulation of a fund for the purchase of the property. Mr. Wright held that the people expect both low fares and municipal ownership. Mr. Wright's final suggestion was to make the fare low and then let the people decide by vote whether it shall be increased to provide a fund for the purchase of the property.

Henry L. Doherty presented a clause which provides for a sliding scale, with fares from the present fare down to five tickets for 15 cents. The commission asked that the minimum fare be made 2 cents and that 5 cents be made the maximum.

HOLYOKE ARBITRATION FINDING MADE PUBLIC

Brief reference was made in the ELECTRIC RAILWAY JOURNAL of Oct. 21, page 906, to the finding of the arbitration board sitting in the wages and working conditions case of the Holyoke (Mass.) Street Railway. The conclusions of the board were made public during the week ended Nov. 25, following the signing of the award by all three members. The union endeavored to obtain a day basis of payment for its members, but the board ordered compensation upon the basis of platform time, as desired by the company. Under the award the maximum pay of the platform men becomes 33 cents an hour. The finding extends from June 1, 1915, to Oct. 1, 1918, the wage scale in cents an hour being changed as of June 1, 1916, as tabulated below:

	June 1, 1915-June 1, 1916	June 1, 1916-Sept. 30, 1918
First six months	26	27
Second six months	28	28
Second year	29	29
Third year	30	31
Fourth year, etc.	32	33

In connection with the 1915-1916 scale above listed, each man of thirty crews who worked more than nine hours on schedule runs is to receive one-half hour's extra pay for each day so working, at the rates as determined above, allowing the men a cent in each case instead of a fractional part thereof.

The award allows each conductor, after June 1, 1916, five minutes at the close of his platform work each day for making up and turning in his cash returns, with compensation at his platform rate. Schedule runs are defined as those that provide daily not less than eight hours nor more than nine and one-half hours platform work inside of twelve consecutive hours. The company is to arrange its schedule runs so that not more than 20 per cent are to exceed nine hours' platform work performed within eleven consecutive hours; not more than 20 per cent are to exceed nine hours' platform work within twelve consecutive hours; not more than 30 per cent are to exceed nine and one-half hours' work in eleven and one-half hours, and not more than 30 per cent nine and one-half hours' work in twelve. Extra platform work may be performed daily within fourteen consecutive hours. Any scheduled run taking from eight hours to nine hours is to be paid as nine hours, but crews so paid are to hold themselves in readiness at the expiration of the day's schedule runs to perform reasonable service until the close of the nine hours. Such men are to be notified by the manager or superintendent at the close of their respective schedule runs of the day whether the company has further occupation for them.

Spare men are to have the preference for extra platform work, followed by employees operating schedule runs, and then by men not otherwise employed by the company whom the manager shall consider qualified to perform extra or other platform work. Spare men ordered to report, and who do report to cover sleepovers, are each to receive two hours' pay, provided they remain on the company's premises during that period. Carhouse men, shop employees and track greasers are to receive ten hours' pay for nine hours' work. Employees of carhouses and shops are to be allowed ten minutes' time before the noon hour for washing purposes. Intervening time is to be paid to all motormen and conductors operating scheduled runs who report on order for extra service within one hour after the completion of their scheduled run, such payment to be from the time of such completion until they take their cars into the house or are relieved; but in no case are such platform men to receive less than two hours' pay.

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PLEA MADE FOR HYDRO-RADIALS

The central executive of the Ontario Hydro-Radial Railway Union interviewed the Cabinet of the Ontario government at the Parliament Buildings, Toronto, on Nov. 7, and made the following requests:

1. That the government provide money so that the Hydro-Commission may from time to time purchase radial rights-of-way for the municipalities of the province. That such sums be in the nature of loans to the municipalities until after the war, when the municipalities can raise the required sums on debentures and repay their obligations to the government.

2. That legislation be passed at the next session of the House placing the Chippawa Creek power development scheme in the hands of the Hydroelectric Power Commission, as representing the municipalities, and that the municipalities receive authority to vote on Jan. 1, 1917, on the question of guaranteeing the bonds of the commission jointly with the government's guarantee.

3. That the "ambiguous and uncalled for and unwarranted" sections of bill 167, which prevents municipalities building radials during the war, be eliminated and only the clause allowed to remain which gives the government power to authorize the purchase of rights-of-way.

4. That legislation be passed at the next session divorcing the hydro and its commission from any government department so as to make it absolutely independent and not liable to be referred to as being under the attorney-general's department.

After a very attentive hearing by the government to the deputation, careful consideration of the proposals was promised. The government also promised that the necessary orders-in-council providing money for the purchase of the rights-of-way would be passed as they were asked for by the votes of the municipalities. With regard to the Chippawa Creek development, it was pointed out that it would have to stand pending the determinations of the respective rights of the Province and the United States.

Voters along the route of the proposed electric railway between Toronto and St. Catharines, Ont., have been asked to express approval at the January municipal elections of various bond issues assessed against localities for the construction of the line. The Ontario Hydro-Electric Commission has agreed that no construction work shall start until after the war, but it is the purpose of the commission to have all financial details and construction surveys completed before that time. It is said that the commission desires to buy the Niagara, St. Catharines & Toronto Railway, between Niagara Falls, Ont., and St. Catharines, and use the line as the connecting link between Toronto, St. Catharines and the Niagara frontier. If these negotiations are unsuccessful the commission has completed a survey of a route 4 miles shorter which extends from Niagara Falls, Ont., to Port Colborne, along the Canadian shore of Lake Erie and through to Welland and St. Catharines. Cities and towns along the route are asked to meet any deficit that may result from the operation of the road. If the railway should prove a succcess the bonds will be paid from the earnings. The bonds are to run for fifty years.

NEW OFFICERS FOR NORTHERN OHIO TRACTION & LIGHT COMPANY

New officers have been elected for the Northern Ohio Traction & Light Company, Akron, Ohio, as follows: President, B. C. Cobb; vice-president, T. A. Kenney; vice-president, treasurer and general manager, A. C. Blinn; secretary, F. C. Potvin; assistant secretary and assistant treasurer, S. E. Wolff. The board of directors consists of B. C. Cobb, J. C. Weadock and T. A. Kenney, New York; Frank Silliman, Jr., Philadelphia; A. C. Blinn and Charles Currie, Akron; E. W. Moore, J. R. Nutt, T. H. Hogsett, J. P. Witt and J. P. Becker, Cleveland. Messrs. Cobb, Weadock, Kenney and Wolff are connected with Hodenpyl, Hardy & Company, New York, N. Y., while Mr. Blinn was formerly vice-president, treasurer and general manager of the Public Utilities Company, Evansville, Ind. Control of the Northern Ohio Traction & Light Company passed recently to Hodenpyl, Hardy & Company and E. W. Clark & Company.

CLEVELAND HAS A PAVING QUESTION

The Cleveland (Ohio) Railway has notified Fielder Sanders, street railway commissioner, that the cost of repaving between the tracks, where street improvements are being made, must be borne by the city. Mr. Sanders found that the ordinance making this requirement had been repealed during the administration of Peter Witt, and the same is true of the ordinance requiring the company to pay for the relocation of tracks, where public improvements are being made. Mr. Sanders contends, however, that the company did not attempt to place the charge for such work upon the city during Mr. Witt's time.

The Cleveland Railway was granted a franchise on Oct. 30 for an extension of its track to the new city hall on Lakeside Avenue, but it will probably not accept it, because of the fact that it requires the company to pay for paving between the tracks.

J. J. Stanley, president of the Cleveland Railway, recently notified the board of directors that the present car equipment was not sufficient to take care of the increased number of passengers without unpleasant crowding.

FRANCHISE DISCUSSED IN MONTREAL

The Montreal (Que.) Tramways is desirous of obtaining a further franchise from the city, and the president, counsel, and manager have recently met the comptrollers and publicly discussed the terms of the franchise with a view of finding a basis of agreement. The proposed clauses include those relating to poles, rails, repairs, maintenance, seating accommodation, etc. It was suggested that the wooden poles should be replaced by iron poles laid in cement, the cost of the wooden poles being $1,000 per mile while the iron poles would cost $6,000. The question of appointing experts to advise the city as to the physical valuation of the company's property and on other points before a further franchise was granted was debated. The names of E. L. Cousins, Toronto, and P. St. George, Montreal, were mentioned. The representatives of the company strongly opposed certain suggestions involving large expenditures, the president pointing out that if the comptrollers insisted on very onerous conditions the public would have to pay for them in the end. The question of fixing standards of service was also considered.

Service Abandoned in Cleburne.—The Cleburne (Tex.) Street Railway has discontinued service. Announcement is made that lack of patronage made it impossible to operate the lines at a profit. The company has been in receivership and the property has once been sold at public sale by order of the court. It is said that the rolling stock will be sold and the rails probably torn up.

Park Commissioner Opposes Central Electrification Plan.—The proposed contract between the City of New York and the New York Central Railroad involving changes in Riverside Park is discussed at length by Park Commissioner Ward in his annual report. Mr. Ward is dissatisfied with the proposed plan. He seems to fear that the Board of Estimate, at an early meeting, will adopt the plan, and it will then be too late for the modifications which he deems should be made.

Wilbur Sadler's Memory Honored.—The Board of Freeholders of Mercer County, N. J., will place a memorial lamp on the new Willow Street bridge at Trenton in honor of Adjt. Gen. Wilbur Fisk Sadler, electric railway promoter, who died recently at Carlisle, Pa. as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 18. General Sadler took much interest in having a bridge erected and rendered valuable assistance to the freeholders. The State of New Jersey will also have a bronze tablet erected in memory of General Sadler because of his efforts in behalf of the State in the building of General Stacy Park in the rear of the State House at Trenton.

Railroad Club Elects Officers.—At the annual meeting of the New York Railroad Club on Nov. 17 these officers were elected: President, James Milliken, superintendent of motive power for the Philadelphia, Baltimore & Washington Railroad; First Vice-President, Sidney Chambers, superintendent of motive power of the Central Railroad of New

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Jersey; Second Vice-President, C. L. Bardo, general manager of the New York, New Haven & Hartford Railroad; Third Vice-President, Miles Bronson, manager of the Grand Central Terminal; Treasurer, R. M. Dixon, president of the Safety Car Heating & Lighting Company, and Secretary, Harry D. Vought.

Cities Service Orders Power Equipment.—The Cities Service Company, New York, N. Y., has placed with the General Electric Company an order which calls for generating units for various electric generating and distributing subsidiaries of the Cities Service totaling 86,000 kw., or approximately 115,000 h.p. of generating capacity. The contract price is close to $1,000,000. In addition to this order the Cities Service Company also has placed with the Westinghouse Electric & Manufacturing Company orders for generating equipment totaling 41,000 kw., or approximately 58,000 h.p., at a contract price of about $500,000.

Final Hearing on Proposed Removal of Elevated Tracks.—The Public Service Commission for the First District of New York, on motion of Commissioner Travis H. Whitney, has fixed Dec. 4, 1916, as the date for a final hearing upon the question of the disposition to be made of the elevated tracks upon lower Fulton Street, Brooklyn. Upon the facts presented at the hearing, taken in connection with those brought out at previous hearings, together with studies made by Commissioner Whitney and other officials of the Public Service Commission, will be predicated the action of the commission in its final settlement of the much discussed Fulton Street situation.

Electric Railway Labor Leaders See President Wilson.—Four labor leaders affiliated with organizations of electric railway employees called at the White House on Nov. 27 by appointment and had an interview with President Wilson. None of them would make known the object of his visit, and from the White House no statement was forthcoming. It was reported from Washington that the purpose of the visit might be to ask President Wilson to use his influence to have employees of electric railways engaged in interstate commerce included in the provisions of the Adamson eight-hour law. Another theory was that the visit was in connection with the New York City local situation.

Two New Trustees for the Connecticut Company.—Morgan B. Brainard, vice-president and treasurer of the Aetna Life Insurance Company, and Charles C. Sanford, president of the First National Bank, Bridgeport, have been appointed by Federal Judge Mayer as members of the board of trustees of the Connecticut Company provided for in the decree entered against the New York, New Haven & Hartford Railroad in the Sherman act law suit. The appointments were made to fill vacancies caused by the deaths of George E. Hill and Lyman B. Brainard. Of the original board of trustees, named in April, 1914, only two members are living, Judge Walter C. Noyes, New London, and Charles Cheney, South Manchester. Those who died were William Waldo Hyde, George E. Hill and Lyman B. Brainard. In December, 1915, Leonard M. Daggett, New Haven, was appointed to the board to fill the vacancy caused by the death of Mr. Hyde and, with the appointment of Mr. Brainard and Mr. Sanford, the board is complete.

Cleveland's First Franchise Granted Fifty Years Ago.—On Oct. 25, 1859, fifty-seven years ago, the City Council of Cleveland, Ohio, granted its first street railway franchise to the Kinsman Street Railway. There were objections to the innovation from people who felt that a railway would interfere with other forms of traffic and transportation and others thought that a city of 40,000 people could not afford a luxury of that kind. Troubles and delays of one kind or another interfered with construction and the East Cleveland Street Railway had its line in operation first. Ground was broken for the latter in the summer of 1860, and in the fall of the same year cars were running between Bank Street, now West Ninth Street, and Wilson Street, now East Fifty-fifth Street. Fifteen years later the city had nine car-lines, owned by a number of companies. The East Cleveland Street Railway, however, kept ahead of others and at that time was operating thirty-seven cars with 246 horses, while the Kinsman Street Railway had three cars, six horses and 2 miles of track.

Financial and Corporate

THE FUTURE OF UTILITY INVESTMENTS

Non-Speculative Capital Will Flow Freely if Rate Regulation Provides for Security of Investment to Go With Lower Rate of Return

The expansion of public utilities and the enormous increase in public utility investments during the last twenty-five years have been among the most remarkable developments of this age. The important question to-day, however, is—how will the future affect this utility development and utility investments? To Delos F. Wilcox, writing in the November issue of *The Annals* of the American Academy of Political and Social Science, it seems reasonable to anticipate that the need of additional capital to be invested in the expansion of utility plants in this country will go on in the future much as it has in the past, say at the rate of $1,000,000,000 a year. In spite of this need, however, capital will for some time to come hesitate about going into public utilities in those communities where the chance of speculative profit is removed and no compensating security given. Ultimately, through the full triumph of the theory of public service, there will be a free flow of non-speculative capital into utilities to the extent that the consuming public is able and willing to pay for the expansion of the service.

Mr. Wilcox bases his prediction upon certain conclusions deduced from utility experience. In a growing community, he says, utility investments tend to lag behind the demand, and therefore when city growth slackens or stops, the demand for utility expansion continues until the community has spread out. Transfers of population, moreover, will not release existing utility investments but will necessitate large additional ones in new districts. In general, the relative importance of transportation and communication necessarily increases with the growing complexity of social organization. Furthermore, although utilities are primarily urban phenomena, they are the promoters or sales agents, to rural districts, of the economic and social advantages hitherto characteristic of urban life, and the territorial expansion of utility service means generally an even greater investment in proportion to the population served than the investment required for strictly urban service.

In the early days, Mr. Wilcox states, utilities were involved in a riot of speculation, but this was attacked first through taxation and then more directly through rate regulation. At present the public pressure for a reduction of rates is a continuing force tending toward the elimination of the speculative element in utility investments. At the same time this force, if not supplemented by measures calculated to give security to the investment, will drive capital into other fields. If security follows rate regulation, utility stocks and bonds will merely appeal to another class, the investors, who are willing to accept a lower return with security.

In Mr. Wilcox's opinion, there are some facts which the public must recognize, for security of utility investments and the assurance of a fair return thereon will necessitate the giving up of many long-cherished illusions on the part of the public. The fancied protection of maximum or absolute rates fixed by franchise contract for a long term of years must be surrendered. It must be frankly admitted that rate regulation involves the possibility of increase as well as decrease of rates, whenever justice demands it. Utilities must not be harassed by demands financially impossible, and if the standards of service are to be raised year by year, the people who receive the improved service will have to pay for it. Moreover, the public will have to reconcile itself to an allowance of adequate depreciation funds, and it must give up once for all its lingering fancy for competition in utility service. It will also have to forego the short-term franchise that imposes no obligation upon the city to protect the investment at the end of the franchise period. In short, Mr. Wilcox states, the "let-them-take-a-chance" policy must be definitely discarded.

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ANNUAL REPORT

Virginia Railway & Power Company

The comparative statement of income, profit and loss of the Virginia Railway & Power Company, Richmond, Va., for the years ended June 30, 1915 and 1916, follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Revenue from railway operations	$3,172,862	56.20	$2,838,370	55.55
Light, power and gas revenues	2,472,296	43.80	2,271,252	44.45
Total operating revenues	$5,645,158	100.00	$5,109,622	100.00
Railway operating expenses:				
Maintenance of way and structures	$251,424	7.92	$286,560	9.46
Maintenance of equipment	180,611	5.70	173,137	6.10
Traffic expenses	8,725	0.27	6,742	0.24
Transportation expenses	1,006,422	31.71	901,005	31.74
General expenses	342,205	10.79	293,157	10.33
Total	$1,789,387	56.39	$1,642,601	57.87
Light, power and gas expenses	886,792	35.87	826,473	36.39
Total operating expenses	$2,676,179	47.41	$2,469,074	48.32
Operating income	$2,968,979	52.59	$2,640,548	51.68
Other income	96,610	1.71	80,919	1.58
Gross income	$3,065,589	54.30	$2,721,467	53.26
Taxes and licenses	327,631	5.80	298,551	5.84
Income applicable to fixed charges and rentals	$2,737,958	48.50	$2,422,916	47.42
Fixed charges and rentals	1,415,036	25.05	1,337,867	26.19
Surplus over fixed charges and rentals	$1,322,922	23.44	$1,085,049	21.23
Depreciation	$100,000	1.77	$100,000	1.96
Proportion of discount on securities	30,316	0.54	29,261	0.57
Net miscellaneous charges not operating	38,488	0.68	33,284	0.65
Total direct charges	$168,804	2.99	$162,546	3.18
Surplus over fixed and other charges	$1,154,118	20.45	$922,503	18.05

The operations of the Richmond Railway & Viaduct Company for the last fiscal year are included in the above statement, but not for 1915. The gross income from all sources, after operating expenses, showed an increase of $344,122, or 12.65 per cent, and established the highest record of earnings in the history of the company. Railway operations secured increased revenue of $334,492, or 11.8 per cent, and the total light, power and gas revenues rose $201,044, or 8.8 per cent, so that the total operating revenue increased $535,536, or 10.4 per cent. The total operating expenses, however, increased $207,104, or 8.4 per cent, so that the operating income gained $328,431, or 12.4 per cent, This, combined with an increase of $15,691 or about 19 per cent in other income, gave the unprecedented gain in gross income before noted. The gain in surplus over fixed and other charges was $231,615, or about 25 per cent.

The stated increase in total operating expenses arose from an increase of $60,318, or 7.3 per cent, in light, power and gas expenses, and $146,786, or 8.9 per cent, in railway expenses. In the railway group, maintenance of way an structures alone showed a decrease. The total expenditures for railway maintenance amounted to $432,035, or 13.62 per cent of the railway revenues in 1916, as compared to $441,697, or 15.56 per cent, the previous year. In addition to the regular charge for maintenance of way and equipment, $100,000 was carried to the depreciation reserve, and an additional sum of $335,973 was credited thereto as of June 30, 1916. The balance in the reserve on this date was $1,157,866, as compared to $960,572 the preceding year.

The company expended $371,597 for additions, extensions and betterments in 1916. Various statistics follow:

	1916	1915	Change
Revenue passengers carried	67,226,456	62,271,603	+4,954,853
Transfer and free passengers	16,980,726	14,706,115	+2,274,611
Total passengers carried	84,207,182	76,977,718	+7,229,464
Percentage of passengers using transfers	19.33	18.10	+1.23
Average fare per passenger, including transfers	$0.037	$0.037	.....
Car mileage	13,750,325	12,439,758	+1,310,567
Car hours	1,645,521	1,513,612	+131,909
Total revenue per car mile	$0.231	$0.228	+$0.003
Total revenue per car hour	$1.928	$1.87	+$0.058
Operating expenses per car mile	$0.131	$0.132	—$0.001
Operating expenses per car hour	$1.088	$1.09	—$0.002

ELECTRIC RAILWAY STATISTICS

Returns for Year Ended June 30, 1916, Are Encouraging for East and South, with Depression in West

A comparison of electric railway statistics for the twelve months ended June 30, 1916, with figures for the corresponding period of 1915, made by the information bureau of the American Electric Railway Association, indicate an encouraging improvement in the electric railway business of the Eastern and Southern districts of the United States, together with a continued depression in the Western district. This latter is probably due both to the economic effects of the European war and to unregulated jitney competition. Increasing expenses and taxes accompany the advance in net earnings and net income. Data for twelve months representing 8721 miles of line* of companies scattered throughout the country indicate an increase in operating revenues of 3.47 per cent, in operating expenses of 2.40 per cent and in net earnings of 5.15 per cent, while data representing 7718 miles of line indicate an increase in taxes of 3.04 per cent, and in net income of 25.72 per cent. The operating ratio of the United States as a whole decreased from 61.19 per cent in 1915 to 60.56 per cent in 1916, though that of the Western district increased from 63.01 per cent in 1915 to 64.18 per cent in 1916. Moreover, the operating ratio of this district was higher than that of the other two groups.

The number of revenue passengers carried by companies representing 6667 miles of line increased 4.13 per cent, while the number of transfer passengers increased 2.90 per cent, the revenue car mileage 2.42 per cent and revenue car hours 0.43 per cent. Indications point to almost no increase in traffic in the Western district while its earnings decreased. The average fare per revenue passenger decreased 0.39 per cent while the average fare per passenger, including transfers, decreased 0.25 per cent. It must be borne in mind in this connection that both of these figures are based upon the combined returns of both city and interurban electric railways. The average number of revenue passengers per passenger car-mile increased 1.64 per cent.

The returns from the city and interurban electric railway companies, as shown in the tables on the following page, were classified according to the following geographical grouping: *Eastern District*†—East of the Mississippi River and north of the Ohio River. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

Table I shows the revenues, expenses and net earnings of 185 electric railways in the United States as well as the net income of 150 companies reporting taxes and fixed charges. Of the three groups in this table, the Western represented by 2262 miles of line showed a decrease in operating revenues of 1.04 per cent and a slight increase in operating expenses, while net earnings decreased 4.19 per cent. The net income of companies in this group represented by 1966 miles of line decreased 14.91 per cent. The Southern and Eastern groups secured increases in operating revenues, expenses and net earnings. The net income of the Southern group increased about 25 per cent, while that of the Eastern apparently increased over 50 per cent. All groups had an increase in the amount of taxes paid, the percentage increase for the United States as a whole being 3.04.

Table II shows the details of the operating revenues of companies represented by 6926 miles of line. This table shows a considerable decrease in the mail revenue together with increases in freight, express and milk revenue. As a whole passenger revenue increased, though that of the Western group decreased. The largest increase in passenger revenue, one of 5.71 per cent, occurred in the Eastern group.

Table III gives the traffic statistics of companies represented by 6667 miles of line. All groups secured increases in the number of passengers carried and car-miles run. The Eastern and Southern showed increases in the number of car-hours run, while the Western suffered a very slight

*The 1912 report of the Bureau of the Census on street and electric railways gives the total miles of line in the United States as 30,437 miles.

†The returns for this group include the First and Second Districts of New York, exclusive of the Interborough Rapid Transit Company of New York City.

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decrease of 0.07 per cent. The Southern district showed the greatest increase in the number of transfer passengers carried; the Western, the least. The per cent of increase in the number of revenue passengers carried was almost the same in the Eastern and Southern groups, while the Western district showed almost no increase. A large number of companies keep no record of free passengers, and the records of free passengers as shown in the table are therefore somewhat smaller than the actual figures. The average fare per revenue passenger decreased in all but the Southern district, where there was apparently a slight increase. A similar decrease occurred in the average fare per passenger including transfers, though the Southern district showed no change in this respect. The average number of revenue passengers per passenger car-mile increased in the East and decreased in the South and West, particularly in the latter district. The increase for the United States as a whole was one of 1.64 per cent.

In Table IV are shown the revenues, expenses and net earnings per revenue car-mile and per revenue car-hour, together with the per cent increase or decrease over the corresponding figures for 1915. There are also given the number of revenue car-miles and revenue car-hours involved with the last three figures omitted. The table indi-

TABLE I

REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR TWELVE MONTHS ENDING JUNE 30, 1916
COMPILED FROM MONTHLY RETURNS OF ELECTRIC RAILWAYS TO THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

Account	United States		Eastern District		Southern District		Western District	
	Amount, 1916 (in thousands)	Increase over 1915, per cent	Amount, 1916 (in thousands)	Increase over 1915, per cent	Amount, 1916 (in thousands)	Increase over 1915, per cent	Amount, 1916 (in thousands)	Increase over 1915, per cent
Operating revenues	208,641	3.47	141,650	5.18	13,947	4.27	53,044	*1.04*
Transportation revenues	202,822	3.54	137,472	5.37	13,425	4.12	51,931	*1.14*
Other railway operating revenues	5,813	0.87	4,178	*0.78*	522	8.30	1,113	4.02
Operating expenses	126,352	2.40	84,396	3.25	7,911	0.36	34,045	0.81
Way and structures	18,758	2.89	13,682	6.85	1,018	*4.41*	4,058	*6.96*
Equipment	15,488	1.56	10,912	3.20	782	1.69	3,794	*2.89*
Traffic	637	6.17	344	*7.77*	53	3.92	240	36.36
Conducting transportation	73,000	2.66	47,929	2.54	4,758	0.42	20,313	3.48
Power	19,690	2.70	12,663	0.18	987	*0.60*	6,040	9.06
Car operation (including supervision)	53,310	2.64	35,266	3.41	3,771	0.72	14,273	1.29
General and miscellaneous	18,469	1.46	11,529	2.53	1,300	3.17	5,640	*1.08*
Net earnings	82,289	5.15	57,254	8.15	6,038	9.89	18,999	*4.19*
Operating ratio, per cent. 1916	60.56	.....	59.58	.....	56.72	.....	64.18	.....
Operating ratio, per cent. 1915	61.19	.....	60.69	.....	58.93	.....	63.01	.....
Average number of miles of line represented	8,721	.....	5,430	.....	1,029	.....	2,262	.....

COMPANIES REPORTING TAXES AND FIXED CHARGES

Operating revenues	195,491	3.58	140,073	5.20	7,169	1.20	48,249	*0.54*
Operating expenses	118,182	2.21	83,371	3.26	3,866	*5.86*	30,945	*0.56*
Net earnings	77,309	5.73	56,702	8.20	3,303	10.91	17,304	*0.45*
Taxes	12,687	3.04	8,574	*2.44*	583	12.58	3,530	*3.07*
Operating income	64,622	6.28	48,128	9.29	2,720	10.57	13,774	*3.75*
Miscellaneous income	7,831	*0.55*	4,677	*2.48*	607	16.51	2,547	*0.39*
Gross income	72,453	5.50	52,805	8.14	3,327	11.61	16,321	*3.84*
Income deductions	39,887	0.45	26,824	*0.08*	1,468	3.67	11,595	1.15
Interest	17,158	2.64	16,229	2.60	345	*4.96*	584	8.96
Rentals and other	15,408	25.72	9,752	57.67	1,514	25.96	4,142	*14.91*
Net income	60,45	.....	59,52	.....	53,93	.....	64,14	.....
Operating ratio, per cent. 1916	61,26	.....	60,64	.....	57,96	.....	63,44	.....
Average number of miles of line represented	7,718	.....	5,181	.....	571	.....	1,966	.....

TABLE II

DETAILS OF OPERATING REVENUES OF ELECTRIC RAILWAYS FOR THE YEAR ENDING JUNE 30, 1916

Account	United States		Eastern District		Southern District		Western District	
	Amount, 1916 (in dollars)	Increase over 1915, per cent	Amount, 1916 (in dollars)	Increase over 1915, per cent	Amount, 1916 (in dollars)	Increase over 1915, per cent	Amount, 1916 (in dollars)	Increase over 1915, per cent
Operating revenues	187,349,945	3.62	120,358,951	5.46	13,947,029	4.27	53,043,965	*0.48*
Transportation revenues	182,516,328	3.64	117,100,267	5.57	13,425,150	4.12	51,930,911	*0.59*
Passenger	178,918,815	3.68	114,922,053	5.71	13,110,931	4.17	50,885,831	*0.75*
Baggage	22,609	*5.59*	17,615	*1.58*	.....	.....	4,994	5.49
Special car, etc	180,907	2.70	83,418	8.87	12,066	8.18	85,423	*3.53*
Mail	140,742	*14.70*	83,686	*11.71*	7,412	1.45	49,644	*41.47*
Express	569,119	13.70	356,218	17.01	82,171	*7.81*	131,730	22.18
Milk	134,402	33.82	80,703	15.68	22,068	0.02	31,631	*65.85*
Freight	2,385,321	0.49	1,519,297	*3.05*	184,035	6.23	681,989	7.67
Switching	68,897	2.08	24,141	*8.69*	2,196	*22.95*	42,560	11.49
Miscellaneous	95,516	*25.81*	74,136	*30.16*	4,271	70.84	17,109	18.18
Other railway operating revenues	4,833,617	2.98	3,198,684	1.46	521,879	8.32	1,113,054	5.10
Station and car privileges	1,452,643	*1.79*	1,116,235	*5.18*	56,723	7.54	279,685	2.01
Parcel room	7,707	*5.67*	4,317	*1.89*	1,204	*3.53*	2,186	*7.10*
Storage	781	224.07	127	11.40	.....	.....	654	414.96
Car service	10,948	24.27	5,471	170.57	.....	.....	5,513	*19.18*
Rents, tracks and terminals	980,455	*4.94*	679,408	*8.08*	68,922	7.50	232,125	1.74
Rents, equipment	246,427	38.97	92,767	20.96	2,100	*12.75*	151,560	*84.57*
Rents, buildings, etc	341,592	8.30	257,355	3.98	18,798	*4.45*	65,439	35.62
Power	641,788	*0.17*	354,162	*3.54*	79,880	*4.85*	207,746	8.33
Miscellaneous	1,151,240	11.73	688,842	22.23	294,252	14.20	168,146	*19.60*
Average number of miles of line represented	6,926	.....	3,635	.....	1,029	.....	2,262	.....

TABLE III

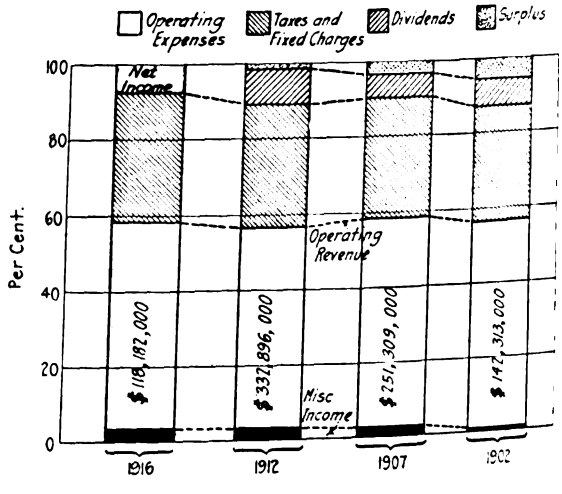
TRAFFIC STATISTICS OF ELECTRIC RAILWAYS FOR THE YEAR ENDING JUNE 30, 1916

Account	United States		Eastern District		Southern District		Western District	
	Amount, 1916 (in thousands)	Increase over 1915, per cent	Amount, 1916 (in thousands)	Increase over 1915, per cent	Amount, 1916 (in thousands)	Increase over 1915, per cent	Amount, 1916 (in thousands)	Increase over 1915, per cent
Car miles — total	631,862	2.46	387,184	2.04	45,360	5.59	199,318	2.59
Passenger car miles	619,006	2.45	379,821	2.15	44,541	5.69	194,644	2.31
Other revenue car miles	10,076	1.25	6,557	*4.88*	817	13.03	3,042	18.83
Non-revenue car miles	2,760	11.69	806	27.12	342	*15.45*	1,612	11.75
Car hours — total	68,998	0.45	42,551	0.24	5,258	4.33	21,189	*0.07*
Passenger car hours	68,106	0.42	42,143	0.35	5,161	4.64	20,802	*0.44*
Other revenue car hours	631	1.45	370	*7.50*	55	*1.79*	206	24.39
Non-revenue car hours	261	5.24	38	*18.59*	42	*19.25*	181	25.57
Passengers — total	4,507,701	3.82	2,884,785	5.39	244,942	5.98	1,377,974	*0.32*
Revenue passengers	3,457,028	4.13	2,262,859	5.85	200,626	5.41	993,543	*0.17*
Transfer passengers	1,019,672	2.90	609,258	3.81	39,944	8.76	370,470	*0.96*
Free passengers	31,001	0.96	12,668	2.32	4,372	9.06	13,961	*1.49*
Average fare per passenger	5.08c.	*0.39*	5.08c.	*0.39*	4.89c.	0.62	5.12c.	*0.97*
Per revenue passenger	3.92c.	*0.86*	4.00c.	0.25	4.08c.	0.00	3.73c.	*1.06*
Per passenger (including transfers)								
Average number of revenue passenger per passenger car mile	5.58	1.64	5.96	3.65	4.50	*0.44*	5.10	*1.16*
Average number of miles of line represented	6,667	.....	3,635	.....	770	.....	2,262	.....

TABLE IV

OPERATING REVENUES AND EXPENSES OF ELECTRIC RAILWAYS PER REVENUE CAR MILE AND CAR HOUR YEAR ENDING JUNE 30, 1916

Account	United States		Eastern District		Southern District		Western District	
	Amount, 1916 (in cents)	Increase over 1915, per cent	Amount, 1916 (in cents)	Increase over 1915, per cent	Amount, 1916 (in cents)	Increase over 1915, per cent	Amount, 1916 (in cents)	Increase over 1915, per cent
Per revenue car mile:								
Operating revenues	29.22	1.11	31.15	3.39	23.10	0.52	26.63	*5.48*
Operating expenses	17.53	*0.17*	18.16	0.89	13.45	*8.54*	17.22	*1.09*
Net earnings	11.69	3.09	12.99	7.09	9.65	5.12	9.41	*6.61*
Revenue car miles*	629,082	.....	386,378	.....	45,018	.....	197,686	.....
Average number of miles of line represented	6,667	.....	3,635	.....	770	.....	2,262	.....
Per Revenue car hour:	(In dollars)		(In dollars)		(In dollars)		(In dollars)	
Operating revenues	2.67	3.09	2.83	5.20	1.99	1.53	2.52	*1.18*
Operating expenses	1.60	1.27	1.65	2.48	1.16	*1.69*	1.62	*1.25*
Net earnings	1.07	5.94	1.18	9.26	0.83	6.41	0.90	*0.86*
Revenue car hours*	68,737	.....	42,513	.....	5,216	.....	21,008	.....
Average number of miles of line represented	6,667	.....	3,635	.....	770	.....	2,262	.....



Note.—Figures in italics denote decreases. *Last three figures are omitted.

MISCELLANEOUS STATISTICS OF ELECTRIC RAILWAYS IN THE UNITED STATES FOR THE FISCAL YEAR ENDED JUNE 30, 1916, WITH INCREASES OVER THE PRECEDING YEAR

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cates that the net earnings per revenue car-mile increased 3.09 per cent, while the net earnings per revenue car-hour increased 5.94 per cent. The largest increase occurred in the Eastern group, while the Western suffered decreases of 5.26 and 6.61 per cent respectively.

The chart on page 1176 is a graphical representation of the income account of the electric railways of the United States for the four years 1902, 1907, 1912, 1916. The first three are based on the returns from the 1912 census of street electric railways and are taken from a diagram in F. W. Doolittle's "Studies in the Cost of Urban Transportation Service" (page 25). The figures for 1916 are based upon the returns of 150 electric railways represented by 7700 miles of line. Though of course not strictly comparable owing to the difference in the number of companies represented, they furnish some indication as to the trend of operating expenses and net income.

Cincinnati & Columbus Traction Company, Cincinnati, Ohio.—The property of the Cincinnati & Columbus Traction Company is advertised to be sold at Cincinanti on Dec. 19, under foreclosure of the first mortgage of $600,000 and the second mortgage securing $148,000 of notes outstanding. The upset price of the property free and clear of all liens has been set at $850,000.

Illinois Traction Company, Peoria, Ill.—Bodell & Company, Providence, R. I., are offering at 99½ and accrued dividend a block of 6 per cent cumulative guaranteed preferred stock of the Danville, Champaign & Decatur Railway & Light Company, which is under the management of the Illinois Traction Company. The present offering is a small additional amount to that previously outstanding and brings the amount of this issue outstanding up to $500,000.

Keystone Utilities Company, Hanover, Pa.—The Keystone Utilities Company was incorporated under the laws of Delaware on Nov. 27, with an authorized capital stock of $5,000,000, to take over a number of public utilities in Pennsylvania, among them the Hanover & McSherrystown Street Railway, the Hanover Light, Heat & Power Company, the Gettysburg Electric Company, the Du Bois Electric & Traction Company, and the Susquehanna County Light & Power Company. Among the directors are F. J. Platt, E. J. Lynett, James A. Linen, Jr., Griffith T. Davis and W. W. Inglis, Scranton; Irving A. Stearns and Guy W. Moore, Wilkes-Barre.

Pensacola (Fla.) Electric Company.—The Pensacola Electric Company has declared a dividend of 1½ per cent on the $300,000 of preferred stock of the company on account of accumulation, along with the semi-annual 3 per cent dividend, both payable on Dec. 1 to holders of record of Nov. 23. This leaves about 7½ per cent still in arrears.

Public Service Corporation of New Jersey, Newark, N. J.—The financial statement of the Public Service Commission of New Jersey for October shows a gross increase in total business over October, 1915, of $466,189, or 13.9 per cent. The balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus, was $641,066, and the increase in surplus available for dividends over the corresponding month in 1915 was $130,234. The gross increase in total business for the ten months ended Oct. 31, 1916, amounted to $4,096,443, or 13.4 per cent. The balance available for amortization, dividends and surplus totaled $4,568,381, and the increase in surplus was $1,018,738.

Springfield, Troy & Piqua Railway, Springfield, Ohio.—The Springfield, Troy & Piqua Railway has applied to the Ohio Public Utilities Commission for authority to issue $280,000 of common stock and $250,000 of bonds to reimburse the estate of Asa F. Bushnell on account of $670,844 of advances made to the company.

Toronto (Ont.) Railway.—William A. Read & Company, New York, N. Y., have sold $1,250,000 of 6 per cent gold notes of the Toronto Railway due $500,000 on Dec. 1, 1917, and $750,000 on Dec. 1, 1918. The notes are in coupon form of $1,000 each. They are redeemable at 102½ and interest on any interest date on thirty days' notice. The railway agrees not to issue any bonds or other funded debt while any of these notes remain unpaid, without applying the proceeds to their redemption. The present $1,250,000 of notes are part of an authorized issue limited to $2,000,000, of which $1,500,000 will eventually be issued to refund a like amount of a previous issue. Of this old issue, $1,250,000 was to mature on Dec. 1, 1916, and $250,000 on Dec. 1, 1917. The notes represent extensions and improvements of the Toronto Power Company, Ltd., which endorses them.

Third Avenue Railway, New York, N. Y.—The Third Avenue Railway, on Nov. 28, passed the quarterly dividend. Dividends were renewed last January for the first time since 1911, at the rate of 1 per cent a quarter, and 3 per cent has been disbursed this year. F. W. Whitridge, president of the company, said: "The statement for four months shows that there was a decrease of $1,433,921 in the operating revenue and a decrease of $1,282,154 in the net income. This latter sum may be estimated to be the net cost of the strike on the Third Avenue Railway during the last four months. That performance is practically over. The service on all the lines under the jurisdiction of the Third Avenue Railway is now normal except in the town of Yonkers, where it is between 50 and 60 per cent normal." The October statement of the company showed that total revenue of $390,022 was $578,626 less than in the same month last year. There was a deficit of $505,508 after all deductions had been made.

United Light & Railways Company, Grand Rapids, Mich.—The United Light & Railways Company has executed an agreement with the New York Trust Company to secure an issue of convertible debenture bonds, due Nov. 1, 1956. One and a half million dollars will be issued presently.

DIVIDENDS DECLARED

Baton Rouge (La.) Electric Company, 3 per cent, preferred.

Eastern Power & Light Corporation, New York, N. Y., quarterly, 1¾ per cent, preferred.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct.,	'16		$1,122,910	$20,041	$1,102,869	$393	$1,102,476
1 " "	'15		411,504	14,323	397,181	40,833	356,348
12 " "	'16		8,233,952	232,384	8,001,568	340,069	7,661,499
12 " "	'15		4,232,914	163,503	4,069,411	490,000	3,579,411

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m., Oct.,	'16		$513,465	*$230,840	$282,625	$215,691	$66,934
1 " "	'15		477,723	*192,605	285,118	212,502	72,616
4 " "	'16		1,884,103	*860,077	1,024,026	859,430	164,596
4 " "	'15		1,768,622	*759,418	1,009,204	847,035	162,169

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH KY.

1m., Sept.,	'16		$26,019	*$17,033	$8,986	$7,128	$1,858
1 " "	'15		23,864	*14,131	9,733	7,475	2,258
12 " "	'16		309,432	201,118	108,314	87,345	20,969
12 " "	'15		290,264	*181,222	109,042	91,654	17,388

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Sept.,	'16		$23,920	*$12,997	$10,923	$7,712	$3,211
1 " "	'15		22,012	*12,186	9,826	7,062	2,764
12 " "	'16		280,503	*155,104	125,399	90,585	34,814
12 " "	'15		246,988	*146,777	100,211	86,639	13,572

PHILADELPHIA & WESTERN RAILWAY, UPPER DARBY, PA.

1m., Oct.,	'16		$47,433	$20,865	$26,568	$12,570	$13,998
1 " "	'15		44,922	21,302	23,620	12,485	11,135
12 " "	'16		508,235	242,346	265,889	150,501	115,388
12 " "	'15		449,346	217,636	231,710	147,448	84,262

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m., Oct.,	'16		$846,915	$512,896	$334,019	$141,883	$192,136
1 " "	'15		807,582	488,731	318,851	144,173	174,678
10 " "	'16		8,441,904	5,205,673	3,236,231	1,434,878	1,801,353
10 " "	'15		7,822,440	5,020,124	2,802,316	1,416,420	1,385,896

*Includes taxes.

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Traffic and Transportation

BATHING BEACH A REVENUE BUILDER

Sunday Beach Travel in Summer Averages 30,000 on Portland Interurban Line that Carried Less than 5000 Before Resort Opened

About the middle of the summer season in 1915 it became apparent to the Portland Railway, Light & Power Company, Portland, Ore., that as a whole the people of Portland preferred above all other places of resort and recreation during the summer season those which afforded bathing facilities. It did not seem to matter particularly whether there were additional amusements. This led to a study of the possibility of developing some resort on the traction company's system which would offer bathing attractions.

On the Columbia River about 7 miles north of the heart of the city the railway, in conjunction with a number of other owners, held title to property on Sand Island, known as Columbia Beach. The Vancouver interurban line of the railway passes within a few hundred yards of the beach at a point which is an even thirty-minute run from the city. The island has a frontage of 5800 ft. on the river, the water is clean, the average current is from 2 to 3 m.p.h. in the summer, and the beach is of fine white sand with a gradual slope, making it an ideal beach for children and beginners.

Although there is a fine grove of trees on the island and attractive places for picnicking and camping, the place was practically unknown as a resort, and had never brought the owners any revenue.

In the middle of August, 1915, in its company publication which is distributed on the street cars, the railway company printed a paragraph about the possibilities of Columbia Beach. This was followed with an expenditure of $80 for display advertising in the daily papers in which the beach was mentioned as "an ideal romping place for the kiddies." The results of this publicity was a flood of applications for leasing the beach for the 1916 season, leases being requested on short and long terms and for almost every conceivable amusement and concession privilege. As a result, a concessionaire's agreement was drawn up whereby the lessee agreed to expend several thousand dollars for improvements, such as bath-houses, water supply and sewerage systems, athletic field, etc. This agreement netted a considerable revenue to the owners and the only expenditure on the part of the railway was the cost of the display advertising and construction of a station and loading platform.

When these arrangements were completed it was too late to accomplish much in 1915, but the lessees undertook an active advertising campaign in which the company assisted, and the beach came to be generally known.

The Vancouver line which serves the beach handles the regular through business to Vancouver, Wash., and there were no elements tending to increase the revenues on the line except the development of Columbia Beach. In 1916, the receipts on this line were about 230 per cent more than in 1915, and 550 per cent more than prior to the development of the bathing beach idea. The passenger totals for four Sundays in August, 1914, were 18,383, while the totals for four Sundays in August, 1915, were 35,769, and similar totals for four Sundays in August, 1916, were 119,314.

In the summer of 1916, the unprecedented high waters in the river and the late rains made it impossible to open the season at the beach until the first Sunday in August. Another condition which worked against the greatest returns to the railway was the construction of a 700-ft. causeway which enabled automobiles to reach the beach. In 1915, the only access to the beach was by electric car or boat, but with the completion of a highway bridge in 1916 the number of automobiles entering the grounds on Sundays ranged from 500 to 2000 and checks made by the railway showed the average number of passengers per automobile to be 4.8. The remarkable gain in receipts despite the auto competition indicates the efficacy of the advertising campaign and the popular approval which met the beach idea.

STATISTICS OF ACCIDENTS IN PENNSYLVANIA

John P. Doheny, chief of the bureau of accidents of the Pennsylvania Public Service Commission, on Nov. 25 submitted to William D. B. Ainey, chairman of the commission at Harrisburg, Pa., statistics relating to accidents that have occurred on steam railroads and street railways in Pennsylvania during the year ended June 30, 1916.

The total number of accidents during this period was 13,278, an increase of 9 per cent over the previous year so far as steam roads are concerned, and of 10 per cent with respect to the operation of electric railways. As a result of these accidents 1138 persons were killed on the railroads and 10,419 injured, while 174 were killed on the street railways and 2858 injured. There is an increase of 14 per cent with regard to railroad facilities and of 16 per cent with regard to the number injured. The increase in the number of killed on the street railways was 7 per cent. and in the number of injured 3 per cent.

The report shows that the trespasser is the chief sufferer from railway accidents, for although there is a decrease in the number of trespassers killed this class represents 50 per cent of the total number of railroad fatalities and only 1 per cent involves passengers.

Grade-crossing accidents on street railways other than city street crossings resulted in the death of eighteen people, fifteen of them automobilists, two pedestrians, and one by collisions with trains.

Thirty-nine people were injured in grade-crossing accidents, one an employee, twenty-three passengers, and fifteen others. The total number of killed and injured was fifty-seven.

CLEVELAND SERVICE TO BE INCREASED

Yielding to persistent demands from the public and the newspapers, Fielder Sanders, street railway commissioner of Cleveland, Ohio, has arranged a schedule for Superior Avenue that will add fourteen cars during the rush hours, and has promised to increase the number on Euclid and Detroit Avenues as soon as his checkers have finished their work.

The demand for additional cars has been earnest and vehement for some weeks past. It has been stated that as many as 200 and 250 cars have been found in the car storage yards during the rush in the morning and evening, while people were fighting for standing room in order to get back and forth.

Under the Cleveland settlement grant the operation of cars is in the hands of the company, but it must be conducted according to instructions from the city. J. J. Stanley, president of the Cleveland Railway, insists that the base tables should be raised, so that more cars may be run all through the day. Aside from the need of additional cars through the day, he says it will be impossible to secure men for the short hours morning and evening. All men receive pay for five hours any way, and he believes that the service should be better all around. The officers of the local branch of the Amalgamated Association agree with him in this.

Mr. Sanders said that it was very difficult to secure men and he did not know whether a sufficient number to operate the additional cars he has put on Superior Avenue can be obtained. The demand for men in other work is so great and the wages so high that men will not take places on the cars at the wages the company can afford to pay.

FARE INCREASE IN PENNSYLVANIA

The Titusville (Pa.) Traction Company has succeeded in securing an increase in fares from 5 cents to 6 cents in the city of Titusville, in the boroughs of Pleasantville and Hydetown and in the township of Oil Creek. Some few weeks ago the company in its campaign for permission to charge an adequate fare addressed the Mayor and the Commissioners of the city of Titusville summarizing the facts in connection with the affairs of the company that made an advance in rates imperative. In its statement to the Mayor and the Commissioners the company, through William J. Smith, its general manager, said that the road had not earned sufficient to pay interest at 5 per cent on its first

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mortgage bonds, to say nothing of the interest on the second mortgage bonds. Mr. Smith stated that this condition had been brought about in the last seven years by the great number of automobiles publicly and privately owned, together with the high cost of labor and materials which entered into the financial operation of the road. He offered to submit the records and books of the company to the Commissioners for verification of the facts set forth by him. Mr Smith said that the day had passed when the company could secure capital to meet its obligations year by year if it was unable to do so through its own resources.

The statement by Mr. Smith to the Mayor and the Commissioners was published in the papers in the territory through which the company operates. In a subsequent notice to the public published in the papers the company quoted in full the editorial, "Encouraging Fare Increases," which appeared in the ELECTRIC RAILWAY JOURNAL of Oct. 28. It also referred to other articles in the same issue of this paper relating to fare matters, notably the application of the Bucks County Interurban Railway, Trenton, for permission to increase its fares, the decision of the New Hampshire Commission in the Manchester & Derry Street Railway fare case and the allowance of the 6-cent fare rate for the major portion of the lines of the Massachusetts Northeastern Street Railway.

PITTSBURGH NIGHT FARE CASE ARGUED

The question of 10-cent fares at night on the lines of the Pittsburgh (Pa.) Railways was argued before the Superior Court at Philadelphia, Pa., recently. David A. Reed, attorney for the company, asserted that the Public Service Commission had wilfully ignored its own tariff statement in ruling that the railway had violated the publicity provision of the law when it restored the 10-cent night fare last summer. Mr. Reed explained that in 1907 the Pittsburgh Railways reduced its night fare to 5 cents in obedience to an act of the Legislature. Subsequently the act was declared unconstitutional. The railway, however, continued the 5-cent rate until the recent strike. With the aid of the Mayor the strike was settled, but the company was called upon to meet an additional expense of $500,000 a year. This made it necessary to find additional revenue, and it was decided to restore the 10-cent owl fare. The proposed new tariff was published and posted and notice was served on the Public Service Commission. In referring to the complainants' grounds of attack, Mr. Reed said the tariff was properly posted. C. Elmer Bown, representing William Jacoby, city complainant, contended that the company did not do what the law required in making the rate nor did it do anything that would give the public adequate notice that it proposed to put the increase into effect.

The decision of the commission in the case was referred to at length in the ELECTRIC RAILWAY JOURNAL of Oct. 14, page 856. The commission held that the company acted in violation of both the spirit and the letter of the Public Service Company Law of Pennsylvania in the way in which it proceeded to give notice of the doubling of the fare. No opinion was expressed of the commission with regard to the authorization of an increase in rates. It said that "when that matter comes before us in the regular way, and after full hearing shall be had, this commission will decide."

One-Man Cars in Fort Worth.—The Northern Texas Traction Company has put ten front-entrance one-man cars in service on the Summit Avenue line in Fort Worth. According to G. H. Clifford, general manager, the one-man cars are being tried as an experiment.

Accident on New York Elevated.—Eleven persons were injured on the morning of Nov. 24 by the derailment of the rear car of a southbound Third Avenue elevated train of the Interborough Rapid Transit Company at 129th Street, New York. After the car had left the rails it was dragged about 20 ft.

Withdrawal of Reduced Rate Tickets Suspended.—The Public Service Commission of Massachusetts has issued an order requiring the Bay State Street Railway to suspend until Jan. 1, 1917, unless otherwise directed, its proposed withdrawal from sale of strips of six tickets for 25 cents in the city of Fall River.

Near-Side Stops in Jeffersonville and New Albany.—The city cars of the Louisville & Southern Indiana Traction Company are being stopped on the near side in Jeffersonville and New Albany, Ind. The commercial organizations of the two cities requested the change, as the cars in Louisville and in other cities stop on the near side.

Journal Cartoon Reproduced in Birmingham.—The *Buzzer*, published in the interest of the employees of the Birmingham Railway, Light & Power Company, Birmingham, Ala., reproduced in its issue of Nov. 25 the editorial "Every Employee a Publicity Representative" and the accompanying cartoon, from the ELECTRIC RAILWAY JOURNAL of Nov. 4.

Prizes Offered for Car Names.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., will offer cash prizes for the best name submitted and adopted for two new limited cars which have lately been installed. The new cars will operate between Fort Wayne, Ind., and Lafayette, Ind., the running time being four hours for the 110 miles.

New Destination Ordinance in St. Louis.—A bill has been passed by the Board of Aldermen of St. Louis, Mo., which provides that extra cars used at times when traffic is heavy, must display placards informing passengers just how far the car is going. By the provisions of the bill the United Railways is prohibited from running cars over any other than their regular routes except when emergencies arise.

Louisville Semaphores Successful.—In the annual report of the Board of Public Safety of Louisville, Ky., special attention is paid to the success which has attended the use of the semaphores installed as a part of the police department's traffic regulation at the principal corners. It is observed that pedestrians are coming more and more to be governed in their crossing at these intersections by the semaphore signals of the traffic officer.

Additional Time to Rebuild Running Boards.—A supplemental order has been issued by the Public Utilities Commission of Connecticut which makes it compulsory on the Shore Line Electric Railway to equip on or before June 1, 1917, all its double truck open cars with double running boards. The order permits the company to reconstruct cars that are not now so equipped, but on the understanding that the plans of reconstruction are first approved by the commission.

Portland Company to Test Rebuilt One-Man Car.—The Portland Railway, Light & Power Company, Portland, Ore., is rebuilding one of its three-compartment cars so that it can be operated by one man. The company has a number of these cars, weighing 13 tons, and equipped with two 27-hp. motors. The one being rebuilt will be operated as an experiment to see whether it will afford quicker service and whether it would be desirable to remodel other cars of this type in a similar manner.

Near Side Stops for Houston.—By agreement between the Public Service Commissioner of Houston, Tex., and the officials of the Houston Electric Company, near-side stops have been put into force on all street railway and interurban lines operating in the city. The near-side stop has been the order for down-town streets for several months and has proved satisfactory. It now has been extended to all residential streets. Certain leniency will be extended on unpaved streets, especially in wet weather, when the motorman may be permitted to use his own discretion.

Statement of Accidents Posted Monthly.—Every month hereafter there will be posted in each division of the United Railroads, San Francisco, Cal., a classified statement of all accidents. During the month of July last the number of car-miles per accident was 3955, and the number of passengers carried per accident was 32,546. In both August and September these figures each decreased, showing that, relatively, the number of accidents was greater in these months. The actual comparison of September with July showed that there was a decrease of 995 car-miles per accident and 5987 passengers per accident.

Conference on Louisville-Indianapolis Rates.—Action in regard to division of the rates for freight traffic north from Louisville over the Louisville & Southern Indiana and connecting lines to Indianapolis and beyond is understood

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to have been considered at a conference in Louisville between representatives of the Louisville Board of Trade and the railway managements. Chester P. Wilson, president, and Frank Smith, vice-president, of the Interstate Public Service Corporation, represented the railways, and John Telford, secretary of the transportation committee, represented the Board of Trade. Through routes and through rates were ordered by the Interstate Commerce Commission nearly three years ago, but no agreement has been reached as to division of the rates.

Service Abandoned in Lincoln.—The Lincoln Railway & Heating Company, Lincoln, Ill., has suspended business after a long period of unsettled relations with the city. About three months ago, the Public Utilities Commission of Illinois decided that the company could quit business if the city of Lincoln would concur therein. This permission was not received by the company, but after a number of weeks of uncertainty J. R. Patton, president of the company, issued an order discontinuing railway service. The Lincoln Railway & Heating Company was organized in 1891 and the first cars were run Christmas Day of that year. Mr. Patton bid in the property two years ago at foreclosure. It is expected that the lines will now be dismantled. The road is 5.5 miles long and equipped with seven motor cars. The decision to abandon the road is said to have been hastened by the prohibitive prices for coal and by the need which existed for immediate repair to the plant and equipment.

Thirty Extra Cars in Portland After Enforcement of Jitney Ordinance.—In the ELECTRIC RAILWAY JOURNAL for Nov. 25, page 1130, mention was made of the arrest of drivers of jitneys in Portland, Ore., charged with failing to secure franchises to operate as prescribed in an ordinance which went into effect on Nov. 15. In rendering decision in the case of one of the drivers arrested Judge Langguth sustained the right of the city to enforce the franchise requirement and sentenced the driver to pay a fine of $25. Attorney for the defense immediately gave notice of appeal. Meantime the jitneys, equipped with the speed and time recording devices required by the city ordinance for taxicabs, continued operating on the usual routes. On Nov. 20 A. J. Lee was arrested and made the defendant in a test case which will determine whether the jitney-taxicabs are infringements of the franchise ordinance. On Nov. 16 the Portland Railway, Light & Power Company added thirty cars to its regular service to handle the traffic which was not provided by the jitneys. Although no definite check of the additional traffic has been made, Fred Cooper, superintendent of transportation, estimated that the daily average jitney patronage was about 20,000. The railway company, it was announced, would put on such additional cars as were required to accommodate increases in the traffic.

Kansas City Suburban Fares to Be Considered.—The Kansas City (Mo.) Railways has asked the Public Service Commission of Missouri to inquire into the question of suburban rates on its lines extending beyond the city limits of Kansas City, Mo. The request of the company was a result of many complaints as to suburban rates, and specifically of the complaint filed with the commission on the rate to Maywood, a suburb about 15 miles from the center of Kansas City, Mo. At one hearing, Judge Kennish, chairman of the commission, intimated that without passing on the merits of the Maywood rate, the commission would be inclined to grant a reduction to a 5-cent fare, because the company already allowed a fare of only 5 cents to Fairmount Park, about equally distant from the city. The final hearing on the Maywood case was to have been held in Kansas City on Oct. 27. At that time the company intimated its purpose of filing the request for a general review. Temporarily, the Kansas City Railways is not charging the 10-cent fare heretofore charged for Maywood. It is, however, preserving its position, by not charging anything for the ride between Maywood and Kansas City, on business on which a city fare is collected. The fare from Kansas City to the city limits is 5 cents, and no additional fare is collected until after Maywood is passed. Inbound, conductors do not collect from passengers boarding cars at Maywood until after the city limits are reached, when the city fare is collected.

Personal Mention

R. W. Harris has been retained to make a survey of the Kansas City (Mo.) Railways with reference to the relation of schedules and cost of service on the various divisions.

A. C. Blinn, vice-president, treasurer and general manager of the Public Utilities Company, Evansville, Ind., has been elected vice-president, treasurer and general manager of the Northern Ohio Traction & Light Company, Akron, Ohio.

Charles Currie has been succeeded as vice-president and general manager of the Northern Ohio Traction & Light Company, Akron, Ohio, by A. C. Blinn, as noted elsewhere in this column. Mr. Currie has been general manager of the property for sixteen years, and has been active in electric and street railway work for thirty-four years. Some time ago he indicated his wish to be relieved of the active management of the Northern Ohio properties. He will continue with the company actively until Jan. 1, while Mr. Blinn is becoming familiar with the property. Mr. Currie has been re-elected a director, and, in addition, will serve the company hereafter in an advisory capacity.

Luke C. Bradley has been appointed district manager of the Stone & Webster properties in Texas. Mr. Bradley succeeds M. M. Phinney, who has been elected vice-president of the Stone & Webster interests with headquarters in Boston. Mr. Bradley has been in Texas for the last six years. His services with Stone & Webster cover a period of about fifteen years. For the last twenty years he has been engaged in public utility work, having occupied responsible positions of an engineering and operative character with various public utility corporations throughout the United States. Mr. Bradley went to the gulf coast section of Texas nearly six years ago as vice-president of the Houston Electric Company, Galveston-Houston Electric Railway and Galveston Electric Company, and manager of the latter two companies. In these capacities he was a constructive factor in the development of the Galveston-Houston territory. Early in 1913 he was appointed assistant district manager of the Stone & Webster properties in Texas, relieving Mr. Phinney of a large part of his duties as district manager. For a while the office was maintained in Dallas, but on account of its more centralized location with respect to the Stone & Webster properties was moved to Houston. Mr. Bradley is president of the American Electric Railway Transportation & Traffic Association, to which office he was elected at the recent convention in Atlantic City.

OBITUARY

Karl L. Wilcoxon, for the last five months master mechanic of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., in charge of the shops and motive power, died recently from injuries received when one of the locomotives of his own company ran him down while switching in the Michigan City yards. Karl Wilcoxon was a son of C. N. Wilcoxon, president and general manager of the company. He was born in Muncie, Ind., in 1879. After completing his education he entered railway work at the age of nineteen, in the shops of the Citizens Street Railway, Muncie, Ind. Later on he was employed in the shops of the Decatur Railway & Light Company, Decatur, Ill., as general electrician. In 1901 Mr. Wilcoxon took employment with the Western Ohio Railway, Lima, Ohio, his first work in the interurban field being as train dispatcher. He was subsequently made chief train dispatcher of the Western Ohio Railway, and later was promoted to the office of superintendent of the company. He left the Western Ohio Railway in 1907 to become superintendent of the Pittsburgh & Butler Railway, a single-phase road operating between Pittsburgh and Butler, Pa. He afterward engaged in general construction work, and spent about three years on the Pacific coast in railway work. For the last three years he had been connected with the Chicago, Lake Shore & South Bend Railway, first as signal inspector and for the last five months as master mechanic.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Denver & Ephrata Street Railway, Denver, Pa.—Governor Martin G. Brumbaugh has approved a charter for the Denver & Ephrata Street Railway, which proposes to construct a line between Denver and Ephrata, 4.7 miles. Capital stock, $130,000. H. S. Dissler, Denver, president. Incorporators: H. W. Marburger, R. S. Dornbach, J. Guy Eshelman, G. R. Zimmerman and H. S. Dissler.

***Keystone Utilities Company, Scranton, Pa.**—Incorporated under the laws of Delaware to take over a number of public utilities in Pennsylvania, among them the Hanover & McSherrystown Street Railway, the Hanover Light, Heat & Power Company, the Gettysburg Electric Company, the Du Bois Electric & Traction Company, and the Susquehanna County Light & Power Company. Authorized capital stock, $5,000,000. Among the directors are F. J. Platt, E. J. Lynett, James A. Linen, Jr., Griffith T. Davis and W W. Inglis of Scranton; Irving A. Stearns and Guy W. Moore of Wilkes-Barre.

FRANCHISES

Peoria Heights, Ill.—The village of Peoria Heights, a suburb of Peoria, has revoked the franchise of the Peoria Railway, which operates a car on Galena Road through the village. The trustees said the company had failed to provide a fifteen-minute schedule as stipulated in the franchise. The company was ordered to discontinue the operation of its cars on the night of Nov. 22 and to have its tracks removed by Dec. 1.

Paterson, N. J.—An ordinance has been passed by the Board of Public Works permitting the Public Service Railway to relocate its tracks on lower Broadway opposite Mulberry Street and also on Van Houten Street west of Furman Street.

Bowling Green, Ohio.—The Toledo, Fostoria & Findlay Railway has received a twenty-five year franchise from the Council to operate cars over Wooster and Meeker Streets, Bowling Green.

TRACK AND ROADWAY

Edmonton Radial Railway, Edmonton, Alta.—It is reported that acting city engineer A. W. Haddow and J. H. Moir, traffic manager of the Edmonton Radial Railway, are investigating the suggestion of forming a belt line in the center of the city. The matter will come before next year's city council. The estimated cost of the line is $40,000.

Visalia Electric Railroad, Exeter, Cal.—Freight service has been begun by this company on its El Mirador extension.

Municipal Railways of San Francisco, San Francisco, Cal.—It is reported that the Municipal Railways of San Francisco plans the construction of 20 miles of new tracks into residence districts not touched by city lines.

Tidewater Southern Company, Stockton, Cal.—This company has withdrawn its application filed with the Railroad Commission of California for authority to extend its line from Hatch to Irwin City. The commission has issued an order granting the request and dismissing the company's application for authority to build the extension.

Ferrocarril Electrico De Matanzas S. A., Matanzas, Cuba.—A report from this company states that operation will be begun this month on its line between the city of Matanzas and suburbs, about 12½ miles. Storage battery cars of the Electric Storage Battery Company will be used. Luis Amezaga, Matanzas, president.

Miami, Fla.—Bids will be received by the Board of County Commissioners of Dade County, Fla., at the office of the Clerk of the Board of County Commissioners, Miami, up to Dec. 14, for the construction of the Miami Causeway across Biscayne Bay, connecting the city of Miami and the town of Miami Beach. The structure will consist of approximately 4000 lin. ft. of viaduct and 13,000 lin. ft. of embankment. The embankment portion will be composed of sand and will be protected and retained by either a creosoted timber bulkhead or a concrete wall on each side. Bids will be received on both types of construction, and the type to be constructed will be selected after the bids are opened. This portion of the structure will be 105 ft. wide. The viaduct portion will consist of a series of reinforced concrete girder spans, providing for a roadway 20 ft. wide, a sidewalk 5 ft. wide, and an electric railway track outside of the roadway.

St. Petersburg & Gulf Railway, St. Petersburg, Fla.—This company reports that construction is now under way on its proposed Coffee Pot Loop, 1½ miles.

Chicago, Fox Lake & Northern Electric Railway, Chicago, Ill.—The Illinois Public Utilities Commission has granted a certificate of convenience and necessity to the Chicago, Fox Lake & Northern Electric Railway for the construction of an electric railway from Evanston to Palatine. It is reported that work on the proposed railway will be begun early next year. L. K Sherman, Chicago, chief engineer. [Nov. 25, '16.]

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company is now at work repairing and otherwise placing its lines in East St. Louis in first-class condition at a cost of more than $200,000.

Southern Illinois & St. Louis Railway, Harrisburg, Ill.—Work will be begun at once on this company's proposed line to connect Harrisburg, Marion, Johnston City, Herrin, West Frankford, Benton and St. Louis. The first work will begin at Marion and the road will be built north toward Johnston City. An office will be opened in Marion immediately and placed in charge of L. F. Kipley, who will be cashier and general auditor. Frank Payne will continue in charge of the engineering department. It is reported that negotiations are under way for the purchase of the Eldorado, Marion & Southwestern Railroad. [Oct. 21, '16.]

Waukegan, Ill.—It is reported that a movement is now on foot among local capitalists for the organization of a gigantic stock company in Waukegan which plans to secure rights to operate a street railway in Waukegan and to take over the holdings of the Chicago, North Shore & Milwaukee Railroad in case the latter company does not obtain a franchise from the city in the immediate future. The franchise matter is now at a standstill. The Chicago, North Shore & Milwaukee Railroad is not inclined to tender any further proposition other than the offer of $40,000 and building of extensions while the City Council is holding out for the payment of $60,000 claimed as due the city from the company in payment for special assessments.

Wichita Railroad & Light Company, Wichita, Kan.—This company is considering the construction of a street car trestle across the Arkansas River at Douglas Avenue.

Alexandria (La.) Municipal Railway.—Work will be begun at once by the Alexandria Municipal Railway on the construction of an extension beginning at the corner of Second and Casson Streets, thence in a southerly direction along the railroad to Third Street, down Third Street to a point to be determined. It is possible that the extension will eventually go down Third Street to the old Watkins tracks and out through the hardwood mill district across to Lee Street near Vance Avenue.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—It is reported that this company plans to construct an extension to Rumford.

Winnipeg (Man.) Electric Railway.—Negotiations are under way with the Winnipeg Electric Railway to construct a line between Transcona and Winnipeg, and it is expected that this line will be built next year.

Worcester (Mass.) Consolidated Street Railway.—It is reported that this company proposes to construct an extension to Rochdale.

Detroit (Mich.) United Railway.—Operation has begun by the Detroit United Railway on the new extension of the Grand Belt line. The route determined upon connects the

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line on Forest Avenue east with the Grand Belt line on Junction Avenue. Combined it will be called the Grand Belt line.

United Light & Railways Company, Grand Rapids, Mich.—This company has sold $1,500,000 of convertible debentures, of which the proceeds of $400,000 will be used to retire underlying bond issues, for payment of a small amount of floating debt, and the balance for construction requirements of subsidiary companies during 1917.

Michigan Railway, Kalamazoo, Mich.—Right-of-way is being secured by the Michigan Railway for its proposed extension from Flint to Owosso.

***Jefferson City, Mo.**—It is reported that preliminary surveys have been made by interests connected with the Illinois Traction System for the construction of an interurban electric railway from Jefferson City to Mexico, via Fulton, about 45 miles.

Kansas City (Mo.) Railways.—The engineers of the Kansas City Railways recently condemned the Seventh Street Bridge in Kansas City, Kan., and arrangements are now being made for the erection of a new bridge, at a cost of $260,000, to be paid for by the company and two steam roads over the tracks of which the viaduct passes. Cars will be stopped at each end and passengers will walk across the old structure pending construction of the new one.

***Woodbury, N. J.**—Plans are being made to construct a line from Woodbury to Paulsboro and possibly to Gibbstown and Pennsgrove. Thomas F. Deegan, Philadelphia, is reported interested.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has approved the award of a contract by the New York Municipal Railway Corporation to the G. E. Engineering Company, Inc., New York City, the lowest bidder, at $116,702.75 for the furnishing of tunnel lighting, station lighting, heating and ventilating systems in the Broadway and Canal Street subways. The work of installation must be completed by April 15, 1917.

Carolina & Yadkin River Railway, High Point, N. C.—This company has discontinued operation of the storage battery car placed in service on its line between High Point and Thomasville last July.

Northern Ohio Traction & Light Company, Akron, Ohio.—*The Traction Bulletin*, published by the Northern Ohio Traction & Light Company, in its issue of Nov. 25 states that among other things contemplated by the retiring directors for the immediate future, the Akron terminal project is to be carried forward to completion without delay by the new owners. In general, this paper ventures the prediction that although the retiring executives have authorized liberal expenditures for additions to the property, keeping pace with the growth of the territory served, those to whom the control now passes will be even more ready to build for the future.

Dover, Millersburg & Western Railway, Dover, Ohio.—Plans are under way by this company for the construction of a new bridge over Sugar Creek. The bridge will be about 200 ft. long and will have concrete foundations with steel spans. No contracts have as yet been awarded. D. F. A. Wheelock, Woodward Building, Warren, Pa., engineer. [Oct. 21, '16.]

Ardmore (Okla.) Railway.—This company reports that plans are being made for some new city and interurban extensions.

Sand Springs Railway, Tulsa, Okla.—This company will construct an extension from Crib Siding to Lake, 3½ miles.

Oregon Electric Railway, Portland, Ore.—It is rumored that the Oregon Electric Railway, a subsidiary of the Spokane, Portland & Seattle Railway, will build an extension to the Hill timber tracts, above Cascadia, branching off the main line at Salem, passing through Stayton and east of Scio, following the South Fork of the Santiam River, opposite Lebanon, thence through Waterloo into Sweet Home and Foster. This route will open a well developed district that now has no railroad facilities. It is reported that location surveys have been made.

***Dover-Rossville Transit Company, Dover, Pa.**—The Public Service Commission of Pennsylvania has announced its approval of a plan to operate trackless trolley cars on the public highways submitted by the Dover-Rossville Transit Company. This company proposes to operate a trackless line between Dover and Rossville.

Johnstown (Pa.) Traction Company.—The construction of an extension from Johnstown to New Florence is being contemplated by the Johnstown Traction Company. It is estimated that the cost of such a line would be about $300,000.

Hull (Que.) Electric Company.—Work will be begun next spring by the Hull Electric Company double-tracking its lines on Montcalm Street and Chelsea Road from Graham's Corners to Montclair Street, also constructing a loop at the Mountain Road.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—This company will double-track its line from Five-Mile House to the Navy Yard, 1½ miles.

Memphis & Rugby Railroad, Memphis, Tenn.—This company, which is constructing an electric railway between Memphis and Rugby, reports that the line will be in operation about Jan. 1. The line will be 2 miles long and will reach Rugby Park. The company will also do a general lighting business in Rugby.

Morgantown & Wheeling Railway, Morgantown, W. Va.—W. E. Glassock, receiver of the Morgantown & Wheeling Railway, has let a contract to H. D. Eichelberger, Richmond, Va., to construct an extension from Price Station to Blacksville, W. Va.

SHOPS AND BUILDINGS

Illinois Traction System, Peoria, Ill.—This company has made changes in its Urbana station, the business of the traction company requiring the entire station. The Urbana Light, Heat & Power Company has been removed into the first building west of the station.

Detroit (Mich.) Railway.—It is reported that this company has purchased a site at Lake Orion Junction on which it will erect a new carhouse and power house next year.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company is negotiating for the purchase of the warehouse of the Canton Feed & Milling Company on Cherry Avenue, Canton, as a site for a new freight station. A substantial building is to be erected as soon as the site is secured.

Philadelphia & Garretford Street Railway, Upper Darby, Pa.—It is reported that this company contemplates the construction of a passenger and freight station on the West Chester Pike, in Media, a few feet west of the present terminal at Sixty-ninth Street.

POWER HOUSES AND SUBSTATIONS

Tri-City Railway & Light Company, Davenport, Iowa.—This company has purchased a 20,000-kva. Westinghouse turbine together with condensing equipment for installation in its plant at Moline, Ill. Plans are now being prepared for the installation as well as an addition to the power plant building, which will be required to accommodate the new unit. All the equipment has been ordered and will be delivered next summer. The total estimated cost of equipment and improvement is $300,000.

Piedmont Railway & Electric Company, Burlington, N. C.—This company proposes to erect a transmission line to Elon College and Gibsonville, about 8 miles.

Memphis & Rugby Railroad, Memphis, Tenn.—This company, which is constructing a line between Memphis and Rugby, reports that it is purchasing machinery and erecting a power plant at Rugby Park.

Monongahela Valley Traction & Light Company, Fairmont, W. Va.—Arrangements are being made by the Monongahela Valley Traction Company for increasing the output of its power plant at Hutchinson. Contract, it is understood, has been placed for an additional 1150-kw. generating unit. The addition to the power station will provide space for the installation of two additional units when needed.

Waupaca Electric Service & Railway Company, Waupaca, Wis.—This company expects to make a number of improvements in its power plant.

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INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases **Business Changes** **Trade Literature**

WHO SHOULD CARRY THE REPAIR PARTS IN STOCK?

Manufacturers Continue to Discuss This Important Question —One of Them Considers It a "Fifty-Fifty" Proposition

Opinions on this subject from a number of manufacturers were presented in the article beginning on page 1135 of last week's issue. They may be briefly summarized into the statement that the manufacturer of a standard product should be prepared to furnish repair parts promptly, that the railway should be notified when standard designs are to be changed and patterns destroyed, but that the railway should see to it that enough local stock is carried to avoid the necessity of making rush demands on the manufacturers for repair parts subject to periodic renewal because of wear. Twelve representative manufacturers discussed this question in last week's issue. Communications have been received from other manufacturers and abstracts of these are given below:

Fifty-Fifty Proposition

E. G. Marble, American Engineering Company, the manufacturer of the Taylor stoker, writes as follows:

"We have always felt that good business policy made it advisable for any manufacturer to carry in stock, so far as possible, all parts normally subject to call for repairs for all the product which he manufactures. Existing conditions many times make it impossible to carry in stock a sufficient quantity to provide for shipment immediately upon receipt of order. But we are satisfied that from an economic standpoint in the long run the best results will be obtained if the manufacturer carries a stock of these parts, rather than each user should carry an individual stock in sufficient quantity to protect himself against normal breakdowns.

"So far as tying up capital in repair parts is concerned, this is a 'fifty-fifty' proposition, because when the manufacturer does it he necessarily has to add interest charges to the price he asks for the parts, and on the other hand, if the individual customer carries parts, his money is tied up, with consequent carrying charges, even though he may not so figure it."

Electric Tools Are Standardized

G. P. Blackiston, of the Van Dorn Electric Tool Company, is of the opinion that if the repair parts needed will tie up the earning capacity of a car, then certainly it would seem that the railway would consider it very important that its supply department keep such parts in stock. A manufacturer should, of course, carry a sufficient quantity to meet normal demands. "Consider, for example," says Mr. Blackiston, "the portable electric tool which we manufacture. This particular field has been one that has shown rapid development. A great many changes have been necessary. Also, these tools are used in 'hard service,' and it is expected that a user will keep all parts of a tool of this character in stock, unless he can delay his work pending receipt of repair parts from the manufacturer."

The Road Should Carry Non-Standardized Parts

R. G. Clapp, of the Brown Hoisting Machinery Company, writes as follows:

"It is our plan and intention to carry stock parts for our regular standard product, but where anything special is ordered we feel that we should not be obliged to carry the spare parts for the customer on this class of material. The chances of his making the material himself, or at least of not wanting to purchase from us, are such that it looks and always has looked unwise for us to attempt to anticipate his possible repair parts. We cannot agree with the position you state the railroads are taking with reference to repairs. That would mean that the manufacturer would have to bear all the expense of financing repair parts for all of his product without knowing the condition of service of all the apparatus involved—a position which this company would creditably decline to assume."

Oil Pumps Require Few Repairs

B. F. Geyer, of the Wayne Oil Tank & Pump Company, says:

"Our pumps require very few repairs as compared with the total number sold. As nearly as we can tell, less than 10 per cent of the outfits sold ever require any repairs.

"I know from experience that some manufacturers do not give the attention to repair parts that they should. I feel that every manufacturer who is called upon to furnish repairs for any device he is marketing should make a special effort to have these repair parts in stock and ready for shipment instantly. There are some extenuating circumstances in connection with this. If it is an exceptionally old model the purchaser should have some patience with the manufacturer.

"I do not believe that the purchaser should be expected to carry regular repair parts in the majority of instances. I further believe that there is a point of compromise on this subject. In my opinion, if the purchaser has equipment the parts of which are subject to breakage under service, it would be advisable for the purchaser to carry such repair parts in his own stock. If he has a device or equipment that is not particularly subject to breakage at any particular point, then he may depend entirely on the manufacturer for such repair parts as he might need."

Stocks for Old Models Are Carried

F. W. Buchanan, Independent Pneumatic Tool Company, discussing this question from the standpoint of the manufacturer of a highly standardized tool, says that the purchaser of a machine "is entitled to prompt service when repairs are required and while it would be absolutely impossible with a great many manufacturers to supply any pieces that might be ordered from stock, the customer's interests should be considered sufficiently to protect him against delays by giving the most prompt service possible. When you consider that we manufacture approximately 100 different sizes and types of tools which contain anywhere from 25 to probably 125 various small parts from small screws up to pieces requiring the very best and most accurate finish, it is difficult to guarantee immediate shipment of any part at all times. However, with a tool such as we make, which is generally in continuous service and considered a big labor-saver, the manufacturer is not only under obligations to see that the user does not suffer loss on account of unnecessary delays by having tools out of commission but should figure a reasonable interest on the investment, the expense of storage space and insurance, the loss occasioned by parts being left over as obsolete when new models are brought out and the expense of handling small shipments. He should then plan to keep a sufficient stock on hand to make as nearly immediate shipment as possible.

"We might add that it has always been our policy, when bringing out new models, to provide a stock of parts for the old models sufficient to maintain the tools of that type which were out until such time as the customer received sufficient service to warrant the replacement of his old machines with the newer models."

Car Builders Keep Trimmings In Stock

A. H. Sisson of the Southern Car Company says that as far as the car-building business is concerned, it has possibly a few of the minor trimmings, etc. As a rule, however, where the articles manufactured are standard, and

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are made up in large quantities, he believes that it would be good business for the manufacturer to keep repair parts on hand at all times.

MANUFACTURER HAS POOR EXPERIENCE IN ATTEMPTING TO GAGE THE MARKET

Roads Report No Orders in Sight and Then Ask for Quotations

The sales manager of a large manufacturing company selling to the electric railways has some comments to make on the remarks of Nic Le Grand of the St. Louis Car Company, which appeared on page 1135 of last week's issue of this paper in Industrial News.

Mr. Le Grand cited as a "fault peculiar to railway buying" that a salesman had interrogated the department heads of a road and got a uniform reply that there was no business in sight for his company, but within ten days in came a telegram pleading for parts to be shipped immediately. This experience was similar to that of the sales manager first mentioned. The observation made by him is that unless the roads know what they will need for future use how can the manufacturers afford to purchase in advance large supplies of raw materials and thus be able to lower costs? Continuing, he said:

"In order to get some tangible idea of what the larger roads would be apt to purchase during the next six months or a year, the writer recently sent a letter to his district salesmen explaining the raw material situation and requesting them to get in touch with the large buyers. The salesmen were requested to obtain an idea of what the next year's requirements were likely to be.

"The replies indicated that the market was practically dead, yet in a dozen or two instances, after we had received advice that there would be nothing doing for six months, these very companies came into the market for large orders. The reason advanced for misleading the manufacturer's representatives was that they did not want to be pestered by having a swarm of supply men calling on them and taking up their time several weeks or months before they were ready to buy.

"We cannot whine about this practice, but it certainly is not co-operation, or perhaps we did not reach the right people. Of course, there are some good reasons for railway companies not desiring to announce probable purchases, yet how else can a manufacturer gage the market? Perhaps some one can make a suggestion."

BUYING REPAIR PARTS ON AN ANNUAL BASIS

Roads Are Urged to Order for Monthly Delivery—Instances of Such Orders Are Cited

BY WARREN L. BOYER
Of the Bemis Car Truck Company

Referring to the discussion in your issue of Nov. 25, "How far should a manufacturer go in keeping in stock renewal parts for service repairs to his product?" I believe that the manufacturer should keep a certain amount of repairs on hand at all times to meet at least the average demand of customers for a period of six months. As a rule, a manufacturer can tell from past orders approximately the amount of stock to carry.

Under conditions such as these it sometimes happens that the demand for a certain article is unusual, exhausting the supply before the manufacturer has a chance to replace it. This condition applies especially to those things that the manufacturer does not make himself but for which he depends on either the open market or other manufacturers to supply. I do not think, however, that it is fair for the railroad to expect the manufacturer to assume the entire burden in carrying repair parts for his particular non-standardized equipment subject to immediate call. The manufacturer should have due notice from the railroad to prepare himself for an unusual demand. The manufacturer has no control over the plan of work followed by the various roads, such as the spasmodic overhauling of equipment in periods of two or three years, when such a practice is not standard on a particular road. This general overhauling naturally takes more repair parts than has been the custom of that railroad to buy for several years previous. We think it is up to the railroad company to arrange for stock in advance of the time that it is actually required.

Our company is willing at all times to meet its customers more than half way. We endeavor to have them state what their yearly requirements will be and to tell us approximately the periods of the year at which they will call on us for certain quantities of the yearly requirements. In this way we are usually able to have the material on hand thirty to sixty days before it is actually needed. We can then make prompt shipments to them. To make up enough material for a year's requirements means larger orders to run through the shop. This would reduce our shop costs, and the saving would pay the interest charge for carrying the material from the time it is made to the time it is called for.

The Springfield (Mass.) Street Railway and the Worcester Consolidated Street Railway are working with us on such a yearly basis. For instance, they will give us an order on the first of the year for 1000 pieces of a certain kind, specifying shipments in equal monthly installments, starting March 1 and continuing until the order is completed. In this way we can handle our work in the shop to advantage, giving them material at the time wanted, saving them money, and making a better percentage ourselves.

It would be a good thing if more railways realized what an advantage it would be to have such a working agreement with a reliable manufacturer instead of waiting until the last minute and then shopping around for hurried competition on a certain product.

CROSSING SIGNAL MAKERS REPORT ACTIVITY

Large Steam Road Sales Reported—Electric Railway Prospects Bright

Comments on the highway crossing signal article appearing on page 1085 of the Industrial News department of this paper for Nov. 18 have been received from two manufacturers. The article pointed out that there have been very few purchases of highway crossing signals during 1916, although according to one informant inquiries have been quite numerous. The question was whether reliability of action was not the greatest desideratum.

A. M. Adams, secretary, the Protective Signal Manufacturing Company, Denver, Col., writes as follows:

PROSPECTS FOR INCREASED SALES IN 1917-1918

"We have enjoyed an exceedingly good business in crossing signals embodying our wig-wags, bells, and other devices sold the steam roads during the last six months. We have also received some orders from two or three of our regular customers in the electric railway field. However, our orders from steam roads far exceed the orders from the electric roads, and the only explanation which we can give for this fact is that the electric railway companies throughout the country are loath to enter what is considered by many a new field in signaling.

"From conversations which the writer recently had with a number of electric railway men throughout the East he was impressed with the fact that they were not quite sure that any crossing signal now on the market was really efficient and effective. The wig-wag and bell signal seem to be favored more than lights and bells, and in a majority of cases the electric railways are holding back awaiting action of the various State railroad commissions on this question.

"We have not noticed any considerable increase in inquiries from electric railways this last year, and we have felt that this was due to the fact that they were not quite sure as to what their future plans would be in connection with crossing protection. In other words, they were not yet ready to go definitely into the matter. We believe, however, that the prospects are very good for a considerable market among the electric roads during the next two or three years.

"While the question of reliability is a very important one, still we do not believe that it is the chief one to be met in furthering advance in sales to electric roads. In our opinion, the greatest question is what action the various utilities commissions and State railroad commissions are going to take in this matter, and whether, by installing

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crossing signals, the railway companies will be exonerated of any blame for crossing accidents providing they can prove that a signal operated at the time of accident. If the courts will take this stand, we believe the electric roads will not hesitate to put in more highway crossing signals."

ELECTRIC RAILWAYS SHY AT EXPENSIVE SIGNALS

E. W. Vogel, president Chicago Railway Signal & Supply Company, Chicago, says:

"It is a fact that on electric railways, so far as we know, very few purchases of crossing signals have been made.

"On steam railways, our business in crossing signals has been better than ever before. For example, only recently we sold over 100 for one installation on the Chicago Great Western Railroad, and it is a satisfaction to note that these signals were all of the very best and highest price types that we manufacture, with large locomotive bells, relay boxes, and the very best material throughout.

"The difficulty on electric railways, as we see it from our past experience, is that these roads want to put in crossing signals, but usually wish to purchase the materials required for about half of the price that it costs steam railroads. This, of course, cannot be done when reliable signals are furnished. The result is that some of the electric railways have experimented with cheap contrivances that, in the end, do not give satisfaction, and the trouble experienced with these cheaper contrivances, we believe, is the real cause for the lack of a more general installation of crossing signals."

POLE PRODUCER OFFERS NEW COMPLETE SERVICE

Utility Poles to Be Shaved, Gained, Bored and Creosoted by Producer

The Paducah Pole & Timber Company, Paducah, Ky., is about to offer to its customers special pole service at a comparative cost that will make it economically attractive for the railway company to have the pole producer finish the poles ready for immediate setting on delivery. The company's sales manager, John L. Fay, has had experience in operating distribution and transmission lines for electric railways and other utilities, and is familiar with the difficulty of obtaining and retaining suitable labor in public utility pole yards. Therefore, he proposes to finish poles at his yards, meeting railway specifications, and deliver them ready for setting.

The plan is to shave the pole for its entire length, remove the outer bark, fiber, and foreign material, and dress the knots down smooth. The poles are then to be taken to the treating vats and receive an open-tank treatment.

The course of treatment is to be as follows: The poles will be seasoned for at least six seasoning months before treatment; all fiber, inner bark and foreign substance will be removed from that portion of the pole, from the butt end to a point 1 ft. 6 in. above the ground line. Then the pole will be placed in an upright tank, with the butt fully and continuously submerged in the preservative not less than fifteen minutes, when the atmospheric temperature is 70 deg. F., or higher, and a proportionately longer time when the temperature is lower, or until such time as will be required to cause the wood to become as thoroughly treated as it would be in fifteen minutes at atmospheric temperature of 70 deg. F. After the foregoing treatment has been carried out the poles will be brush treated with the same preservative for the entire length above the butt where the preservative used in the open-tank process reached.

The principal purpose of this method of preservation is to secure an increased life for the pole not only below but above the ground, so that the upper portion can be retreated by the brush method while it is standing in its old position. After this treatment the pole can be sawed off at the surface of the ground and reset, or else moved to some other location on the system where a shorter length of pole is sufficient. The usable life of the pole can thus be increased sufficiently to justify the expense of the treatment above the ground line. This scheme, it is believed, will aid the utility companies materially in that they can arrange, at a nominal cost, to have the work done for them by an efficient organization. It will also relieve the utility superintendents from maintaining temporary organizations for this class of work.

COPPER WIRE BASE PASSES FORTY-CENT MARK

It was reported early in the week that copper wire base could be obtained in limited quantities for 1916 delivery at 40 to 41 cents. The price, however, was nominal, each sale having its own quotation. For January shipments, quotations of 39.75 cents are being made and 37 cents for March, all quotations f.o.b. factory.

Practically all mills are sold out to Feb. 1, and some as far in advance as July 1, 1917. For this reason it is very difficult to obtain prompt deliveries, and even if possible to get them they command a premium of 1 cent to 1.5 cents.

On Monday, copper was quoted at 34 cents for 1916 delivery in a very strong market. Prices for 1917 delivery sloped off from this mark, but did not go below 30 cents, the quotation for last quarter delivery.

Buyers will therefore enter the December market with the metal around 35 cents and with practically none to be had except that held for better prices by speculators.

ROLLING STOCK

Richmond Light & Railroad Company, New York, N. Y., is said to be in the market for one steel dump car.

Trenton & Mercer County Traction Corporation, Trenton, N. J., is reported to be in the market for a number of cars.

Tri-City Railway & Light Company, Davenport, Iowa, is reported to be considering the purchase of ten or twenty city cars.

North Carolina Public Service Company, Greensboro, N. C., is reported to be considering the purchase of fifteen single-truck cars.

Northern Ohio Traction & Light Company, Akron, Ohio, has ordered ninety-five car bodies, fifty-seven motor trucks and ten trailer trucks from the St. Louis Car Company.

International Railway Company, Buffalo, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Aug. 5, 1916, as losing sixteen cars in a fire, is reported to have ordered sixteen cars from the G. C. Kuhlman Car Company.

East St. Louis & Suburban Railway Company, East St. Louis, Ill., has ordered forty-five new steel bodies for the cars now in use, which, when rebuilt, will be of the pay-as-you-enter type.

Memphis & Rugby Railroad, Rugby, Tenn., has purchased a new Edison storage-battery car from J. B. N. Cardoza, Inc., Norfolk, Va. This car, which will be used between Memphis and Rugby, will be put into service about Jan. 1, 1917, when the road will be finished.

TRADE NOTES

William J. Hammer, consulting electrical engineer, announces the removal of his office to 55 Liberty Street, New York City.

Arthur V. Farr, who for the last three years has been advertising manager of the SKF Ball Bearing Company, Hartford, Conn., has accepted the position of sales manager of the Hess Steel Corporation, Baltimore, Md.

Electric Cable Company, New York, N. Y., announces the opening of a Chicago warehouse with a complete stock of "Ecco" insulated wires and cables, and is now prepared to make prompt shipments of all sizes of its stock from this point.

Electric Porcelain & Manufacturing Company, Trenton, N. J., has acquired the plant of the Climax Pottery Company on New York Avenue, as a new factory for the manufacture of its electric porcelain specialties. A new addition, about 130 ft. x 150 ft., will be erected at an estimated cost of $70,000. H. T. Paiste, Philadelphia, is president.

Holden & White, Chicago, Ill., report that the Anderson Brake Adjuster Company has recently received an order

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for equipping twenty-five new cars being built by the Omaha & Council Bluffs Street Railway. This will complete the entire equipment of this property with these brake-slack adjusters.

Consolidated Car Heating Company, Albany, N.' Y., announces an order for 180 geared-type pneumatic door engines with cut-off at the end of stroke to go on the Pressed Steel Car Company's forty-five cars ordered for the Long Island suburban service of the Long Island Railroad. These engines will be fitted with electro-pneumatic control. The engines are similar to the Consolidated types used at Rochester and at Brooklyn.

J. A. & W. Bird & Company of Boston, Mass., distributers of Ripolin enamel paint, announce that George Price, formerly manager of the New York office, 120 Broadway, will hereafter handle the sales department covering the entire territory south of New York as far west as the Mississippi, and also including the states of Louisiana and Texas. Mr. Price has been in charge of the Metropolitan district for the last eight years and recently completed an extensive trip covering this territory.

Page & Hill Company, Minneapolis, Minn., announces the addition to its sales force of Buford Adams of Kansas City, who will act in the capacity of sales engineer. Mr. Adams is well known, particularly throughout the Southwest, as a practical engineer and manager of public utility properties. At one time Mr. Adams was manager of the Missouri & Kansas Telephone Company at Carrollton, Mo., Joplin and St. Joseph. He then went to Denver, and was employed by the Colorado Telephone Company as assistant engineer. Mr. Adams later traveled for a telephone manufacturing company in the capacity of sales engineer, and for a period of time was general manager of the Independent Company's plant at Waco, Tex.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces an extension of its present bonus system to include salaried and office employees on hourly rates by which they will receive a bonus of 8 per cent of their salary each month providing their total excusable time absent and late during the month does not exceed six hours incurred on not more than three occasions. An additional 4 per cent will be given each month to the employee who has not lost any time from work during the month through absence or tardiness, thus enabling those to obtain an increase in earnings of twelve per cent for a 100 per cent attendance. Several thousand employees in the Pittsburgh district are benefited by the granting of the bonus.

Westinghouse Electric Export Company, East Pittsburgh, Pa., has recently sold twenty-seven new forced-draft, high-reserve capacity stokers of the underfeed type for service in Japan, twenty of them being sold to the Osaka Electric Light Company, two to the Negoia Electric Light Company, and five to the Imperial Steel Company. They are all for use with 600-hp. boilers. The orders also included engines for operating the stokers, turbine and motor-driven forced-draft fan units, controllers, and other auxiliaries. No better illustration of the progressiveness of Japanese concerns in changing over their power plants to the most up-to-date, high-capacity equipment could be found than what these orders indicate. By the use of these stokers the plants are able to obtain from two to three times the capacity of the boilers.

Consolidated Car Heating Company, Albany, N. Y., announce that, effective Dec. 1, 1916, the following changes and promotions have been made in the sales organization of this company: C. A. Eggert, formerly assistant in the Chicago sales office, will be in charge of that office, and H. L. Hawley, formerly assistant in the New York office, will be responsible for the New York office. Thomas Farmer, Jr., heretofore vice-president in charge of the Eastern sales office at New York, has resigned in order to devote his time to his large interest in automobile garages in New York City. Mr. Farmer has been associated with the company for the past eleven years, and the company regrets the necessity of his resignation; it is pleased to state, however, that it will have the benefit of his services in an advisory capacity. W. S. Hammond, Jr., formerly vice-president in charge of the Western sales office, will be vice-president in charge of all sales of the company.

ADVERTISING LITERATURE

Johnson & Johnson, New Brunswick, N. J., are distributing catalog 110 on "First Aid to the Injured."

Hanlon & Wilson Company, Wilkensburg, Pa., is distributing a pamphlet on its "Vak Klean" portable vacuum cleaning machine.

Roller-Smith Company, New York, N. Y., is distributing bulletin 201 on its portable storage-battery equipment for use with the Roller-Smith bond tester.

Imperial Car Cleaner Company, Newark, N. J., renovator of electric, steam or trolley cars, has issued a bulletin of directions for handling work on cane and plush cushions.

Stow Manufacturing Company, Binghamton, N. Y., has issued a miniature of its bulletin 102, on the Stow flexible shaft portable tools. It is not only a novelty but is most complete in detail.

Electric Railway Equipment Company, Cincinnati, Ohio, has just issued a well illustrated 12-page bulletin on Elreco tubular steel poles and combination railway and lighting poles.

Automatic Reclosing Circuit Breaker Company, Columbus, Ohio, is distributing bulletins on its automatic reclosing circuit-breaker system, the theory and operation of these circuit breakers, the different types used and the important considerations necessary to perfect individual motor circuits.

International Motor Company, New York, N. Y., is distributing a pamphlet showing auto-buses in use by a number of railways and motor truck lines. Among these is shown a unique adaptation of the Mack truck as a railroad bus used by the Unitah Railway Company, Unitah, Col., and also a Mack 2-ton pay-as-you-enter bus used by the New York State Railways, Rochester lines.

M. W. Kellog & Company, 50 Church Street, New York, N. Y., manufacturers of piping material, has issued a ninety-page bulletin on lap-welded steel pipe, welded steel tanks, vanstone joints, welded nozzles and welded flanges. In addition, a number of the pages are devoted to the Bulkeley barometric injector condenser, giving illustrations, drawings and performance curves of the different types of this injector.

Bound Brook (N. J.) Oil-Less Bearing Company has just issued a well-illustrated booklet of forty-eight pages on its type of bearings, washers and clutch releases. Several pages of the booklet are devoted to the story of the trolley wheel bushings used by the Colorado Springs & Interurban Railway Company. In addition there are a number of full-page illustrations of battleships and of aeroplanes on which the bearings of this company are used.

General Railway Signal Company, Rochester, N. Y., has just issued Vol. I of its direct-current electric signal appliances. This volume, which is handsomely bound, contains sections E to L inclusive, each section covering the following items respectively: Relays, indicators, cable posts, battery chutes, bond wires, etc.; power generating and distributing equipment, generators, motor generators, switchboards, etc.; electric interlocking machines and appliances; electrically operated signals, mechanisms, poles, bearings, ladders, etc.; electrically operated switch machines, derail, layouts and fittings; circuit-controlling appliances, switch-circuit controllers, bridge circuit closers, locks, etc., and electro-mechanical interlocking machines and appliances.

NEW PUBLICATIONS

Some Graphical Solution of Electric Railway Problems. By A. M. Buck, Engineering Experiment Station, University of Illinois, Bulletin No. 90. Copies can be secured gratis from W. F. M. Goss, Director, Urbana, Ill.

This bulletin, of which an advance notice appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 12, 1916, page 281, is now ready for distribution.

Comparative Railway Statistics—United States and Foreign Countries—1913. Bureau of Railway Economics, Washington, D. C. Seventy-eight pages. Paper.

This pamphlet, just released, gives the latest available comparative data regarding the railway situation in the United States and in the principal foreign countries.

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Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

Vol. XLVIII NEW YORK, SATURDAY, DECEMBER 9, 1916 No. 24

THE PREVENTION OF STRIKES

In his message to Congress on Tuesday, President Wilson very clearly explained the difference between the action of an individual in doing a legal thing, as to stop work, and the concerted action of powerful bodies of men to do the same thing and so stop the industrial processes of the nation. The difference, in our opinion, is obvious; in fact, it is the basis of all anti-trust legislation. Society is undoubtedly justified in safeguarding itself in some way from conspiracies of this kind. As for the remedy, Mr. Wilson seems to incline toward legislation similar to that embodied in the Canadian industrial disputes act when he recommends an amendment of the existing federal statute by which, if the present methods for mediation provided by it fail, a full public investigation of the merits of the dispute shall be instituted and completed before a strike or lockout may lawfully be attempted. The occasion of the recommendation was, of course, the existing dispute between the railway trainmen and the steam railroad companies, but the principle would be the same when any community, to use the words of the President, finds "the necessary processes of its very life" imperiled. We do not consider the Canadian industrial disputes act a panacea for all labor problems. The final solution lies in a recognition by both capital and labor that their interests have far more objects in common than in opposition. But for the protection of the community until this fact is realized, the adoption of some plan like that suggested by the President is most important.

WEBB BILL SHOULD BE PASSED

With constructive railroad legislation imperative, it is apparent that other legislation must indeed be of vital interest to the nation to be accomplished during the present short session of Congress. In view of this fact, it is very significant that President Wilson in his message this week saw fit to include in a special group of desirable legislation the Webb bill, which embodies the principle of co-operation among exporters, with due safeguards against unreasonable restraint of domestic commerce. Yet it is not difficult to understand why the President considers this bill of capital importance. What his railroad program means to our domestic welfare, the Webb bill means to our influence and prosperity as a world trader. Present international conditions have opened the eyes of Americans to the possibilities of international trade, but if they are even to hold the trade that has been turned to them, to say nothing of expanding the foreign trade of this nation as they should, they must be allowed to adopt with full legal sanction those practices of fair combination that have made other nations so successful in foreign trade. The need is urgent, and the time is opportune. The Webb bill has already passed the House of Representatives. It should be enacted by the Senate without delay, unless its members wish to prove that their minds are of a provincial type.

PRACTISING THE ART OF PUBLICITY

Generalizing on the subject of publicity amounts to nothing. In the electric railway field there has been a great deal such generalization but comparatively little action. We learn to do by actually doing things, and each opportunity to practice the art of publicity must be embraced, for no theorizing will ever teach it. Such an opportunity was forced upon the Public Service Railway of New Jersey by the recent political campaign. The railway was introduced as one among a number of issues and certain candidates endeavored to gain political capital by attacking it. The answer to this was an announcement occupying half pages in New Jersey newspapers last week, of which the text was reproduced in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 2, page 1171. No one has told us who wrote this advertisement, but all who are acquainted with President Thomas N. McCarter, whose name is signed to it, will readily accept him as its author. Its wording is fearless, implying a conviction of correct dealing and, regardless of consequences, it hits straight from the shoulder. The occasion was one which fully justified this treatment. Many so-called replies to similar charges in the industry have temporized with the situation, or the replies have been so feeble as to be negligible.

SPIKING THE POLITICIANS' GUNS

We believe in the expression of personality in things corporate as well as in individual affairs, and any attempt to straddle the issues listed by the politicians in the case cited above or to issue a feeble reply would have been worse than no reply at all. If the story of the railway is being told fairly, fully and intelligently to the public, any attacks made by politicians and demagogs will fail of their purpose. The Public Service Railway has a strong publicity department which has done good work and could do more. This answer of Mr. McCarter's is the most powerful blow that it has yet struck. We welcome this advertisement as typical of the awakening interest of the electric railway industry to publicity and as a harbinger of the time when its standing with the public will be commensurate with its real strength. The

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series of cartoons and talks on publicity now running in this paper is evidence of our convictions along this line. That the Public Service Corporation, of which the railway is a part, is aware of the possibilities of other phases of publicity is indicated by the splendid advertising copy which the Electric Company issued in connection with last Saturday's inauguration of flood-lighting of the Statue of Liberty in New York Harbor, for which the company furnishes power.

THE OUTLOOK FOR HIGHER NET RETURN

The reception which has been accorded to the plea of the Boston Elevated Railway for some relief from its present financial burdens is encouraging, we believe, not only to that company but to others which have felt the pinch of a constantly decreasing amount of net return. The Boston investigation, which is now being conducted before a special legislative commission, is undoubtedly the most important study of the kind ever conducted in search of remedial measures.

As might be expected, opinions in Boston differ somewhat as to the best means of putting the company on a more stable plane of development. Opposition to an increase of fare above the 5-cent unit and to any substantial curtailment of free transfer privileges is substantially greater than objection to plans involving the sharing of some of the company's burdens by the municipalities in its territory, through reduced taxation of the road itself or through a scaling down of fixed charges in Boston proper in connection with the rapid transit lines. At least there seems to be a growing sense of responsibility on the part of the public for rapid transit improvements which are ahead, and a very general appreciation that the company has been persuaded to "go the limit" in the past in assuming the continuing burdens of subway, elevated and tunnel construction charges which are so important a proportion of its yearly outlay. That some co-operative reduction in these burdens may be secured seems now quite possible in view of the attitude of the public so far in the case, if the commission in its thorough study of the company's situation comes to what seems to us the logical conclusion.

The company laid its cards face upward at the opening hearing, and there is no question that the thinking public has been greatly interested in the admirable brief summarizing the company's financial history and requirements which were printed and distributed at the outset of the proceedings. The general recognition of representatives of the public that the special commission itself must bear the brunt of the investigation is coupled with an equally general opinion that the exact working out of the problem of granting relief must also be left chiefly to that tribunal, assuming that the commission finds the company's plea valid. The question in the minds of the public, so far at least, seems to be one of ways and means, and the company is reaping the reward of its frank public relations policy in the attitude of the various improvement associations, boards of trade, etc., that have come to the hearings. Wholly apart from the question of details these proceedings are significant of a spirit of co-operation which ought to make the work of the commission easier and the solution of the company's problem free from the handicaps of a less friendly public opinion.

INSULATING THE TRANSMISSION LINE

The transmission line insulator problem seems to be a live one with interurban railways at present. This is true because of the increasing demand on the part of the public for continuity of service, the number of insulator replacements necessary each year and the increasing cost of new insulators. Many of the interurban transmission systems were built with the decade ending in 1907—the heyday period of electric railway promotion—and now the effects of the ravages of time are beginning to be apparent. When installed the insulators used on these lines were no doubt considered as of the first quality, but in both electrical and mechanical strength they were, as a rule, even when new, by no means the equals of carefully designed and manufactured modern insulators. In the early days the requirements of electrical porcelain were not as well known as they are at present, nor was as much attention given to the various ceramic processes involved in insulator manufacture.

Experience has shown that insulator deterioration has been caused largely either by the gradual absorption of water or by cracking due to mechanical stresses, the latter being the result of poor design and faulty manufacturing methods. In addition to these causes of failure within the insulators themselves, the decay and deformation of the supporting structures have further increased the mechanical stresses which the insulators have been called upon to withstand. Moreover, the increased power loads have tended to magnify the surge voltages which result from accidental grounds, insulator breakdowns and faulty switching, and therefore the electrical stresses imposed on the insulators. The present situation is that, on some roads at least, the matter of insulator replacements is assuming considerable importance.

The problem as it now confronts the railways presents two phases: the detection of defective insulators now in service, and the selection of a proper type of new insulator for replacement purposes. The continuity of service afforded by a line and the annual maintenance costs thereof reflect very closely the success with which the problem is being solved in a given instance. Both of these factors affect the net earnings of a railway, and the first named may be of some importance in its influence on relations with the public. It seems to us, therefore, that the insulator problem is one which well merits careful consideration by railway officials. In solving this problem they may well profit by the recent work of the technical societies which have been successful in bringing together the experts among the users and the manufacturers. These societies have proposed standard specifications which should prove a valuable guide in the selection of new insulators for a given service.

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Getting the Employees to Help

Employees Who Do and Who Do Not Help Make the Company Popular

DISAFFECTED and disgruntled employees can tear down faster than any means of establishing good public relations can build up.

It is of no avail to insist that this should not be the case, because it IS the case.

And this being so, it is evident that good treatment of and being on good terms with platform men are very important factors in making publicity work effective.

If most of the public is "against the railroad" this feeling reacts on the employees.

They absorb the hostile virus, and, once infected, pass on the disease to those with whom they come in contact.

No one does much riding on electric railways without hearing passengers and conductors or motormen knocking the company to their mutual satisfaction.

This is a bad noise to hear in the machinery of any organization.

It is as easy as lying to fine and fire men for criticising the company; too easy to accomplish any good.

What is needed is the creation of such an attitude on the part of employees that they will stand up for the company instead of criticising it or agreeing with anyone else who does so.

Good treatment of employees is the only way to get good treatment from them.

The usual kinds of welfare work are admirable, but rest-rooms and pensions will not take the place of good wages and a voice—a chance for a man to get his grievances off his chest.

And, then, too low wages and too many long-swing runs or other grievances make an employer hardly less unpopular with the general public than with the employees immediately concerned.

When a company is giving its employees a square deal the public does not often know it, with the result that in case of trouble sympathy is all with the men.

Here is ANOTHER chance for the publicity man.

In one Eastern city where strikes had formerly been almost as regular as Washington's birthday an attempt by a small fraction to pull out the men recently fell flat, largely because the company has in later years done well by its men, and the people knew it.

Where a few years ago the men were almost incited to strike by popular opinion, this year they were told not to make fools of themselves and they didn't.

Late repentances and dashing into print just before and after a strike call has gone out cannot accomplish much.

Good relations with employees, like good relations with the public at large, are plants of careful cultivation and slow growth. The publicity man can make the plant grow faster and let people see it growing.

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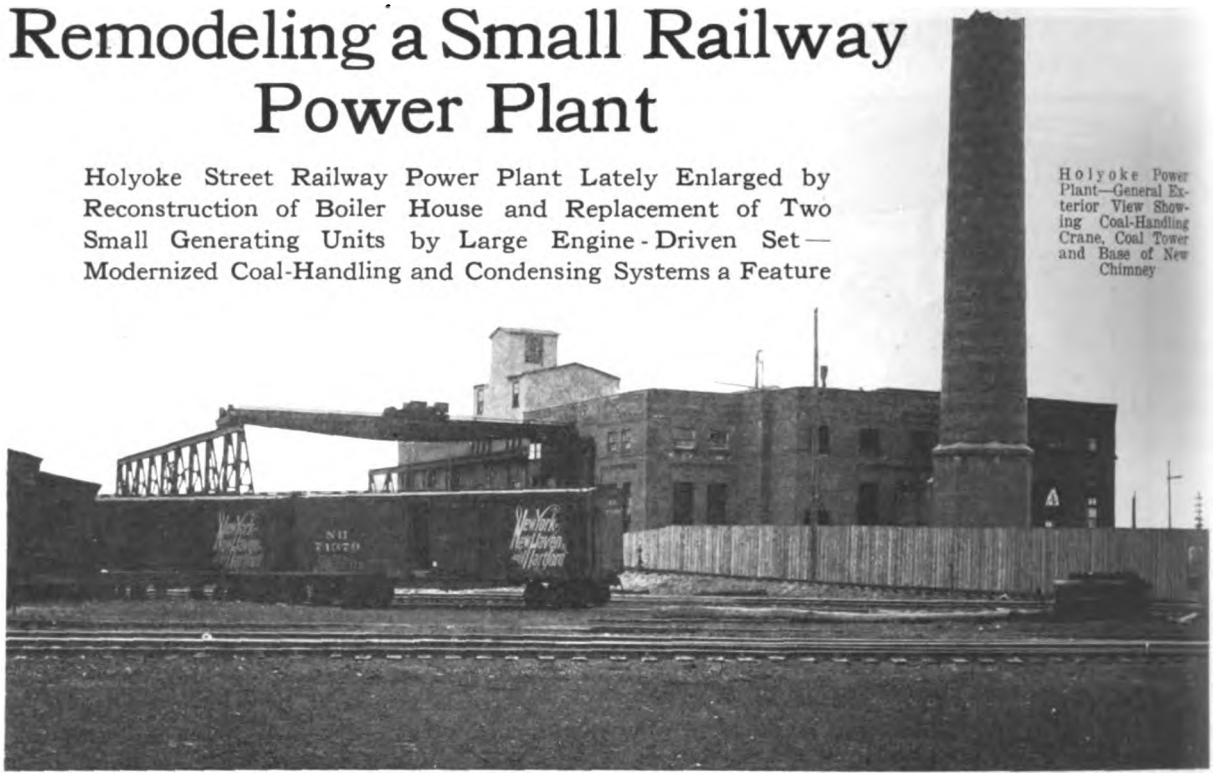
Remodeling a Small Railway Power Plant

Holyoke Street Railway Power Plant Lately Enlarged by Reconstruction of Boiler House and Replacement of Two Small Generating Units by Large Engine-Driven Set—Modernized Coal-Handling and Condensing Systems a Feature



Holyoke Power Plant—General Exterior View Showing Coal-Handling Crane, Coal Tower and Base of New Chimney

THE power plant of the Holyoke (Mass.) Street Railway has recently been reconstructed to meet increasing demands on the company's generating capacity, following a comprehensive study of the general power situation by the road's consulting engineer, G. E. Pellissier of Springfield, Mass., who drew the plans and supervised the installation of the equipment. The original plant had a rated capacity of 2650 kw. with five reciprocating engine-driven units, all generators being of the direct-current type with the exception of a motor-driven outfit of 75 kw. not included in the above and used in connection with the lighting of Mountain Park, a summer resort about 5 miles from the station. The plant now has a rating at the direct-current buses of 3550 kw., an increase of about 34 per cent in capacity having been secured by the removal of two 300-kw. units driven by 15-in. x 28-in. x 48-in. Greene tandem compound engines installed in 1895, and the substitution of a 1500-kw. generator of the interpole type, direct connected to a 30-in. x 60-in. x 54-in. Rice & Sargent horizontal cross-compound engine.

Besides the changes in prime movers above outlined, the boiler plant of the station has been remodeled, new and larger units replacing old equipment. A Taylor stoker installation and a Stephens-Adamson coal-handling system have been put in, a new chimney built, and improvements effected in the feed water supply and condensing systems. These are reviewed below, following an outline of the power problem of the company, based upon a report by its consulting engineer.

Reasons for Adhering to Direct-Current Generation

The street railway service of Northampton and Amherst is under the same management as the Holyoke company, and the power requirements at these points affected the development problem at the Holyoke station. The load of the Holyoke plant is nearly all located within about 4 miles of the station and the existence of other companies on the boundaries of the system offers little opportunity for expansion into the outlying country. From the distribution standpoint, the continued use of direct current appeared desirable. One of the plans considered was the installation of a 2000-kw. turbo-alternator at Holyoke for the supply of power to the Mountain Park and Amherst lines, with the erection of a substation at each point. It is a disadvantage, however, that the park is open only about four months in the year, and that for only a small part of that time is the power consumption large, while the fixed and operating charges would run the entire year with this arrangement. It was found to be undesirable, also, to transmit energy from Holyoke to Northampton, the existing cost at the steam plant of the Northampton Street Railway in that city not being enough higher than that at Holyoke to warrant the supply of a.c. power from the latter station.

Assuming that the Holyoke station was enlarged sufficiently to carry the Amherst and Mountain Park loads through substations, and that a 2000-kw. turbo-alternator was installed, it appeared upon analysis that in order to work the turbine at anywhere near full load it would be necessary to throw a part of the Holyoke load upon this unit. The maximum demand at Amherst and Mountain Park would probably not exceed 85 per cent of the output of this machine, and for the greater part of the year would not exceed 25 or 30 per cent of its capacity. To carry a part of the Holyoke load on the turbo set it would have been necessary to install transformers and either rotary converter or motor-generator equipment at Holyoke in order to obtain 550-volt direct current. The addition of these extra units would have made the floor space occupied at Holyoke about the same as though the extension of the plant were made along reciprocating engine lines. As regards efficiency under the best conditions, viz., constant full load, there appeared little to choose between turbine and engine sets, and in view of the losses in conversion and transformation, any possible increase in efficiency by the use of the turbine would have been more than offset.

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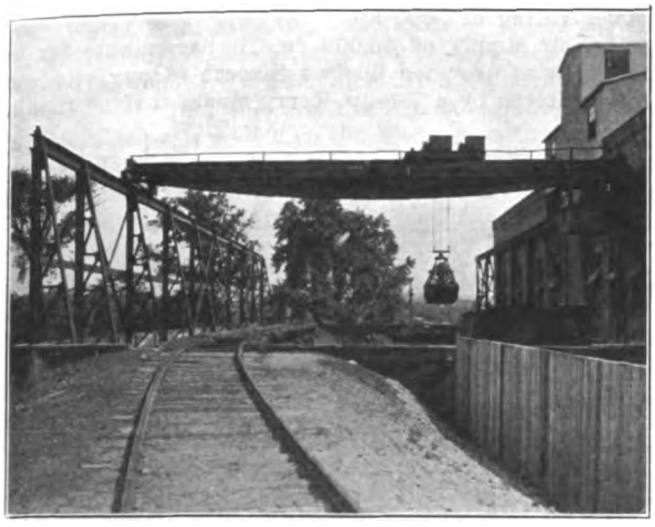
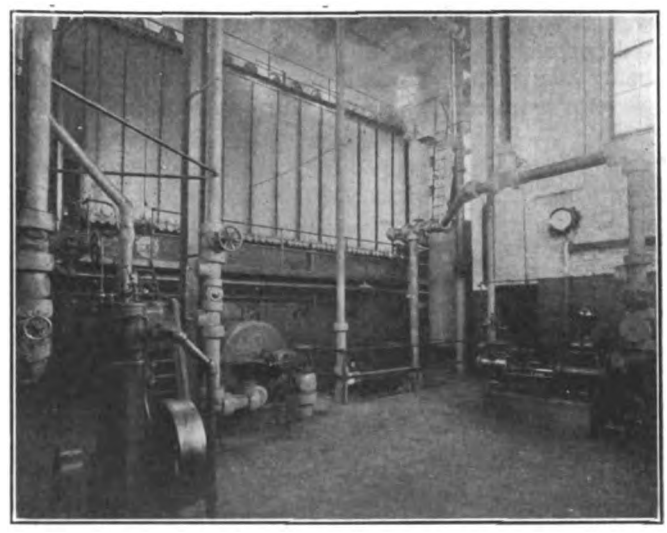


HOLYOKE POWER PLANT—COAL POCKETS, TRACK HOPPER, RECLAIMING CRANE AND TOWER OF COAL-HANDLING SYSTEM



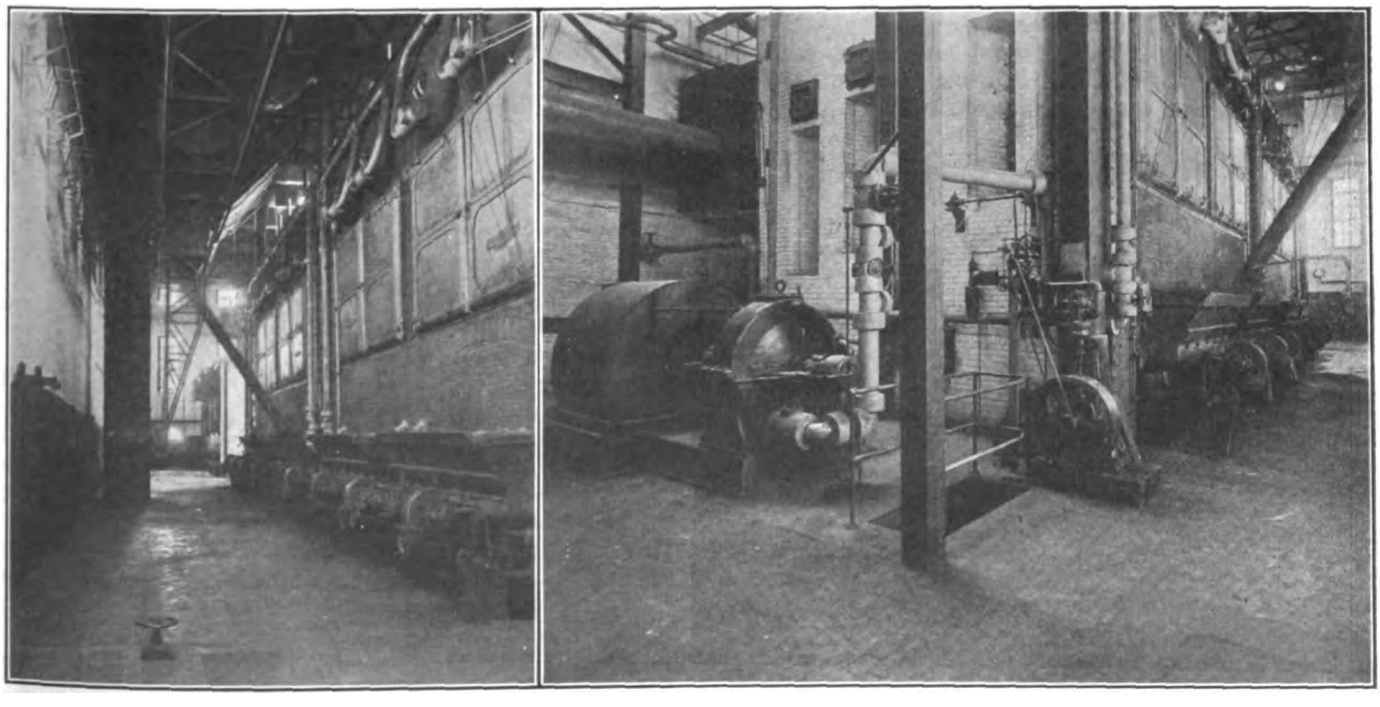
HOLYOKE POWER PLANT—FUEL ECONOMIZER, RESERVE BOILER FEED PUMP AND OTHER BOILER ROOM AUXILIARIES

With the use of a single turbine the reliability of service in the districts supplied by it would not be as high as on the lines supplied by the various engine-driven direct-current units, and the cost of duplicate a.c. units and transmission lines would have been prohibitive. Accordingly, it was decided to purchase power at Amherst from the Turners Falls Power & Electric Company, installing a motor-generator substation at that point, and the Holyoke station was reconstructed along purely direct-current lines, accompanied by a general overhauling of the feeder system.

From Coal Pile to Stoker

Run-of-mine bituminous coal is used at the Holyoke station. Fuel is either dumped or unloaded from coal cars outside the building for storage in the yard or deposited in a 12-ft. x 12-ft. steel track hopper, which is the beginning of the coal-handling system. A 5-ton Northern electric crane with a span of 60 ft. 6 in., equipped with a 1.5-cu. yd. grab bucket and operator's cage, facilitates handling fuel in the yard. From the track hopper the coal is drawn by an "S-A" reciprocating plate feeder, driven by a variable-throw eccentric which regulates the flow of coal. A 24-in. x 24-in. "S-A" double-roll coal crusher, driven by a 20-hp. motor, receives the fuel from the feeder, reducing it to 2-in. lumps and under, the crusher being driven by a 20-hp., 550-volt, direct-current motor. From the crusher coal is delivered to an "S-A" vertical bucket elevator, 53 ft. on centers, equipped with 14-in. x 18-in. buckets having a capacity of 40 tons per hour. The fuel is elevated to a sufficient height to permit the use of gravity in handling the coal in the remaining steps toward the stokers. From the discharge of the bucket elevator the coal is spouted through a bifurcated outlet to a suspension type bunker of 150 tons capacity. From the bunker the fuel falls through three "S-A" rack-and-pinion slide gates operated from the boiler room floor by hand chains. A powerful leverage is secured by the use of the rack and pinion design, and this, combined with the fact that the gate cuts into the fuel at right angles to the flow, makes operation unusually easy.

The connecting link between the storage bunker and the stokers is an "S-A" traveling weigh hopper. This



HOLYOKE POWER PLANT—FIRING AISLE IN BOILER ROOM; STOKERS, WITH ONE OF THE DUPLICATE STOKER ENGINES AND ONE OF THE DUPLICATE STEAM TURBINE BLOWERS FOR FORCED-DRAFT SYSTEM

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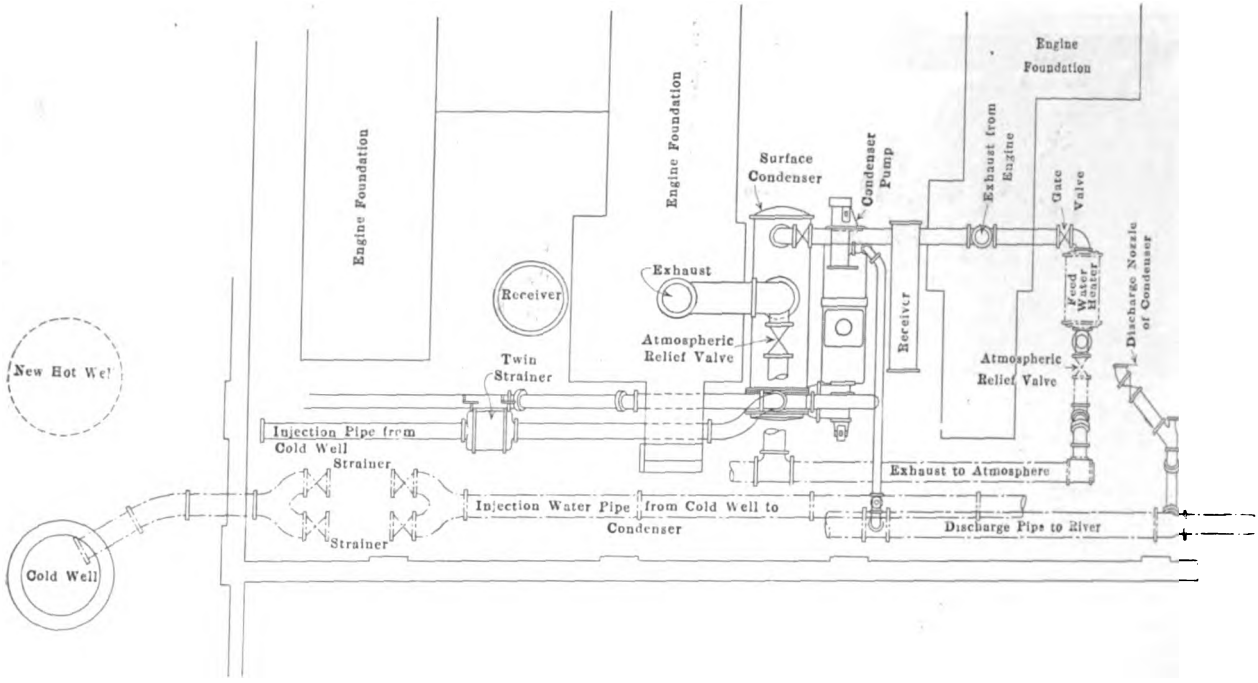
device serves to provide accurate operating records as well as to distribute the fuel. Thus the storage bunker did not require extending the length of the boiler room, being conveniently located so as to be filled by a single elevator and gravity chutes. In operation the desired quantity of coal is drawn from the bunkers, accurately weighed and recorded, and the hopper is moved and the coal discharged to any one of the stokers.

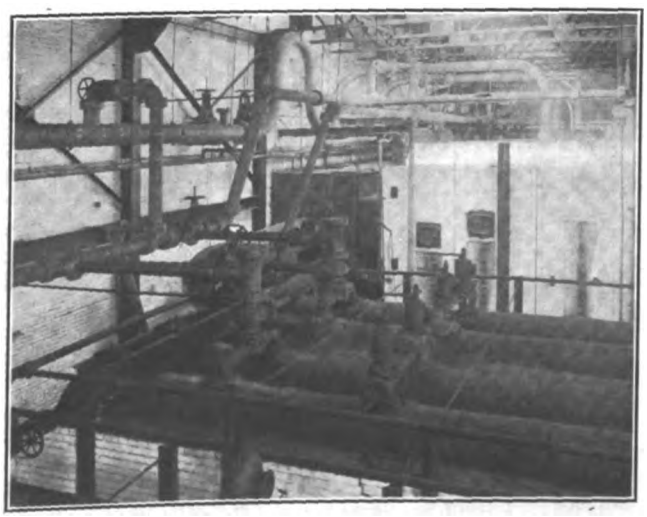


HOLYOKE POWER PLANT—PIPING CONNECTIONS IN ENGINE EXHAUST SYSTEM

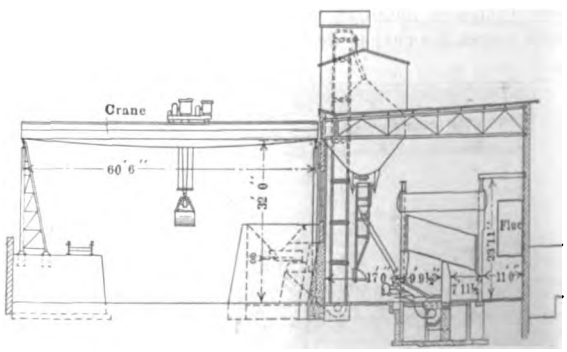
STEAM-GENERATING EQUIPMENT

Four new 500-hp. Babcock & Wilcox boilers equipped with six-retort Taylor stokers supply the present steam requirements of the plant. Three hand-fired Babcock & Wilcox boilers of 200-hp. rating each are held in reserve from the old steam-generating equipment. The new boilers replace one 307-hp. and two 342-hp. units of the hand-fired type, which were removed in the reconstruction work. A new brick stack of the Alphons Custodis type, 10 ft. in inside diameter and 175 ft. high, has been erected, and a new Greene fuel economizer, twelve tubes wide and fifty-two tubes long, with 12-ft. tubes, has been installed, replacing an economizer with 9-ft. tubes, six tubes wide and fifty-two long. Both stack and economizer are designed for a maximum boiler rating of 3000 hp.

An air supply of 50,000 cu. ft. per minute for the furnaces is provided by two Sirocco blower sets, each direct driven by a 136-hp. Terry steam turbine running at 1640 r.p.m. normal speed. Either set is sufficient for the requirements. Two stoker engines, each 6 in. x 6 in., of the American Blower Company's make, are installed, and the speed of the blowers and engines is automatically controlled by a Mason regulator, which also governs the damper opening. Special care has been taken in the design of the air supply ducts to provide as short connections as possible between the main duct and the wind boxes, corners being rounded to reduce friction when feasible. The main duct is located behind the bridge wall, and the connections to each furnace are flared and cast-iron elbows employed, as shown in the accompanying illustration, the intakes making an angle in each case of about 40 deg. with the axis of the air duct. The economizer is by-passed by a duct carried under the floor from the end of the flue nearest the stack to an uptake discharging into the stack inlet at the north end of the boiler room, the usual dampers being provided.



HOLYOKE POWER PLANT—LIVE STEAM PIPING IN BOILER ROOM AS SEEN FROM CHIEF ENGINEER'S OFFICE



HOLYOKE POWER PLANT—CROSS-SECTION OF BOILER ROOM AND OUTDOOR COAL STORAGE

Feed water is normally taken from a hot well outside the station, an auxiliary city connection being provided for emergencies. The new condensing installation is of the surface type, the circulating water discharge

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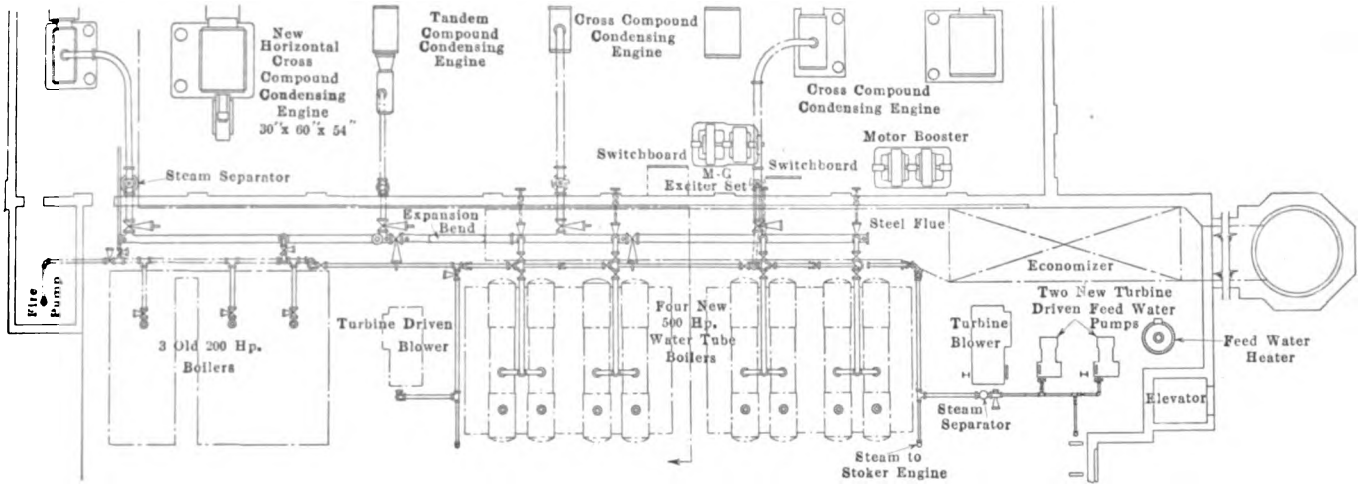
being carried into this well and serving as a boiler supply. Water from the Connecticut River is used for the circulation supply, the latter being taken into a cold well outside the plant by gravity flow from the river. Three suction lines from this well lead to the condenser sets, strainers being installed in the leads in each case. The new condensing equipment was supplied by the C. H. Wheeler Manufacturing Company of Philadelphia, Pa. The feed water is normally handled by either of two 4-in. Jeansville three-stage horizontal centrifugal pumps, each direct-connected to a Terry steam turbine operating at 3000 r.p.m., and located in the boiler room basement. One Deane feed pump used with the former station equipment is held in reserve, and a Deane fire pump is in service, the latter being piped for feed-pump work in emergencies. Water taken from the hot well at 100 deg. Fahr. passes through a feed pump into a 2500-hp. National closed heater, through which steam from the auxiliaries is passed. Leaving the heater at 205-210 deg. Fahr., the water temperature is then raised to 270 deg. Fahr. in the economizer, thence entering the boilers. A 5-in. Venturi meter, with extra 2-in. throat to measure feed water during the night when the load is very light, is installed in the feed water main piping, with dials and recording mechanism in the office of the chief engineer, C. L. Sheldon.

Without the mechanical stoker installation it would be necessary in this plant to operate three or four boilers, whereas with the present installation two boilers are sufficient for all the steam requirements. About 25 tons of bituminous coal are burned per day in the plant under normal load conditions, but in the summer and winter peaks about 30 tons are burned. The use of stokers and of the automatic coal-handling system has enabled the operating force in the station to be reduced from a former total of eighteen men to a present total of fourteen. The various improvements have also reduced the fuel consumption from an average of about 3.5 lb. per kilowatt-hour before the changes were made to 2.3 lb. per kilowatt-hour at switchboard, which includes steam for auxiliaries.

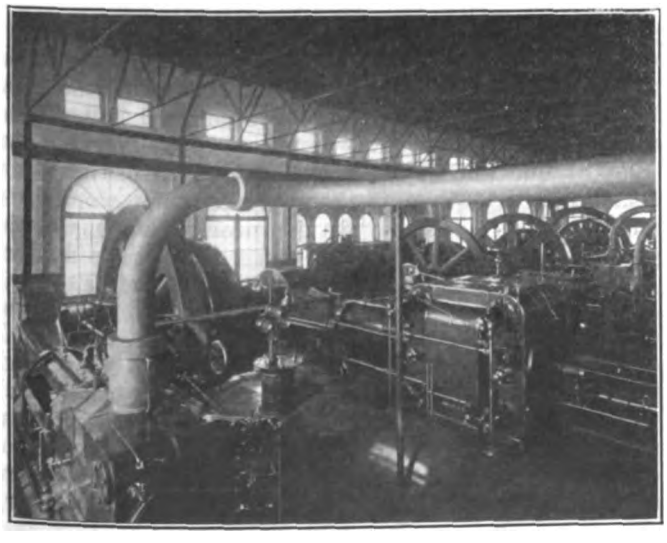


HOLYOKE POWER PLANT—LIVE STEAM PIPING CONNECTIONS

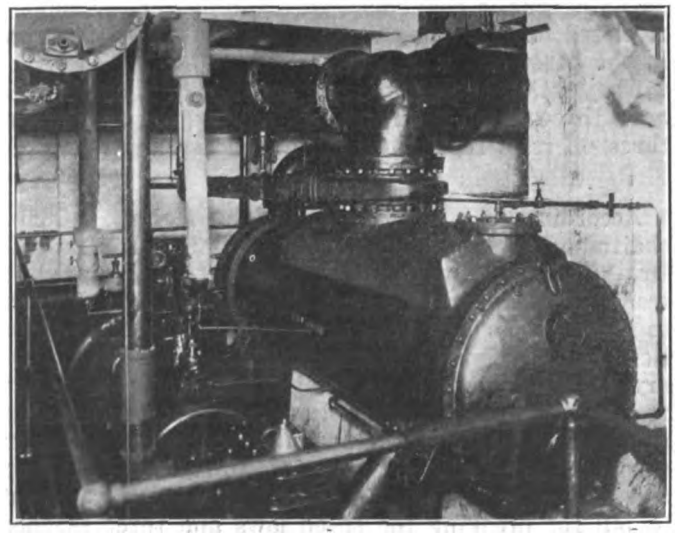
Ashes are at present dumped from the grates upon a concrete shelf in the boiler-room basement. A passageway is provided at one side of this shelf and equipped with a narrow-gage track upon which ash cars can be operated later to a hoist for yard delivery. About 12 per cent ash is obtained in the present fuel combustion, all ashes being weighed.

From Boiler to Hot Well or Switchboard

At the rear of the boilers and about their settings are carried two live steam headers, one 10 in. in diameter for prime movers and a 5-in. auxiliary line. The two headers are cross-connected at various points, and the steam delivery lines from the boilers are 6 in. in diameter in the cases of the new units and 5 in. in diameter in the older installation. Short connections with a gate valve in each are carried through a fire wall between boiler and engine rooms through separators to the corresponding engines, with the customary expansion bends. The steam connections to the auxiliaries are made as short as possible.



HOLYOKE POWER PLANT—ENGINE ROOM IN RECONSTRUCTED PLANT



HOLYOKE POWER PLANT—SURFACE CONDENSER WITH AIR AND CIRCULATING PUMPS

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Besides the Rice & Sargent engine, the engine room contains a 15-in. x 28-in. x 48-in. Greene tandem compound engine direct connected to a 300-kw. generator; a 26-in. x 50-in. x 48-in. Hamilton cross-compound engine direct connected to an 850-kw. generator, and a 30-in. x 60-in. x 54-in. Pennsylvania Corliss cross-compound engine direct connected to a 1200-kw. generator. The Greene and Hamilton engines have been rebuilt to operate at 150 lb. pressure, these outfits formerly having been designed for 125 lb. The main generators are 550-volt General Electric multipolar railway type direct-current machine. The Greene and Hamilton engines operate at 100 r.p.m., the Pennsylvania Corliss at 90 r.p.m., which is the speed of the Rice & Sargent engine. The last named is designed with cylinder ratios which will permit its operation in connection with a low-pressure turbine if further expansion of the station becomes necessary along alternating current lines. The electrical equipment of the engine room includes the usual railway type direct-current switchboard, with General Electric equipment throughout and a 120-kw. General Electric booster with a maximum rating of 450 volts and 310 amp., used in feeding the Amherst line. The Mountain Park lighting service is handled by 2300-volt, 60-cycle energy supplied by a motor-generator of 75-kw. rating previously mentioned. Overhead feeders supply the distribution system.

As stated, C. H. Wheeler surface condensers are used in the remodeled station, these being installed in the engine room basement and so arranged that a pair of engines can be exhausted into each if desired, or two of the engines can be operated on surface condensers and the other two on the Deane jet condensers left over from the old installation. The Rice & Sargent engine exhausts into a surface condenser equipped with a 16-in. x 32-in. "Rotrex" air and vacuum pump, and a No. 10 centrifugal pump, direct driven by a 9-in. x 8-in. vertical engine. The Greene engine adjacent to this unit may be exhausted into the surface condenser or into a jet condenser. The Hamilton engine exhausts into a surface condenser with a "Rotrex" air and vacuum pump of the foregoing size, but provided with a No. 8 centrifugal pump and an 8-in. x 8-in. vertical engine. All of these units may be exhausted into the atmosphere if necessary. A 28-in. vacuum or better is readily obtained with this installation. All the condensate from the engines is discharged into the river below the plant through a discharge well piped to the channel and connected with the hot well by an overflow line leading from the latter. The utilization of circulating water after its passage through the condenser tubes is highly advantageous in connection with the feed water supply. A closed circuit oiling system with White Star filters in the basement is in service.

The station operating force consists of a chief engineer, three watch engineers, six boiler room attendants, three oilers, a repairman and a coal assistant.

According to a report compiled by Harry P. Coffin, chairman of the Public Safety Commission, Portland, Ore., two people were killed and forty-six injured in traffic accidents in Portland, during October. Failure to comply with city ordinances regarding traffic violations caused offenders to pay $1,562 into the city treasury during the month. A total of 171 people were fined for violations of the speed laws and other ordinances, ninety-eight were continued for sentences, nineteen warned, 116 paroled by captains, thirty-one dismissed and six sent to the juvenile court. Three men were sent to jail for breaking the speed laws and three escaped after they had been arrested by officers.

Some Phases of the One-Man Car Question*

The Author Discusses Design and Equipment, Operation at Steam Railroad Crossings and Methods of Introducing One-Man Operation

BY C. D. CASS
General Manager Waterloo, Cedar Falls & Northern Ry., Waterloo, Iowa.

IT is particularly to some of the variations in methods of operation and character of one-man cars that this paper is devoted. First, as to the character of the cars, it may be said that some lines have found it impossible to purchase new equipment and have been compelled to rebuild old equipment. The controlling idea in the designing of new equipment or the rebuilding of old, of course, is the entrance and exit of passengers through the front vestibule past the operator. On old equipment in some cases it has been found impossible to provide a large enough entrance to permit of entering and alighting at the same time. A large entrance is a desirable feature of one-man cars, and its absence causes complaints from the public.

In all cases it is necessary to provide a door-opening mechanism to be controlled by the operator, and a fare-collecting scheme also under the control of the operator. Very satisfactory results have been obtained with manual mechanical contrivances for door-opening mechanisms, and on our small road these have been put on at a nominal cost and have been fairly satisfactory.

The near-side stop, of course, is desirable. Rear doors are closed and locked in such a manner as they cannot be opened from the outside. Some state commissions have required companies to furnish emergency exits in the rear of the car controlled by the operator. In other states this has not been required, and it has been found sufficient to provide at the rear doors a locking device which can be operated readily in an emergency by the passenger. In building new equipment for one-man car operation perhaps the Illinois Traction Company has been the most successful in obtaining car designs that meet the fancies of the public most completely. New cars have been designed by the mechanical department of the Illinois Traction Company which operate the doors and steps by pneumatic engines and the cars are completely equipped with air brakes and sanders. In my opinion these one-man cars are the best designed for the purpose in the United States, and inasmuch as the Illinois Traction Company is represented on your membership, I suggest that further details of the design of these cars be obtained from that source.

Now concerning operating features: Probably the most discussed subject, and the one on which there has been the greatest variation of opinion, has been the method of operation over steam railroad grade crossings. I find almost as many methods in use at steam road grade crossings as there are companies operating one-man cars. Some companies provide flagmen at the crossings, the wages for such flagmen being paid either jointly by the steam and electric company or else wholly by the electric company. Other companies require the operator of the car to flag himself across steam road crossings, and various other methods are being used. This was the one subject in my particular case which required the most courage to handle. I contend that the flagging of a steam road crossing by a conductor on a two-men car has resulted in increasing the hazard of operation over steam road crossings. The theory

*Abstract of a paper presented before the Chicago meeting of the Illinois Electric Railway Association, Nov. 28, 1916.

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on which this method was built was perhaps correct, but the element of human fallibility was not given sufficient weight in arriving at the solution of the problem. It is the old story of divided responsibility increasing the hazard. With this in mind when we started our one-man cars, the plan inaugurated was for the operator of the one-man car to bring his car to a full stop just in the clear of the steam road crossing, and then with the entire weight of responsibility upon him, if the crossing was clear, he could proceed in safety. He did not depend upon a conductor or anyone else; he knew the responsibility rested solely upon him, and with us it has proven itself safer than the old plan of the flagging of the crossing by the conductor.

I reached the conclusion of permitting operation in this manner after considering the operation of motor car traffic and team traffic over railroad crossings. It was apparent to me that there was no more reason why the operator of a street car could not cross a steam road crossing safely than the operator of an automobile could cross such crossing safely. And with the additional precaution of requiring a full stop, which is not required of automobiles, I felt that safety was completely secured. It has been contended that the electric railway should join the steam railway in providing safety signals, crossing gates, crossing flagmen or some other safety precaution. I take issue with anyone advocating this for the following reasons: First, all the courts in the land have held times without number that a street car is a part and parcel of the ordinary traffic of a city street, and this being true, there is no more reason why an electric street car line should be required to pay for protection at a steam road crossing than there is for an automobile owner or a taxicab owner or the owner of any other vehicle to be required to pay for such protection. I maintain that if means for protection are required at a steam road crossing to safeguard street car traffic, then means for protection are required to safeguard vehicle traffic of all kinds, and in that case it is the duty of the steam road that creates the hazard to protect the public against such hazard. In case the hazard is apparent to all, it must be equal in extent to all using the crossing, and the parties responsible for creating the hazard should be responsible for the elimination of it.

One more phase of this subject is the attitude of the public and the necessity of careful planning before the inauguration of one-man car service In a city that has become accustomed to street cars manned by two men, the advancement of the one-man car idea is apt at first to be received by the public with intense hostility. This is perfectly natural, first, because of the habit of seeing two men on cars; second, on account of the sympathy of the public with the men displaced by one-man operation, and third, in our particular case, an issue was required for a municipal election just at that time, and the one-man car subject was immediately available and peculiarly popular.

Experience, despite the advancement of education, remains always the best teacher. It will be found that schedules must be slightly lengthened. The problem of transfers and trip reports must be carefully solved. For those companies that can afford it, new cars designed for one-man operation are to be recommended. More frequent service on thinly served lines will help in a large measure to pacify the public. If these things be kept in mind and the foundation for one-man service be built with a frank, open statement concerning its necessity, there should be no difficulty in obtaining in advance the sanction of a fair proportion of street car riders, and when the system has been installed and is working smoothly you will find that the traveling public will be entirely satisfied and that you have offset to a very large extent the unhealthy condition of your street car revenues.

Modern Requirements Fulfilled by One-Man Cars*

The Author Cites Operating Records for One-Man Cars on an Important Line in the City of Fort Worth, Tex.

BY C. H. BECK
Westinghouse Traction Brake Company, St. Louis, Mo.

IN the following paragraphs, which deal with the operation of light-weight units controlled by one person, the name "safety car" has been adopted for such units. To those who have become closely associated with the operation of such cars, it has appeared important that the term "one-man car" should be discarded, for the reason that, in the first place, it does not especially distinguish the car, since the operation by one man is only, after all, one of a number of important features. Also, the term gives rise to the suggestion that a great number of men are to be turned out of work, and is, therefore, likely to prove unpopular.

It has been the writer's pleasure to have been associated with the introduction of ten cars of this type to service on an important residence line in the city of Fort Worth. The question of adaptability of such a car has never been seriously doubted, so far as its application to small lines is concerned, but the instance referred to is one in which such cars were placed in operation on a first-class line. The cars were of the double-end type and weighed 12,500 lb. They were so equipped that the brakes, as well as the doors and steps, were controlled from a single valve handle. Furthermore, a safety element was combined with the operation of the controller through a device similar to the well-known "dead man's handle."

Under this arrangement the braking positions are in no way complicated by the addition of door-operating ports, and the stop is accomplished in almost exactly the same manner as has been the standard practice. After the stop is made, a simple movement of the same handle is all that is required to open the door and step. When the work of unloading and loading has been accomplished, a movement of the same handle in the opposite direction, closes the door and step and releases the brake, and the car is ready to proceed.

The service previously given on this line was fifteen-minute headway in non-rush hours and seven and a half minutes in rush hours, the original type of car being a double-truck, double-end car, having a seating capacity of forty passengers. The physical characteristics of the line are such as would constitute a most difficult problem for making experiments, for the reason that the line is of single-track construction with a great number of switches and curves and with practically no level track. The length is 3.32 miles, making a round trip of 6.64 miles. The running time for round trip was forty-five minutes, thus making an average schedule speed of 8.8 m.p.h. The average number of passengers handled per day was 3860.

With the safety cars a non-rush-hour service of ten-minute headway and a rush-hour service of five-minute headway was installed, thus reducing the headway by one-third or, on the other hand, increasing the car service 50 per cent. The time for round trip was reduced to forty minutes, making an average schedule speed of 9.9 m.p.h., or an increase of 12.7 per cent. The

*Abstract of a paper presented before the Chicago meeting of the Illinois Electric Railway Association, Nov. 28, 1916.

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number of passengers for the first fifteen days of operation of the safety cars averaged 4510, or an increase of 16.8 per cent. The increase in car mileage was practically 50 per cent and, as would be expected under the circumstances, the receipts per car-mile decreased.

By means of a meter at the substation, it was found that the old cars were operated on a basis of 2.4 kw.-hr. per car-mile, and by the same means it has been discovered that the new cars are being operated on the basis of 1 kw.-hr. per car-mile, with prospects of slightly reducing the cost of operation of the new cars after the men become familiar with the operating conditions. The figure on the power consumption, of course, includes line losses in each case. With respect to the question of power consumption generally, it has been found that the safety cars are being operated under a 25 per cent reduction in total kilowatt-hours per day, as compared with the old type of car, notwithstanding the improvement in service amounting to 50 per cent increase in car-miles per day.

The volume of patronage on this line is distributed in such a manner that a peak load is created in the morning and evening, with the greater peak, of course, coming in the evening. It has been observed in this connection that the peak is not an instantaneous affair, but is fairly well distributed over a period of twenty-five or thirty minutes. Under the five-minute headway the maximum loads were observed to have been less than was the case under the original seven-and-one-half-minute headway, as might have been expected, but were not of such great proportions as to fill the safety car uncomfortably, although it seats only twentyeight passengers.

The cars have been controlled by one operator from the beginning of the service, which was Nov. 1 of this year, and as may be inferred from the increase in average schedule speed, no difficulties have been encountered with respect to making change or issuing transfers. As a matter of fact, a study of the data given will reveal that the operation has been a complete success from every point of view, and has carried with it all that could be desired from an operating standpoint.

The time of boarding and alighting for any given number of passengers up to ten and twelve was carefully observed in connection with the operation of old cars. While the new operation has not been established for a sufficient length of time to assure that the majority of patrons are well familiar with its arrangement, at the same time such observations as have been made indicate that the time for boarding and alighting in this case will appear almost as favorable for, say, one or two passengers, and will appear more favorable for a greater number of passengers. A remarkable condition was found in checking the new car service, in that the traffic is more evenly distributed and, as might have been expected with the improvement in car service, the total number of passengers boarding and alighting at any point is much less than with the cars operating under the longer headway.

With respect to the car operators, these men were chosen from among the regular force, some having previously been conductors, some motormen and some both. It became apparent that those who had operated both ends of the car previously, and therefore were familiar with not only running the car but handling change and transfers, were able to attain a great degree of proficiency in the new operation very quickly. Those who had not enjoyed experience in both directions, however, readily adapted themselves, and within a remarkably short time all were able to make the schedule, and at this time, after twenty-four days of operation, they are apparently just as enthusiastic and well pleased with the new form of service as are the patrons and officials of the organization.

Since no loops are provided at the end of the line, it is necessary to change ends of the car, and arrangements are now under way to provide two trolleys per car, so that it will not be necessary for the operator to leave the car at any time.

Under the old system of operation, the fact developed that the northbound traffic (toward the center of the city) was only 85 per cent of the southbound traffic. This indicates a great possibility that a considerable number of patrons were being carried toward the city by other means of conveyance, probably by their friends who owned automobiles. Since the advent of the more frequent service, the ratio has increased considerably until it is now nearly equal as between the northbound and southbound traffic. This means that the prospective passenger is being provided with a service such that long waits on street corners are not necessary. As a matter of fact, under five-minute headway there is a car in sight nearly all the time. The line on which the safety car service was started had not previously been served by jitneys.

It is to be remembered that the cars are of single-truck type, but they have been found to ride as easily as double-truck cars. The only reason that can be assigned to this most desirable feature is that they are of extreme light weight and that the effect of momentum at low joints, switch points, etc., is not so great as with the old type of single-truck car. The acceleration is considerably greater than that experienced with the older type of car.

Government Operation Is Defective

Representatives of the Merchants' Association of New York City will appear before the Newlands investigating committee in Washington, D. C., to oppose Government ownership of public service corporations. The association has issued in pamphlet form the arguments which it has instructed its representatives to offer the committee. In this pamphlet the association says that the fundamental defects of Government operation are:

1. Dilatory, inconsistent, vacillating, and therefore ineffective and wasteful policy.
2. Unsuitable, inefficient, and frequently changed executive organization.
3. Hampering limitations upon executives.
4. Lack of self-interest as an incentive.
5. Lack of standards of efficiency.

Continuing, the association says:

"The fundamental assumption which underlies the argument for government ownership and operation of public utilities is that a profit equal to that now secured by private corporations through private operation can be secured for the public benefit by public operation; or that, as an alternative, by the elimination of profit, service may be increased or charges reduced. This implies that public management will be as economically, efficient and productive as private or corporate management. This assumption is unwarranted. On the contrary, it can be shown that government management is fundamentally defective in important particulars; that its defects are inherent in and inseparable from our system of government, and that these defects make relative inefficiency and lack of economy inevitable."

One of the first steps toward the centralization of work and departments in the Kansas City (Mo.) Railways is the reduction in districts for roadmasters from five to three.

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$96,371,300 Expenditure by 1926 Recommended for Chicago Traction

Report of Chicago Traction & Subway Commission Includes Plans for Subway Construction for Rapid Transit and Surface Cars Through Central Business District, Conversion of Present Elevated System Into Completely High-Speed Express System and Extensive Rearrangement of Traffic in Loop District

[The report of the Traction & Subway Commission of Chicago, insofar as the general plan is concerned, has been given out to the press, although it will be three weeks or more before it will be ready in its entirety to submit to the City Council. This premature publicity of the general scheme in advance of the completion of the great mass of supporting data and information, and in advance of the financial plan, is precipitated through a so-called "scoop" of an unscrupulous Chicago daily newspaper. The engineering studies, which are most unique and exhaustive in nature and form the background for the conclusions in the general plan described herewith, will appear in these columns as rapidly as they take final form.—EDITORS.]

APPROXIMATELY $100,000,000 is the estimate of the cost of providing the city of Chicago with an adequate rapid transit system and relieving the congestion in the central business district, as developed in the report of the Chicago Traction and Subway Commission, of which William B. Parsons, Robert Ridgway and Bion J. Arnold are the commissioners, and H. M. Brinckerhoff is chief engineer. The expenditure of this sum is called for in the course of nine years, divided into three equal periods. The immediate construction program for the period 1917 to 1920 calls for an expenditure of $60,553,000, the second period $24,516,300, and the third period, principally for additions to rolling stock and extensions of the surface lines, $11,302,000. The ultimate investment to carry out the plans of the commission through the year 1950, with a Chicago of 5,000,000 inhabitants, is placed at a minimum of $260,000,000.

The general physical plan of the traction system is elaborate in its scope, and aims to provide main rapid transit lines that will serve all parts of the city, distribute traffic, relieve congestion and carry people to and from all the business districts of the city, whether central or outlying; to provide rapid transit routes outside of the loop district, enabling through passengers to travel direct without being unnecessarily diverted into or through this district, and to give direct facilities to outlying centers; to provide additional and better means of travel through the central district with a view to broadening its area; to relieve surface congestion wherever necessary and carry as many West Side cars to the lake front as practicable through subways in the loop district, and to provide express service on all parts of the present elevated system.

The conclusions and recommendations of the commissioners provide, briefly, for the unified operation under one management of all of Chicago's local transportation facilities with the control vested in the City Council, but giving to a board of supervision and control the broadest possible powers as to improvement and regulation of service, development of the property, extension of facilities and other administrative matters. The existing companies are to surrender their present franchises and receive in lieu thereof a franchise to the new corporation, terminable at any time by the city by purchase, by amortization, or by forfeiture if the corporation fails to comply with the provisions of the ordinance. The city's present traction fund will be used for the construction of the subways, which it is planned will be owned by the city from the start. The future divisible net receipts are to be shared by the city in such a way as to facilitate acquisition of the properties. A 2-cent charge for transfers between surface and rapid transit lines is tentatively planned to help carry the heavy capital expenditures of the construction period, but this charge is to be gradually eliminated after construction work is completed, if and as the earnings of the corporation permit. The present free transfer privileges between surface lines and between elevated lines are to be retained. The report also will provide a financial plan, not yet completed, whereby the city and the corporation owning and operating the consolidated companies will each receive the current rate of interest upon the traction fund and new capital as furnished by them from time to time to develop the system. The corporation will receive 6 per cent upon the total valuation of the existing properties at the time of consolidation. A suitable sinking fund (amortization) provision is to be made, and thereafter a division of net receipts on the present basis between the city and the corporation; that is, 55 per cent to the city and 45 per cent to the corporation, provided that the corporation shall receive for its share at least 1 per cent of the gross receipts. The initial nine-year construction program will increase the rapid transit facilities of the city two and one-half times the present rush-hour schedule and call for the construction of 11.1 single-track miles of double-track subway, of which 6 miles are for rapid transit and 5.1 miles for surface cars; 64.5 single-track miles of elevated lines; 150 miles of new surface lines, and 111 miles of rehabilitated surface track. The ultimate plan, which calls for the expenditure of $260,000,000, provides for the construction and equipment of 58.1 miles of subway, of which 53 miles are for rapid transit and 5.1 miles for surface cars, and 525 miles of surface lines.

DEVELOPMENT OF THE GENERAL PLAN

The general plan which the commissioners recommend has in view a development along the following broad lines, which as a primary basis will require the construction of four north and south rapid transit lines parallel with the greater dimension of the city. Two of these lines will pass through the present loop district and the other two will be located further west on Halsted Street and Ashland Avenue. The east and west rapid transit lines extending from the outer limits of the city to and through the greatly broadened central business district will intersect the above four lines, with transfer arrangements at points of intersection. This rapid transit system is to be extended, as may be necessitated by the city's growth from time to time, so as to serve the new and growing subcenters and residential districts. Elevated platforms are to be lengthened and, at convenient points throughout the

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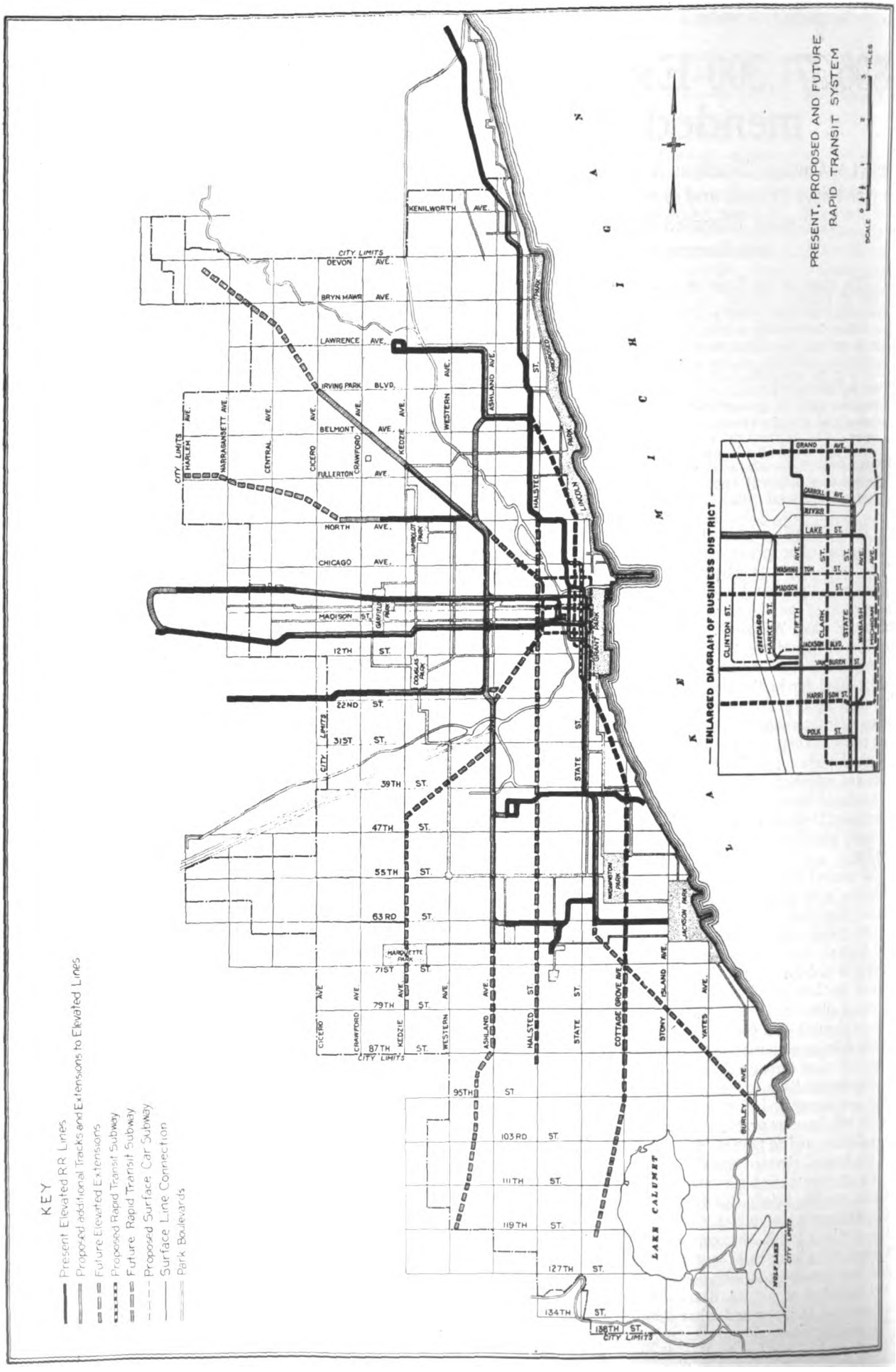

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city, transfer is to be provided from the surface lines to the rapid transit lines to give as complete an interchange of traffic as is consistent with the diversion of the long-haul traffic to the rapid transit lines and the short-haul traffic to the surface lines.

North and South Rapid Transit Lines

Considering the fully developed plan and describing the rapid transit lines in order of completion they are, for north and south travel, as follows:

1. A line is to be developed by four-tracking completely the Northwestern and South Side Elevated lines from Sixty-third Street on the south to Wilson Avenue on the north. The central portion of this four-track through line is to consist of a two-track subway extending from Eighteenth Street on the South Side Elevated north under State Street to Chicago Avenue, thence west to a junction with the Northwestern Elevated. The other two tracks of the central section of this through four-track line is to be secured by the utilization of the existing Fifth Avenue elevated tracks extended south to Polk Street, and east over Polk Street to the existing South Side Elevated structure. The through routes on these lines will spread the old loop district north and south by virtue of the subway mentioned above and the existing and extended tracks over Fifth Avenue, both subway and elevated giving two-way service on opposite sides of the loop instead of one-way service as at present.

In addition to these through lines, the existing elevated tracks over Wabash Avenue at Congress Street are to be utilized for South Side stub service. A corresponding North Side stub service is to be provided by the extension of the North Water Street tracks of the Northwestern Elevated east and south to a new elevated stub terminal at State and Lake Streets. Both these terminals will afford special rush-hour service north and south from the loop district similar to the West Side service of the Metropolitan Fifth Avenue stub terminal as well as transfer facilities from West Side lines in both directions.

2. A through north and south line to be established by constructing a two-track elevated railroad north from a terminal at Sixty-ninth Street and Ashland Avenue over or parallel to Ashland Avenue to Twentieth Street with connections to the Englewood and Stock Yards branches of the South Side Elevated Railroad. Thence from Twentieth Street north it will connect with the existing Metropolitan right-of-way with additional tracks constructed on it to Robey Street junction, with grade separation at Marshfield junction. From Robey Street junction a two-track elevated is to be constructed north over or parallel to Robey Street to a junction with the existing Ravenswood branch of the Northwestern Elevated in the vicinity of Roscoe Street, thence by additional tracks north over the existing Ravenswood right-of-way. This line will give direct transfer to the five existing elevated branch lines from the west and to five branch and main lines to the east.

3. A two-track subway is to be built extending from a transfer terminal at a point south of Sixty-third Street and at or east of Cottage Grove Avenue, northward under Cottage Grove Avenue or some adjacent north and south street to about Twenty-second Street, thence to Michigan Avenue, to Ninth Street, thence west, passing under the State Street subway to Clark Street, thence north under Clark Street, passing under and connecting with the State Street subway at Chicago Avenue. These two subways form a four-track subway extending north under Clark Street to a junction with the Northwestern Elevated in the Belmont-Wilson (Lake View) section. Two tracks may be needed northwesterly beyond this district to accommodate the outlying territory. At the termini of this subway, suitable and convenient transfer arrangements are to be provided for passengers from radiating surface lines, as well as facilities for through running of trains from rapid transit lines reaching out into the outlying districts.

4. A line over Halsted Street formed by a two-track elevated extension of the Northwestern Elevated south over Halsted Street from North Avenue to the vicinity of Seventy-ninth Street, with grade separations and transfer stations at intersections with the Oak Park Elevated, Metropolitan Elevated and Stock Yards and Englewood branches of the South Side Elevated, is to be constructed.

East and West Rapid Transit Lines

For the east and west rapid transit lines the fully developed plan contemplates additional tracks on the existing west side elevated lines to provide express service, extension of these lines into new territory, the construction of a new line into the southwestern portion of the city, amplification of the existing trunks leading into the central business district, the construction of an additional stub connection in the present loop district, and finally the construction of additional trunks leading from west side junction points by subway through the central business district to Michigan Avenue or Grant Park. These are shown on the accompanying map.

The traffic investigations of both surface and elevated lines, as well as the residential and occupational canvass, show clearly the desirability of direct service from the northwestern residential districts of the city into the manufacturing and office building district on the west side of the loop and west of the river north and south of Madison Street. For this purpose a physical connection is proposed from the Metropolitan system to the Oak Park Elevated at Lake and Paulina Streets. Some northwest branch trains can be operated to the Fifth Avenue terminal over their present route, and the others east over Lake Street, either to the Fifth Avenue terminal or through the Union Loop via Lake Street, Wabash Avenue and Van Buren Street. This diversion of part of the heavy traffic now hauled over the four-track Metropolitan trunk east of Marshfield Avenue station to Lake Street will relieve the Metropolitan main trunk, thus providing additional capacity for the west and southwest districts. Later a still more direct service will be secured by constructing the line parallel to Milwaukee Avenue south to a subway connection as above mentioned. Still later, when warranted, the Blue Island Avenue elevated connecting with the subway under Halsted Street will form a symmetrical southwest outlet similar to the Milwaukee Avenue diagonal line.

Surface Line Improvements

Street congestion in the central business district of Chicago has already reached the point where relief has become imperative. With the extremely limited possibilities of providing further street capacity there remains but the alternative of depressing surface lines beneath the streets. Hence surface line subways are recommended by the commissioners on the score of necessity even if they cannot fully justify their investment. As one element of the broad, general plan recommended such surface line subways should be constructed through the congested central business district to form the nucleus of a downtown terminal system of subways into which as many surface line cars as possible should

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be diverted. As far as the needs of the future may be foreseen these surface line subways should be constructed in the following order:

1. A two-track subway should be built east under Washington Street at low level to Michigan Avenue for the much needed relief of the district north of Madison Street, passing beneath and transferring to the north and south rapid transit subways; thence at high level south under Michigan Avenue to Jackson Street, with loop or stub facilities under Grant Park or Michigan Avenue. This subway with its present west portal under the Northwestern Station can accommodate a number of important lines from the west and northwest territory which now are forced to use the congested surface terminal loops along State and Dearborn Streets.

2. Another east-west two-track subway should be built under Jackson Street from the east portal of the Van Buren Street tunnel (reconstructed for this purpose) east under Jackson Street at low level to a connection at Michigan Avenue with the previously mentioned Washington Street subway.

3. A north-south surface car subway should be built under Indiana Avenue from Fourteenth Street, connecting with the proposed Illinois Central station at Twelfth Street; thence under Michigan Avenue at high level to a connection with the above mentioned west side surface car subways. This subway will accommodate the majority of the surface cars now entering the business district in Wabash Avenue, thus greatly relieving the surface congestion in the narrow throat between the railroad yards west of State Street and east of Indiana Avenue.

In addition to the primary object of relieving surface congestion, a great advantage to be realized from these subways will be the establishment of a much needed station service directly connecting the Northwestern, Pennsylvania-Burlington-St. Paul, Lake Shore, and Illinois Central-Michigan Central steam railroad terminals. This complete subway route further provides for a direct passenger movement between the south lake shore district and the west and northwest districts At present direct transfer facilities downtown between these important districts are unavailable.

Much surface line improvement, however, should, in the opinion of the commissioners, be put into effect at once without waiting for the construction of the above surface car subways. This is urgently required not only because of the rapidly increasing street traffic and the increasing rush-hour passenger traffic on the surface lines, but also the additional street congestion which will unavoidably result from subway and elevated construction work. These improvements require strict enforcement of traffic regulations rerouting as follows:

1. Prohibiting the existing abuse of parking vehicles on car streets and any unnecessary use of tracks by vehicles in rush hours.

2. The reservation of safety loading berths at near-side stops.

3. The use of visible traffic signals at important crossings, maintained and operated by city authorities.

4. The diversion from the heavier car line streets of unnecessary vehicular movement.

5. The abatement so far as practical of interlocking surface loops and divisional operation by further through routing of balanced car movement in the nature of a zone service and the establishment of short lines turning back at the edge of the congested district.

COMMISSION ALSO RECOMMENDS SKIP-STOP

The commission adds that while future surface line operation, routing and schedules cannot possibly be predicted with any reasonable definiteness, it is contemplated that with such a supervisory board as recommended in the report, the city-wide development of the surface lines in conjunction with the rapid transit lines should be carried out efficiently as the growth of the city proceeds. This development should encourage the further establishment of:

1. Logical through routes on sufficiently short headway to render them efficient and attractive to patrons:

2. Further development of the zone system of car operation by means of which service on these long lines may be tapered off according to the traffic demands by establishing short line terminal routes.

3. Skip-stops whenever practicable. The entire outside system of surface line stops should be revised so as to eliminate needless stops, especially on diagonal streets or where transverse streets are offset.

4. Finally, outlying lines intersecting rapid transit lines should be arranged so that transfer of long haul passengers may be facilitated without disturbing or disconnecting the through surface line service along important thoroughfares reasonably required by the traffic

Wages Should Be Regulated

Committee Report to National Municipal League Favors Giving Power to Commissions as Experiment

THE National Municipal League, an organization founded by representatives of civic bodies throughout the country, received at its twenty-second annual meeting in Springfield, Mass., on Nov. 24, a committee report treating broadly on the subject of public regulation of wages, hours and working conditions of utility employees. In general the committee in question, that on franchises, felt the outstanding fact to be that "continuity" is a fundamental interest of all three parties concerned: for the employees, continuity of employment; for the companies, continuity of earnings, and for the public, continuity of service.

The committee believed that the public interest is sufficient to warrant the adoption of legal measures to prevent strikes, but that until effective substitute measures for the adjustment of the grievances of employees have been worked out and tested, it would be unfair and impracticable to deprive the employees absolutely of the right to use this weapon of self-defense.

Public control over the relations between utilities and their employees, the committee said, might be established by: (1) the inclusion of the necessary provisions in franchises; (2) a general regulation from time to time by statutes or ordinances, and (3) the fixing of standards by regulating commissions or tribunals. The franchise method would be open to the objections that many perpetual, long-term or indeterminate franchises already exist, that a long-term contract is an unsuitable means for regulating changing wages and that employees are not a party to franchise agreements. Where franchises come up for renewal, however, definite provision should be made for the settlement of disputes. Maximum working hours and other working conditions might be fixed, but specific wages should not be established unless made subject to frequent revision.

As for general regulation, the committee stated that wherever well-equipped commissions exist, the duty of establishing detailed standards and rules relative to the relations of utilities and their employees might properly be imposed upon such bodies. As to the settlement of particular disputes and the fixing of wages, etc., in particular cases, the committee favored that experimentally the power be given to the commissions rather than to special tribunals, the decisions to be final for comparatively short periods.

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Boston Subway Policy Defended

City Ownership and Private Operation of Tunnels Shown to Be Wise After Twenty Years' Experience and Investment of Thirty-five Millions

CORPORATION Counsel John A. Sullivan of Boston made a vigorous and telling defense of the subway policy of the municipality for the last twenty years at a hearing Dec. 4 in connection with the Boston Elevated Railway revenue investigation. Declaring his belief in city ownership and private operation under present conditions, Mr. Sullivan showed that although Boston has lent its credit to the extent of about $35,000,000 for subway construction, the policy has been sound from the beginning, and that the losses therefrom claimed by the Boston Real Estate Exchange at a former hearing are without foundation.

Mr. Sullivan said that the city's financial relation to the tunnels and subways had been so misrepresented as to make it appear that the municipality had been blundering along in reckless fashion through the entire history of Boston rapid transit legislation. The criticism is that the tunnel leases are unfavorable to the city; that the city is sustaining losses annually on this account; that public ownership is a bad policy financially, and that the city would have been better off had the Boston Elevated Railway built and owned the subways and tunnels and paid taxes on this property to the city. In reality the leases and rentals, taken as a whole, are very favorable to the city, which sustains no loss on their account and will ultimately gain greatly by them. The policy of public ownership has had the sanction of the Legislature, of the city government, and of the people as expressed by popular vote. Mr. Sullivan said, however, that he believed the public would choose to-day an unfavorable contract involving city ownership and stand the financial loss in preference to a more favorable contract between the road and the city by which the company would own the subways.

PUBLIC OPERATION NOT FAVORED

The only doubt that has ever been expressed, the speaker said, is as to whether public operation should have been added to public ownership. "Personally I should oppose public operation," said Mr. Sullivan, "but that of itself is a question simply of expenditure. If the day ever arrives when these communities are so well organized that they can administer these transportation systems efficiently and economically, then it will be proper at that time for the public to operate the transportation systems as well as to own them. In my judgment that day has not arrived, and the best solution of this kind of problem is to have the public own the subways and tunnels and lease them to private corporations for operation. Knowing the history of the public ownership of these tunnels and subways, therefore, I was astonished when I read the Boston Real Estate Exchange's wail over the taxes it said the city is losing—losing because the city owns the property and therefore cannot tax the road on it. In other words, the city cannot tax non-taxable property. This loss was put at $200,000 a year, and it made it look as if the city needed a conservator. Of course, there is no loss of taxes on the tunnels and subways, any more than there is on the City Hall or the City Hospital." The case was made to appear worse by combining two losses which could not possibly co-exist, *viz.*, the so-called losses of public and of private ownership throughout the same period.

More serious than this illogical combination of losses, Mr. Sullivan said, is the misstatement as to the annual deficit in the interest and sinking-fund requirements of the city's rapid transit loans. There was no deficit in the interest requirements in 1915, or in any prior year, and there never will be. The combined rentals will always take care of the combined interest charges, because the average rate of interest paid by the city on the bonds is 3.84 per cent, and the rentals paid to the city are, to speak broadly, 4.5 to 4.875 per cent. The actual results of twenty years' ownership of subways in Boston are: (1) No deficit in interest requirements; (2) total deficit in the entire period of only $58,869 in sinking-fund requirements, and (3) an equity in favor of the city in the tunnels and subways of $3,778,986, represented by the amount in the sinking funds up to Jan. 31, 1916. All this has been secured without calling for a single dollar from the taxpayers in the entire period.

In the present year, 1916, the taxpayers made their first contribution toward the cost of the subways. The car riders have in general paid the whole cost of construction and of operation of this road. The city appropriated $77,910 from taxes to take the place of the penny tolls of the East Boston tunnel, which were abolished in February, after due popular vote and legislative enactment. The total appropriations required for this purpose will probably not exceed $400,000, which is less than one-half the value of the city's present equity in the tunnel.

There will be some debt when the existing subway and tunnel bonds mature, but that will be refunded and eventually retired, so that the city will own the entire system of subways and tunnels free from debt, without having required any contribution from the taxpayers other than the above-mentioned $400,000 raised to take the place of the East Boston tunnel tolls. Beginning with 1946, there will be large additions, amounting to about $686,000 a year, paid in from the rentals of subways, which at that time will be debt free. In the future it is desirable that each subway built shall finance itself, but the rate at which this can be done depends upon the state of the money market. The highest rate the city has been obliged to pay on subway bonds is 4.25 per cent.

METROPOLITAN OWNERSHIP AND CONTROL OPPOSED

Mr. Sullivan emphasized the fact that the city is opposed to any plan for the ownership and control of tunnels and subways by a metropolitan organization or commission. Boston has taken the risk of financing the subways; it now has a substantial equity in them, and it will not surrender them to a metropolitan district now that its experiment seems likely to succeed. The city will fight such a plan to the last ditch. Nor will it consent to control by a metropolitan commission. It owns its subways and it wants only Boston citizens on any commission which plans future rapid transit development within the Boston territory. The city has reason to believe that a metropolitan commission would very early in its career plan rapid transit development in such a way as to subordinate Boston interests to outside interests and to put its highways under a new servitude in favor of the municipalities outside. Such plans would probably find favor in the Legislature, owing to its political complexion, and such great undeveloped areas as West Roxbury and Dorchester would have to wait until outside interests had first been served.

In these undeveloped districts there are but eight persons per acre, compared with 40.4 persons in the rest of Boston. Four new wards have 41 per cent of the land in the city and only 12.5 per cent of the

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population. Until better transportation is provided, the development of the city will be retarded. In reply to inquiries, Mr. Sullivan said that Mayor Curley of Boston is not opposed to an outside commission's taking over tunnels and subways outside Boston proper, as in Cambridge. The state could presumably take the Boston subways by eminent domain if it so desired, but the city would oppose it because the whole cost paid by the state for recoupment would very likely not be worked out through rentals.

If the communities are to make a substantial reduction in taxes, they might well claim some supervision over the company's expenditures. Moreover, if there should be a formal guarantee on the part of the public of, say, a 6 per cent dividend for the company, there should be some participation by the public in the control. On another point Mr. Sullivan stated that in view of the possible benefits to real estate and population increase resulting from the building of a rapid transit line, it would be proper in some instances to provide deliberately for the renewal of part of a subway bond issue at maturity, instead of establishing a rental which would invariably pay the sinking-fund requirements during the life of the bonds. A situation might even arise which would justify the city in building a certain subway line at its own expense and foregoing the advantage of rentals. A graduated rental and a policy of deferring the beginning of sinking fund payments might also be justified in some cases. In such event the rental would naturally be increased during the latter portion of the lease and the city should be guaranteed against immediate loss by having the rents equal to the interest requirements from the beginning.

WHO SHOULD PAY THE TRANSPORTATION COST

In response to a question, Mr. Sullivan said that theoretically the car riders ought to pay the entire cost of transportation, but as a practical matter, if resort must be had to reduction of taxes or to increased fares, it would work out better in the long run to have a reduction in taxes, at least temporarily. There is some equity in having taxpayers who may not use the company's service to any extent contribute toward a subway fund which will ultimately become an asset of the city. There are owners of automobiles whose property values have been enhanced by the street car lines, and to that extent they may well be called upon to assist. A special assessment against individuals, however, in place of a general tax levy, would be undesirable and difficult to enforce.

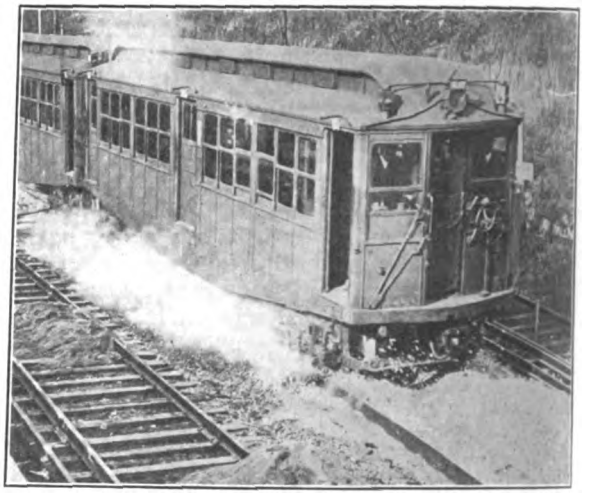
PRESIDENT BRUSH DISCUSSES HIGHER FARE PROBLEM

Following Mr. Sullivan, President Matthew C. Brush of the Boston Elevated Railway answered a number of inquiries bearing upon the problem of higher fares. Mr. Brush said that if the company could secure the needed revenue in other ways it would be unfortunate to resort to a 6-cent fare, and that it would be better to go so far as to subsidize a transportation company to secure a continuance of a fare arrangement on which the community has been built up. In Boston the facilities offered for a 5-cent fare exceed those anywhere else in the world, if the interrelation of rapid transit and surface line service is taken into account. As far as loss of business resulting from a 6-cent fare is concerned, Mr. Brush felt that unquestionably there would be a net profit, although a 20 per cent gain could not be expected. Some of the short-haul riders would be lost, and there would not be enough falling off in traffic to offset the benefit of higher fares from those who continued to ride.

New Derailing Train Stop Tested at Boston

Train to Be Stopped Is Deflected Onto a Broken Stone Roadbed, Being Guided by Means of Wood and Steel Guard Rails

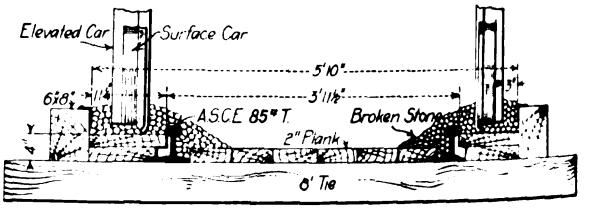
In the presence of the engineering committee on drawbridge operation recently named by Mayor Curley of Boston, Mass., representatives of the city and of the Massachusetts Public Service Commission, railway officials and newspaper men, a new derailing train stop was tested at the Forest Hills yards of the Boston Elevated Railway on Nov. 29. The development of safety precautions in connection with drawbridge operation for both train and surface car service has been given



BOSTON SAFETY STOP TESTS—ELEVATED TRAIN PLOWING THROUGH BROKEN STONE BED

constant attention by the Boston Elevated Railway since the fatal accident at Fort Point Channel on Nov. 7, and the test at Forest Hills indicates that a remarkably effective and simple means of stopping elevated trains is available for drawbridge approaches, even in cases where the motorman fails to shut off power and where the brakes fail to operate, if it is possible to install a derailing track on the right of way.

In all the conferences at Boston upon safety in operation at drawbridges following the recent disaster, emphasis has been laid by electric railway men upon the importance of instituting a gradual stop in bringing a train or car quickly to rest, and this principle has been recognized by the Massachusetts Public Service Commission in its finding upon the Fort Point Channel acci-



BOSTON SAFETY STOP TESTS—CROSS-SECTION OF SPECIAL EMERGENCY-STOP SIDE TRACK

dent. President Matthew C. Brush of the Boston Elevated Railway has taken active personal interest in the development of methods for increasing the safety of operation, and under the general direction of H. M. Steward, chief engineer maintenance of way, with the co-operation of other officials of the company, the new train stop or "decelerator" has been established.

As installed for test purposes at Forest Hills, the

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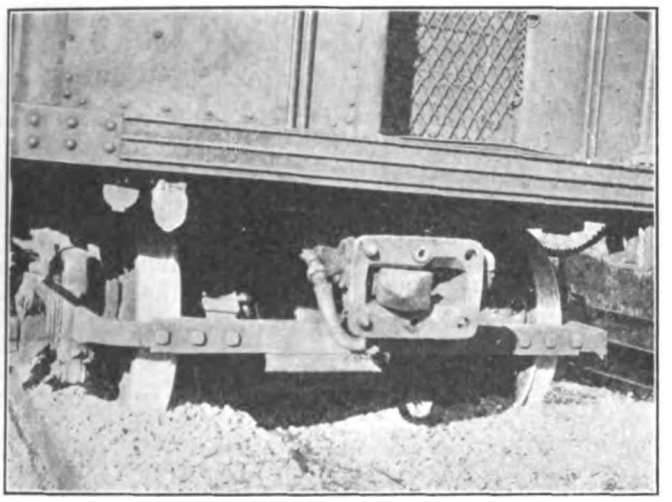
train stop consists of a stretch of roadbed about 300 ft. long, without running or third rails, but provided with the usual 6-in. x 8-in. wooden guard rails. Between the latter crushed stone 1 in. in diameter is piled against each guard timber, and as a precaution against injury to the guard timbers a section of T-rail is installed as an inside guard and covered to a depth of about 3 in. with stone. The inside rail is about 8 in. from the guard rail, and the section of retarding track is provided at the connection with the ordinary running track with a thin wedge of wood, steel plated, to guide the wheels more accurately as the train leaves the running track.

Upon approaching the decelerating track with full power on the motors the supply of energy is automatically cut off as the third rail shoes break their contact



BOSTON SAFETY STOP TESTS—CLOSE VIEW OF FRONT OF FOREMOST TRUCK AFTER TRAIN HAS COME TO REST

and the train enters the crushed stone right of way at full momentum. The wheels are embedded in the crushed stone, forcing the latter down into the roadbed and against the guard timbers. The dead cars rapidly lose their momentum as the wheels roll forward, and a smooth stop with a retardation of about 2 m.p.h. per second results. A four-car train upon which a representative of the ELECTRIC RAILWAY JOURNAL rode, after a rainy night came to a dead stop in ten seconds from a speed of about 22 m.p.h., the foremost wheels in the train coming to rest at a point 203 ft. from the entrance to the derailing track. Beyond an insignificant jar as the train left the running rails, the retardation was virtually as smooth as in an ordinary service application of the brakes, and much smoother than an emergency stop would ordinarily be. At 25 m.p.h. a four-car train stopped in 232 ft. In some tests sand was used instead of trap rock and single cars of the box and semi-convertible type were tried. Crushed stone gave the best results. Representative data from the tests are given in the following table:

CAR AND TRAIN STOPPING TESTS, FOREST HILLS YARD, BOSTON ELEVATED RAILWAY

Nov. 27 and 28, 1916

Number of Tests	Type of Car or Train	Speed in M.p.h. Entering Stop Section	Feet Traversed in Retardation	Remarks
1	20-ft. box	11.0	43	Sand used in stop section
1	20-ft. box	14.5	54	Sand used in stop section
1	4A3 semi.	14.5	62	Sand used in stop section
2	4A3 semi.	18.8	97	Sand used in stop section
2	4A3 semi.	18.3	96	Pebbles used in stop section
2	4A3 semi.	20.3	90	1-in. crushed stone used in stop section
1	2 elevated cars	23.5	177	1-in. crushed stone used in stop section
1	3 elevated cars	23.0	200	1-in. crushed stone used in stop section
1	4 elevated cars	22.0	215	1-in. crushed stone used in stop section
1	4 elevated cars	25.0	232	1-in. crushed stone used in stop section

Minor variations were noted according to the condition of the roadbed, extent of crushing, dryness, etc.

In general, a four-car elevated train entering the stop section at from 20 to 25 m.p.h. was brought to rest substantially within its own length.

It is planned to install a train stop built along the above general lines between the north and southbound tracks on the north approach to the Charlestown drawbridge, on the rapid transit lines, and also to provide a stop of this general character on the East Cambridge viaduct for surface cars. Whenever the draw is open a switch will automatically be set to turn a train passing a danger signal and automatic stop upon the intermediate roadbed, which will probably be equipped with one or more light bumpers in advance of the derailing section, the latter to be covered with moisture-proof paper or its equivalent.

Mechanical Design of Electric Locomotives*

The Author Discusses A. F. Batchelder's Recent Paper, Submitting Actual Operating Records, Which He Considers Most Important

BY C. H. QUEREAU
Superintendent Electric Equipment, New York Central Railroad

IN the main I agree with the conclusions that have been presented to the American Society of Mechanical Engineers in A. F. Batchelder's paper on the mechanical design of electric locomotives. However, it seems to me very unfortunate that this paper, as well as others recently presented, is simply a general statement of the conclusions of the writer rather than a statement of accomplished results. I am reminded very forcibly of the discussion indulged in about ten years ago before any considerable electrification of steam railroads had been accomplished. These discussions were based almost entirely on personal views and theories, without any demonstration. At the time of which I speak this was necessarily so, but there should now be available accurate figures based on actual operation. This criticism, in general, is true of all electrification papers, probably because of mistaken ideas on the part of those who have the facts or those who have the authority to make them public. That Mr. Batchelder appreciates this is shown by the last paragraph of his paper.

In Mr. Batchelder's paper the list of desirable features arranged in the order of their importance did not include "Maintenance." It is quite probable that convenience of maintenance was in the author's mind, but it seems to me of sufficient importance to be mentioned specifically.

The analysis of the action of a locomotive on curved track I must confess that I cannot quite follow, probably because I do not clearly understand what was written or have not the information on which the author bases his discussion. For instance, in describing the action of a two-axle swivel truck the statement is made that "the flange of the leading wheel gradually comes in contact with the outer rail, giving the guiding truck an angular motion about its outer rear wheel." I have believed that the angular motion of a four-wheeled truck was about its inner rear wheel, the fact being that when a truck is on a curve the outer forward wheel flange and the inner rear wheel flange are against the rail, the other two flanges not touching the rail. I do not see, however, that this difference is of particular moment, and bring it up only that the matter may be discussed and clearly understood.

*Discussion of a paper on this subject by A. F. Batchelder, presented before the American Society of Mechanical Engineers, Dec. 15, 1916, and published in abstract in the ELECTRIC RAILWAY JOURNAL for Nov. 4, 1916.

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With regard to the operating advantages gained by having electric locomotives designed to operate in either direction, I consider this feature to be of so great importance that satisfactory designs must be found to meet this condition. This need exists notwithstanding the fact that the effect of a trailing truck contributes to unstable riding of the engine. Mr. Batchelder proposes to prevent the consequent oscillation by the introduction of resistance against swivelling. This scheme is practicable and has been so demonstrated, but it results in increased flange wear, at least when the locomotive's center of gravity is low.

I am particularly interested in the feature of reliability in service for electric locomotives. It is a requirement that is quite commonly omitted in a discussion of this kind. On railroads that run through a sparsely settled country, with comparatively few trains per day, a train delay of half an hour may be of comparatively little importance. But in Eastern territories, especially around the large cities, a delay of a very few minutes will upset the smooth operation of the railroad for hours, and the effect of it may reach back on the line for 150 miles. It is, of course, impossible to determine in dollars and cents the cost of a delay in congested territory, but that it may easily amount to large sums in over-time there can be no doubt, and its effect on the traveling public can better be imagined than described. It is my opinion that the prevention of such delays is worth considerable increase in the first cost of electric locomotives, and that the maintenance methods should be such as to prevent, so far as possible, delays to traffic, practically regardless of cost. It is decidedly poor policy to reduce maintenance costs if by so doing the result is an increase in traffic delays.

Mr. Batchelder very wisely considers the cost of maintenance of permanent way to be of more importance than cost of maintenance of locomotives. Yet it is extremely difficult to state definitely what, if any, effect the electric equipment has on the cost of maintenance of track. I believe, as a general proposition, it would be safe to assume that, if the cost of maintenance of way is no greater under electric than steam operation, it would be a satisfactory condition, which undoubtedly would not be used as an argument against electrification.

As to the cost of maintenance of electric locomotives, the difference in maintenance charges at the rate of 3.5 cents per mile and the frequently reported figure of 7 cents per mile may be figured as not less than $1000 per engine per year. This saving, when capitalized, represents a considerable sum, and its establishment would warrant an appreciable increase in first cost. The sum mentioned is 10 per cent of $10,000, or 5 per cent of $20,000.

So far as I know, there have been published very limited data as to service results, either as to first cost or maintenance, or reliability in service as shown by train-delay statistics. Under these circumstances it would be only reasonable to expect differences of opinion and, in all probability, failure to consider results as a whole. In consequence I am submitting herewith maintenance and operating records for the electric engines on the New York Central Railroad.

These locomotives are all equipped with bi-polar, gearless motors mounted directly on the driving axles. The operating results have been completely satisfactory to the officials of every operating department affected, although this statement does not include consideration of the net financial returns from the investment, which must take into account the item of fixed charges.

With the usual maintenance these locomotives ride satisfactorily and without undue effect on the track structure, and are perceptibly more comfortable than steam locomotives. In order to secure these results it is necessary to keep the total lateral motion, both at the boxes and at the center-pins, within limits which approximate three-quarters of the allowable lateral motion on steam locomotives.

Table I contains statistics which will permit a personal conclusion as to the reliability of these locomotives in service, and this will probably be more satisfactory than any general statement or expression of opinion, no matter how authoritative. In connection with this table I wish to enter a strong plea for the use of the unit "Miles Per Detention" rather than "Miles Per Minute Detention" for the preparation of statistics by which to judge the reliability of equipment in service and the efficiency of the organization responsible for maintaining it. Inclusion of the time element leads only to confusion, and is, therefore, worse than useless.

TABLE I—TRAIN DETENTIONS DUE TO DEFECTS OF ELECTRIC LOCOMOTIVES, NEW YORK CENTRAL RAILROAD

Miles Per Detention—All Locomotives

Year	Mechanical	Electrical	Grand Total
1912	48,271	103,967	32,965
1913	27,873	86,716	21,093
1914	35,625	57,395	21,981
1915	53,720	107,440	35,813
Original Rigid-Frame-Type Locomotives			
1915	59,583	187,260	45,201

Note: All detentions of two minutes or more included. In 1912 there were forty-seven locomotives in service. Since the middle of 1914 there have been sixty-three. Detentions due to man failure, or delays to following trains, not included.

TABLE II—INSPECTION AND REPAIRS OF ELECTRIC LOCOMOTIVES

Cost, Cents Per Mile

Year	Labor	Material	Total
1912	1.888	1.460	3.348
1913	1.982	1.454	3.436
1914	2.155	2.134	4.286
1915	1.901	1.379	3.280

Note: The above statistics were compiled in accordance with the requirements of the Interstate Commerce Commission. In the year 1914 it was necessary to replace all driving-wheel tires because of unsuitable material, regardless of the extent to which they had been worn. The costs of maintenance have been essentially as above since 1907, omitting 1914.

In connection with Table II the following facts should be borne in mind: The figures include the cost of inspection and maintenance of all the electric locomotives in both road and switching service. In 1912 and 1913 approximately half the total engine mileage, and in 1914 and 1915 approximately one-third of the mileage was that of engines used in switching service. Our experience has shown that the cost of maintenance of engines in switching service is about twice that of those used exclusively in road service. It follows that the cost of maintaining the road locomotives has been about 2.5 cents per mile and that of the switch engines about 4.9 cents per mile. In this connection it is only fair to call attention to the fact that these engines were not designed for switching service.

For the first ten months of 1916 the average cost of maintenance of all the electric locomotives has been 2.73 cents per mile. This gives a cost of approximately 4 cents per mile for the locomotives in switching service and approximately 2 cents per mile for those in road service. I expect these costs will not be exceeded for the entire year 1916, but doubt very much that we will be able permanently to keep the maintenance costs at this level.

A gun club, with twenty members to start, has been organized among the employees of the Kansas City (Mo.) Railways. The officers will instruct members in the handling of a gun. The company will assist in securing and building a club house, so that the expense to members shall be nominal.

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Securing Industrial Democracy*

Capital and Labor Should Be Equal Partners—Profit Sharing Plan Suggested—Strikes and Lockouts Should Be Prevented by Law

BY GEORGE WESTON
Engineer Board of Supervising Engineers, Chicago Traction

THIS paper is presented for the purpose of bringing out a most liberal discussion of the subject, particularly of the fundamentals and recommendations contained therein, with the hope that it will have its influence in bringing the representatives of labor and capital into a more satisfactory and harmonious working relation for their own mutual benefit and permit the uninterrupted operation of public utilities for the accommodation of the public.

A copy of the paper has been received by the President of the United States and additional copies have been sent to his secretary for distribution. Others to whom copies have been forwarded are the presidents of the brotherhoods of steam railroad employees and other labor leaders; Chairman Newlands and Vice-Chairman Adamson of the joint committee on Interstate Commerce, United States Senate and House of Representatives; members of the Interstate Commerce Commission, railroad presidents, several state public utility commissions, officers of the Chamber of Commerce of the United States, the Chicago Association of Commerce, and many other interested organizations and individuals.

The necessity for a public utility is the need of some class of service to the public, and this requires capital investment and the work of labor skilled in the different branches necessary to create the property and operate it. Each should receive a fair return for its service, but neither capital nor labor should be permitted to exploit the property for unreasonable gain or for the exercise of objectionable, coercive union or political power. Capital should not be permitted to pile up huge profits at the expense of underpaid labor. Capital and labor should be partners in the business, each receiving its fair return from the net profits. When labor understands that it will be placed upon a footing equal to that of capital, that there will be one great democracy of interests building up a great public utility to serve the people, then the present general feeling of jealousy, dissatisfaction and unrest will disappear and harmony and general good feeling will be restored.

My connection with public utility matters for many years has caused me to give this subject considerable study. At the time of the street and elevated railway strike in Chicago in June, 1915, I compiled the following fundamentals:

(1) Capital and labor are dependent upon each other.
(2) Capital cannot be successfully employed without the help of labor, and labor cannot be profitably employed without the assistance of capital.
(3) From this fact it seems most fair and equitable that each should participate fairly in the results of their joint efforts.
(4) This principle should be the fundamental economic basis upon which to consider the relations between capital and labor.
(5) Therefore, the two chief elements necessary to create and operate a public utility have the same fundamental interest in properly performing the obligation to the public assumed in the franchise of the public utility.
(6) This obligation should be inviolate in principle, and good service to the public should be the first consideration in the operation of a public utility property.
(7) The obligation to give good service to the public falls upon labor as much as upon capital. Consequently, all legitimate and fair operating expenses necessary to give good service must be considered, as well as all reserve funds necessary for the upkeep of the property or other franchise obligations, before any increased division should be made to capital or labor.
(8) After having fulfilled all franchise obligations, any remaining earnings should be disposed of upon some fair basis to the benefit of both labor and capital.
(9) It would be unfair to increase the share to capital beyond a reasonable return upon the investment and not increase the return to labor, and it would be unfair to increase the return to labor by reducing the return to capital below a reasonably fair amount.
(10) From the fact that service to the public should be the first consideration of any public utility, it should be unlawful for the employees to conspire to strike or the employers to conspire to institute a lockout.
(11) It would seem that a national, state or city court or board of arbitration should be established by law, to which body should be referred all matters of dispute between employer and employees that cannot be settled between themselves, and this should be accompanied by a law making it a penal offense for employees to conspire to strike or for employers to conspire to institute a lockout.

It often becomes necessary for persons to be protected against themselves, and I am herewith recommending forced arbitration and legislation to prevent strikes or lockouts, not in order to attack either labor or capital but to prevent them from conducting a warfare based upon erroneous principles. The strong arm of the government should be used, not in favor of one side but impartially in favor of the general public for its general good. Is it fair to the general public to exact legislation to control rate making in the case of capital and then tolerate unlimited organization of labor and its use of threats and coercion to accomplish its selfish ends in regard to one element of rate making, *i.e.*, wages?

Profit sharing, as it has been practised in the past, differs from industrial democracy as advanced in this paper. The initiation of profit sharing and its discontinuance have been optional with the employer. Industrial democracy, however, as applied to public utilities means that along lines fair and equitable to all parties, capital, labor and the general public, the continuity of service to the public shall be regulated by law, nationally to the extent applicable, and by state and city legislation to the extent necessary, and that the character of service and rates and the distribution of gross earnings shall either be regulated by law or supervised by a board or boards of control established by law.

With large public utilities the following basis of profit sharing offers a simple method of adjusting income distribution so that capital and labor will each receive its just share. It must be conceded that the wages of labor at the present time in the United States are high by comparison with any previous time in its history or with any other nation. Present wages, therefore, can be taken as the minimum return to labor and be used as a fair basis for future payrolls to be charged to operating account, or be readjusted from time to time as the limitations of the gross income may require. The total amount thus paid will establish the percentage of the gross receipts paid to labor. This gross amount allowed to labor for future payrolls should be distributed between all classes of labor upon the basis of value of service rendered, the skill required, the hazard with respect to life or limb, etc.

It is necessary to determine what is a fair percentage of return for capital, including sufficient to care for extra hazards of the business and corporate organization expense, etc. This, together with general operating expense, including taxes, renewals, any other necessary reserve funds, franchise obligations and the possible establishment of a cash working reserve, should be first deducted from gross income. The residue, if any, should then be divided between labor and capital in the proportion that the total per cent of gross paid in wages to labor bears to the per cent of fair return to capital.

*Abstract of paper presented before meeting of Western Society of Engineers, Chicago, Ill., on Dec. 4.

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Many other dispositions of surplus earnings in the interest of both capital and labor could be arranged and worked out in detail to cover the general principle or to fit any particular case. The above is simply an example.

In the discussion on the paper abstracted above, Ira W. Dye, Newark, N. J., declared there is no identity of interests between capital and labor to-day, and there cannot be until a few labor men have been elected upon the boards of directors and a few directors placed in the position of workingmen. He favored profit sharing with employees through stock ownership. C. W. Baldridge, Chicago, Ill., said that it is time to extend the functions of courts to deal with disputes between capital and labor and protect the paramount rights of the public. A. J. Schafmayer, Chicago, Ill., declared that the obligations that can be placed upon capital and labor are not equal because capital has, through franchise rights, received a monopoly. On this account, he argued, a strike should not be made a penal offense. He also expressed the opinion that there should be a third party in the division of profits, *i. e.* the public, which should get its profit through reduced rates.

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

Engineering Association Committee Appointments Announced—B. R. T. Indorses Educational Committee Work—Equipment Committee Plans Definite Co-operation with Manufacturers—Several Sections Heard From

Educational Committee Notes

On Dec. 1 the electrical department of the Brooklyn Rapid Transit Company, by H. A. Robbins, superintendent of power, issued a notice which in part is as follows:

NOTICE TO ALL EMPLOYEES

About two years ago the American Electric Railway Association, of which this company is a member, tried the experiment of conducting correspondence courses for the employees of member companies. The same was not a success due to lack of organization. Therefore, the plan was abandoned and arrangements were made with the International Correspondence Schools of Scranton to take up the work. The American Association has approved and co-operated with the schools in preparing courses which will be offered. This arrangement makes it possible for those of our employees who desire to secure technical knowledge pertaining to their work in its many phases, such as steam, electric and mechanical engineering.

We are satisfied that material benefits will result to all who can and will give the necessary study time to any of the courses, and we would suggest careful investigation of the courses offered. However, all should appreciate that a lot of good hard study will be required to complete any of the courses.

Manufacturers' Association

Thomas Finigan, president of the Manufacturers' Association, has sent to the members copies of a letter summarizing the findings of the committee appointed to consider the advisability of continuing the association, and, further, to formulate plans, if possible, looking to the use of the association to promote the interests of the electric railway industry. As was fully explained in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 14, 1916, page 849, the recommendation was that the association be continued for another year at least for the following reasons: "1. That this is the first time that manufacturers and sellers of electric railway supplies have not participated as an organization in the activities of the electric railway convention, due to the action of the American Association at the meeting in Chicago, February, 1916, when the constitution and by-laws were altered so as to admit manufacturers to full company membership with all the rights and standing of railway companies. 2. Although manufacturing concerns are now members of the railway association their exact status has not yet been determined."

The committee report was signed by B. A. Hegeman, Jr., chairman; James H. McGraw and M. B. Lambert.

Equipment Committee to Have Flying Start

Although the Engineering Association committee on equipment has been appointed but a few days, a meeting is already scheduled for Dec. 13 in New York. The assignments listed in the ELECTRIC RAILWAY JOURNAL Nov. 18, page 1063, will be divided among sub-committees with instructions to consider particularly the revision of standards and recommendations now contained in the *Engineering Manual*. The following manufacturers' representatives have been invited to act in conjunction with the committee: C. F. W. Rys, Carnegie Steel Company; A. A. Green, Galena Signal Oil Company; C. E. Eveleth, General Electric Company; N. W. Storer, Westinghouse Electric & Manufacturing Company; W. S. Adams, J. G. Brill Company, and G. W. Lyndon, Association of Manufacturers of Chilled Car Wheels.

Committee Appointments

ENGINEERING ASSOCIATION

President F. R. Phillips has announced the following committee appointments. Other committees will be announced as soon as all of the members have accepted appointment.

Buildings and Structures—C. S. Kimball, Washington, D. C., chairman; H. G. Throop, Syracuse, N. Y.; F. F. Low, Boston, Mass.; H. E. Funk, Brooklyn, N. Y.; James Link, Knoxville, Tenn.; R. C. Bird, New York City; G. C. Estill, Portland, Me.; H. R. Whitney, Springfield, Mass., and H. C. Young, Buffalo, N. Y.

Electrolysis.—A. S. Richey, Worcester, Mass., chairman; I. W. Gross, New York City.; E. B. Katté, New York City; E. J. Blair, Chicago, Ill., and G. W. Palmer, Jr., Boston, Mass.

Way Matters—C. H. Clark, Cleveland, Ohio, chairman; A. E. Harvey, Kansas City, Mo., vice-chairman; E. M. Haas, Cleveland, Ohio; E. M. T. Ryder, New York City; W. F. Graves, Montreal, Quebec; William R. Dunham, Jr., New Haven, Conn.; C. G. Keen, Philadelphia, Pa.; H. H. Ross, Toledo, Ohio, and D. P. Falconer, Rochester, N. Y.

Special Committee on A. I. E. E. Rules—J. W. Welsh, Pittsburgh, Pa., chairman; C. L. Cadle, Rochester, N. Y.; W. A. Del Mar, New York City; J. M. Waldron, New York City, and J. J. Sinclair, Brooklyn, N. Y.

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JOINT COMMITTEE

Presidents Bradley and Phillips have also announced the following appointments:

Transportation-Engineering—G. H. Clifford, Fort Worth, Texas, chairman.

Engineering Association Members—J. W. Allen, Boston, Mass.; R. F. Carbutt, New York City, and E. F. Gould, Lima, Ohio.

Transportation & Traffic Association Members—F. W. Hild, Denver, Colo., and F. W. Coen, Sandusky, Ohio.

ACCOUNTANTS' ASSOCIATION

President M. R. Boylan announces the following as the committee to represent the association at the convention of the National Association of Railroad Commissioners: W. F. Ham, Washington, D. C., chairman; N. E. Stubbs, Baltimore, Md., and C. L. S. Tingley, Philadelphia, Pa.

The Traffic Inspector Discussed at Manila

Joint company section No. 5 held its twenty-first monthly meeting in Manila, P. I., on Oct. 10. A paper by Jerome Grindstaff, division superintendent, on "Duties of a Traffic Inspector," was presented by the author and discussed. As a paper of this kind is necessarily a summary of the details of the work of the official in question, Mr. Grindstaff's statements may be summarized for reference in the following epigrammatic form although these points were considerably expanded in the paper.

An inspector must bear in mind that he is engaged in a public service where he is constantly called upon to exercise great patience and self-control.

In going on duty he should inspect all cars leaving the carhouse and should make a trip over his entire division as soon as possible for the purpose of inspecting track, overhead wiring, signal lights and telephones.

He should be familiar with all schedules, transfer points, transfer connections, etc.

He should persistently endeavor to interest his trainmen in their work.

He should not humiliate trainmen by reprimanding them in the presence of passengers.

He should work in harmony with other inspectors and be as courteous to employees as to passengers.

He should keep his cars on time but should not allow the making up of time in dangerous locations.

He should prevent delays at layovers, adjust car capacity to demands and see that the cars are comfortable and sanitary.

He should see that the traveling public is handled safely.

He should issue instructions intelligibly and see that they are understood.

He should see that correct car signs are used and that the public is correctly informed regarding routing, etc.

He should exercise good judgment in the case of emergency, keeping up traffic by temporary rerouting if necessary.

He should explain operating details to passengers when questioned.

He should keep his superintendent informed of all special demands on the transportation facilities.

He should be well informed on all regular and special rules, making timely suggestions as to revisions.

He should confine himself to his own division as far as giving of orders is concerned.

He should exercise great care and good judgment in checking the work of conductors.

He should report accident cases fully and promptly, assisting the car crews in securing lists of witnesses' names.

In the discussion of Mr. Grindstaff's paper, O. Keesee, superintendent of transportation; J. M. Bury, assistant superintendent; Leopoldo Jiz and J. J. Dunning, traffic inspectors, and C. H. Van Hoven, claim agent, reinforced the speaker's remarks from their own experience, commending the intelligent use of the telephone service, the study of the general needs of the service, loyalty to the company's interest, and the exercise of tact. J. H. Blaisdell, just returned to Manila after a vacation in the United States, gave some reminiscences of his trip.

Snow Fighting and Preparedness

The above was the topic discussed at the meeting of the Denver Tramway Company Section held on Nov. 24, this being the thirty-ninth regular monthly gathering of the section. The attendance at this meeting was 200.

The topic of the evening was set before the members in papers by W. L. Whitlock and T. Sparks, who described the methods and equipment necessary in coping with the several types of snowstorms. The papers provoked a lively and lengthy discussion in which many members participated, and the chairman reluctantly adjoined the meeting at a late hour.

A Busy Session of Section No. 1

Eighty members attended the meeting of the Milwaukee Electric Railway & Light Company section held on Nov. 9. The election of officers resulted as follows: President, A. E. Wallace, division superintendent; vice-president, E. H. Olsen, promoted from secretaryship; secretary, F. A. Luber, draftsman; treasurer, T. J. Buckley, surveyor; director, E. J Archambault, civil engineer.

Three members described their experiences and observations at the Atlantic City Convention, covering respectively track work, rolling stock and transportation. F. A. Luber was announced to discuss current events of the way and structures engineering department which he did with the aid of lantern slides, some of which were of a humorous character. He described the layout of the new offices of the department and showed how it was related to the efficient carrying on of the work. Following this, motion pictures and lantern slides were shown to illustrate the fire prevention work of the company.

R. B. Stearns, general manager of the company, then presented to Bert Hall the gold medal awarded by the association for the best paper presented by a member of a company section. In his presentation speech Mr. Stearns remarked that the section had entered the competition three times and had carried off the medal every time. Officers and privates of the National Guard next discussed experiences in the service of the federal government on the Mexican border, after which retiring president Dentz reviewed the work of the section for the year and outlined the possibilities for the coming year. During the evening a quartet consisting of Messrs. Olsen, Cook, Miller and Abendroth sang several times.

As this issue of the paper goes to press word is received of an enthusiastic joint meeting of the gas, railway and electric sections of the Newport News & Hampton Railway, Gas & Electric Company. Details will be given in a later issue.

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COMMUNICATIONS

Enamelling vs. Painting and Varnishing Cars

UNION TRACTION COMPANY OF INDIANA.
ANDERSON, IND., Nov. 18, 1916.

To the Editors:

I have just noticed on page 1045 of your issue for Nov. 11 a short comment on car enamels and varnishes by Langdon B. Valentine. I am very much interested in this statement but cannot altogether agree with Mr. Valentine. Bear in mind that it is not my intention to doubt the correctness of his contention that the enamel process of painting does not make a first-class, lasting job of quality. While we have not perhaps made the elaborate or extensive tests which he claims to have made, yet our experience and opinion are quite the reverse.

We have some few cars to which we have applied the enamel process. These cars have been watched continually with great interest. The manufacturer has made great claims for his products, but we, like all the rest, are from Missouri. We had to be shown. We find, it is true, that with the enamel process the brilliant luster which the car has before it first leaves the paint shop is not retained, but this is the case regardless of whether a clear finishing varnish or the enamel process is used.

Our experience indicates that the life of car paint is largely if not wholly governed not only by the quality of varnish used but by the number of coats as well. We have some cars which we carried through the ordinary method of prime coats, service and colors, and finished with two and three coats of varnish. These cars were released about the same time from the paint shop that the cars were to which we gave the enamel process. The varnish used on these cars was conceded to be the very best that the market could produce. In less than thirty days the varnished car had lost its luster and did not even have an egg shell gloss. The enamel process, while it has lost its high luster, still maintains a beautiful egg shell gloss, and we predict that it will be necessary to revarnish the cars painted with the varnish system long before it will be necessary either to re-enamel or revarnish those painted with the enamel process.

We have had cars, as stated before, that after being thirty days out of the paint shop, even though they were cleaned all over once or twice a week with cleaning materials which in no way affects the varnish, looked as though they had not been revarnished for a period of a year or more.

The writer has begun to question whether such expensive methods of painting cars are worth while considering the amount of minor abrasions that they will receive in a season's run and the amount of touching-up which is necessary, especially as this touching-up usually demands a coat of color in order to make the car have a uniform appearance. It is the desire of almost every railway property to revarnish its cars every year, although conditions and financial situations arise which restrict the carrying out of this policy, and it is my belief that cheaper methods, whether it be material or process, are going to be compulsory to combat the ever-increasing price of labor and material.

I see no economy in revarnishing cars with expensive varnishes where the road is so fortunate as to have enough equipment to varnish it every year, but if the cost of materials and the method can be shortened it will enable the operator to get a greater number of cars and possibly all, through the paint shop every season. The tendency to-day is to economize in every way possible. It used to be that interurbans as well as city cars were dolled up with a lot of stripes and scroll work like a circus wagon, but the striping of cars on most properties has now been eliminated and the lettering is being reduced to the minimum.

In conclusion I would say, from the results obtained and with the conditions which must be met, that the enamel process is one which is worthy of the most careful consideration as I think it is the road not only to economical but to substantial car painting.

Recently we have painted a number of interurban cars with house paint. These were of a type that we only use on special occasions when traffic is extremely heavy. I consider that these cars look equally as well as the most expensive piece of work which we have put on, and I warrant that the luster and body of paint will last as long. If a car is to be varnished every year, the plan of giving a car a coat of house paint, which, at first thought, seems ridiculous, might not be such a joke after all.

R. N. HEMMING,
Superintendent of Motive Power.

Side-Truss Construction for Railway Cars

L. B. STILLWELL
CONSULTING ENGINEERS
NEW YORK CITY, Dec. 7, 1916.

To the Editors:

We are much interested in reading in the ELECTRIC RAILWAY JOURNAL for Dec. 2 your editorial comment on the side-truss construction for railway cars, and are pleased to note that its great ability to resist distortion, or "weaving," in service, appeals to your judgment as being advantageous. In our opinion this feature of the side-truss construction is of the greatest importance, and becomes positively essential when the car body is extremely light, as distortion of a frail superstructure will soon land it in the repair shop. Your statement that the shock of impact between two cars is less than between long trains is obviously correct, but that the strength of superstructure is an important factor, even in case of collisions between two single cars, was apparent to all who saw the photographic record of wrecked cars exhibited at the Toledo meeting.

It is obvious that a car body structure that is designed to minimize destruction in case of derailment or collision will be capable of resisting any stress arising from even the most extreme service conditions. That the side-truss construction accomplishes this is demonstrated by several years' severe service record of several hundred cars.

L. B. STILLWELL.

As a part of a campaign to teach children the dangers of taking "short cuts" over railroads, playing on the tracks or using railroad rights-of-way, bridges and trestles as highways, the Pennsylvania Railroad System has issued an illustrated calendar especially designed to appeal to young folks. The calendar is intended particularly for use in school rooms and will be supplied for that purpose throughout the cities, towns and country districts served by the Pennsylvania lines, both east and west of Pittsburgh.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

This Week Too Master Mechanics Tell How They Handle Cars in the Shop and Keep Down Journal Troubles Respectively—Line and Cable Matters, and Crossing Safeguards Are also Covered in Several Articles

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Testing Line Insulators

BY D. D. EWING
Associate Professor of Electric Railway Engineering, Purdue University, La Fayette, Ind.

There is considerable truth in the old saying, "Put a rotten apple in the barrel and it will spoil all of the rest." And the fundamental idea involved is as true of the insulators on a line as it is of the apples in a barrel. The failure of the weak member of a system affects the welfare of all of the other members. Line surges set up by the destructive breakdown of a deteriorated or damaged insulator are likely to damage other insulators, and thus the trouble once started becomes cumulative. The problem of insulator testing as it confronts the operating man, therefore, is largely the problem of weeding out the defective insulating units before they actually break down.

For this weeding out process two methods of field testing have recently come into considerable use—the megger test and the telephone receiver test. The megger test cannot be used on a live line, and the testing equipment is somewhat expensive. Moreover, this plan requires a larger crew and is a little slower than the telephone receiver test. The results secured with it, however, are more definite than those obtained by the other method and are not affected either by the presence of an overhead ground wire or by the type of supporting structure. It has become quite popular for field tests on high-voltage transmission lines, particularly where a duplicate line is available for carrying the load while tests are being made.

The telephone receiver test can be performed by one man, as the apparatus and the methods used are of the simplest. Since the indication given the operator depends upon the shunting of leakage or unbalanced capacity currents from the pole through a telephone receiver, this test must be performed with the line energized. This instead of being objectionable is one of the important advantages of the method, since tests for defective insulators can be made without taking the line out of service. In a modified form the method can be used with steel supporting structures, but the best results are obtained when the supporting structures are of wood and where no overhead ground wire is used on the line.

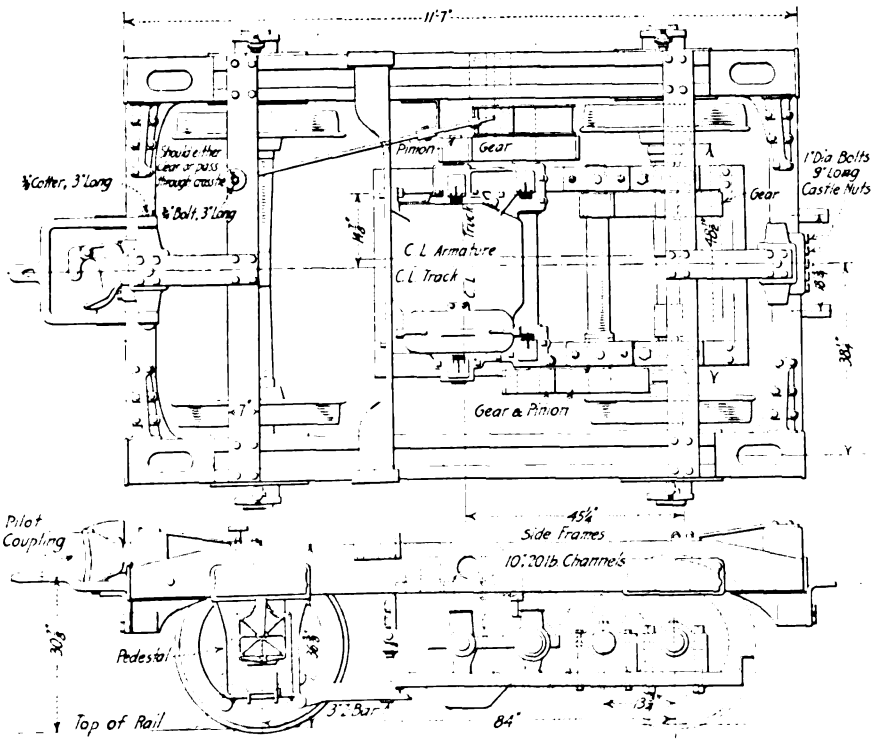
Continuity of service must prevail if trains are to be run in accordance with printed schedules and if desirable contracts for lighting and power service are to be secured. Poor line insulation, while not the only cause of service interruption, on many lines is an all too frequent cause. While experience has shown that no field test so far proposed is infallible, it has also shown that the consistent use of the method best adapted for a particular line eliminates to a large extent interruptions of service due to insulator troubles and decreases the average annual maintenance costs.

Handling Cars or Trucks with a Home-Made Electric Tractor

Present Equipment in the Long Island Railroad Shops Shows a Saving of 58 Per Cent on Each Truck Handled

BY J. S. MILLS
Foreman Electrical Department, Morris Park Shops, Long Island Railroad, Morris Park, N. Y.

The writer has noted with interest the articles in the ELECTRIC RAILWAY JOURNAL on handling cars and trucks in shops, particularly those entitled "Portable Controller Proves a Time-Saver" and "A Movable Carriage for Current Collection," which appeared in the issues for Sept. 30, 1916, page 685, and Oct. 28, 1916, page 939, respectively.



PLAN AND ELEVATION OF MP-54 TRUCKS EQUIPPED WITH MOTOR AND TRIPLE-REDUCTION GEARS

The layout of a shop, of course, has a great deal to do

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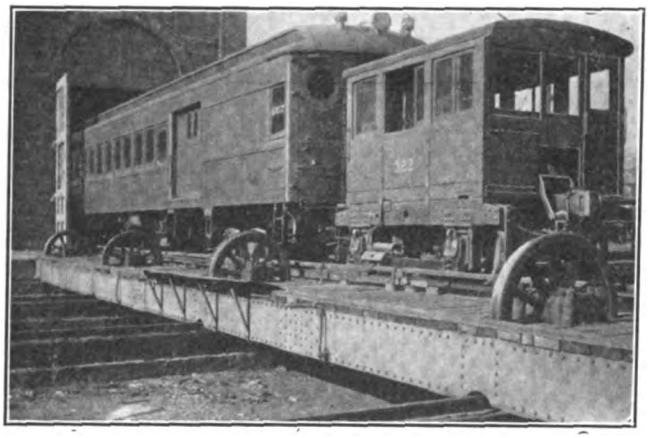
with the selection of the safest and cheapest method of doing this work. At the shops of this company an electric tractor was built and equipped for the purpose, and this has proven very satisfactory and has materially reduced the cost of the work. It consists of an MP-54 trailer truck with bolster guides and brake rigging removed, equipped with a GE-57 motor suspended on a carriage between the wheels. The power is transmitted through three sets of gears and pinions to one pair



ELECTRIC TRACTOR PULLING MOTOR-CAR OUT OF THE SHOP ONTO THE TRANSFER TABLE

of wheels. A shaft upon which a gear and pinion is mounted extends beyond the bearings and a band brake wheel is mounted on the same axle, being operated by foot from the inside of the cab. An R-27 controller, cast-iron resistance grids, circuit breaker and sand boxes are all mounted inside of the cab.

In order to remove the cab from the truck it is only necessary to disconnect the four motor leads, and to remove one pin from the brake rigging and eight ½-in. bolts that pass through straps holding the body to the truck. The tractor is equipped with two drawheads suitable for coupling with the two types used by this company, one being a Van Dorn & Dutton type which turns back out of the way when not in use and the other a standard automatic coupler.

Each track in the electric shops of this company holds two small cars, with a clear passage at each end, or one large car with space for one set of trucks in front of the car. An electrically-operated transfer table, equipped with a third rail for the movement of cars on and off the table, is located outside of the building and extends between two wings of the shops.

The process of handling a car when the removal of trucks is involved is as follows: It is first run off the transfer table into the crane house under its own power, the car body is lifted from the trucks by a crane, a rope is hooked onto the rear truck and both trucks are pulled from beneath the car. This rope is operated by a drum which is driven, through a clutch, by the main driving motor on the transfer table. The electric tractor is then coupled to the trucks, and they are either placed in the truck shop or on adjoining stub tracks. The tractor then takes the car, which rests on dummy trucks, and places it in the electric car shop. When the cars are again ready for trucks the operation is reversed.

Between alternate tracks inside the door adjoining the transfer table a standard bus-line receptacle is installed and connected to the 600-volt supply through a circuit breaker, so that when the contact shoe on the tractor leaves the third-rail on the transfer table a short jumper with a standard bus-line head on one end and with a fork on the other can be inserted in the receptacle to furnish power for operation.

The saving in time effected by the use of this electric tractor in handling trucks amounts to 58 per cent and in handling car bodies still more. By the old method of handling one set of trucks with rope and block six men for six minutes were required, while with the electric tractor it requires three men but five minutes. Between twenty-five and thirty sets of trucks are shopped each week and these must be handled twice and often three times. Another saving is in the amount of rope used on the transfer table. Formerly this hemp rope, which is 4¾ in. in diameter and 160 ft. long, had to be renewed about once a month, but since the electric tractor has been in service, about eight months, only one rope has been used and that is still in service.

It was feared that in speeding up the work more than 50 per cent more accidents would occur but since this motor car has been in service not a man has been injured on this work.

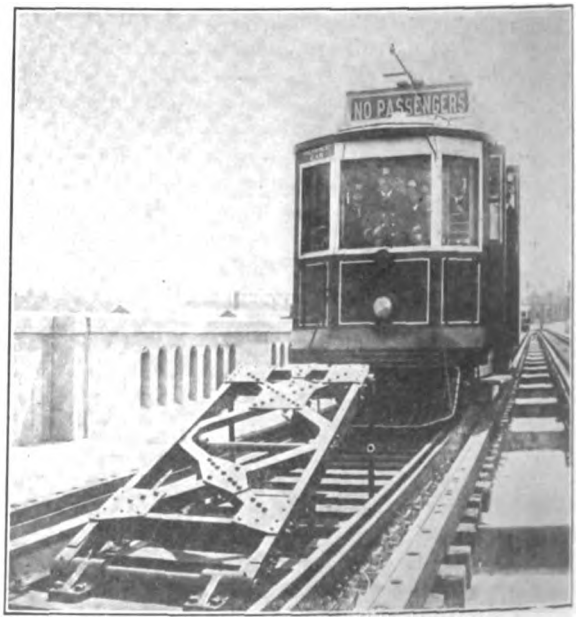
Safety Stop for Drawbridges and Grade Crossings

The Author Describes Several Devices for Safeguarding Traffic at Drawbridges and Grade Crossings

BY J. B. STRAUSS, C. E., CHICAGO, ILL.
President The Strauss Bascule Bridge Company.

The recent fatal accidents in Boston, Chicago and Vancouver, due to open drawbridges, have proved the necessity for more effective means for removing this danger. The ideal gate or barrier is one that will stop any vehicle positively, but at the same time so gradually that the impact will cause no damage. The writer has spent several years developing and testing devices for this purpose and the following is a description of some of his designs.

One of these is an automatic bumper, intended for



AUTOMATIC BUMPER RAISED TO STOP CAR ON APPROACH TO DRAWBRIDGE

strect car traffic across bridges and railway tracks where there is little speed or impact. This device comprises a heavy structural steel "striking frame," as shown in an accompanying illustration. This frame is pivotally mounted between the rails with its top below the rail

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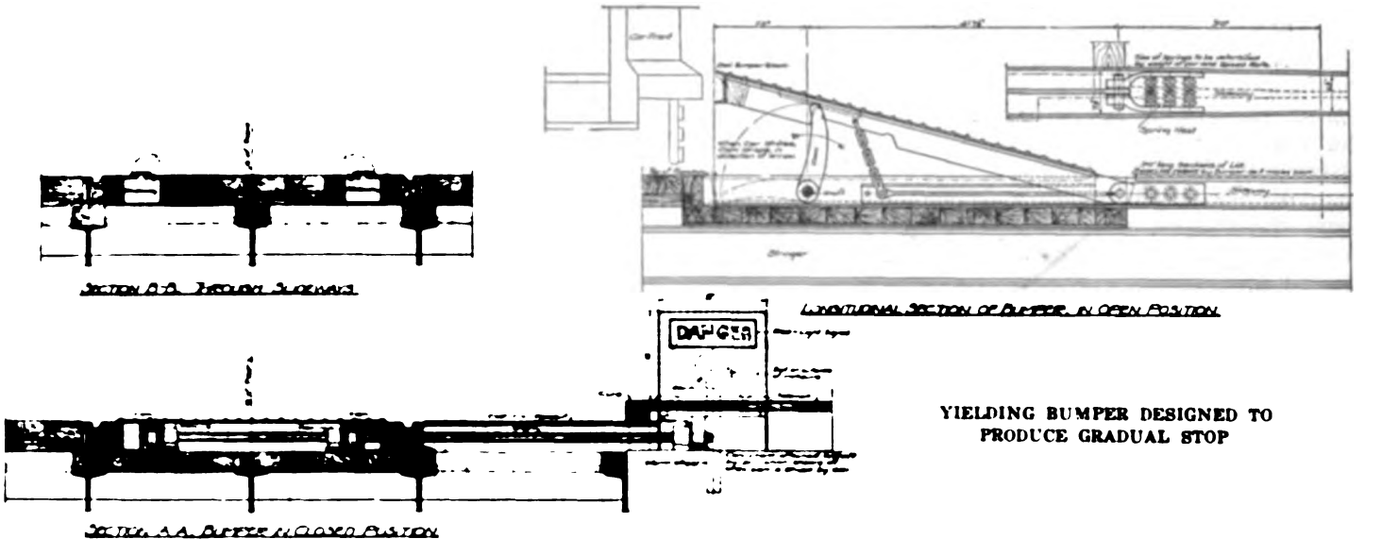
head when not in use. When traffic is to be stopped a motor lifts the striking frame so that it stands at an angle to the track, thus blocking traffic.

This form will not suffice where the speed of the car is high and the impact, therefore, heavy. For this condition a "yielding bumper" was developed, as is



YIELDING BUMPER DESIGNED TO PRODUCE GRADUAL STOP

illustrated in the accompanying drawing. This form combines with the positive protection of the fixed bumper, a yielding element which permits movement when struck, thus offering a constantly increasing resistance until the car stops. The striking frame in the yielding bumper is mounted on a secondary traveling frame, which moves in slideways between the tracks, extending a distance of 50 ft. The slideways are made of two Z-bars, set so as to form wide slots. Spring shoes travel in these slots, these shoes being fastened to the toe of the traveling frame. The friction between these shoes and the inner surfaces of the slideways determines the force necessary to push the bumper along the track. The slideways are tapered so that their width at the far end is less than that at the other end, causing the friction between the shoes and the slideways to increase as the frame approaches the bridge. The strength of the springs may be changed for cars of different weights and speeds.

In addition to the above, a cam is provided automatically to raise the striking frame when traffic is to be stopped. Ordinarily this serves as a signal and is sufficient to cause the motorman to stop his car. However, should a car get beyond control, its front sill will engage the striking frame, which, with the traveling frame, slides forward under the force of the car. The resistance increases as the speed decreases, and the car is brought to a gradual stop. In combination with this bumper, there is a danger light and a signal bell which are automatically operated when traffic is to be stopped.

These bumpers are intended especially for car traffic, so another device called a "yielding barrier" was developed for general highway protection. This barrier is made in two types, the one designated as the "portal" type, having a frame across the roadway, for the purpose of supporting the chain or cable and the machinery which operates it. The chain barrier proper consists of three horizontal chains or cables spaced and held in place by a web system of lighter chains. It can be raised and lowered by the operator in the operator's house. It is fastened at the ends to some form of shock absorber, which, in case the barrier is struck by a vehicle will permit the chain to pay out and gradually bring the vehicle to a stop.

In the other form of the yielding barrier, the portal or cross strut is omitted and the chains or cables are left exposed. Where street car traffic exists a center post must be provided in this type to support the trolley wires. Where there are no trolley wires, this center post is omitted and there are simply the two side posts. This type, from the standpoint of appearance, may be considered better than the portal or cross strut type. In this design the operating machinery for raising and lowering the barrier is located beneath the roadway in a closed compartment, which, however, is readily accessible for inspection and repairs. It will be noted that this does not interfere with the trolley wires in any respect, that it takes up very little space and that it is simple and direct in operation. All forms of this yielding form of gate or barrier are covered by patents issued to the author.

These devices have been developed to produce a satisfactory method for the elimination of accidents in all kinds of traffic. The old flimsy railway and bridge gates have proved themselves to be insufficient protection and it is believed that some yielding form of barrier must soon become generally adopted.

Small Steam Turbines in the Power Plant

Among recent applications of the steam turbine to power plant auxiliaries is one adapting it to the driving induced draft fans the speed of which is low compared with that of the turbine. The perfecting of high-speed reduction gears has made possible the use of turbine-driven fans and a considerable number are now in operation. The fans used generally require from 25 hp. to 50 hp. and give a draft of 2 in. to 5 in. In one type of unit developed by the Terry Steam Turbine Company the maximum turbine speed is 4500 r.p.m. and the gear ratio is 3.7:1. Another type has a maximum speed of 3630 r.p.m. for the turbine, with a gear ratio of approximately 6.8:1.

Another application is to exciter driving. An example is furnished by the three 300-kw. exciter units now being installed by the Buffalo General Electric Company. To insure the plant against loss of excitation, two independent sources of power are provided to drive each exciter, which are direct-connected to an induction motor at one end and to a Terry steam turbine at the other end. The governing mechanism of the turbine is so arranged that if power for the induction motor should fail the turbine will automatically pick up the load. An interesting feature is the high pressure and temperature supplied to the turbine (275 lb. and 275 deg. superheat).

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Cutting Out Journal Troubles on an Interurban Road

The Author Gives a Formula for Journal Brasses and Describes Methods of Eliminating Hot Boxes, Loose Journals and Other Troubles

BY A. BLANCHARD
Master Mechanic Boston & Worcester Street Railway

Much progress has been made during the past year on the Boston & Worcester Street Railway in the direction of eliminating hot journals. These were formerly the source of much operating inconvenience on this system, the main line cars of which reach a maximum speed of about 45 m.p.h. on level track. For many years the company has manufactured its own journal brasses, but a study of the road's experience led to the conclusion that there were several causes for our hot journals, such as improper composition and improper design of journal brass, wornout wedges, worn motor suspensions (on old-style motors having three-point suspension), improper journal packing and excessive braking effort. The last-named is 150 per cent maximum, which we find necessary in order to make a quick

FIG. 1—(LEFT TO RIGHT) LATEST TYPE OF BRASS FOR SMALL CARS; EARLIER TYPE OF BRASS; BRASS CRACKED FROM OVERHEATING

stop with a loaded car on our long heavy grades, of which we have a great many.

Our first step was to find a mixture for our journal brasses, so that they would run cold from the start, without any lead lining, when properly fitted to the journal; also that it would not cut the axle when they did run hot. At the same time it could not be so soft that it would wear rapidly where the brass comes in contact with the wedge and sides of the journal box. After trying a great many different mixtures we found the following one would meet our requirements: Copper, 79 per cent; tin, 9 per cent; lead, 10 per cent, and phosphor copper, 2 per cent (containing 10 per cent of phosphorus).

Under ordinary conditions I consider it unnecessary to line brasses, but on account of the previous difficulties we have had with hot journals, which has caused a great many of our journals to become rough and hollow in the center, we are at present lining our brasses with 1/16-in. lead linings. We had considerable trouble in making the lining stick to the brass, as at first it would flake off or roll out, but we found the following practice would make the lining stick and prevent it from flaking off or rolling out. After boring the brass is heated, then painted with whiting, with the exception of the surface to be lined, to which surface we apply Reed's "Grade B" soldering flux. Then the whole brass is dipped in a bath of pure tin, after which it is put on an arbor while still warm and given 1/16 in. of lead lining.

Our second step was to find some way to stop the brasses from tipping and the button on the end of the journal from wearing a hole in the side of the journal box. We found that this was caused by the excessive braking effort that we were using, as when the brakes were applied the journal was pushed against the side of the journal box and in time wore a hole through it, and sometimes the brass would tip, causing it to wear

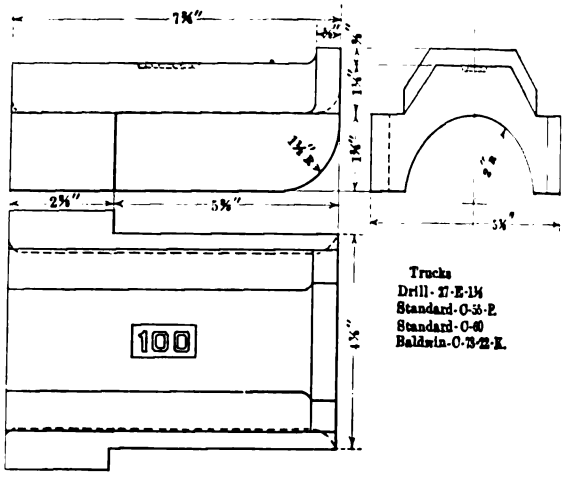

FIG. 2—REDESIGNED BRASS USED ON LARGEST CARS B. & W. ST. RY.

as shown at right of Fig. 1. We overcame this trouble by designing our brasses as shown in Fig. 2. This brass cannot tip and will not allow the end of the axle to come in contact with the side of the journal box. As this brass will not allow the axle to increase its distance, to any great extent, from the center of the truck, we have not had any more hot journals caused by the motor suspension (on motors with three-point suspension) binding on the truck frame. On our larger cars we have four types of trucks in which we formerly used four types of journal brasses, but by making a slight change in some of the journal box wedges we are

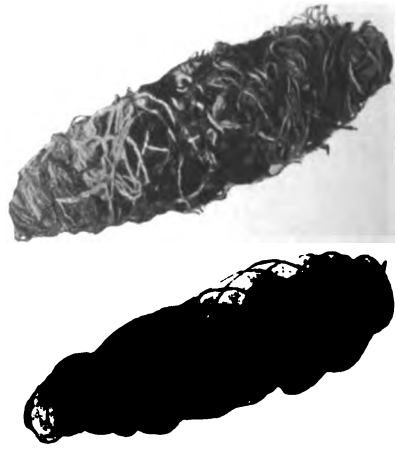

FIG. 3—ORDINARY AND X-RAY PHOTOGRAPHS OF SPECIAL PACKING

able to use one type of brass for all four types of trucks. Due to hot journals in the past, some of our journals had to be turned down, as they were very rough. The original size was 4¼-in. by 8-in. M.C.B. type. Therefore we have journals 4 3/16-in., 4⅛-in., and 4 1/16-in. diameter, and in lining our brasses we use four different sizes of arbors and stamp the brass according to its diameter.

We had a great deal of trouble to find a suitable

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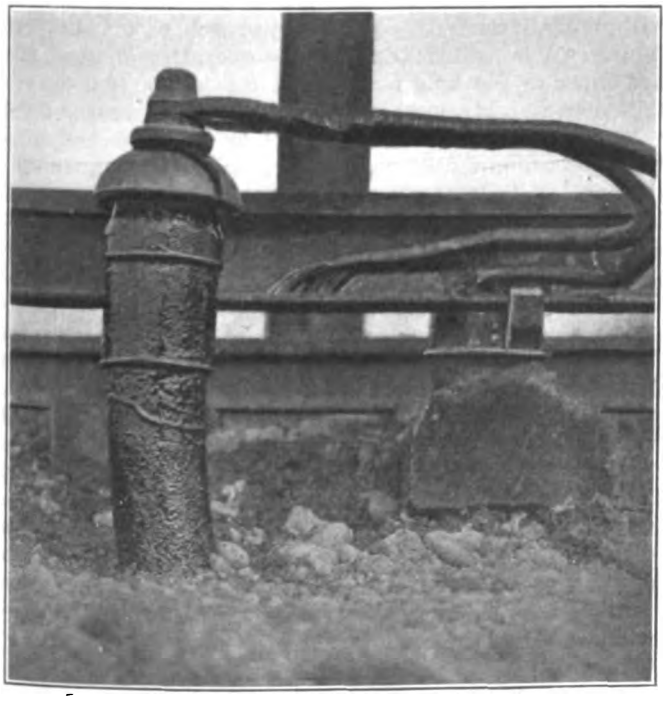
journal packing, one that would not pound away from the journals. We have adopted the "Elastic" car waste, manufactured by the Elastic Car Waste Company, Philadelphia, Pa. This waste is put up in different size rolls, which are woven with soft brass wire as shown in the illustration. We use the "Electric" size and put five rolls in each journal on our large cars, four under the journal and one at the end. This type of waste is more difficult to put into the box than the ordinary loose waste, but when once in place it is practically impossible for it to pound away from the journal. Before using, the elastic packing is saturated in Galena car oil for forty-eight hours and then drained twenty-four hours in a room at about 70 deg. Fahr. The rolls are then put into the journal box without additional oil. We have had some of this waste in service for over six months and have not added any additional oil or had to touch the initial installation.

Brasses have also been redesigned to fit our smaller cars, and the left-hand brass, Fig. 1, is one of these latest types remodeled in shape as indicated by comparison with the middle brass, which is the first of the new mixture to be placed in service. About 75 per cent of the cars are now fitted with improved brasses, and last Labor Day was the first holiday on which the company ever ran its service without a hot journal.

We expect to get at least four years' life per brass now compared with six months' maximum under the former practice, and the improvement in car service so far is most gratifying.

A Third-Rail Feeder Plug

The method of supplying current to the third-rail from the feeders on the Puget Sound Electric Railway, Tacoma, Wash., is shown in the illustration herewith. A tap from the feeder cable is led down the pole and run under the track through Orangeburg fiber conduit to the side of the third-rail. An insulated plug, made



CONNECTION FROM FEEDER TO THIRD RAIL SHOWING SPECIAL PLUG

especially for the Puget Sound Electric Railway by the Standard Underground Cable Company, is attached to the top of the fiber conduit This plug, which is protected by a petticoat very similar to that of a high-tension insulator, has a bolt extending through the petticoat, which is threaded and takes a nut. The terminal of the third-rail connection fits down over the bolt and is held tightly in place by means of the nut.

Cable Faults Located by Small Portable Instrument

Practical Method of Locating Feeder Troubles Is Tried Out by Several Operating Companies

The location of cable faults is a problem common to all electric railways, and many companies have devoted considerable study to developing methods of locating their cable troubles. The method used in most instances to locate faults such as grounds or short-circuits between cables is to send an interrupted current through the defective cable, and then an exploring coil connected

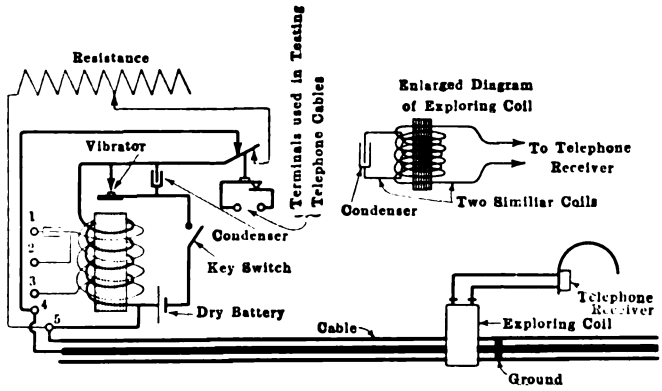


DIAGRAM OF INSTRUMENTS AND TESTING CONNECTIONS USED IN LOCATING CABLE FAULTS

to a telephone receiver is applied to the cable at intervals along the line. If the exploring coil is between the fault and the source of the interrupted current a current will be induced in the exploring coil, causing a sound in the telephone receiver. If the sound is very weak or if none at all is heard it indicates that the exploring coil is beyond the fault. By continued trial it is thus possible to locate the trouble within a few feet.

An instrument called a "telefault" is used quite extensively for the purpose of detecting faults by the method just outlined. The design and adjustment of this instrument is such that the pulsating current which is sent through the cable causes a distinct tapping sound in the telephone receiver when the exploring coil to which it is attached is held close to the cable. This tapping is similar to the sound made by a woodpecker and it is an important feature of the instrument since it is essential that a characteristic sound be produced—one that can readily be detected from the humming sound which might be caused by induction from adjoining cables.

The accompanying illustration shows the wiring diagram and testing connections which are used in locating cable grounds and short-circuits. A single dry cell is connected in series with a key switch, a vibrating current-interrupter and the primary winding of an induction coil. A condenser is connected across the interrupter contacts to absorb the spark. There is also a secondary winding on the induction coil and a set of resistances for locating troubles in telephone and signal cables, but these resistances are not used for testing for power cable troubles.

The pressing of the key switch causes the vibrator to operate, and a pulsating current is sent through the cable to the point where the cable is grounded to the

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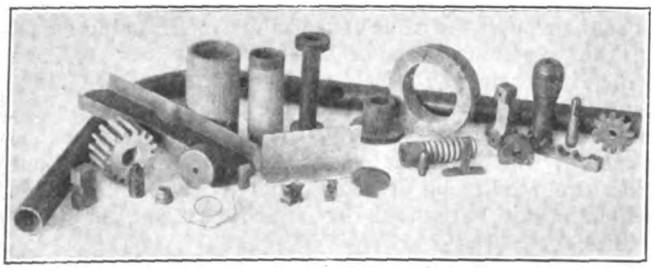
sheath. The sheath then forms the return circuit back to the instrument. The exploring coil consists of two exactly similar coils of fine wire wound on a laminated iron core. As shown in the diagram the terminals of one coil are connected to a condenser, and the other coil is connected to a telephone receiver. The coils and condenser are mounted in the same case. This is made of bakelite and is small enough to be easily held against the cable with one hand. The operator in search of a fault applies the exploring coil to the cable at intervals along the route, and the characteristic tapping sound is heard until a point in the cable is reached where a sound is heard on one side, but where none is heard on the other. This is the location of the trouble.

A test of the instrument was made by the New York Edison Company. In this case a three-conductor 250,000-circ. mil cable was shorted by a 3000-ohm resistance placed at a point unknown to the testers. This short-circuit was located in two hours and thirty minutes at a point about 4 miles from the substation. Only six manholes along the line were entered in making the test. In trying out the telefault the Interborough Rapid Transit Company of New York City used it in locating a ground in a single conductor, lead covered, 2,000,000-circ. mil cable.

Other tests of a similar nature have been made, and the companies that have used the instrument believe that it saves much time in locating cable faults. It has been pointed out that the sound heard in the telephone receiver is a tapping like that of a woodpecker, for this reason its makers, W. N. Matthews & Brother of St. Louis, Mo., have named it the "Woodpecker Telefault."

A New Electrical Insulation

A new form of electrical insulating material called "Condensite-Cellulac" is being placed on the market by the Diamond State Fiber Company, Bridgeport, Pa. This material is said to be entirely different in physical and chemical characteristics from any other form of fiber, hard rubber, mica or synthetic insulation. It is said further to combine in great part the stable physical and chemical properties, and high dielectric resistance of condensite, which is employed in its manufacture, and the good qualities of the best grade of vulcanized fiber. These properties are summarized by the manufacturers thus: It is permanently anhydrous and



SHAPES IN WHICH NEW INSULATING MATERIAL IS ALREADY BEING MOLDED

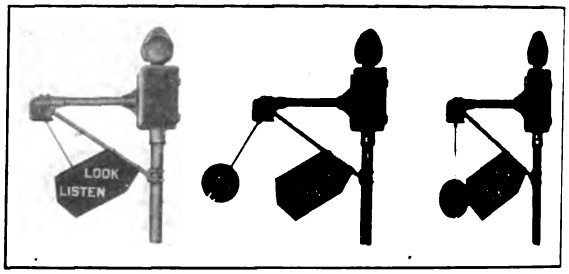
non-hygroscopic, and is impervious to the action of oil and ordinary acids or solvents. It is infusible and is not affected by the action of heat within the range of temperature ordinarily encountered. It is not fragile and will stand considerable vibration or shock.

This insulating material is furnished in merchantable shapes, sheets, rods, tubes, etc., and is readily machined. It may be formed into very thin sheets (0.015 in. or less in thickness). It can also be supplied in the soft uncured state, permitting of its being hardened in the place in which it is to be used, as for instance, in making gaskets for hot lines, steam, hot water, compressed air, etc.

Three-Aspect Automatic Flagman

A special type of visual signal to protect dangerous grade crossings has been developed by the Union Switch & Signal Company, Swissvale, Pa., which, while displaying a "stop" indication by the movement of a disk in normal operation, is so designed that a failure of any part of the apparatus or the absence of power will cause a second or emergency "stop" indication. In other words, this signal has three aspects, one indicating "proceed," and either of the other two indicating "stop," as shown in the accompanying illustration.

Under normal conditions this flagman indicates the approach of a train by swinging a red banner on which



THREE ASPECT FLAGMAN—FIRST POSITION—PROCEED; SECOND POSITION—SIGNAL SWINGING, STOP; THIRD POSITION—SIGNAL HANGING VERTICAL, STOP

appears the word "stop," and displays a red light attached to the banner. When no train is approaching the banner is held to one side between two screens upon which is painted the phrase "look and listen," and the lamp suspended from the banner is not lighted. If the circuit through the holding magnets is broken, but the apparatus is otherwise in good condition, the banner will swing irrespective of the approach of a train. If the circuit is broken through the operating magnet but not through the holding magnet the banner will be retained in its extreme position between the screens until a train approaches when it will be released and ultimately assume a vertical position with the banner stationary but fully displayed. If current is totally cut off the mechanism, or if the operating parts become disconnected, the banner will also assume the vertical position and be fully displayed.

The operating mechanism is inclosed in a weatherproof case and consists essentially of operating magnets for driving the swinging banner and of holding magnets for retaining the banner at one end of its arc of travel.

This flagman is designed to operate normally at 10 volts direct current. It requires an average of 0.4 amp. for swinging the banner, and 0.4 amp. for the 5-watt 12-volt lamp while the banner is swinging. The holding magnets require normally 10 milliamp. when the flagman is latched in the clear position. The signal can be equipped with a bell for further protection. The control of the flagman can be effected by any of the well-known automatic or non-automatic methods.

The Kansas City, Clay County & St. Joseph Railway has contracted for an electric locomotive. The company will install in the locomotive the present motor equipment of its work car, using the steel frame of that car for the ditcher. The locomotive is needed to haul the ditcher and upkeep equipment, the freight cars transferred from steam lines, and the company's freight cars.

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NEWS OF ELECTRIC RAILWAYS

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

ST. LOUIS SETTLEMENT SUGGESTION COMMENT

Principal St. Louis Papers Agreed that Long-Time Settlement Is Desirable—President McCulloch Discussed Problem

The proposal made by the United Railways, St. Louis, Mo., to the city for a settlement of the differences between the company and the city, referred to at length in the ELECTRIC RAILWAY JOURNAL for Dec. 2, page 1170, has provoked much public discussion of the street railway question. Quite naturally, differences of opinion exist as to what seems best to be done, but such opinions as have been expressed contain no elements that would seem to prevent their reconciliation.

On one principal point the two leading daily papers, the *Post-Dispatch* and the *Republic*, are agreed, namely, that any temporary expedient is inadvisable. In this connection the *Republic* says that "the city should go to the bottom of the question having in mind the settlement not only of the troubles which are now worrying the company, but also of the future of street railroading in St. Louis, which future should be considered in the light of what other cities have accomplished in the way of bettering service or reducing fares." Similarly the *Post-Dispatch* says that "the adjustment merely of surface differences will leave the problem unsolved." It makes a plea for provision for subways and extensions in the city and suburbs, and says that the only satisfactory settlement will limit the earnings of the company to fair returns on a fair valuation and devote all earnings in excess of that to a fund for real rapid transit.

The *Republic* seems to think that there is a disposition on the part of the Mayor to hasten the proceedings and get the question out of the way as soon as possible. In this it "does not see promise of a satisfactory adjustment of the question."

Many subjects affecting the company closely were discussed by Richard McCulloch, president and general manager of the company, in an interview with a representative of the *Post-Dispatch*, published in that paper for Nov. 25. Mr. McCulloch said that he would be glad to present to the directors the suggestion that the city have a representative on the railway board with full voting power and such other rights as were enjoyed by other directors. He did not see, however, how it would be possible for the city to have a representative in the operating department of the company. Control of the company was lodged with the Public Service Commission, but if the State would delegate power to the city to create such an official he would recommend the proposal to the directors.

Mr. McCulloch said that the capitalization of the company could be reduced only by a financial readjustment agreed upon mutually by the security holders or through receivership and foreclosure. The company had outstanding approximately $40,000,000 of stock and $60,000,000 of bonds. Considering intangibles and obsolescence due to the rapid changes in the street railway art with the attending need for superseding equipment before it had anything like outlived its usefulness, he did not think the total of securities outstanding was excessive.

The *Post-Dispatch* had advocated editorially a return to the company limited to 5 per cent. Mr. McCulloch said that with any such condition as this imposed the company would not be able to compete for capital in the financial markets with other forms of investments and that it would be unable to secure the new capital that was constantly required. With respect to the traction settlement of 1907 in Chicago and the much more recent settlement in Kansas City, he personally liked the principle, because it made the city and the company partners and insured co-operation between them.

ELECTRIC RAILWAY LABOR SHORTAGE ACUTE

City and Suburban Lines Find It Increasingly Difficult to Secure Satisfactory Help

Although this is ordinarily the time of year when there is, if anything, a surplus of labor in the electric railway field, reports from a number of Eastern and Middle West cities indicate that some of the companies have actually had to abandon plans which they had in preparation for the expansion and betterment of their service. The strike in New York has been over now for weeks, so far as the railways are concerned, but the plans of the companies for resuming operations in full were delayed considerably on account of inability to secure men of the high standard fixed for the arduous metropolitan service.

Among the other large cities that report man shortage are Washington and Cleveland. But this is not all. Even the lines in semi-metropolitan and rural districts are reporting labor shortages. The Connecticut Company, in particular, has been hard hit in this respect. The call for men from other industries has been insistent now for months in Bridgeport, New Haven, Hartford, and other places in Connecticut where machinery and tool-making are the principal industries. J. K. Punderford, general manager of the Connecticut Company, says that motormen especially have quit to go into the factories.

In Cleveland, the question of labor shortage has been brought out forcibly by the demand for increased service there on some of the lines. There the amount of service given and the fare question are almost inextricably mixed under the Tayler franchise, by which the service is under the control of the city street railway commissioner. Yielding to persistent demand from the public and the newspapers, that official has consented to those increases in service which have been most persistently urged, but now that this has been done the question up for settlement is that of securing the men for the cars. The commissioner said recently that the demand for men in other work was so great, and the wages so high, that men would not take places on the cars at the wages the railway could pay.

So acute did the labor shortage become in Washington, D. C., that the Washington Railway & Electric Company resorted to an ingenious scheme of advertising calculated to increase applications for employment and bring the instruction department to a normal condition. Letters were mailed to more than 660 postmasters in Maryland and Virginia, in which the company said that it had recently received communications from residents of the vicinity of the particular postmaster addressed asking for information relative to securing employment with the company. The company then said to the postmaster that in order to be of material service to those in his vicinity who might be interested it would appreciate his posting on the post-office bulletin board a circular which was inclosed informing those interested how to apply for employment without the necessity of going to Washington. This poster accentuated the fact of steady employment at from $45 to $80 a month. The inquiries that these posters provoked were answered promptly by the railway with a letter suggesting an appointment for a personal interview. With this letter went a circular giving the necessary qualifications for appointment, the cost to enter the service and the rates of pay.

The Washington Railway & Electric Company up to Dec. 6 had applications for employment from forty-three men who read the circular posted on the bulletin boards of rural post offices. The expense of the trial to the company was only $30.50, $12 of which was for postage. The opinion prevails in the company that the plan is better than paid advertising in country newspapers and that it brings a better class of applicants for permanent employment.

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ACTION URGED UPON CITY OF SEATTLE

The legal department of the city of Seattle, Wash., has been instructed by the franchise committee of the Council to bring suit against the Puget Sound Traction, Light & Power Company to require the company to pave its right-of-way. The committee of the Council acted upon the opinion of Walter F. Meier, assistant corporation counsel, who stated that the city has the right to force the company to comply with its franchise provisions, notwithstanding its appeal to the Public Service Commission for relief from such requirements.

This action is in conflict with an agreement entered into more than a year ago, when officials of the company conferred with Mayor H. C. Gill and other city officials. At that time, the company paid its 2 per cent gross earning tax under protest, and agreed to continue these payments until the Public Service Commission disposed of its petition, the amounts to be refunded in the event that the relief sought by the company was granted and confirmed by the courts. At that conference, it was also agreed that instead of paving right-of-way, the company should be required to plank such parts of the street, until the petition to the Public Service Commission had been acted upon. Accordingly the company planked its right-of-way in a number of improvement districts where the franchise required paving with the same material and at the same time the city paved the remainder of the street. In these districts, the company pleaded its petition to the commission as an excuse for not complying with the letter of the franchise.

The relief petition of the company to the commission asked that the company be relieved of paving its right-of-way, of paying 2 per cent of its gross earnings to the city annually, and of paying any of the cost of bridges used for street railway purposes. The petition has been pending nearly two years. Counsel Meier holds that the application to the commission does not relieve the company from complete compliance with the terms of its franchises until the petition has been acted upon and the relief prayed for has been granted. It has not been determined in what district the company will be cited to remove the planking and pave its right-of-way with the same kind of material used on the remainder of the street.

The utilities committee of the Council has taken up with A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, the question of the company contributing toward the cost of constructing the proposed viaduct and bridge on West Spokane Street and across the West Waterway.

NEW TERMINAL FOR INDIANAPOLIS

An important stage in the development of the interurban lines operating out of the city of Indianapolis, Ind., was marked during the week ended Dec. 9 by the purchase by the Terre Haute, Indianapolis & Eastern Traction Company of the Federal League Ball Park in Indianapolis. The park comprises about seven acres of ground within a few squares of the central business district of the city, and is to be used as a site for new interurban freight terminals for all the interurban lines entering Indianapolis. The three freight houses adjoining the Traction Terminal Building and passenger station at Indianapolis have for some time past proved inadequate to handle the increasing volume of freight business.

The new property is valued by real estate men at approximately $250,000, and has a frontage of 600 ft. on Kentucky Avenue, making it accessible for all traction lines entering the city as well as for manufactories and other shippers. The facilities for handling interurban freight in Indianapolis will be more than doubled when the new freight stations are completed.

The work of removing the grandstands and other structures on the ground formerly occupied as a baseball park will commence at once, and plans are now being made for the new buildings to be erected by the Terre Haute, Indianapolis & Eastern Traction Company. These new freight stations will be of brick construction, as attractive architecturally as possible. Proper track facilities, storage and transfer houses will be provided. The work on the new buildings will probably commence in the spring of next year.

BOSTON TUNNEL EXTENSION OPENED

The extension of the Dorchester tunnel of the Boston (Mass.) Elevated Railway from Washington Street to Dewey Square was opened for traffic on Dec. 3. Although the length of tunnel placed in commission is only ¼ mile, the new service represents one of the most important improvements in rapid transit from the standpoint of public convenience that has been completed by the Boston Transit Commission during the last few years. With the exception of the East Boston tunnel, Boston has had no crosstown rapid transit line of major importance running east and west, although the Atlantic Avenue elevated line has to some degree compensated for this condition by the loop and inter-terminal service operated upon it in the course of its history. The Dorchester tunnel, when completed, will enable high-speed train service to be rendered between Harvard Square, Cambridge, and Andrew Square, Dorchester, the section between Harvard Square and Park Street being popularly known as the Cambridge subway. In order to accommodate the public as far as possible in advance of the completion of the tunnel, the Boston Elevated Railway has established service in the downtown sections of this tunnel as rapidly as the completion of stations has permitted. Under this plan trains were operated from Harvard Square to Washington station following the completion of the tunnel under Winter and part of Summer Street, and the further extension of service to South Station under the present terminal point provides rapid transit from Cambridge and the various suburbs at the west of the Charles River to the South Terminal Station of the New York, New Haven & Hartford and Boston & Albany railroads.

EXPERIENCE ORDINANCE UNCONSTITUTIONAL

Judge Joseph H. Beall of the City Court of Yonkers, N. Y., on Dec. 1, declared unconstitutional the fifteen-day ordinance, which forbids the operation of a trolley car in that city by men not having had that period of instruction in that city. In the decision Judge Beall said:

"The so-called experience ordinance should be declared invalid for its very obscurity. No man can tell what it means. And no man's reputation and liberty should be placed at stake by a law which neither the author of it nor any other person, including the court, can understand. This decision has no relationship to the strike in this city, except to take into consideration existing conditions. It relates purely to an interpretation of this ordinance as exercised by the Council of the police power which could only be exercised in behalf of all the people of the city and not of any class. One of the first requisites of any law or ordinance is that it be reasonable, and this ordinance is not reasonable."

"Nothing is reasonable which threatens a community with ruin. And in connection with that phase of the matter it is right that the court should take judicial notice of conditions which have existed in this city for a number of months; the practical paralysis of the means of transportation for a long period of time, the discomfort and inconvenience that have resulted, the accidents to life and limb and property, the peril and expense of the child on its way to school and the laborer to his work, the grave and serious injury to all forms of business, the deadening effect upon and the irreparable loss to all holdings of real estate, the necessary withdrawal of the police from the ordinary avenues of their work, and, most of all, the nation-wide blot upon the fame and reputation of the city, which is ineffaceable."

Judge Beall's decision was rendered in the case of Louis Schwam, a motorman, who was arrested on complaint of Samuel Hoey, president of the local of the Amalgamated Association in Yonkers, who alleged that Schwam had not been trained for the period stipulated in the ordinance. Assistant Corporation Counsel Cohen of Yonkers was quoted to the effect that the city could not appeal from the decision, as it was returned in a criminal case, and that, as the defendant had no interest in taking the case to a higher court, the decision would stand.

Mount Vernon and New Rochelle repealed similar ordinances lately, as a result of the recent strike on the lines of the Yonkers Railroad and the Union Railway, New York, included in the system of the Third Avenue Railway. The Common Council of Yonkers refused to do so.

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MESSRS. BEMIS AND BURCH TESTIFY IN CLEVELAND

E. W. Bemis testified on Nov. 27 before the board of arbitrators which is to decide on the power contract between the Cleveland (Ohio) Railway and the Cleveland Electric Illuminating Company. He said that money was not all that was involved in the differences between the company and the city. The question should be decided in a way that was for the best interests of the city. The welfare of the municipal light company should be considered, as well as the welfare of the railway.

Edward P. Burch engineer in the employ of the city, and F. W. Ballard, former commissioner of light and heat, witnesses for the city, both testified that the railway would save money in the long run by accepting the bid of the municipal light plant. They argued that the cost of producing energy was steadily going down and that no contract that might continue for eighteen years should be made. Mr. Burch said that the saving under the bid of the municipal plant would be $355,000 and that the railway's own figures showed that it would lose $15,000 by taking the Illuminating Company's contract.

Mr. Burch testified before the board on Dec. 4 to the effect that the municipal plant is economically and efficiently handled and that it will be in a position within two years to supply the Cleveland Railway with all the power needed. He was the last witness for the city in the hearing. There will be some testimony in rebuttal.

DALLAS VOTE FAVORS LOCAL CONTROL

The final count on Dec. 6 of the postcard vote on the Dallas traction and lighting franchises showed the total of ballots cast to be 15,422. Of this number only 10,474 were found eligible. The vote in favor of the franchises was 9896 and against them 578. Mayor Lindsley and the City Commissioners announced that the franchises unamended would be passed on Dec. 8. Petitions are being circulated for a referendum election on the franchises after their passage by the commissioners.

The plan for the settlement of the differences in Dallas provides for new franchises to the consolidated street railways and the new lighting company to be organized by J. F. Strickland and C. W. Hobson, under which the control and management of the properties will be vested with local Dallas interests. The vote shows the desire of the public to keep the operation of public utilities in private hands where capital shows a desire to operate the properties in the best interests of all.

New York Road to Be Scrapped.—No efforts will be made to electrify the Wellsville & Buffalo Railroad, which has been abandoned after ten months' unsuccessful operation. Construction gangs have already started to take up the rails at several points. The equipment will probably be scrapped.

Strike in Marion.—The night force of motormen and conductors on the Marion (Ohio) Street Railway stopped work on Nov. 22 because of the discharge of a motorman. Once out, they demanded an increase in wages. The company offered to take the men back at the schedule of wages which prevailed before the strike.

President on the Railroads.—President Wilson in his address to Congress confined himself largely to the pressing railroad problem. He made it clear that he had not abandoned his program of legislation to prevent a recurrence of the situation that confronted the country recently through the prospect of a disastrous strike of railway trainmen. He reiterated all except one of the recommendations concerning railway conditions which he laid before Congress last summer when the general railroad strike threatened.

East Cleveland Will Push Paving Case.—Common Pleas Judge Levine has set Dec. 15 as the date for hearing the case of the city of East Cleveland, Ohio, against the Cleveland Railway in an effort to compel the latter to pave the 15-ft. space occupied by its tracks on Euclid Avenue the entire distance through the town. A similar suit was brought last spring, but Judge Levine ruled that the city could not ask the company to make improvements until the town itself had started the work. It is now almost finished with the exception of the portion occupied by the tracks.

An Electric Railway Roll of Honor Man.—James W. Drury, who had served for many years as a motorman on the lines of the Louisville & Southern Indiana Traction Company, died at his home in New Albany, Ind., on Nov. 16. Mr. Drury started to work with the Louisville & Southern Indiana Traction Company in 1887 on the first mule car in the city of New Albany. In 1903 he ran the first interurban car for the company through Jeffersonville to Louisville. In all of the twenty-five years with the company he was never inside a courthouse and had never had an accident charged to him.

Paving Suit Won by Company.—Supreme Court Justice Lehman has dismissed an action by the city of New York to recover the cost of tearing up the tracks of the Third Avenue Railway for the purpose of repairing a sewer. It has been the custom to charge the cost of removing and relaying the tracks to the railway companies, but when a bill for $1,008 was handed to F. W. Whitridge, president of the Third Avenue Railway, he refused to pay. The city's practice was based on a statute of 1884, but Justice Lehman ruled that the Legislature could not have intended to make a charge against a railroad in a case where the company was not responsible for the damage the city was compelled to repair.

Pass Law Retroactive.—Under the ruling of the attorney-general of Kentucky many public officials of Kentucky will have to decide by New Year's whether they will give up their passes on railway lines or give up their public offices. This applies to employees of the railways who are as such entitled to passes, but who also are frequently serving the public in some capacity, many without salaries. Numbers of railway employees who will be affected, for instance, live in suburbs and serve without pay on school district boards, town trustee boards, etc., seldom with emoluments. By the terms of the anti-pass law effective on Jan. 1 the State is depriving itself of the services of these men, few of whom can afford to give up their passes in the interests of the public.

Montreal Negotiations to Be Investigated.—As a result of a petition signed by 106 electors of Montreal, Canada, Justice J. M. McDougall of the Superior Court for the district of Ottawa and the county of Argenteuil, Quebec, has been appointed by the Superior Court to investigate the relations existing between civic authorities of Montreal and the Montreal Tramways. In the petition it is charged that the tramway has attempted unduly to influence the action of at least one civic official; that certain proposals, said to be unfair, for the granting of a new franchise to the company were prepared by the company for submission to the Board of Control, and that for the purpose of eliminating unfavorable newspaper criticism, the company secured control of certain newspapers and attempted to obtain control of others. The negotiations between the city and the company were referred to in the ELECTRIC RAILWAY JOURNAL for Dec. 2, page 1173.

Coming Public Service Commission Appointment.—Guesses are already being made as to the disposition Governor Whitman of New York will make of the four vacancies that will have to be filled by him on the Public Service Commissions during his second administration. Of these the place on the commission for the First District, now occupied by Commissioner Charles S. Hervey, who was appointed this year to fill out an unexpired term will become vacant on Feb. 1 next year, as will the place of Devoe P. Hodson, an Erie County Democrat appointed by Governor Sulzer, on the up-State commission. On Feb. 1, 1918, the term of Oscar S. Straus, who succeeded Edward E. McCall as chairman of the Commission for the First District, will expire, together with that of Seymour Van Santvoord, chairman of the up-State commission. Governor Whitman has already announced that he will reappoint Commissioner Hervey, but beyond that nothing is known in public of his plans.

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Toledo Fare Suggestions.—The sliding scale of fares for Toledo, Ohio, as prepared by Henry L. Doherty of the Toledo Railways & Light Company, starts with a 5-cent straight cash fare and free transfers; then six tickets for 25 cents and transfers only on 5-cent cash fares; six tickets for 25 cents and free transfers; seven tickets for 25 cents and 1 cent for transfers; eight tickets for 25 cents and 1 cent for transfers, eight tickets for 25 cents and 1 cent for transfers, with rebate of 1 cent on transfers; eight tickets for 25 cents and free transfers; five tickets for 15 cents. Under the plan of carrying an equalization fund, the fare will be reduced to the next lower point when this fund reaches $200,000 and will be increased to the next higher rate when it reaches a minimum of $100,000.

PROGRAMS OF ASSOCIATION MEETINGS

Pennsylvania Street Railway Association

Final plans are being made for the meeting of the Pennsylvania Street Railway Association on Dec. 12 and 13 at the Adelphia Hotel, Philadelphia. The session on Dec. 12 will be devoted to a discussion of insurance questions, while at the session on Dec. 13, taxation, lightning protection, electric welding, the jitney and the electric railway in mobilization will be considered.

National Fire Protection Association

The biennial meeting of the electrical committee of the National Fire Protection Association will be held in March, 1917, in New York City, the day and place of the meeting to be announced later. As usual, the provisions of the national electrical code as they now exist will be considered, together with reports of all sub-committees. Suggestions for amendments to the code, in order to be included in the bulletin, must be specific, and where a change is desired in a rule or section of a rule definite wording for such change must be given, together with the reasons why the change is recommended and these suggestions, together with all committee reports, must be in the hands of Ralph Sweetland, secretary of the electrical committee of the association, 141 Milk Street, Boston, Mass., not later than Jan. 15, 1917. As heretofore, the meeting will be open to all interested and such persons will not only be welcome but are urged to be present and give the committee the advantage of their experience and advice.

New York Railroad Club

The list of papers for the ensuing season of the New York Railroad Club, with the exception of the month of May, is as follows:

December, 1916—No paper. Annual Christmas entertainment, Waldorf-Astoria.

January, 1917—"Accident Prevention," with motion pictures of "The House That Jack Built." By Marcus N. Dow, general safety agent of the New York Central Railroad.

February, 1917—"Cost Accounting." By Henry Lehn, maintenance of way accountant of the New York Central Railroad.

March, 1917—Annual Electrical Night. "Electrification of the Norfolk & Western Railroad," with particular reference to economic and operating features thereof, with moving pictures by the Westinghouse Electric & Manufacturing Company, to be described by an operating official of the railroad company. C. H. Quinn, chief electrical engineer, will be invited to prepare a paper descriptive of the more interesting and peculiar engineering and structural features. By L. E. Johnson, president of the Norfolk & Western Railroad.

"Economic and Operating Features of the Electrification of the Chicago, Milwaukee & St. Paul Railroad, with moving picture illustrations by the General Electric Company, described by an operating official of the railroad. Mr. Beeukes, electrical engineer, has been invited to prepare a paper on the peculiar engineering and structural features. By C. A. Goodnow, assistant to the president of the Chicago, Milwaukee & St. Paul Railroad.

April, 1917—"Railway Water Supply." By C. R. Knowles, Chicago, superintendent of water service of the Illinois Central Railroad.

Financial and Corporate

ANNUAL REPORT

United Railways Investment Company

The income statement of the United Railways Investment Company, San Francisco, Cal., showing the net income applicable to its common stock when the company and its subsidiaries are considered as one, is as follows for the year ended June 30, 1916:

Gross earnings	$34,495,572
Operating expenses	$17,037,090
Taxes	1,479,258
Total	$18,516,348
Net earnings	$15,979,224
Other income	402,906
Gross income	$16,382,130
Deductions from income (rents, miscellaneous interest, etc.)	3,858,887
Income before deducting fixed charges	$12,523,243
Fixed charges—interest on bonds, notes, etc., held by the public	*6,179,063
Net income	$6,344,180
Dividends on preferred stock held by public	†1,738,691
Balance available for improvements, etc., and dividends on common stock	$4,605,279
Improvements, etc., charged against income by the several companies	1,777,607
Balance available for dividends on common stock	$2,830,272
Proportion applicable to common stock of United Railways Investment Company (5.025 per cent)	1,027,119

Note: The foregoing statement includes no charges for depreciation, as such, and no amounts charged against income for sinking fund requirements.

*Includes $186,138 interest on Series "B" second mortgage 5 per cent bonds of Sierra & San Francisco Power Company, payable in like bonds.

†Includes $799,130 for dividend on United Railways Investment Company preferred stock, although none was declared during the year.

In the preceding year the gross earnings, according to a similar statement before published, amounted to $32,574,111, and the income available for dividends was $2,071,423, of which $828,705 was applicable to common stock of the United Railways Investment Company, at the rate of 4.062 per cent.

Owing to an apparent lack of understanding by stockholders and the public in regard to the structure of the United Railways Investment Company, the report this year by means of an organization chart and a detailed description shows the exact inter-relations of the various companies. The United Railways Investment Company is solely a holding company, having interests in two widely separated districts, around Pittsburgh and in California. Its interests in the Pittsburgh district are represented by holdings of stock in the Philadelphia Company, which in turn controls the Pittsburgh Railways, the Duquesne Light Company, the Equitable Gas Company and the Pittsburgh & West Virginia Gas Company. The interests of the United Railways Investment Company in California, however, are represented by its holdings of stocks of the California Railway & Power Company, which controls the United Railroads of San Francisco, the Sierra & San Francisco Power Company and the Coast Valleys Gas & Electric Company. The Pittsburgh situation and the California situation are entirely separate, neither having any direct relation with the other, but each being operated and accounted for as a distinct entity.

The last fiscal year of the Philadelphia Company showed a revival of business in the Pittsburgh district, with the result that the company was able to increase its common stock dividend rate from 6 per cent to its normal rate of 7 per cent. The income of the company from the holdings of income debentures of the Pittsburgh Railways increased from $330,739 to $600,000. The latest detailed comparative statement for the Pittsburgh Railways, whose fiscal year ends March 31 as in the case of other parts of the Philadelphia Company group, was published in the ELECTRIC RAILWAY JOURNAL of July 22, page 159.

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In contrast to the dividend increase in the Pittsburgh district, the common and preferred issues of the California Railway & Power Company are at present paying no dividends at all. The income of this company for the year ended June 30, 1916, amounted to $203,327, with expenses of $36,947. After the payment of the regular 7 per cent dividend on the prior preference stock, there was a profit and loss surplus of $14,013.

Of the various companies in the California group the one of chief interest to the electric railway field is the United Railroads of San Francisco. How this has fared lately is shown by the following comparative income statement for the years ended June 30, 1915 and 1916:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Operating revenue:				
Passenger	$7,692,258	99.2	$7,968,094	99.3
Other operating revenue	59,485	0.8	56,000	0.7
Total	$7,751,743	100.0	$8,024,094	100.0
Operating expenses and taxes:				
Maintenance of way and structures	$550,046	7.1	$633,943	7.9
Maintenance of equipment	371,561	4.8	435,826	5.4
Transportation	3,353,488	43.2	3,129,802	39.0
General	630,139	8.1	558,255	7.0
Total operating expenses	$4,905,234	63.2	$4,757,826	59.3
Taxes	508,800	6.6	516,000	6.4
Total operating expenses and taxes	$5,414,034	69.8	$5,273,826	65.7
Operating income	$2,337,709	30.2	$2,750,268	34.3
Other income	178,525	2.3	208,058	2.6
Gross income	$2,516,234	32.5	$2,958,326	36.9
Income charges	515,470	6.7	522,147	6.5
Income before deducting bond interest	$2,000,764	25.8	$2,436,179	30.4
Bond interest	1,604,026	20.7	1,628,652	20.3
Net income	$396,738	5.1	$807,527	10.1

The last fiscal year, it is said, was in point of earnings one of the most unsatisfactory in the history of the company. Through the unregulated competition of the jitneys, which throughout the year were permitted to enjoy a large percentage of the short haul traffic, serious inroads were made into the gross earnings, which it was not possible to recoup by a reduction in operating expenses. The passenger revenues decreased $275,836 or 3.5 per cent, and a small increase in other operating revenues was sufficient only to reduce the loss in gross operating revenues to $272,351 or 3.4 per cent. Operating expenses, however, rose $147,408 or 3.1 per cent, in spite of decreases of $83,897 or 13.2 per cent in maintenance of way and structures and $64,265 or 14.7 per cent in maintenance of equipment, on account of numerically greater increases of $223,686 or 7.1 per cent in transportation expenses and $71,884 or 11.8 per cent in general expenses.

The combined effect of decreased revenues and increased expenses was slightly lessened by a decrease of $7,200 or 1.4 per cent in taxes, but the operating income fell off $412 559 or 15 per cent. Moreover, other income decreased $29,533 or 14.1 per cent, so that the total loss in gross income amounted to $442,092 or 14.9 per cent. Income charges, consisting of rentals, interest on notes, etc., showed a small decrease, as did bond interest, but the net income suffered a loss of $410,789 or 50.8 per cent. After making a profit and loss charge of $550,000 for depreciation and other adjustments, the surplus as of June 30 amounted to $1,270,610. The depreciation reserve at the end of the year showed a balance of $75,507. During the year there was a decrease of $219,109 in the property accounts for sold or scrapped material, and additions and betterments were made to the extent of $180,734.

American Railways, Philadelphia, Pa.—The American Railways has sold to Newberger, Henderson & Loeb and Bioren & Company, Philadelphia, and Scott & Company, Wilmington, Del., $2,475,000 of its 5 per cent thirty-year bonds secured by the deposit as collateral of $1,675,000 first mortgage 5 per cent bonds of the Ohio Valley Electric Company, and $800,000 of 5 per cent bonds of the Consolidated Light & Power Company. These bonds of the controlled companies are guaranteed, principal and interest, by the American Railways. The American Railways has called for payment on Feb. 1, at 100½ and interest, $628,000 of the $2,300,000 of three-year 5 per cent notes issued on Feb. 1, 1916.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has been authorized by the Massachusetts Public Service Commission to issue $2,500,000 of coupon notes, bearing interest at 6 per cent, to pay for reconstruction of track equipment and betterments. The notes mature serially $357,000 on Dec. 1, 1917, and each year in like amount up to and including Dec. 1, 1922. On Dec. 1, 1923, the final $358,000 in notes mature.

Boston (Mass.) Elevated Railway.—The special commission investigating the finances of the Boston Elevated Railway gave a final hearing on Nov. 28. On this occasion the various relief measures proposed by the company were attacked, but some of the interests opposing an increase in fares, reduction in transfer privileges or abatement of taxes, favored the purchase of the Cambridge subway by the State or the city of Cambridge, subject to a thorough investigation of the transportation problem of the Boston district.

Cape Electric Tramways, Ltd., Cape Town, South Africa.—The profit and loss account of the Cape Town Electric Tramways, Ltd., on June 30, 1916, showed a profit of £72,497, and after providing for debenture interest and redemption of debentures and taking into account last year's balance, a net credit of £31,404 remained. The traffic receipts during the last year showed a small improvement, but this was more than offset by the higher cost of operation, including increased labor charges and war allowances. During the year the tramways carried 22,477,366 passengers as compared to 21,680,070 in 1915.

Consolidated Cities Light, Power & Traction Company, New York, N. Y.—Klemm & Keen and Brooke, Stokes & Company, Philadelphia, Pa., are offering $3,000,000 of the first lien 5 per cent gold bonds, due July 1, 1962, of the Consolidated Cities Light, Power & Traction Company heretofore owned by the Cities Service Company. In 1912, $7,000,000 of these bonds were sold in England, making the total amount of the issue $10,000,000. The bonds are secured by deposit with the Bankers Trust Company, trustee, of substantially all the common stocks and certain of the bonds of thirteen properties. The Cities Service Company subsequently acquired the equities of the Consolidated Cities Light, Power & Traction Company in these subsidiaries and guaranteed both the principal and interest of the first lien 5 per cent bonds. The bonds are being sold at 92½ to yield about 5½ per cent.

Fresno (Cal.) Interurban Railway.—The California Railroad Commission has authorized the Fresno Interurban Railway to issue $149,700 of first-mortgage 6 per cent twenty-five-year bonds, under its deed of trust to the Mercantile Trust Company, San Francisco. These bonds are to substitute other bonds heretofore authorized under another form of mortgage. The company is also authorized to issue $70,000 of these bonds, and 350 shares of stock of a par value of $35,000. The $70,000 of bonds are to be sold at not less than 80 per cent net, and the stock at the same rate. Both are to be issued so that the par value of the stock issued shall at all times be not less than 50 per cent of the bonds. The proceeds from stock and bonds are to go as follows: $49,597 for extending the company's railway line, $25,000 for a gasoline motor car and $10,000 for rights-of-way. The Fresno Interurban Railway has also been authorized to execute notes for $3,850 and $4 000 to pay deficits in operation of the company's line during construction and cost of materials in connection with the construction. The notes are to be for not more than two years at 8 per cent. The company has heretofore been authorized by the commission to issue 450 shares of stock at a par value of $100 a share, $149,700 of bonds and a note for $10,396. Its main line is 16 miles long.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—The Indianapolis Traction & Terminal Company has filed a petition with the Indiana Public Service Commission asking for approval of an issue of car trust certificates amounting to $125,000. The company proposes to pay

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$33,000 in cash on an order for twenty-five cars already placed, and issue the remainder of the purchase price in car trust certificates.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Judge Bird of the Jackson County Court, at Kansas City, Mo., on Nov. 29, discharged Jacques Harvey and I. D. Hook as receivers of the Kansas City, Clay County & St. Joseph Railway and turned the property over to J. R. Harrigan, general manager. This action followed the approval of a new appeal bond of the railway by the Supreme Court of Missouri in the suit against it by the Interstate Railway, which previously obtained a judgment of $1,500,000 against the company. The plaintiff had resisted the approval of the bond for a year. The Supreme Court recently declared that the bond supplied by the National Surety Company for $3,400,000 was insufficient, because the bond represented more than 10 per cent of the Surety Company's capital and surplus. A new bond for the same amount, filed as a result of this decision, had, in addition, the names of six leading bankers of Kansas City and St. Joseph. The appeal of the suit, in which judgment had been entered, will be heard in the April term by the Supreme Court.

Knoxville Railway & Light Company, Knoxville, Tenn.—The Knoxville Railway & Light Company has decided to pay off and discharge all of the consolidated mortgage 5 per cent gold bonds bearing numbers from 1 to 926 inclusive, and from 1751 to 3000 inclusive, on March 1, 1917, at 107½ on each $100, with interest accrued to March 1. The company has also elected to call and redeem all the two-year 6 per cent collateral notes of the company outstanding on Jan. 3, 1917, at 101½ and accrued interest for each $100.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Bodell & Company, Providence, R. I., are offering a block of Mahoning & Shenango Railway & Light Company 7 per cent cumulative preferred stock at a price close to par.

Metropolitan Street Railway, New York, N. Y.—Announcement is made of the termination of the agreement entered into under date of Dec. 10, 1907, by the stockholders of the Metropolitan Street Railway for their protection. The committee had a claim pending against the New York City Railway for breach of its guaranty with respect to the payment of dividends at 7 per cent per annum upon the stock of the Metropolitan Street Railway. This claim was finally allowed by the court as a general claim against the assets of the New York City Railway to the extent of $1.75 a share. The New York Railways, the successor to the Metropolitan Street Railway, offered to purchase the claim of the committee for cash at 45 per cent of $1.75 or 78¾ cents per share. Counsel for the committee reported that as other litigation was pending, it was not possible to determine accurately what dividend would ultimately be paid upon general claims, but that in their judgment the dividend would not be more than 45 per cent and might be materially less than that amount. Counsel for the committee also advised that adjustment would probably be subject to considerable further delay and advised that the committee accept the offer of the New York Railways. The chairman of the stockholders protective committee now announces that having exhausted all means of protecting the rights and interests of the participants the agreement entered into to conserve the interests of the stockholders has been terminated. A cash distribution of 85 cents for each share of the stock of the Metropolitan Street Railway deposited under the agreement is to be made in full liquidation of the interests of the holders. John I. Waterbury, chairman of the protective committee, says that the members of the committee will not accept any compensation for their service in the interest of the depositing stockholders.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—The Federal Court at Minneapolis has ordered the foreclosure of the mortgage securing an issue of $1,000,000 of first mortgage bonds of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company. The issue of $1,000,000 of bonds is pledged as collateral to secure an issue of $750,000 of three-year notes.

Seattle & Rainier Valley Railway, Seattle, Wash.—Frank P. Helsell, chief deputy prosecuting attorney of the State of Washington, has advised Fred J. Carver, attorney, that since the Seattle & Rainier Valley Railway is complying with the statutory provisions regulating such foreign corporations, the State has declined to institute *quo warranto* proceedings to oust the railroad, as requested by Mr. Carver. Mr. Helsell claims the lawyer was acting as creditor of the old Seattle, Renton & Southern Railway. Attorney Carver urged four grounds for bringing the proceedings; (1) That the new company was organized under the general corporation laws of Delaware, and by virtue of those laws was not permitted to do a street railway business within that State; (2) that the new company has issued bonds in excess of double the amount of the paid-up stock in violation of the Washington law; (3) that under the Delaware law, there is the same bond limitation; (4) that the bonds of the company were issued to an amount in excess of the assets received in exchange for them. Prosecutor Helsell states that in Delaware special incorporation laws govern companies doing a street railway business in that State, and that the fact that the Seattle & Rainier Valley Railway was incorporated under the general law does not, under the Washington statutes, exclude it from doing business in Washington. Helsell also asserted that the bond law, given as the second ground, had been repealed, and that even if a similar one existed in Delaware, it was not applicable to the local corporation. Replying to the fourth reason, Helsell said that the State was in possession of no facts that would justify an allegation that the amount of the company's bonds exceeded the assets received in exchange for the bonds.

Springfield Terminal Railway & Power Company, Springfield, Ohio.—The Springfield Terminal Railway & Power Company has been organized to succeed the Springfield, Troy & Piqua Railway. The management remains unchanged, except that F. J. Green, who has been vice-president and general manager, succeeds to the presidency. The company has authorized an issue of $350,000 of first mortgage 6 per cent serial gold bonds of 1916. These bonds will be used to fund floating indebtedness and constitute the new company's only indebtedness. Of the $350,000 of bonds $250,000, the portion outstanding, is now being offered for subscription by C. W. Anderson & Company, Chicago, at 101 and interest. The remaining bonds can be issued only for betterments and additions to the extent of 85 per cent of their cost.

Standard Gas & Electric Company, Chicago, Ill.—The directors of Standard Gas & Electric Company have declared a dividend of 1.5 per cent on the preferred stock for the quarter ending Nov. 30, payable on Dec. 15, to stockholders of record of Nov. 29. This is an increase of one-half of 1 per cent over the quarterly dividends recently paid.

Third Avenue Railway, New York, N. Y.—E. A. Manice has been elected a director of the Third Avenue Railway to succeed George W. Davison.

United Light & Railways Company, Grand Rapids, Mich.—William P. Bonbright & Company, New York, N. Y., are offering for subscription at 99 and accrued interest $1,500,000 of 6 per cent convertible gold debentures of the United Light & Railways Company dated Nov. 1, 1916, and due Nov. 1, 1926. The debentures are convertible at the option of the holder upon ten days' notice from Nov. 1, 1918, to Nov. 1, 1923, into 6 per cent preferred stock at the rate of $1,125 par value for each $1,000 par value debenture. The issue is callable in whole or in part upon thirty days' notice any time prior to Nov. 1, 1921, at 102 and interest and thereafter at 101 and interest. The debentures are in the denomination of $100, $500 and $1,000 registerable as to principal in all these denominations, but fully registerable only in the $1,000 denomination. The New York Transit Company is trustee of the issue.

Washington Water Power Company, Spokane, Wash.—The Farmers' Loan & Trust Company, New York, N. Y., trustee under the indenture securing the first and refunding mortgage 5 per cent bonds of the Washington Water Power Company, dated 1909 and due in 1939, has $35,000 to invest for the quarterly purchase of bonds for the sinking fund, and is advertising for proposals until Dec. 15.

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DIVIDENDS DECLARED

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent preferred.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Indianapolis (Ind.) Street Railway, 3 per cent.

Iowa Railway & Light Company, Cedar Rapids, Iowa, quarterly, 1¾ per cent; quarterly, 1¾ per cent, preferred.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

United Railways & Electric Company, Baltimore, Md., 2 per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE LINE RAILWAY, SANFORD, ME.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct., '16	$25,367	*$24,841	$526	.....	.....
1 " " '15	24,486	*24,452	34	.....	.....

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m., Oct., '16	$84,964	*$72,994	$11,970	$27,675	††$15,526
1 " " '15	81,178	*67,879	13,299	16,845	††3,382
4 " " '16	374,050	*296,935	77,115	110,906	††33,065
4 " " '15	352,785	*259,633	93,152	67,740	‡26,015

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Oct., '16	$307,437	*$187,470	$119,967	$42,863	$77,104
1 " " '15	272,152	*155,914	116,238	40,189	76,049
12 " " '16	3,461,301	*2,039,510	1,421,791	512,332	909,459
12 " " '15	3,076,070	*1,828,835	1,247,235	473,115	774,120

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Oct., '16	$1,458,380	*$807,437	$650,943	$419,085	$231,858
1 " " '15	1,245,866	*650,441	595,425	373,097	222,328
12 " " '16	16,518,224	*8,878,592	7,639,632	4,998,342	2,641,290
12 " " '15	14,173,088	*7,532,353	6,640,735	4,385,885	2,254,850

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m., Oct., '16	$812,160	*$682,222	$129,938	$96,174	‡$56,896
1 " " '15	711,184	*508,782	202,402	98,014	‡127,637
4 " " '16	3,502,968	*2,578,596	924,372	391,402	‡653,585
4 " " '15	3,067,969	*2,008,869	1,059,100	392,438	‡759,458

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Oct., '16	$271,636	*$160,412	$111,224	$63,665	$47,559
1 " " '15	222,456	*125,272	97,184	63,051	34,133
12 " " '16	2,911,182	*1,736,727	1,174,455	753,533	420,922
12 " " '15	2,430,418	*1,436,389	994,029	760,804	233,225

GRAND RAPIDS (MICH.) RAILWAY

1m., Oct., '16	$103,659	*$70,579	$33,080	$15,995	$17,085
1 " " '15	97,125	*71,592	25,533	14,061	11,472
12 " " '16	1,286,511	*838,788	447,723	178,555	269,168
12 " " '15	1,189,541	*826,024	363,517	164,353	199,164

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., Oct., '16	$72,302	*$19,895	$22,407	$15,166	$7,241
1 " " '15	63,932	*40,069	23,863	15,951	7,912
12 " " '16	793,677	*536,681	256,996	189,025	67,971
12 " " '15	722,203	*469,777	252,426	189,242	63,184

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Oct., '16	$265,999	*$127,095	$78,904	$41,474	$37,430
1 " " '15	189,636	*121,088	68,548	43,141	25,407
12 " " '16	2,355,769	*1,442,952	912,817	510,379	402,438
12 " " '15	2,135,656	*1,299,749	835,907	497,717	338,190

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., Oct., '16	$60,133	*$48,738	$11,395	$$5,943	‡$6,710
1 " " '15	45,190	*40,898	4,292	$4,495	‡1,129
4 " " '16	206,894	*184,312	22,582	$25,795	‡1,013
4 " " '15	170,076	*166,354	3,722	$25,038	††14,412

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Oct., '16	$2,417,096	$1,380,594	$1,086,502	$814,450	$272,052
1 " " '15	2,219,105	1,232,080	987,025	816,615	170,410
4 " " '16	9,007,921	4,986,327	4,021,594	3,259,138	762,456
4 " " '15	8,066,753	4,530,010	3,536,743	3,264,763	271,960

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., Oct., '16	$478,522	*$363,881	$114,641	$120,714	‡$21,388
1 " " '15	439,590	*342,111	97,479	120,284	‡4,630
4 " " '16	2,151,092	*1,468,416	682,676	482,832	‡232,127
4 " " '15	1,898,150	*1,363,844	534,306	481,673	‡84,313

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m., Oct., '16	$15,739	*$17,483	†$1,684	$1,893	††$3,554
1 " " '15	22,249	*21,720	529	1,606	††1,049
4 " " '16	78,373	*81,561	†3,188	7,436	††10,519
4 " " '15	96,381	*87,792	8,589	6,393	‡2,315

*Includes taxes. †Deficit. ‡Includes non-operating income. §Excludes interest on bonds, charged income and paid by the New York, New Haven & Hartford Railroad under guarantee, also interest on notes held by the New York, New Haven & Hartford Railroad, not credited to income of that company.

Traffic and Transportation

CROSSING SAFETY CONSIDERED

Commission, Electric Railway and Automobile Representatives Confer at Rochester, N. Y., on Safety Measures

On Nov. 28 the Public Service Commission for the Second District of New York met at the Powers Hotel, Rochester, with the executive and sub-committees appointed some time ago from among representatives of automobile clubs and electric railway officials to consider greater safety at grade crossings of electric railways and highways. Among the outstanding conclusions arrived at during the conference were the following:

Obstructions which prevent the observance of an approach of an electric train at grade crossings should be removed or diminished.

Character of crossings should determine whether obstructions should be removed or diminished.

Obstructions on railroad property should be removed at the expense of the railroads.

Obstructions on public highways should be removed at the expense of the public authorities.

Obstructions upon private property should be removed upon recommendation of the joint committee, and if they cannot agree the Public Service Commission shall decide.

Data should be acquired on the character of grade crossings for 1000 ft. along the tracks and 200 ft. along the highway at all crossings.

Automobile horns should be standardized.

Devices on trolley cars and automobiles for signaling are as effective as the present condition of the art of signaling affords.

Trolley car whistles and automobile horns should have distinct sounds.

Trolley car motormen should be required to sound their whistles beginning 1000 ft. from a grade crossing, and keeping it up until the head car is not less than 300 ft. from the crossing.

Headlights should be used at night, if possible in conjunction with a reflecting device, at grade crossings.

Uniform signaling devices for automobiles and trolley cars should be adopted.

A large stationary distance marker should be adopted. It should read: "Railroad Crossing 500 ft. Ahead," and the Public Service Commission should use arrows on the signs in its discretion.

Fifteen miles an hour should be adopted as a maximum speed at which an automobile should cross a grade crossing.

One of the most discussed proposals was that for establishing a 15 m.p.h. minimum for autoists crossing tracks at grade. At the morning session Charles R. Barnes, electric railway inspector for the Public Service Commission, made a report in which he said that after all contrivances for safety have been used the personal equation still was a factor that was of primary importance.

It is possible that the commission may ask the Legislature for additional power to meet the recommendations adopted as the result of the study carried on by the committees and by the commission. At present the commission has power to order the elimination of steam railroad grade crossings, and can make certain regulations for the operation of trains for greater safety at grade crossings, but aside from actual elimination the commission has no power over surrounding highway conditions to enforce greater safety at grade crossings. While the commission has power to make regulations for the operation of electric cars and trains at grade crossings, it has no control over other surrounding highway conditions. In the case of electric railways there is no provision of law for the elimination of grade crossings, and it is not likely that such provision could be made at this time. If, as seems likely, the commission asks for the power to control the surroundings of steam railroad grade crossings, members of the committtees with which the commission has been working have advocated the same power for electric railways.

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PORTLAND JITNEYS DIE HARD

Operators Take Advantage of Technicality in Law to Operate at Regular "For Hire" Prices

The action of the City Council of Portland, Ore., in requiring jitneys in that city to operate under franchise has resulted in jitney drivers running their cars as taxicabs through a technicality in the "for-hire" license ordinance. Under this plan the jitneys operate anywhere in the city at regular "for-hire" prices, but specialize in service over certain streets for a 5-cent fare. Where there were routes before the jitney franchise ordinance went into effect there are zones now. The zones have been printed in black and white and posted in every machine. There are concentration points in the lower business districts, and from these points cars are dispatched to the different zones by men in charge of the work.

City Attorney La Roche, in his interpretation of the ordinance under which the former jitneys are operating, stated that machines operating under this ordinance were not compelled to have a fixed standing place, and that the maximum fare charged for any certain zone and for the hour must be filed with the Department of Public Utilities, as well as posted inside and out of the car. In releasing two taxi-jitney drivers in the Municipal Court recently who were charged with having operated without a franchise and without having had their speedometers inspected Judge Langguth of the Municipal Court said:

"Operation of the machines under the present law may be an evasion on the part of the drivers, but this court cannot read anything into the law. I want to warn the members of the Chauffeurs' Union that if they intend to operate under this law they must comply with it in every term. I am not going to show favors on either side, and it will be for the drivers to carry out their part of the contract."

An appeal from the action of Commissioner Daly of the Department of Public Utilities in approving the "zone system" of the taxi-jits and issuing certificates for licenses for the operation of the machines has been filed with the City Council. The appeal is based on the ground that the schedule of zones and rates for service are not clear or distinct or easily understood; that the uniform method of fixing rates has not been followed; that a uniform zone system has not been established and that the schedule of rates is not made according to time consumed in serving a zone or the distance traveled as required in the taxicab and "for-hire" ordinance. The petitioners ask that all the actions of Commissioner Daly in approving the applications and issuing certificates for the issuance of licenses for the operation of the taxi-jits be rescinded by the Council. It is asserted that only the individuals residing within one of the zones served by the machines have advantage of a 5-cent fare, while all other residents of the city have to pay for the hire of such machines on an hourly basis, which is claimed to be discriminatory and unfair.

R. A. Leiter, counsel for the Portland Railway, Light & Power Company, appeared before the Council in behalf of the petitioners with the statement that the appeal had been filed in accordance with a provision of the taxicab ordinance which permits an applicant who has been denied a license for the operation of a machine by the Department of Public Utilities to appeal to the City Council.

Commissioner Daly said that he had not had sufficient time in which to go into the petition, and asked that the matter be postponed for a week, at which time he will make a report on the application. He also stated that his report covering the granting of reasonable franchises to jitneys will be ready for the consideration of the Council at an early date.

With the recent decision of Municipal Judge Langguth that the taxi-jits have a right to operate under the taxicab and "for-hire" ordinance, providing they comply with all the regulations, further molestation of the operation of the machines will be deferred until additional legislation is enacted by the Council. Unofficial reports place the number of taxi-jits in operation at 200.

The various applications for franchises to operate jitneys in Portland were to be considered by the Council on Dec. 7, when Commissioner Daly planned to have the proposed zone system for taxicabs ready for presentation to the Council.

ANOTHER JITNEY DECISION IN PENNSYLVANIA

Certificates to Jitneys Will Be Granted Only When Owners Demonstrate They Can Furnish Satisfactory Service

Jitneys are common carriers within the meaning of the Pennsylvania Public Service law and can only be operated when their owners have obtained certificates of public convenience from the Public Service Commission, which will grant authority to operate only when applicants for certificates show that they have safe and adequate vehicles. This in substance is the ruling of the commission in a decision rendered on Dec. 6. The opinion was written by Chairman Ainey and refuses a certificate to Peter Graco, against whose operation of a jitney the Allegheny Valley Street Railway had filed a protest.

The opinion is the first in which the commission has taken a stand against jitneys not of sufficient size to meet demands of traffic. It lays down rules, and under the decision will come probably a score or more of jitney operators in western Pennsylvania who have been complained against, while the case will furnish a precedent in other cases which may be brought. The opinion says:

"It is clearly apparent from the evidence that their automobiles were frequently and dangerously overloaded; some times as many as sixteen passengers were permitted to ride in automobiles with seating capacity for four or five persons. Passengers were at times seated on the doors or mudguard of the cars or permitted to stand on the running board, and others were crowded within the automobile. Not infrequently passengers were permitted to be crowded beside the driver in the space calculated for but one passenger."

It is also pointed out that the street railway lost money through this unrestricted competition, and after quoting numerous decisions the opinion says:

"The conclusion is irresistible that the professions and the conduct of the said respondent and all the circumstances involved in the jitney business in which he is engaged, constitute him a common carrier of passengers. . . . We may not properly permit individuals to engage in public service unless the safety of the public is reasonably assured and until we have determined that the proposed service is necessary or proper for the convenience, accommodation or safety of the public. . . . Even though we were convinced as we are not that the street railway is not furnishing adequate service and that automobile transportation is necessary for the convenience of the public, this applicant has failed to show that the five passenger automobile is of sufficient size or of proper form of construction to meet any public demand for transportation convenience. If there be any necessity whatever in this locality it is surely one requiring a larger automobile and better arrangements for public service than the one he offers. This and the allied cases must be disposed of on the broad ground of public necessity."

In an opinion by Chairman Ainey of the commission on Dec. 7, in the case of the Wilkes-Barre Railway against Walter J. Parsons for operating a jitney bus from Wilkes-Barre to points beyond the limits of the city, the Public Service Commission holds that the act of 1915 giving cities the right to regulate the operation of motor vehicles in no wise restricts the Public Service Company law with reference to the requirement as to the issuance of certificates of public convenience, preceding the beginning of the exercise of the rights to operate automobiles as common carriers. The commission orders that the respondent, Walter J. Parsons, his agents, servants and employees cease from carrying on the public service mentioned until he shall have obtained a certificate of public convenience.

ILLINOIS TRACTION WINS FARE CASE

The Interstate Commerce Commission on Dec. 4 approved an increase by the Illinois Traction Company, Peoria, Ill., of the fare between St. Louis, Mo., and Venice, Madison and Granite City, Ill., from 5 to 10 cents. This action nullifies a provision of the franchise under which the St. Louis Electric Terminal Railway, the local end of the Illinois Traction System at St. Louis, obtained the use of St. Louis streets. The franchise bill, signed on April 6, 1907, provided that the fare to be charged from St. Louis to Granite City, across the McKinley Bridge, should be 5 cents. This

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was accepted by the company, and the 5-cent fare has been charged since the bridge was opened to traffic in November, 1910. The unofficial report of the finding of the commission says that the commission held that the St. Louis Electric Terminal Railway is a common carrier, and as such is subject to the commission's jurisdiction. It was also held by the commission that interstate fares, when prescribed by a municipal ordinance, are not conclusively presumed to be reasonable, even if accepted by the carrier as one of the conditions of a franchise. The proposed issuance of commutation tickets, valid only during certain rush hours, was tentatively approved. The main argument before the commission in the case was summarized in the ELECTRIC RAILWAY JOURNAL of Nov. 4, page 995.

Accident Talks in New Albany Schools.—Mrs. Minnie Riddle of the safety department of the Louisville & Southern Indiana Traction Company, New Albany, Ind., and allied lines, is delivering talks on accident prevention in the public schools of New Albany. Mrs. Riddle recently completed a campaign of education in the public schools of Chicago.

New York Subway Record Broken.—All records for subway traffic in New York were broken on Nov. 20, when 1,400,747 passengers were carried on the various branches of the underground system of the Interborough Rapid Transit Company between 12.01 a. m. and 11.59 p. m. The capacity of the subway as designed originally was 600,000 passengers daily.

Employees Requested to Take Their Paper Home.—At the top of the cover of the United Railways Bulletin for November, published monthly for distribution among the employees of the United Railways, St. Louis, Mo., was stamped the following: "Take the Bulletin home. There are things in the paper which will be interesting to your wife and children."

Detroit Rerouting Grants Allowed.—The Common Council of Detroit, Mich., has adopted the report of the joint committees on public utilities and traffic and police regulations to the end that rerouting of cars within the heart of the city may be accomplished. By the adoption of the report and the accompanying resolution the Detroit United Railway is authorized to construct several curves and other pieces of special track work, as well as some straight track, all necessary to move the cars and loop them differently than is possible by the existing tracks. The company intends to proceed with all possible speed to install the tracks.

Near-Side Stops and Prepayment Operation in Walla Walla.—On Nov. 20 the Pacific Power & Light Company, operating the railway system in Walla Walla, Wash., through the Walla Walla Valley Railway, began the operation of the near-side stop, with the prepayment method of fare collection. While the near-side stop will be general in its application, it will not prevail under all conditions. The company explained these exceptions to its patrons in advance. Fares are taken as passengers enter cars, except at terminals, where passengers are permitted to enter cars while the carmen are preparing for the return trip. The changes were brought to the attention of patrons by printed leaflets distributed in the cars. The company closed its notice to its patrons with a number of maxims, such as: "Safety First," "Alight Facing Forward," "Wait Until Car Stops," "Safety Always."

Extension in Burlington County Fare Case.—The case of the Burlington County Transit Company, Hainesport, N. J., charged with increasing fares on its line between Burlington and Moorestown and Mount Holly without having made improvements which were ordered by the State Public Utility Commission, was before the commission recently. The company received a certain time to show that it had made the improvements promised. The company's representative convinced the commission that the delay in securing new cars and getting material for repairs was due to trade conditions, and was not the result of any negligence on the part of the company. The promise was made that these improvements would be made at an early date, and in accepting this statement the commission granted another extension to Jan. 9, at which time, if the company has not made the alterations, the increase of fare will be automatically prohibited.

Company to Operate Under Long Beach Jitney Franchise.—The Long Beach Transportation Company, a corporation with a capital stock of $50,000, has been formed by the individuals who recently purchased a ten-year jitney franchise at Long Beach, Cal. The purchase price was $6,600, and 3 per cent of the gross receipts are to be paid each year to the city during the ten-year period. Fifteen buses, built in the Ford shops at Long Beach at an approximate cost of $10,050, will be put in service about Dec. 15. Two routes will be covered, each extending about 2½ miles from the down-town terminus, and transfers will be issued between the two lines. The maximum fare will be 5 cents, with half-fare rates for public school children and free transportation to officials and postmen. A ten-minute service will be in operation from 6 a. m. to 7 a. m., a five-minute service from 7 a. m. to 8 p. m., and a ten-minute service from 8 p. m. until midnight. R. S. Julian has been elected president and general manager of the corporation, with F. H. Church as secretary and assistant general manager.

Company Writing Jitney Insurance Disbarred.—The jitney business in Seattle, Wash., and other large cities in the State has been imperiled by a ruling of State Insurance Commissioner Fishback, who announces that the Casualty Company of America, practically the only company issuing the $2,000 bond for jitneys required by the State, has been debarred from writing insurance in Washington. The Casualty Company of America, which recently absorbed the Pacific Coast Casualty Company, has furnished nine-tenths of the jitney operators with their bonds. Other companies have bonded a few of the motorbus men, but the jitney drivers have found it difficult to obtain bonds anywhere except from this company. The Casualty Company of America's stock is said to be impaired to the amount of $650,000, and until its affairs are in a condition satisfactory to the State Insurance Commissioner, it will not be allowed to do business in the State. The company was allowed until Dec. 4 to adjust its finances. The insurance rate on the $2,000 jitney bonds was raised recently from $175 to $250.

School Children's Fares Discriminatory.—The Railroad Commission of California has rendered its opinion on the application of certain citizens for an order requiring the San Francisco-Oakland Terminal Railways, Oakland, to grant a rate of one-half the regular fare of 5 cents for children attending the public schools, and has reached the following conclusion: "A class of persons cannot be given a special rate when the only distinguishing characteristic of the class is the purpose for which the people in the class are traveling. The service performed by carriers in transporting children attending public schools is the same as that in transporting other children and other persons, the only distinguishing characteristic, as shown by the pleadings and evidence herein, is the purpose for which these children are being transported. This distinguishing characteristic cannot warrant the commission in making a special rate in such cases." On Nov. 16 the applicants for the special rate for school children petitioned the Railroad Commission for a rehearing. This application was denied by the commission the following day.

Commission Transfer Order Set Aside.—An order of the Board of Public Utility Commissioners of New Jersey, made at the request of Bradley Beach, after a hearing directing the Atlantic Coast Electric Railway to issue transfers to its patrons in Asbury Park and Bradley Beach, was set aside on Dec. 1 by the Supreme Court of New Jersey in an opinion handed down by Justice Trenchard. The company operates an electric railway from the junction of Main Street and Cookman Avenue, Asbury Park, southerly through other municipalities and Bradley Beach to Belmar. In the syllabus of his opinion for the court Justice Trenchard said: "When a traction company organized under the general traction act of 1893 obtains from a municipality an ordinance granting a location of street railway tracks, and accepts the same, a regulation of rates of fares contained therein, if lawful and reasonable, constitutes a contract between the company and the municipality which, during the life of the franchise, remains inviolable, and it is incompetent for the Board of Public Utility Commissioners to impose upon the company an additional burden in violation of such contract respecting fares."

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Personal Mention

John Harvey, an inspector of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been promoted to a new assistant superintendency with the company.

C. F. Franklin has resigned as superintendent and purchasing agent of the Winona Interurban Railway, Warsaw, Ind., effective on Jan. 1. No successor to Mr. Franklin has been named.

W. D. Frazer, who retires as general manager of the Winona Interurban Railway, Warsaw, Ind., on Feb. 1 will continue to serve as vice-president of the company and will act as counsel for the receiver.

W. J. Fillmore has been appointed acting superintendent of the Elgin & Belvidere Electric Company, Marengo, Ill., during the absence of L. H. Moss, who is spending a number of months in the East.

J. C. Schade, who has been assistant secretary and assistant treasurer of the Winona Interurban Railway, Warsaw, Ind., has been named general manager under C. J. Munton, the receiver. He will assume his duties on Feb. 1.

Fred J. Green, who has been vice-president and general manager of the Springfield, Troy & Piqua Railway, Springfield, Ohio, has been elected president of the Springfield Terminal Railway & Power Company, organized as the successor company, as noted elsewhere in this issue.

J. W. Osborn, for five years master mechanic of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., now the Chicago, North Shore & Milwaukee Railroad, has resigned. Previous to his service as master mechanic he was assistant electrical engineer on the same property for five years.

Joseph F. Collins, chief inspector of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been promoted to the position of division superintendent of a new division of the company, to be known as the Mahoning Valley division, comprising the main line from New Castle to Warren, the lines to Mineral Ridge and Leavittsburg and the Warren City line.

Trevor C. Neilson, assistant claim adjuster of the Columbus Railway, Power & Light Company, Columbus, Ohio, has been appointed claim agent of the East St. Louis & Suburban Railway and related properties, with headquarters at East St. Louis, Ill. Prior to his acceptance of the position of assistant claim adjuster of the Columbus Railway, Power & Light Company in 1914, Mr. Neilson was in the service of the operating and claims department of the United Railroads, San Francisco, Cal., for six years. Mr. Neilson was born abroad and is an attorney by profession.

W. M. Acworth, the well-known English economist and railroad expert, is expected to arrive in Canada about Dec. 15 to sit as the English member of the commission appointed by the Dominion Government to inquire into the railway situation in Canada. Mr. Acworth has visited the North American continent several times and represented the British Government at the International Railway Congress at Washington, D. C., in 1905. While he was in Washington at that time Mr. Acworth gave evidence on English railway law and practice before the Elkins committee of the United States Senate. He also appeared before the Hadley commission on railway operation in 1911. He is a director of the London Underground Railway and London United Tramways.

Edwin K. Morse has been named as transit commissioner of Pittsburgh, Pa., by Mayor Joseph G. Armstrong, as noted briefly in the ELECTRIC RAILWAY JOURNAL of Nov. 25, page 1126. Mr. Morse has studied the subject of transportation in Pittsburgh for about eight years. He has been connected as consulting engineer with the Pittsburgh Subway Company, which has been unsuccessful in obtaining an ordinance for the construction of a subway in the city with private money and private ownership. He was associated for twelve years with the Jones & Laughlin Steel Company as consulting engineer in the reconstruction of the Eliza furnaces and its rolling mills. He designed and superintended the foundations for all the hot metal bridges for the Carnegie Steel Company and that company's railroad bridge across the Allegheny River on the road to the lakes. He has in the past been connected as consulting engineer with the city of Pittsburgh. The object of Mr. Morse's study as transit commissioner will be to devise ways and means of relieving the abnormal congestion in the downtown business section of the city of Pittsburgh, where owing to the Allegheny and Monongahela Rivers on two sides and the so-called "hump" on the third side of the small triangle representing less than 225 acres of ground, is one of the most congested business sections in the world, and one that can never be changed geographically or topographically. Mr. Morse will also take up and study the question of relief by subway and report to the Mayor and the Council within one year from Nov. 6, the time of his appointment.

James D. Callery has resigned the presidency of the Pittsburgh (Pa.) Railways. He will continue to serve the company as chairman of the board of directors. The vacancy caused by the resignation of Mr. Callery will be filled by Sumner L. Tone, now vice-president of the Duquesne Light Company, one of the subsidiaries of the Philadelphia company, of which the Pittsburgh Railways also is a part. Mr. Callery's resignation will go into effect on Jan. 1, 1917. He has just purchased a seat on the New York Stock Exchange, and will associate himself with N. K. McMullin in the brokerage business. Mr. Callery was born in Pittsburgh on Nov. 11, 1857. He began his business career with his father in the leather manufacturing business. Mr. Callery's father, the late James Callery, founded the Pittsburgh & Western Railroad and was interested in the first horse-car line established in Pittsburgh. In 1889, when president of the Second Avenue railway in Pittsburgh, James D. Callery decided upon a change in motive power of the railway to electricity, and the Second Avenue line was the first in Pittsburgh proper to be operated successfully by that power. In 1902 Mr. Callery was elected president of the consolidated street railways of Pittsburgh, known as the Pittsburgh Railways. Mr. Callery is a vice-president of the Philadelphia Company and of its subsidiary companies, is president of the United Traction, the Southern Traction Company, the Allegheny Light Company, the Pittsburgh Railways and subsidiary companies, and vice-president of the Consolidated Gas Company, Pittsburgh. In addition to these offices he is a director of the Colonial Trust Company and the Diamond National Bank, Pittsburgh, the Westinghouse Electric & Manufacturing Company, the Westinghouse Machine Company, and the United Railways Investment Company.

OBITUARY

James Phair, superintendent and master mechanic of the Manitowoc & Northern Traction Company, Manitowac, Wis., since the line was built twelve years ago, died on Nov. 17. He had been ill for more than two years.

Millard F. Thompson, Carlisle, Pa., died on Dec. 1 from a stroke sustained some weeks ago. He was sixty-seven years old. Mr. Thompson was interested in railway work throughout Pennsylvania and was secretary-treasurer of the Carbondale Traction Company from 1892 to 1896. He was also secretary-treasurer of the Jeannette & Pittsburgh Street Railway and the Greensburg & Mt. Pleasant Railway and president of the Pennsylvania & Western Railroad.

Josiah Quincy Bennett, who was identified with the supply of power to the first electric railway service operated in Massachusetts, by the West End Street Railway, in Cambridge, Mass., died at his residence in that city Nov. 29, at the age of sixty-two. He was president of the Cambridge Electric Light Company, of the Weymouth Light & Power Company, Athol Gas & Electric Company, and other utilities in the central station field, and was a director in various industrial organizations. He is survived by his widow, three sons, and one daughter, who is the wife of Ralph M. Sparks, general passenger agent of the Bay State Street Railway.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

FRANCHISES

New York, N. Y.—In a report by the Bureau of Franchises, upon the application of the Union Railway Company for permission to construct, maintain and operate an extension from a connection with the existing tracks of the company in West 207th Street or Emerson Street southerly along Vermilyea Avenue to Dyckman Street and westerly along Dyckman Street to Hudson River, Harry P. Nichols, Chief of the Bureau, recommends that the petition of the company be denied but that the company be informed that the Board of Estimate and Apportionment will favorably consider a petition for an extension on Amsterdam and Nagles Avenues and Dyckman Street from 207th Street to the Dyckman Street Ferry, provided the company will stipulate to accept a contract providing for the use of the overhead system of electricity on Dyckman Street during the first five years of the grant and at the end of such term to substitute therefor the underground system.

Columbus, Ohio.—The Columbus Railway, Power & Light Company has received a franchise from the Council to construct and operate a double-track line on East Eleventh Avenue, from Fourth Street to Field Avenue, opposite the east entrance to the State Fair Ground. By the terms of the franchise the company is to pay one-half the city's portion of the cost of the Eleventh Avenue subway under which the track will run. This will be approximately $20,000. The new line will complete a loop connecting the Cleveland Avenue and Fourth Street lines.

Pemberville, Ohio.—The Toledo, Fostoria & Findlay Railway has received a franchise from the City Council to maintain and operate the line formerly operated by the Lake Erie, Bowling Green & Napoleon Railway on Front Street, from the westerly boundary line of the village of Pemberville to a point on Bierly Avenue where the line connects with the Toledo, Fostoria & Findlay Railway.

San Angelo, Tex.—The franchise recently granted by the City Council to the Interstate Electric Corporation of New York for operating a street railway system in San Angelo has been confirmed by the voters.

Vancouver, Wash.—The City Council of Vancouver has refused to grant the Portland Railway, Light & Power Company a franchise on First Street to enable it to make a loop about its property and return onto the Interstate Bridge.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—The city of Calgary has purchased 30 tons of 80-lb. rail from the city of Lethbridge for the construction of ½ mile of single track to connect with the north section of the city over the new Center Street bridge. The opening of this route will save a mile ride between the two outside sections of the city as compared with the present route via West Calgary.

Pacific Electric Railway, Los Angeles, Cal.—Elevation of the Monrovia line of the Pacific Electric Railway from a point between the Selig Zoo and the bridge over Mission Road, to clear the streets at Rose Hill, was ordered in a communication recently approved by the Board of Public Utilities for transmission to the Los Angeles City Council. The streets over which the company will be required to elevate its tracks, if the order is approved by the Council, are Mission Road, Turquoise, Tourmaline, Topaz and Ruby, about 1 mile.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has completed the construction of an extension from Stow to Diablo, 1.36 miles.

Castro Point Railway & Terminal Company, Richmond, Cal.—The Castro Point Railway & Terminal Company has filed with the Railroad Commission of California an application for authority to issue $89,000 of its capital stock, $45,153 to discharge obligations, and the remainder to continue the construction of its line and facilities. The commission last June authorized the issue of these shares when the company should prove to the commission that it had completed a substantial unit of its proposed line. The application says that the company has built a line of single track 1500 ft. in length connecting the San Francisco-Oakland Terminal Railways in Richmond to a wharf which the company has leased to Charles Van Damme. This track permits the street cars of the railway to run to and on the wharf, connecting with the ferry service maintained by the Richmond and Point San Quentin in Marin County. The company states that the cost of construction of its lines to Nov. 1, 1916, was $64,569.

Tidewater Southern Company, Stockton, Cal.—This company has filed a new application with the Railroad Commission of California for authority to construct an extension from Hatch to Irwin City. Engineer Lindsay of the Tidewater Southern Company states, regarding the matter of the road withdrawing its application for the extension and immediately filing a new one, that the action was taken for the purpose of correcting some technical omissions. The extension of the road to Irwin City will be carried out according to original plans. Under date of Nov. 9, Byron A. Bearce, president of the company, in a letter to A. G. Chatham of Turlock, stated that work on the extension from Hatch to Irwin City would begin within a week after the right-of-way has been secured. There are two applications pending before the Railroad Commission. One asks permission to take up the tracks on Sharp's Lane, and the other applies for the right to dispose of 600 shares of stock. If the petitions are granted, the road will issue $600,000 in stock for the purpose of electrifying the road from Modesto to Turlock, and to build the extension to Irwin City, and for the purchase of two passenger coaches and two additional freight motors. Mr. Bearce also states that the stock is now practically sold, and the money is in San Francisco, awaiting the action of the commission on the application.

Shelbyville & Frankfort Realty Company, Shelbyville, Ky.—C. E. Coon, president of the C. E. Coon Company, McConnellsville, Pa., has just completed an inspection of the proposed rights-of-way between Frankfort and Shelbyville over which it is proposed to construct an electric railway to connect with the Louisville Interurban Railway and the Kentucky Traction Company lines. The promoters have agreed to provide Mr. Coon with the rights-of-way and the survey, provided he will build and equip the line and put it into operation. [June 10, 1916.]

Winnipeg (Man.) Electric Railway.—It is reported that the Winnipeg Electric Railway plans to construct a direct electric line to Transcona.

Norwood, Canton & Sharon Street Railway, Canton, Mass.—The Selectmen of Norwood have granted a petition of the Norwood, Canton & Sharon Street Railway, the Norwood Electric Light Department and the New England Telephone & Telegraph Company for the right to construct a new pole line to be used jointly by these companies in Norwood.

Manchester Traction & Light Company, Manchester, N. H.—Steps have been taken by the Manchester Traction & Light Company for the construction of a new dam at Gregg's Falls, 20 ft. below the old dam.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has received bids for the construction of the connecting link between the New Utrecht Avenue (West End) line and the Culver line, in Brooklyn. The connection is to be a three-track approach from the West End line to the Culver line, about 600 ft. long, rising from the Thirty-eighth Street cut at the point where the West End line leaves that cut, slightly west of Tenth Avenue and south of Thirty-seventh Street. The approach, curving to the northeast across Tenth Avenue, rises to the elevated grade of the Culver line at a point about 371 ft. east of Tenth Avenue. The low bidder on the contract was Thomas Dwyer of Broadway and 215th Street, New York City, and his price for the work was $42,268.

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International Railway, Buffalo, N. Y.—The village board of Lancaster has asked the International Railway to double-track its Buffalo, Depew & Lancaster division to handle the increasing traffic over this surburban line. The village has also asked for additional car service during the rush hours. A number of large industries are located in Depew and the traffic on this division has greatly increased within the last two years.

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received by the Public Service Commission for the First District of New York, 120 Broadway, New York, until Dec. 14 for the installation of cable-feed pipes for part of the Seventh Avenue-Lexington Avenue line.

Niagara River & Eastern Railway, Niagara Falls, N. Y.—The stockholders of the Niagara River & Eastern Railway have authorized the directors to renew their application to the Public Service Commission for the Second District of New York for permission to construct a double-track electric line from Lockport, N. Y., to the Devil's Hole, near Niagara Falls, N. Y. [March 18, '16.]

Piedmont & Northern Railway, Charlotte, N. C.—A survey has been made by the Piedmont & Northern Railway for an extension from Gastonia to Kings Mountain. This is a section of the line to be built to complete the gap between Gastonia and Spartanburg.

Stark Electric Railroad, Alliance, Ohio.—This company reports that during 1917 it expects to construct a line between Alliance and Marlboro, 6 miles.

Cleveland, Akron & Canton Terminal Railway, Cleveland, Ohio.—J. J. Breitinger, who is associated with O. C. Barber of Barberton in the plan for constructing an electrically operated subway under East Fifty-fifth Street, Cleveland, stated recently that work on the improvement will be begun in the spring. [Aug. 28, '15.]

***Dayton, Ohio.**—It is reported that Will I. Ohmer, president of the Recording & Computating Machines Company, contemplates the construction of an electric railway from the center of the city to the factory of the company.

***Tiffin, Ohio.**—Plans are under consideration for the construction of an electric railway from Gibsonburg to Tiffin, via Helena, Millersville, Burgoon, Bettsville and Maple Grove, and from Tiffin to Marion, via McCutcheonville, Upper Sandusky and Harpster. Owen A. Charles, secretary of Chamber of Commerce, Tiffin, is reported interested.

Brantford & Hamilton Electric Railway, Brantford, Ont.—This company is constructing a 1500-ft. extension from Market Street, the present terminus of the company's line in Brantford, to the Lake Erie & Northern Railway station.

Brantford (Ont.) Municipal Railway.—An extension is being built by the Brantford Municipal Railway on Morrall Street, Brantford.

Port Arthur (Ont.) Civic Railway.—The Port Arthur Civic Railway will resurface the tracks on Cumberland Street from McVicar to Arthur Street and will replace the present rail joints with 100-lb. joints.

Northwestern Pennsylvania Railway, Meadville, Pa.—Construction has been completed on this company's new line from Cambridge View to Venango, 3½ miles. The new line replaces about 3 miles of track between Cambridge Springs and Venango, which will be abandoned.

Houston, Richmond & Western Traction Company, Houston, Tex.—It is reported that contracts for supplies and equipment will be let by the Houston, Richmond & Western Traction Company some time in February or March, 1917, for its proposed line between San Antonio and Houston. Ed Kennedy, Houston, purchasing agent. [Nov. 11, '16.]

Ogden, Logan & Idaho Railway, Ogden, Utah.—A report from the Ogden, Logan & Idaho Railway states that the company is constructing 9 miles of line south from Kent.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—Material has been received, and work will soon be begun by this company on the double-tracking of its line between Farmington and Riverdale, 5 miles.

Blue Ridge Light & Power Company, Staunton, Va.—This company proposes to construct an extension in Staunton.

SHOPS AND BUILDINGS

Visalia Electric Railroad, Exeter, Cal.—Plans are being made by the Visalia Electric Railroad to construct a modern passenger station and freight station at the end of its El Mirador extension.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company has purchased the Federal League Ball Park in Indianapolis, comprising about seven acres of ground within a few blocks of the central business district of the city to be used as a site for new interurban freight terminals for all interurban lines entering Indianapolis. The work of removing the grandstands and other structures on the ground will commence at once, and plans are now being made for the new buildings to be erected by the Terre Haute, Indianapolis & Eastern Traction Company. The work on the new buildings will probably commence in the spring of next year.

Kansas City (Mo.) Railways.—It is reported that five of the eleven carhouses of the Kansas City Railways will be abandoned. These five will be merged with the six larger divisions that are to remain. This change is to be made so that the system may be centralized more. The carhouses which will be maintained will be remodeled and recreation and rest rooms provided.

Northern Ohio Traction & Light Company, Akron, Ohio.—The substation, transformers and carhouse, including eight cars, of the Northern Ohio Traction & Light Company, at Massillon, were recently destroyed by fire, causing a loss of about $50,000.

Rhode Island Company, Providence, R. I.—This company will abandon its present headquarters at the Union Station and move to the corner of Fountain and Mathewson Streets as soon as the three-story Palmer block can be increased to seven stories. It is expected that the block will be finished next July.

POWER HOUSES AND SUBSTATIONS

Albany (N. Y.) Southern Railroad.—Preparations are being made by the Albany Southern Railroad to extend its electric transmission line from Brainard into the town of New Lebanon, where the company has recently been granted a franchise.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Orders have been placed by Eli M. West, receiver for the Columbus, Delaware & Marion Railway Company, for new equipment for the Marion and Stratford power plants and the Prospect substation, to cost about $27,000. Contracts have been placed for copper wire and transformers amounting to about $6,000, for the local lighting system. The equipment for the Marion power plant will consist of a 750-kva. frequency changer set, one 50-kw. motor-driven exciter set, three switchboard panels, and one voltage regulator. Three 220-kw. transformers, which the company has in stock, will also be installed. At the Stratford plant one 425-hp. Heine boiler and smokestack and one 3000-gal.-per-minute turbine-driven centrifugal circulating pump will be installed. Three 100-kw. transformers will be placed in the Prospect sub-station.

Toledo Railways & Light Company, Toledo, Ohio.—Work on the proposed new central electric generating station of the Toledo Railways & Light Company will be rushed as rapidly as possible. The present generating facilities of the company are now taxed to the utmost, and a 20,000-kw. generating unit will be added to the equipment in the present plant to care for the local power load until the new plant is in operation. The present generating capacity, by the addition of the new unit, will be brought up to 85,000 kw. An order for the first of the 20,000-kw. units for the new central station has been placed with the General Electric Company, and it is expected that further orders for additional units will be placed before the completion of the new powerhouse.

Monongahela Valley Traction Company, Fairmont, W. Va.—An agreement has been entered into between the Monongahela Valley Traction Company and the Clarksburg Light & Heat Company by which a large transformer station will be erected in Clarksburg to enable the companies to supply energy to one another in case of emergencies.

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INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases | Business Changes | Trade Literature

RISING PRICES DISCUSSED IN NEWARK

Contributions from Several Departments of the Public Service Railway Depict Graphically the Hampering Effects of the Present Abnormal Stringency in Labor and Materials

At the meeting of the American Electric Railway Association Company Section of the Public Service Railway, held in Newark, N. J., on Nov. 16, representatives of the several departments of the railway discussed the effects of the rise in prices upon their several lines of work. As stated in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 18, page 1062, after an opening paper on public relations by Ex-Senator E. W. Wakelee, associate general solicitor of the company, J. A. Pearson, purchasing agent, opened a discussion on "The Effect of the European War on Market Prices and Deliveries of Railway Material." He was followed by G. J. Newton, local purchasing agent; General Manager R. E. Danforth; F. L. Foulks, distribution department; H. H. George, construction department; P. F. Maguire, maintenance-of-way department, and A. Scheer, Jr., mechanical department. As the subject of rising prices was thus covered so comprehensively, it has been deemed advisable to summarize in this department the data and opinions included in the remarks of these speakers.

THE PURCHASING AGENT'S POINT OF VIEW

By way of introduction, Mr. Pearson said first that he, as purchasing agent, felt like an operating man and wished to be considered as such. Comparing his topic with that of public relations he said that the latter is indefinite and has to be handled with gloves, while the purchasing agent deals with prices, so that purchasing is an exact science. The remarkable thing about the effect of the European War on prices in this country was that for about a year the effect was negligible. In fact, in the early part of 1915 prices were very low. There was great depression, the mills had little work, and the railways had no trouble in getting deliveries of all kinds of materials at the low prices. About Sept. 1, 1915, the effect began to be felt and it was noticed that the railroads could not obtain sufficient freight cars. Embargoes were placed on deliveries of goods all over the East. Last winter there were in and around the port of New York 18,000 freight cars containing all kinds of material which could not be moved. Public Service was not greatly affected except that on the South Amboy pier about 7000 freight cars loaded with coal were accumulated. It was, however, very difficult to move goods through the State of New Jersey and prices on all goods began to rise.

In the spring of 1916 there appeared to be a lull in the congestion, so that from May to July the pressure for material decreased. But in September prices began to climb again and deliveries to be delayed, until to-day conditions are twice as bad as they were a year ago.

Mr. Pearson emphasized the fact that during his twenty years' experience as purchasing agent he has never seen a situation like the present one, the difficulty applying to every item of a railway's requirements, even blotting paper, pens and ink. He believes, however, that soon after the close of the war, which apparently will last from one to two years longer, prices will be greatly reduced. The foreign demand will cease and there will be active competition for our markets.

Coming to the subject of the immediate future, Mr. Pearson advised early placing of requisitions and the carrying of liberal stocks. He stated that while it may seem ridiculous in 1916 to talk about ordering goods for 1918 delivery, that is the best that can be secured in some lines. For instance, a steam turbine cannot be bought to-day for delivery before 1919. On the subject of increases in prices, Mr. Pearson quoted, as examples, the following: "In 1914 we paid 19 cents a pound for brass pipe, whereas in November, 1916, the price was 41 cents, an advance of 110 per cent. Condenser tubes which under the company's last contract cost 18 cents per pound were recently offered for delivery next May at 53 cents as a special favor. Track spikes which in 1914 were bought for $1.40 per hundredweight, now cost $2.75, an advance of 97 per cent. In 1914 the discount on machine bolts was 75 and 5, while to-day it is 25 and 5, an advance of 250 per cent. The advance in twist drills has been 250 per cent, tie rods 50 per cent, tamping picks 40 per cent, steel pipe 70 per cent, iron wood screws 92 per cent. Brass screws have advanced to an unheard-of degree, while cold rolled steel has gone up 183 per cent.

"Car wheels are about 21 per cent higher than in 1914 with deliveries of from twelve to eighteen months, while rails are $6 per ton higher with about the same deliveries. Copper is very important to the railway company and the effect of the rise from 18¾ cents to 32 cents is very serious. While the railway is not directly concerned in the price of coal, as energy is purchased from the Public Service Electric Company, it is of interest to note that while the company has long-term contracts the contractors are not able to live up to them, due to shortage of cars and other difficulties. It has been necessary, therefore, to buy coal at an advance of $4 per ton."

Comparing the railway with the manufacturer under the present abnormal conditions, Mr. Pearson pointed out that the latter is making so much money that he can afford to buy raw material regardless of cost. The railway, restricted to a 5-cent fare, must purchase economically, but its business is not considerable compared with that of manufacturers and its purchasing agent is helpless in the present market. Material can be had at some price, but the railway desires to make some money, which cannot be done by paying bonuses. It is necessary, therefore, for the men in the several departments to look ahead and give the purchasing agent all possible time.

OFFICE SUPPLIES ARE HARD HIT ALSO

Mr. Newton confined his attention to the subject of stationery, noting particularly that some papers have more than doubled in price, for example, bond paper, of which a good watermark grade could be bought recently at 6½ cents per pound, now brings 14 cents. The importation of sulphite from Europe has ceased and American manufacturers seem not to be able to provide a suitable substitute. Apparently the amount of sulphite put into paper has been reduced and the quality has suffered while prices have increased. Deliveries, also, are very slow. The following table is indicative of the situation:

Material	Former Price	Present Price
Bond paper, cents per pound	6½	14
		2 cents more for colored stock
Manila writing paper, cents per pound	4½	12
Ledger paper, cents per pound	10½	18
		2 cents more for colored stock
Scratch pad paper, cents per pound	4	10
Kraft paper, cents per pound	4	12
Gem clips, cents per thousand	16	40
Brass fasteners, cents per thousand	52½	93½
Ink, dollars per dozen quarts	$3.60	$6.00
Pins, cents per pound	32	70

HOW THE WAY DEPARTMENT IS AFFECTED

Messrs. Maguire and George went into details of track construction prices, stating, as an example, that hard-center special-work construction cost 35 per cent less a year ago than to-day, while the cost of solid manganese

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steel construction has gone up 65 per cent and is still rising. This is due to the increase in the cost of manganese from $100 to about $500 per ton.

Last year the company was able to place an order for a bridge at 2¾ cents per pound, while now the price is 6¼ cents, or 127 per cent increase. In the item of rail braces and tie rods the increase has also been large. Seven-inch braces for tram rail have gone from 23 cents to 34 cents each, an increase of 47.8 per cent; those for 7-in. groove girder rail from 20 cents to 34 cents, an increase of 70 per cent. Tie rods which formerly cost 24 cents have gone to 36 cents each, a 50 per cent increase.

Mr. George also took up the subject of lumber and ties. Creosoted yellow pine ties, 6 in. x 8 in. x 8 ft., formerly cost 83 cents each, but are now $1, a 20-per cent increase; whereas untreated chestnut ties formerly 50 cents are now 62 cents, an increase of 24 per cent. Bridge timber has gone up from 28 per cent to 69 per cent, depending upon the size; 12-in. x 12-in. long leaf yellow pine, for example, being now $41 per 1000 ft. as against $32 last year, whereas 8-in. x 6-in. timber is $65 as against $38.50. Three-in. x 10-in. timber is $42; 6-in. x 8-in., $36; 8-in. x 8-in., $37, and there has been a general increase in the price of creosoted yellow pine lumber of about $15 per 1000 ft.

Mr. George also gave the following table showing the general increase in the cost of paving by contract for this year and last, the prices not including the concrete foundation or the rail plaster along the webs of the rails.

Type of Pavement	Price Per Square Yard, 1915	Price Per Square Yard, 1916	Per-centage Increase
Granite block, cement joints	$2.25	$2.45	8.9
Granite block, tar joints	2.39	2.56	7.1
Granite block, sand joints	2.08	2.25	8.2
Trap rock block, cement joints	1.65	1.70	3.1
2d hard clipped block, cement joints (clipping and laying)	.82	.87	6.1
2d hard unclipped block, cement joints (laying only)	.56	.61	8.9
Newark specification granite block cement joints	2.70	2.90	7.4
Newark specification granite block, tar joints	2.85	3.02	6
Newark specification granite block, sand joints	2.60	2 77	6.5

The company has had to pay as high as $3.78 per square yard for granite block pavement laid with cement grouted joints, including the concrete base. This would be about $3.20, not including the foundation. Along with the increase in prices of material have gone increases in labor costs, the minimum increase being about 20 per cent. In addition it has been necessary in some cases to reduce the working day from ten to nine hours, although payment is made for ten hours work. The higher-priced men have been most loyal to the company, so that the actual increase for track labor has been at least one-third. In some cases skilled men have been required to do track labor, increasing the cost very much more.

Among other items mentioned by Mr. George were the following: Standard steel inter-track picket fence, which formerly cost about $2.25 per linear foot erected, cannot now be had for less than $2.83 per foot, not including erection; the lowest bid for fence erected being $4.10. The present price is at the rate of approximately 8 cents per pound for steel, an increase of 82 per cent. Concrete foundation in tracks has gone from about $5 to $6 per cubic yard or from about 50 cents to 60 cents per linear foot of track. Six-inch terra-cotta pipe has gone from 13 cents to 16 cents per linear foot and other sizes in proportion. Cast-iron drain boxes, formerly 1½ cents per pound, are now more than 2 cents. Green paint, used on steel trolley poles, formerly 14 cents, is now 27 cents, an increase of 93 per cent. Taking an average of twenty-eight items entering into track construction, there is an increase for 1916 over 1915 of 43½ per cent, making an actual increase in the cost of track construction work of from 20 per cent to 30 per cent.

TESTIMONY FROM THE LINE DEPARTMENT

Mr. Foulks naturally dwelt upon the subject of copper, in which the distribution department is most interested. He used a price chart in explaining the fluctuations in this material, applying this to conditions on the local property. He said that approximately 215,000 lb. of copper were used in 1915, exclusive of composition line castings, bond wires, etc. which would require 40,000 lb. more. If purchased in May, 1916, instead of September, 1915, this amount of copper would have cost $76,250 more than it did, an increase of 51 per cent.

To illustrate the effect of high prices on the distribution department, Mr. Foulks presented the following table:

	1913	1916	Increase
Bond wires, 10 in.	$0.4050	$0.5850	45 per cent
Bond wires, 12 in.	0.4385	0.8120	85 per cent
Bond wires, 36 in.	0.8078	1.4960	85 per cent
Composition Castings	1914	1916	Increase
Approach ears	$0.18	$0.27	50 per cent
No. 17 splices	1.05	1.22	16 per cent
No. 29 splices	0.57	0.782	37 per cent
No. 00 ears	0.248	0.31¼	26 per cent
Galvanized Span Wire	1913. Per 100 Ft.	1916. Per 100 Ft.	Increase
¼ in.	$0.73	$1.05	44 per cent
5/16 in.	0.885	1.28	44 per cent

He also said that a recent quotation from one manufacturer for a large quantity of No. 00 ears was 46 cents, although it was actually placed with another manufacturer for 38 cents. There has been a recent advance of 12½ per cent on all inclosed fuses.

HOW THE MECHANICAL DEPARTMENT IS AFFECTED

Mr. Scheer opened his part of the discussion by a humorous reference to a recent experience in purchasing steel bolsters for the cars which the company plans to build next one. One steel company facetiously asked, "Well, can't you gentlemen come in about a year? We are closing out all orders and are not taking on anything new for the coming year." Manufacturers seem to be developing considerable facility in explaining why deliveries are not made, but the fact remains that the railway cannot get the material. In regard to the labor situation Mr. Scheer said that while it is true that the hourly rate paid by manufacturers is higher than the rate paid by the railway, a considerable part of the high weekly wage which proves so attractive to many workmen now is partly due to overtime.

To illustrate the increase in prices in mechanical department supplies, Mr. Scheer quoted the following table:

	1914	1915	1916
Babbitt-metal, per lb.	$0.286	$0.31	$0.38
Brass bearings, each	2.62-3.40	2.79-3.02	4.47-5.69
Steel wheels, each	11.59	14.42	18.59
Axles, each	8.77	6.58	16.68
Copper wire, per pound	0.155	0.164	0.226
White lead, per pound	0.06	0.06	0.091
Brooms, each	0.342	0.33	0.42
Linseed oil, per gallon	0.485	0.60	0.73
Rubber hose, per foot	0.028	0.027	0.031
Machine bolts, each	0.026	0.023	0.067
72-in. canvas, per foot	0.20	0.18	0.29

Applying these data to the local railway, he said that the 5000 lb. of babbitt metal used per month will represent an annual increase of $5,640 over the cost in 1914. Similarly, the 366 brass bearings used monthly will cost $18,156 more per year; steel wheels, $5,436 per year; axles, $3,408 per year. In the item of bolts, 2500 of the 3-in. to ¾-in. x 2½-in. size are used per month. In 1914 they cost slightly over 2 cents each, but now they cost more than 6 cents, the increase being 158 per cent. In this small item alone there is an annual increase of $1,230. The total increase for the few items mentioned above is $38,870 per year, a striking instance of how the war is affecting the mechanical department.

THE GENERAL MANAGER'S POINT OF VIEW

In closing the discussion abstracted above, Mr. Danforth said that with the increased cost of material averaging about 30 per cent, the company will spend about $1,500,000 next year in the ordinary operation of the property, using the same quantities of materials as usual. In view of the circumstances brought out in the discussion it is evident that the maximum life must be obtained from all parts of the equipment. Nothing should be wasted, from stationery to car wheels. To offset the increase in cost of operation the cars must be made to earn more. A reduction in the cost of accidents would help in this direction. His closing sentence sums up the situation: "Let's save the pennies where we can, the dollars will take care of themselves."

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JOHN F. OHMER DISCUSSES REGISTER MANUFACTURE

Increased Demand and Greater Use—Production Cost Figures Abnormal—Paper Supply Presents a Serious Problem

The abnormally high material prices have enforced conditions upon the manufacturers which have been very difficult to meet. In a recent interview, John F. Ohmer, president Ohmer Fare Register Company, Dayton, speaking of the manufacturing and sales condition in the fare register field pointed out what high material and labor prices mean to a company which rents its product on a long-term basis. Business for his company, Mr. Ohmer said, has been good this year, particularly since June. A very high proportion of the users of his company's fare registers have renewed their contracts, new companies have been added as customers, and a large number of additional registers have been required for use in the increased car service now given.

Wages Are 50 Per Cent Higher

The Ohmer fare register is rented for five or six-year terms, and the repairs and renewals of the machines are made by the manufacturer. This means, under present conditions, a very greatly increased cost not only for the materials and supplies required in maintenance work, but higher living costs for the maintenance men.

Moreover, as in other lines of manufacture, the cost to produce registers, and especially to develop new products, is higher than ever before contemplated. Wages have been increased at least 50 per cent during the last two years. Tool makers, many of whom are employed in register manufacture, receive from 60 cents to 67½ cents per hour, and some shop employees on special development work are paid wages as high as $80 a week.

The materials mostly used in register work are those which have shown the greatest rises in price. Brass that three years ago cost 13 cents a pound is now from 40 to 45 cents. Light malleable castings have risen from 6 to 18 cents a pound. Soft sheet steel has risen 200 to 300 per cent, high-speed steel 500 per cent, and the alloy used for die-casting register printing wheels and other essential parts is now quoted at about 80 cents per pound.

Paper Supply Situation Very Delicate

A most important feature of the Ohmer fare register is the printed permanent record of the fare transactions. Thus the demand for register paper increases with the traffic of the electric railways. Rolls of specially prepared paper are sold to the railways for use in the registers. The rental contracts contemplate that the register manufacturer will supply suitable paper at a fair cost, subject to fluctuation of the market. At the present time the paper is costing more than its selling price. No attempt has ever been made to profit by the sale of paper, and now that its price ranges between 9½ and 11 cents per pound, with prospects of further increases, the growing demand for paper means a greater loss. The sales price has not been increased.

The amount of paper supplied during a year for use in Ohmer registers is many tons. The stock is special and available from only one mill. It is a part linen paper, the make-up and finish having been determined only after several years of use. This paper is suitable for use in high and low altitudes and in hot and cold climates. It now is very difficult to obtain at any price. Substitute papers cannot be used if satisfactory printing results are expected.

The paper is received from the mills in large parent rolls. These are cut, and small rolls of sizes suited to various types of registers are prepared. In rerolling, the stock is inspected for surface and gaged for width and thickness. Thus the first cost of the stock is only part of the final cost of the printing register paper cost.

The ink rollers of the fare registers, according to Mr. Ohmer, represent the greatest cost increase per part of the elements of a register. These are made of very high-grade felt, impregnated with a special ink. Felt has risen greatly in price, and dyes for the special ink used are hardly obtainable even at unheard-of prices. The manufacturer who supplies the ink has only a limited supply of dye, and this was purchased at $1,500 a ton.

Mr. Ohmer has always shown great interest in the welfare of his employees. He has introduced into his plant many features which have brought working conditions to the highest level. Last August he addressed the following bulletin to his employees. It is pertinent to the wage-earners whose pay is now much higher than it has ever been, except at present.

"SAVE NOW

"No man knows when or how the European war will terminate, and no man knows what the economic and industrial condition in this country will be following the adjustments which must be made all over the world after the tremendous destruction of life and property in Europe ceases.

"After the Franco-Prussian War of 1870 and 1871, *i. e.*, in 1873, the United States of America suffered the worst financial panic on record, causing great depression in all lines of business activity, coupled with much distress and suffering for a number of years. It, therefore, behooves us to lay aside some of our earnings to carry us over the stormy days which may follow the close of the European conflict. Save now while the saving is good."

ELECTRIC WELDERS RENEW MUCH TRACK

E. C. Price Explains the Reasons for Exceptional Demands for Track Repair Materials

At the close of the construction and repair season inquiries for the Indianapolis portable electric welder are even more numerous than they were during the open season. This statement and those which follow are based on a recent interview with E. C. Price of the Indianapolis Switch & Frog Company, Springfield, Ohio. This company's November sales of welders, joint and bonding plates and special welding steel exceeded those of any previous month.

Mr. Price attributes the present activity in welder and welding material sales to the difficulties encountered by the electric railways in buying rails and other track renewal and repair essentials. "Why should a railway," he says, "install new track now at premium prices, when it is possible to repair it and avoid double costs for materials, such as rails, which have a normal life of ten to twenty years? The rail situation to-day, with the makers asking premiums of $20 to $30 a ton and insisting on contracts carrying with them unchangeable and uncancellable specifications, has put the special work makers into a guessing competition."

In July, it is stated, the mills made the ruling that contracts must carry the specifications with them. Formerly a fabricator could contract for a tonnage of rail, and later, as his orders warranted, he could specify the section of rail to be delivered. Now he must specify when he makes the contracts and, as everyone knows, the deliveries are remote. "Thus," Mr. Price says, "the individual special-work makers are embarrassed for rail and cannot accept all the business offered. And all the rail in the store yards of the frog builders if it were properly exchanged as orders for frogs were received would not build all the frogs that the railroads now desire to order.

"This difficulty and others with which the electric railways are confronted has forced them to a more general use of reclamation methods. One of these is the use of the Indianapolis welder for filling rail cups and renewing joints by welding on plates."

Rail Joint Work Expands Rapidly

Rail joint work with this welder has increased enormously during 1916. The number of joints applied so far this year is double that for 1915. In 1912, when the process was new, less than fifty joints were applied, and since that year nearly 50,000 joints have been put on with the Indianapolis welder.

More than 200 welders have been sold to the electric railways. The Bay State Street Railway and the Public Service Railway each use seven outfits, and many other roads have four or five. These outfits are almost entirely engaged in track work. Only three have been purchased primarily for shop work. Of course, on rainy and cold days some roads use their outfits for shop repair work, but their primary use is for rehabilitating track by building up cupped rails, repairing broken and worn special work and for applying new joint plates.

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The Ohio Electric Railway made use of its welder recently for welding rails and rail chairs to the floor of a 70-ft. bridge.

As an indication of the active use of the 200 welders in service, Mr. Price stated that during 1916 his company had sold 600,000 lb. of coated, fluxated welding steel rods. About 31,000 lb. of this was for welding manganese steel special work. Of the total sold, 300,000 lb. was for applying joints and general shop work, and an equal amount for filling rail cups and building up manganese centers.

The price of welding steel has not been changed since 1912. A large stock has, with difficulty, been maintained by a safe margin until the recent great demand for track renewal work lowered the reserve somewhat. Mr. Price says that this special welding steel is essential if good results are to be assured.

ROLLING STOCK

Nashville (Tenn.) Interurban Railway, has placed an order for one freight car with the Southern Car Company, High Point, N. C.

South Boston Industrial Railroad, Boston, Mass., has ordered, through the Wendell & MacDuffie Company, Eastern agents for the Russell Car & Snowplow Company, one single-truck snowplow.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., is said to be in the market for fifteen city cars similar to the ten purchased by this company in 1915 and also for seven center-entrance interurban cars.

United Railways & Electric Company, Baltimore, Md., noted in the ELECTRIC RAILWAY JOURNAL of Oct. 28 as purchasing seventy-five double-truck, semi-convertible, four-motor pay-within cars, will purchase twenty-five additional cars of this type.

Alton, Granite & St. Louis Traction Company, Alton, Ill., has purchased five new cars, three of them to be chair cars, with motors, and two passenger trailer cars. The three motor cars will be of steel, with center entrances, and will have a capacity of forty-six passengers each. The trailers will have center aisles and cross seats, and will each carry sixty passengers. The plan will be to improve the interurban service between Alton and East St. Louis by using two-car trains part of each day.

TRADE NOTES

Horace N. Trumbull has been appointed advertising manager of the S K F Ball Bearing Company of Hartford, Conn.

George K. Morrison, who has been identified for many years with General Electric Company, has been elected vice-president of the organization.

Johnson Fare Box Company, Chicago, Ill., through its Eastern agents, the U. S. Metal & Manufacturing Company, has just received an order from the International Railway, Buffalo, N. Y., for thirty-five of its fare boxes.

Holden & White, Chicago, have been appointed general sales agents by the Garland Ventilator Company for the sale of Garland ventilators in the steam railway field as well as the electric railway field.

Terry Steam Turbine Company, Hartford, Conn., announces the appointment of Stephenson & Nichols, Monadnock Building, San Francisco, as its representatives in northern and central California and the northern part of Nevada.

Peter Smith Heater Company, Detroit, Mich., has received an order for eighty-one hot-air forced-ventilation heaters, six hot-water heaters and seven equipments of gravity-type electric heaters. These heaters will be installed on ninety-five cars recently ordered for city service in Akron and Canton, Ohio, Evansville, Ind., Rockford and Springfield, Ill., Saginaw, Detroit and Grand Rapids, Mich.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received a number of large orders for motor equipment within the last few weeks as follows: Hodenpyl, Hardy & Company, New York, N. Y., have purchased twenty-nine double equipments of 532-B 50 hp. motors for roads at Rockford and Springfield, Ill., and Evansville, Ind.; also five quadruple 140 hp. 600-1200 volt equipments with HLF control for Michigan Railways, Jackson, Mich. The Detroit United Railway has purchased eight quadruple 140 hp. high speed equipments with HL control. The Lake Shore Electric Railway has ordered thirteen quadruple 140 hp. 600-1200 volt equipments with HL control and four quadruple 40 hp. equipments.

McQuay-Norris Manufacturing Company, St. Louis, Mo., announce the removal of its Chicago office to 1140 South Michigan Boulevard. It also announces that L. H. Dally has succeeded H. G. Paro as manager of the Chicago branch, and H. W. Sweeney has succeeded F. W. McKeen as manager of the Pittsburgh branch. R. W. Long has been transferred from the field force of engineers, and will manage the Denver branch.

ADVERTISING LITERATURE

Anglo-American Varnish Company, Newark, N. J., has issued a booklet on its railway varnishes.

Gurney Ball Bearing Company, Jamestown, N. Y., has issued Vol. II of its publication, "Bearing on Bearings."

Automatic Ventilator Company, New York, N. Y., has issued a pamphlet on its Flower brush holder for railway motors.

Armstrong Cork & Insulation Company, Pittsburgh, Pa., is distributing a booklet on its nonpareil corkboard insulation.

Jeffrey Manufacturing Company, Columbus, Ohio, is distributing bulletin No. 141 on its single roll coal-crusher for power houses.

New England Oil, Paint & Varnish Company, Boston, Mass., has issued a pamphlet on an impregnable coating for cement and brick.

Drew Electric & Manufacturing Company, Indianapolis, Ind., has issued a pamphlet on its motormen's safety mirror for closed or for open cars.

Hyatt Roller Bearing Company, Newark, N. J., has issued bulletin No. 1523 of "Engineering Helps" on the selection and mounting of its roller bearings.

Gould Coupler Company, New York, N. Y., is distributing a pamphlet on its universal truck lever type automatic brake adjuster for Brill 39E. and 27F. trucks.

Railway & Industrial Engineering Company, Pittsburgh, Pa., is distributing a pamphlet on outdoor transformer substations protected by Burke Horn Gap equipment.

Shepherd Electric Crane & Hoist Company, Montour Falls, N. Y., has issued bulletin M-1 on its form 2XS floor-operated, single-speed, direct-current electric hoist.

Weiss Manufacturing Company, Springfield, Ill., is distributing a pamphlet on its non-freezable street railway switch equipment, which includes Weiss switch blocks.

Lord Manufacturing Company, New York, N. Y., has issued a bulletin on the National Safety Device & Manufacturing Company's air rectifier which is designed to eliminate frozen air.

Lackawanna Steel Company, Buffalo, N. Y., has issued a 32-page catalog on the Abbott rail joint plate, which is a device to strengthen and improve the efficiency of the ordinary angle-bar joint.

Albert & J. M. Anderson Manufacturing Company, Boston, Mass., is distributing a pamphlet on a testing clamp suitable for testing watt-hour meters, or to be used in any place where temporary electrical connections are desired.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued leaflet 3510-A on its No. 101-K railway motor. This is a 30-kw., 40-hp., 600-volt motor and is especially adapted to the operating conditions requiring the handling of heavy loads at slow speed.

Link Belt Company, Chicago, Ill., has issued a booklet describing its traveling water-intake screens. The installation at the Philadelphia Electric Company stations is described and illustrated. The Metropolitan West Side Elevated Railway Company of Chicago purchased the first screen built by this manufacturer for installation in 1895. Other booklets recently issued describe the Link Belt coal and ash handling equipment for power stations, locomotive cranes for storing and reclaiming coal and the details of the Peck carrier for coal and ash handling.

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RAILWAY ABILITY HONORED

The appointment of Sir Albert Stanley to the British Cabinet is a well-merited recognition of his executive ability in the conduct of the transportation system in London, and through him the electric railway industry in both continents is honored. This appointment also emphasizes the difference in public rewards, in this country and abroad, accorded to men having the ability to conduct large public utility affairs successfully. Under British rule, for example, honor for signal service along such lines is not uncommon. To cite a few instances, there is Sir Albert himself, as well as Sir Thomas Shaughnessy, Sir William MacKenzie, Sir William Van Horne, Sir Donald Mann and Sir Clifton Robinson, all of whom served the empire through their development and direction of large railway affairs. Here, on the contrary, as is well known, the existing public attitude usually puts railway men on the defensive, and active leadership in a railway corporation instead of being accepted as a reason for elevation to high political office is often considered by the public as an argument against it. This is not right. The man who makes an important addition to the transportation facilities of the country, or who, by his successful management, makes such a system of greater use to the public, confers a benefit upon the community which he serves, and, if he was called to political office, we are sure he would serve the public with the same energy and ability that he gave to corporation affairs.

A VISION OF A GREATER CHICAGO

Chicago has waited a long time for the subways which are proposed by the present Traction and Subway Commission. The fact is generally recognized that the present transportation system in that city, though ably conducted, is inadequate for the needs of the city, and that a more efficient system is necessary if the city is to grow as it should and maintain its commercial supremacy in the Central States. The need for some system of underground transit was apparent even in the time of Charles T. Yerkes, but the time was not ripe for subways then. At that period the idea was not sufficiently accepted that in any large undertaking on which the prosperity of the city is so dependent as it is upon a comprehensive rapid transit system, there should be a combination of the forces of both the municipality and private capital to secure the best results. Both the city and the railway companies in Chicago have been gainers by this delay, because by the union of their forces they can now create a more extensive and permanent system of transportation than could private capital alone. Until the full financial plan is published, it is impossible to predict to what extent it will appeal to those who will have to undertake the actual work. But if it is at all reasonable, it is safe to say that those in control of the present roads in Chicago have the vision as well as the means to build a system capable of serving the 5,000,000 people which the city will contain in 1950, according to the report. We trust that the plan will go through and that it will be another example of the merits of combined private and municipal investment under private operation, a plan for municipal utilities which seems to be a characteristic of the present decade.

ROCHESTER TRAFFIC CONDITIONS

Rochester, N. Y., has the reputation of being a very progressive city. It is also a very critical one and part of this criticism flows in the direction of the street railway. The management of the railway has made unusual and successful efforts to promote friendly relations with the public, but the public friendship sometimes appears in disguise. Some months ago the local Chamber of Commerce engaged Bion J. Arnold to study the transportation situation and indicate the most feasible lines of improvement. In this investigation the railway management co-operated heartily, well knowing what the result would be. A fair investigation of this sort could not but reflect creditably upon the management as it would bring out the difficulties involved and the lengths to which the railway had gone in overcoming them. Mr. Arnold's report was presented a few weeks ago, and an abstract of it appears elsewhere in this issue. The time was very propitious for the presentation of this report for, after long and thorough study, the company had earlier in the year ordered a half-hundred cars of a type designed particularly for the local conditions. This type of car, which is described in an article by General Manager E. J. Cook also in this issue, was favorably mentioned by Mr. Arnold in his report. A sample car was due to arrive in Rochester at about the time of the completion of the report and it has now been giving fine service for several weeks. Its presence in the city serves as an omen of the improved service to come. Mr. Cook's description of the car and the abstract of the Arnold report should be studied together because, for the reasons mentioned above, they complement each other. The car is described with particular reference to its transportation features, *i.e.*, boarding and alighting, fare collection, etc., but there are novelties in equipment mentioned by Mr. Cook which are worthy of attention also. The provisions for

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eliminating friction, removing arcing from controller fingers and making the wiring simple and substantial are among these. In Mr. Arnold's report possibly the most noteworthy section is that devoted to the study of geographical distribution of industrial workers and its relation to traffic possibilities. The method used is, we believe, described here for the first time.

THE CHICAGO TRACTION PLAN

The general plan recommended by the Chicago Traction and Subway Commission for Chicago's future transportation facilities was published in last week's issue, although not yet in completed form or ready for submission to the City Council. Until the great mass of supporting data and background for the conclusions reached is made public no comment as to the reasonableness or adequacy of the proposed plan is possible. Nevertheless, it is clear to see from the proposed scheme that certain fundamental considerations have governed the commission in its study. Perhaps the first of these is the assumption that all of the traction facilities will be unified. The advantages of this are pre-eminent and entirely necessary to the financing of the project. With this established, the next step has been to revamp the present elevated system into a completely rapid transit instead of largely local system, as at present, and to separate definitely the long and short-haul traffic, using the surface lines as feeders for the long-haul rapid transit. A third important consideration has been the "pulling out" of the loop in all directions to alleviate the congested business district now seemingly girdled with the present iron band. This is accomplished in the north and south directions through a physical lengthening of the loop by extending the elevated structure south on Fifth Avenue from Van Buren to Polk Street, and by building a subway straight through State Street to Chicago Avenue on the north, and in the east and west directions by supplying both north and south travel on both sides of the loop, which in effect spreads the loop out. A fourth important consideration has been the provision of direct through rapid transit between the northwest and southwest sides of the city without the necessity of detouring this traffic through the central congested area as at present.

While the recommendations of this eminent board of engineers cover the traction program tentatively for fifty years, the immediate nine-year construction program is the really tangible fact, for the board does not presume to forecast the future conditions with such certainty as to warrant planning any definite procedure beyond the nine years. This immediate construction program calls for the rapid transit subway from Eighteenth Street on the South Side Elevated through State Street to Chicago Avenue and thence west, connecting with the Northwestern Elevated. The loop is to be extended and expanded as already noted. The north, south and east sides of the present loop will be utilized entirely for two-way traffic of the West Side trains, with the present grade crossings with the north and south trains at the two west corners of the loop eliminated by two level construction. The portion of the elevated structure at the Congress Street station, the North Water Street stub extended across the river to the State Street loop station, and the Fifth Avenue stub terminal of the Metropolitan Elevated with an extension of the Franklin Street stub into this terminal, will provide an important stub-terminal service out of the central district in all three directions during the great evening rush. The congestion on the surface lines coming into the loop from the west will be eliminated by surface line subways under Washington and Jackson Streets, and across Michigan Avenue or under Grant Park to route these cars through without a switching back. These subways extend west to Clinton Street and the commission says that while they will not be self-supporting financially, it seems necessary that the expense be carried as the only means of avoiding the present crowded condition of the streets. Then finally, in the immediate plan, in addition to completely triple and quadruple tracking the present elevated system, is the building of the Ashland Avenue elevated connecting the Northwest and Southwest sides of the city. This line will connect with the present west, southwest and northwest elevated lines, and there will be constructed two additional branches in the northwest section. Then in the future, when the city's growth warrants, will come the main borough, which will extend from Seventy-first Street on the south, through Cottage Grove Avenue and Clark Street, bisecting the present loop, and north on Clark Street to the Belmont-Wilson district. This is not required in the immediate future, as the engineers have first planned to make maximum use of all existing facilities, and is, of course, more or less a part of the tentative plan of the future.

It is interesting to note that the question of energy supply for the system is dismissed with the simple assumption that energy will be purchased. So far as the published text of the report shows, there is no evidence that a separate power house was considered. This illustrates the change which has taken place in the minds of engineers as to the principles of the economical generation and distribution of energy. Ten years ago, if a $260,000,000 urban transportation system had been planned, one of the chief considerations would have been the power house. When this incident is considered in the light of its relation to the future electrification of steam railroads in the centers of great density of population or density of tonnage, it takes on added significance.

To speak broadly, the Chicago plan seems feasible and offers apparently great conveniences as compared with the present crowded and inadequate dual system. It alleviates completely the present condition by which thirteen tracks on the elevated focus onto two tracks in the loop, and instead there will be in the immediate rapid transit system probably fifteen tracks delivering through six.

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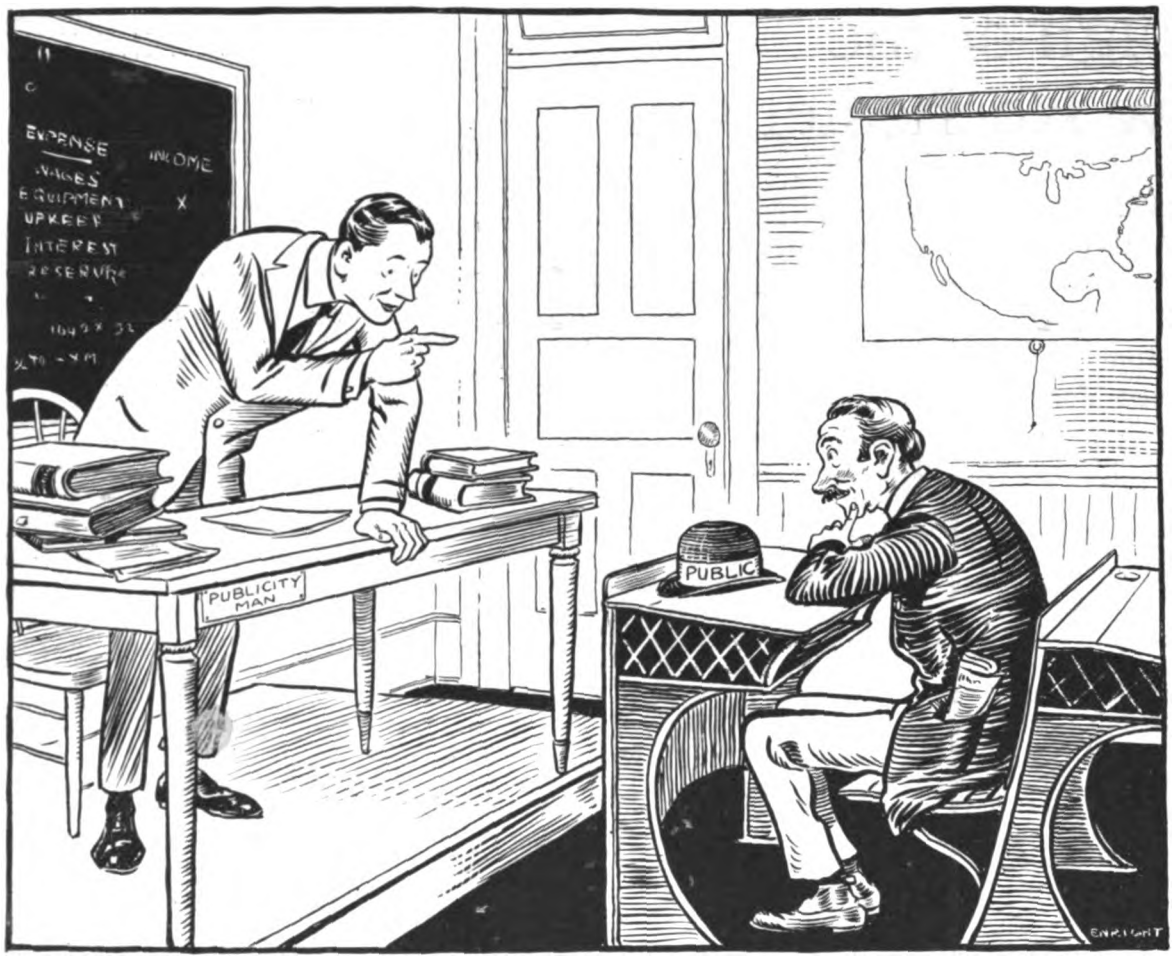
Are You Getting a Fair Return?



Let the Publicity Man Explain Your Problems to the Public

IS your company getting a fair return for service rendered, and to be rendered, in the form of transportation—

A return sufficient not only to pay current expenses, but to improve service and anticipate transportation demands—

To make it possible to invite additional capital, maintain an adequate depreciation reserve, pay good wages and earn a decent dividend on the money put into the property?

If the answer to these questions is No, the next question is, What are you going to do about it?

The public does not demand that electric transportation be supplied below cost.

When it appears to do so (and this is often the case) it is because the public does not know the facts.

The public may have been told, but it was not convinced.

Recently, when it was demonstrated (by a publicity campaign) that the post-office department and a few rabid representatives were asking the railways to carry the parcel post for less than fair pay the proposition was promptly condemned by public opinion.

It would be much easier—if such is the fact—to convince people that their home transportation company is not getting a fair return—

That it is underpaid, overtaxed and otherwise hampered in the effort to provide first-class service—

That all sorts of unproductive expenditures are being forced upon the company—

That whatever may have been the sins of the past, the sole desire of the present is improvement and extension of service.

This can be done and it should be done.

The other policy of staving off the Day of Disaster by temporary expedients is a mere makeshift and a dangerous one.

If it took five years to convince the people of a community that they are not paying enough to secure the kind of transportation they demand, the time (and money) would be well spent.

A company that has this work to be done and isn't doing it is more short-sighted than one that failed to provide coal for its boilers or grease for the journal boxes.

A public utility company can't get money these days unless the public is convinced that the company is entitled to it.

The only way to establish such a conviction is by EDUCATION.

The only feasible and effective method of education is PUBLICITY.

And the only way to make sure that a campaign of educational publicity will be carried on effectively and continuously is to hire a PUBLICITY MAN to do the work.

Let him keep at it until the facts are hammered into the public consciousness.

Then if the community still wants transportation at less than cost they will know that they can only get it by paying the inevitable deficit out of a public treasury—not out of your security holders' pockets.

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Equipment Details and Design of the New Rochester Car

Wide Entrances, Anti-Flashing Controllers, Anti-Friction Bearings, Liberal Window Area and Conspicuous Route Signs Are Among the Features of the Fifty New Front-Entrance, Center-Exit Cars of the New York State Railways, Rochester Lines

By E. J. COOK
General Manager New York State Railways, Rochester Lines

DATA OF NEW ROCHESTER CAR

Length over all	50 ft.
Length over body	49 ft.
Truck centers	26 ft. 3 in.
Wheelbase	5 ft. 2 in.
Width over side panels	8 ft. 3 in.
Width over window guards	8 ft. 4 in.
Height inside at center, approximate,	7 ft. 11½ in.
Height inside at bolster, approximate,	7 ft. 6 in.
Height rail to well floor	14 in.
Ramp in well floor	2½ in.
Height well floor to car floor	10 in.
Ramp in car floor, well to bolster	5½ in.
Post centers	30 in.
Width entrance door opening	5 ft. 4¼ in.
Width exit door opening	6 ft. 2 in.
Seating capacity	52
Weight, completely equipped	31,900 lb.

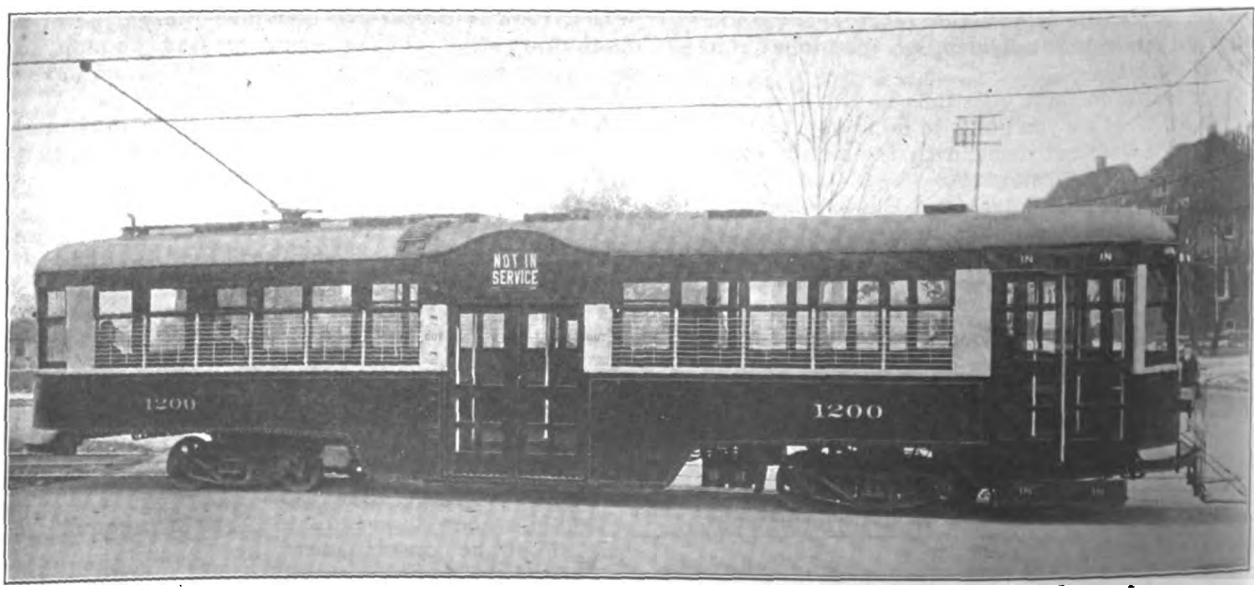
FOR the past few weeks there has been in operation in Rochester, N. Y., with satisfaction to the public and to the management of the New York State Railways, the first of an order of fifty front-entrance, center-exit cars of the pay-as-you-pass-the-fare-box type, the general scheme of which was conceived by Peter Witt, ex-street railroad commissioner of the city of Cleveland, and first practically applied in Cleveland on certain lines, and now being generally adopted by that company. The car has been named by Mr. Witt the "Car Rider's Car." The bodies are framed and covered, in general, in accordance with the standard design for steel cars of the builders, the Cincinnati Car Company. There are, however, some deviations from previous designs in these particulars, as well as a number of details original with the managers and engineers of the railway. In this article particular attention will be given to those elements of the design to which the railway management has devoted most attention.

BODY LAYOUT FROM TRANSPORTATION STANDPOINT

The plan and elevation of the car are given in outline in an accompanying illustration which is reproduced from the convention section of the ELECTRIC RAILWAY JOURNAL, Sept. 30, 1916, issue, page 570. On the plan attention is directed to the following salient items: The front platform is made extra long to permit the use of wide entrance doors. To encourage the use of the entire entrance opening by boarding passengers, a curved rail is mounted in the center of this space to divide the incoming passengers into two lines. The passageways are laid out to give a 28-in. width clear through on each side of the center railing, there being no "neck" to produce congestion.

The width of exit space was made as great as possible, the limitations being set by the necessary location of the air-brake cylinder. The exit space is closed by two sliding doors operated by Consolidated Car Heating Company's pneumatic engines. Hand-operated folding doors are used at the entrance.

The floor level arrangement, while determined primarily on the basis of convenience of passengers, was dictated partly by the necessity for providing clearance at the center on the devil-strip side for fenders of cars on the opposite track. Over the trucks the floor is 32 in. above the rails, with a ramp slope of 2 in. to the foot on each side of the exit well where it is carried through at a height of 27 in. Step heights were arranged so that in entering the passenger steps up 13 in. onto the folding step, 12 in. more to the front platform and 7 in. to



NEW ROCHESTER CAR—GENERAL VIEW OF END-ENTRANCE, CENTER-EXIT CAR NOW BEING ADDED TO EQUIPMENT OF NEW YORK STATE RAILWAYS

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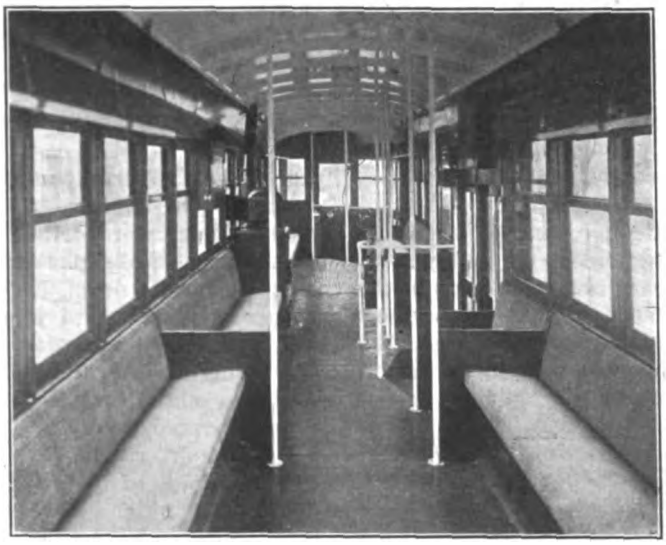
the car floor. In leaving, he steps down 10½ in. into the exit well and 14 in. to the street level. No straps were provided for the support of standees, hand rails and stanchions being considered preferable under local conditions.

The conductor's station is just forward of the exit well, and he stands with his fare box before him, the outlet from the coal box at his right foot and the heater opposite to him. This arrangement provides for the division of the passengers into two groups, one ahead of the fare box and the other behind it, the latter of whom pay their fares as they pass the box to take their places in the rear. The other passengers pay as they leave the car. In commenting upon this arrangement for handling incoming passengers, Bion J. Arnold, in the Rochester traffic report abstracted this week, states his belief that it will greatly increase the loading speed under Rochester conditions.

Over the exit door is an illuminated sign 15 in. x 20 in. in size. A large sign in this position has been found to be a useful adjunct to the front-end signs.



NEW ROCHESTER CAR—INTERIOR VIEW, LOOKING TOWARD ENTRANCE

STRUCTURAL FEATURES OF THE BODY

The bodies of the new cars are of the all-steel Cincinnati Car Company type of construction. The side girder plates are lined on the inside with ½-in. of cork for heat insulating purposes. The carlines and posts are made of T-iron sections and are of the continuous type. The arch roof is made up of a sheet steel plate securely fastened to the upper faces of the carlines. On top of this plate is placed a 1-in. layer of corkboard and, this, in turn is covered with the usual treated and painted canvas.

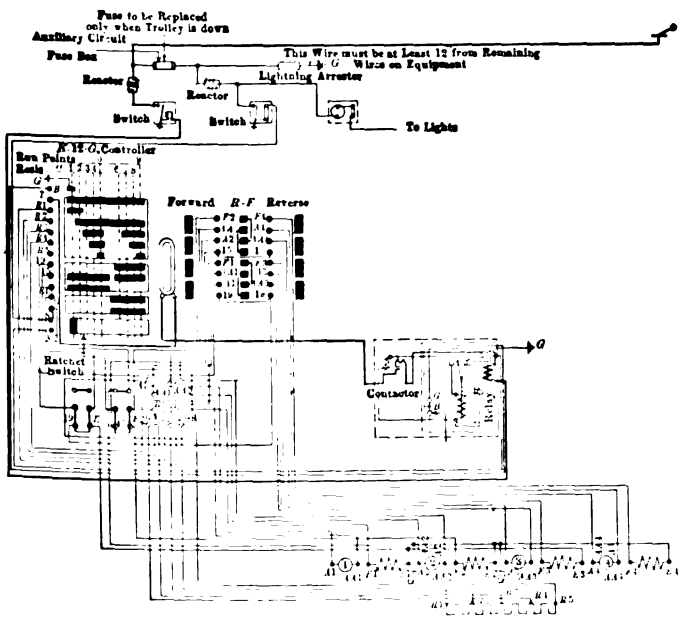
The floor is of double thickness except under the seats and the boards are grooved so that the use of a mat is not necessary. Trap doors are provided over the motors. The grooves are lengthwise on the level part of the floor and crosswise on the ramps. The space under the seats was inclosed partly to cover the heating ducts, air reservoir and wiring conduits, but also for the purpose of reducing the floor area which must be kept clean.

In order to increase the window height the letterboard has been made but 8¼-in. wide. Like the girder plate, this is of No. 14 gage steel.

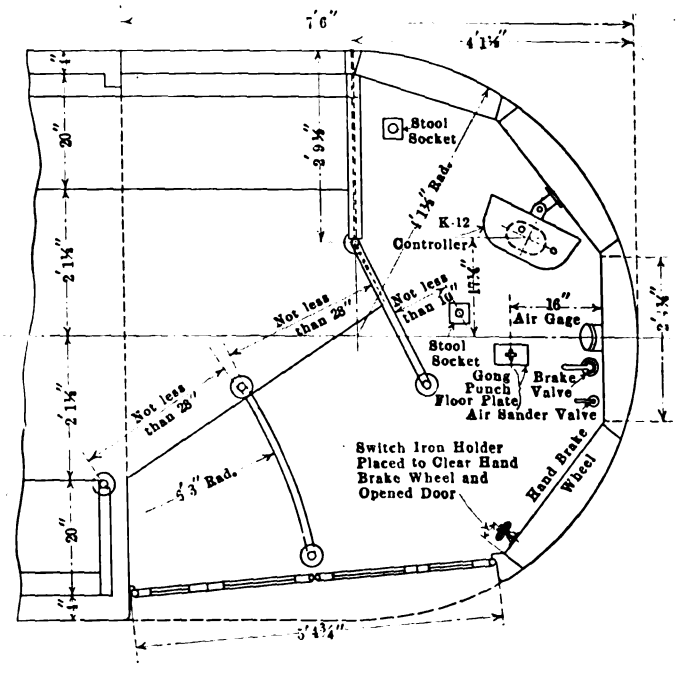
EQUIPMENT DETAILS

On each of the Baldwin arch-bar trucks, which have 26-in. wheels, are two General Electric 258-A motors. Hess-Bright ball journal bearings are used on the trucks as are also Woods side bearings. The latter contain three rollers each, the rollers, however, coming into action only when the car is rounding a curve.

A new type of controller known as the K-12-G forms part of the equipment of the new cars and twenty-five of the older cars are also being remodeled to embody the essential feature of this controller. This feature is the use of an auxiliary contactor and relay which entirely removes the arcing from the controller segments. A wiring diagram is reproduced herewith, to show the details, together with photographs of the contactor and relay. From the former, it will be seen that there is at the bottom of the controller drum a ratchet switch, the function of which is to close the contactor when the controller handle is being turned in the "on" direction and to open the contactor whenever the direction of rotation of the handle is reversed. The name "ratchet switch"



NEW ROCHESTER CAR—WIRING DIAGRAMS, SHOWING RATCHET SWITCH AND CONTACTOR FOR REMOVING ARCING FROM CONTROLLER



NEW ROCHESTER CAR—DETAILS OF FRONT VESTIBULE EQUIPMENT LAYOUT AND ARRANGEMENT OF ENTRANCE RAILINGS

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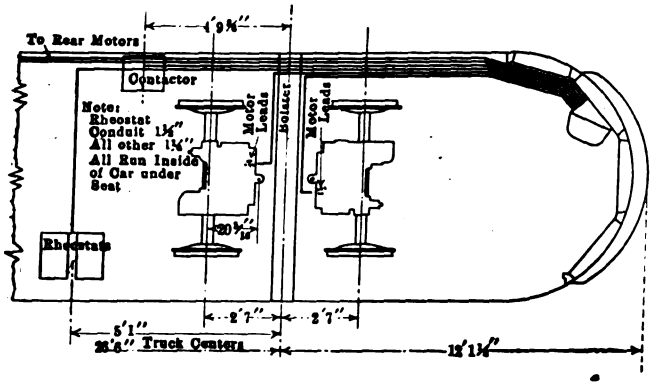
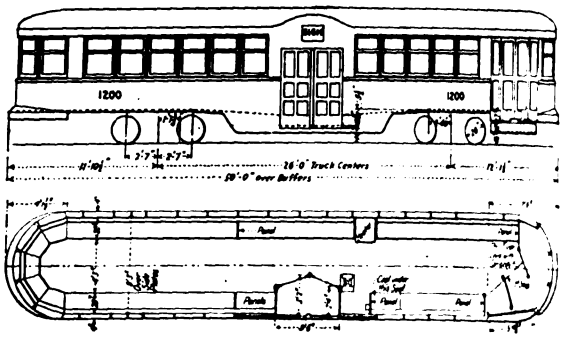
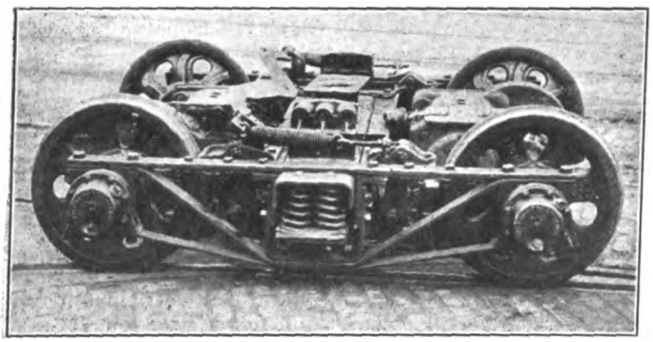


NEW ROCHESTER CAR—GENERAL ARRANGEMENT OF ELECTRICAL EQUIPMENT WITH CONDUIT RUNS



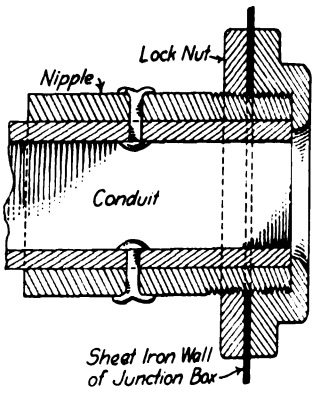
NEW ROCHESTER CAR—SIMPLIFIED ELEVATION AND PLAN

is given to this part of the controller because it contains a ratchet which permits a segment to join fingers *S*1 and *S*2 (see diagram) and remain in a position to bridge them while power is being turned on, but the segment is instantly removed by the ratchet when the controller handle is reversed from any position. Incidentally, the contactor also serves as an overload circuit breaker, a heavy coil being provided on the relay side to trip the contactor when the current exceeds a predetermined amount.



NEW ROCHESTER CAR—TRUCK WITH MOTORS IN PLACE

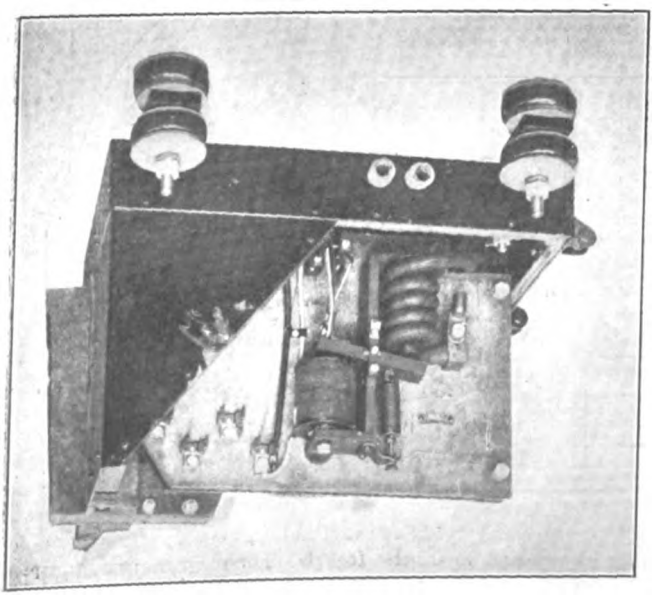
In laying out the control apparatus and wiring, the company's engineers encountered several interesting problems, the solutions of which are partly illustrated in the diagrams accompanying this article. For example, in the motorman's compartment the controller was mounted on an angle to clear the motorman's left knee A sheet iron junction box was placed behind the controller so that the latter could be wired from the rear. Holes were drilled in the side of the box to accommodate the "Alphaduct" conduit. As this procedure was somewhat novel, the engineers found it necessary to devise a fitting to join the ends of the conduit and the side of the junction box. The way in which this was done is illustrated in an accompanying sketch. This shows a short iron nipple riveted, with split copper rivets, to the outside of the duct, with nuts on both sides of the sheet iron to hold the nipple in place.



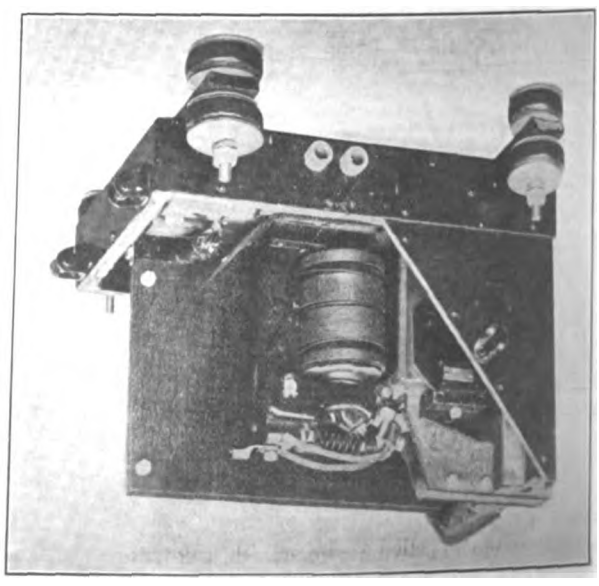
NEW ROCHESTER CAR—CONDUIT TERMINAL FITTING

The wiring was laid out so that the conduits would be continuous from end to end, the main runs being located against the side of the car under the seats, the conduits being cleated to the car sides. An accompanying diagram shows the locations of the several pieces of equipment together with the conduit runs.

While it is impossible within the compass of a brief article to describe all of the details of the equipment of this car the following items, being intimately related to the general design are worthy of note. The heating and ventilating arrangements have already been touched upon incidentally. More specifically the heater,



NEW ROCHESTER CAR—RELAY SIDE OF CONTACTOR BOX



NEW ROCHESTER CAR—CONTACTOR SIDE OF CONTACTOR BOX

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located opposite the conductor's station supplies air through a flue 3 in. by 8 in. in section mounted on the back of the seat riser several inches above the floor. The air is delivered through registers placed on about 30-in. centers.

The heater was supplied by the Consolidated Car Heating Company. The air brake equipment comprises a DH-10 Westinghouse compressor, and the usual parts of a straight-air equipment. The reservoir, which is mounted under the seat, is 12 in. in diameter and 84 in. long. A signal light is used for starting, the light being flashed on when all doors are closed. The door control is not interlocked with the power control.

In selecting the colors for the new car the importance of creating a pleasing impression was carefully considered. The result was the adoption of olive green for body, letterboard and roof, and cream for the parts.

The Public Service Corporation and the Working Man*

Joint Responsibility of Capital and Labor to Maintain Continuity of Service—One-Sided Feature of Commission Regulation

BY THEODORE P. SHONTS
President Interborough Rapid Transit Company, New York, N. Y.

THERE are three cardinal principles for the establishment of which we must aim in our studies of the problem of capital and labor. These principles are:

1. In any conflict between the managers and men of a public service corporation, the rights of the public are paramount.

2. There can be no permanent benefit in the triumph of either labor or capital in such a conflict, if the struggle leaves scars and wounds or bad blood. Unless good-will based on justice and right is restored and made permanent, the struggle is a loss for all.

3. Nothing must be done to impair any of the fundamental rights belonging to any man to work—or not to work—for or with whomsoever he will, and under conditions satisfactory to himself.

Public service is unlike ordinary commercial industry in ways that make the relationship of capital and labor engaged therein peculiar to itself. Unique responsibilities grow out of certain special conditions in public service. For example, the public service corporation is responsible to the public for continuity of service. Moreover, it is regulated by public service commissions which control rates but have no responsibility for its expenses. Lastly, a dollar once invested in a public service undertaking cannot be withdrawn; the business must go on.

Responsibility of the Public

The public has its special responsibility. It must recognize the rights as well as the duties of employers and employees which grow out of service to it. The public service corporation has a moral, legal and financial responsibility to the community, while the workingman of that corporation at present has no enforceable responsibility to the community. Have we not come to a time when it is necessary to make the employees of a public service corporation responsible to the public just as we make those responsible who invest their money in a public service undertaking?

No man is compelled to invest his money in a railroad or an electric light company; but the public says that, once he has so invested, he must allow the conduct of his investment to be regulated in the public interest. No one is compelled to accept employment with a public service corporation, but if a person does enter the employ of such an institution, ought the public not to say to him: "You cannot join with your fellow workmen in interrupting the public service. The old way of 'fighting it out' cannot, in the interest of the public, be permitted. You have entered upon the public service with a responsibility that you must recognize."

If it be said that this means "interference with personal liberty," I reply that civilization itself is in great part a system of wise restrictions of unbridled personal liberty. We gladly sacrifice portions of our personal liberty for the public welfare, and that demand, after all, is the supreme social law. No matter what plan be ultimately adopted, it need not involve "involuntary servitude" on the part of the employee if he desires to cease work. A way can be provided by the public for filling the man's place competently, and that being done, but not before, he may go elsewhere.

Any law must be fair to all concerned. It should, of course, not be possible, for instance, for a corporation to discharge, without reasonable notice, public service employees collectively or to reduce wages or make a general change, arbitrarily, in hours of labor or of working conditions affecting the whole body of employees or a substantial proportion of that body or of a particular class thereof. In short, if strikes are to be restrained in the public interest, for the same reason lockouts should also be restrained.

It has been proposed that the law provide that an agreement be made for a definite period wherein the employer would agree not to make any collective changes except after the expiration of, say, sixty days' written notice. It might also require the employee to agree not to quit work until after the expiration of the same period after written notice of his intention to quit. These are only suggestions current in public prints. I am not debating them.

Incorporation of Labor Unions

The suggestion is under discussion too that labor unions be incorporated in order that they may be held to financial liability in the case of violation of agreements. The fact that this is so widely discussed gives it a standing that calls for just and wise decision. It cannot be ignored. The same may be said, if no more, on the proposition that neither strike nor lockout be permitted until some impartial tribunal, acting on behalf of the public, shall have time to investigate thoroughly all the facts, and report these facts to the public.

The honest belief of many working men that arbitration is likely to fall under the control of men whose life activities bend their sympathies and psychology toward the employers, must be candidly met. There must be absolute fair play, and a conviction in all that the play is fair. One thing is sure—no corporation and no business can profit unless its men feel that they are getting a square deal. We must not only treat our men well, but we must make them feel and know that they are being treated well.

One of the great troubles incident to our large business organizations is the difficulty of men and managers getting together. If they did get together, they would know each other better and understand one another's motives and purposes. The approach to a real and permanent solution of the industrial problem must lie in deeper recognition of the fact that those who direct corporate activity are no less human than those who perform manual labor.

*Abstract of address delivered before the Illinois Manufacturers' Association at Chicago on Dec. 7.

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Fundamentals of Traffic Routing

In His Recent Report on Rochester Traffic Conditions B. J. Arnold Outlines the Principles of Scientific Routing and Describes a Novel Plan for Determining Natural Lines of Travel in an Industrial Community

AT the request of the Chamber of Commerce of Rochester, N. Y., Bion J. Arnold recently made a study of routing, car operation and general service conditions in that city. He presented a report thereon on Oct. 26, 1916, a statement regarding which appears on page 947 of the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 28. While the detail findings of the report are of local interest largely, it contains many interesting statements of underlying principles. These together with a few Rochester data selected for purpose of illustration are given in the following paragraphs.

SUMMARY OF PRESENT CONDITIONS IN ROCHESTER

The report states that the city of Rochester should provide a profitable field for street railway operation. Its population density is comparatively high, the business section is centrally located, and the city has a consistent record of fairly rapid growth. The present rate of return earned on the street railway investment, together with the probability of continued future growth without competition and present earnings per capita of approximately $14, should put the railway company in a financial position to make all improvements reasonably required.

The problem now presented not only concerns present conditions, but also provision of facilities adequate to accommodate future growth of street railway traffic. The number of passengers carried daily has been increasing from 80 to 90 per cent per decade, and downtown rush-hour traffic at an even greater rate. At present, the difficulty with service is more the result of lack of adequate street facilities in the downtown section and lack of improved operating methods than of faulty routing and failure to operate a sufficient number of cars.

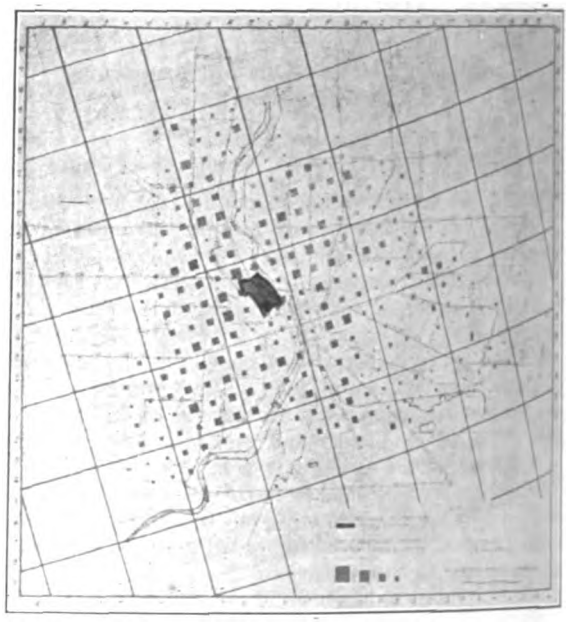
With one possible exception the present routing plan serves the city as a whole nearly as well as could be expected with present track facilities, considering the limitations imposed by the downtown street layout. The complete through routing of all lines is especially commendable. Routing of lines on Main Street has been so arranged that there are practically no curve movements between State and Elm Streets, which is very desirable from the viewpoint of operation and car handling capacity.

Data which were collected show community of interest between the sections of the city and indicate that, as a whole, the routes are reasonably well laid out, although there are certain additional connections which appear desirable, such as lines from the southeast to the southwest and northeast sections of the city.

It should be understood, however, that it is difficult if not impossible to serve every community of interest, at the same time avoiding congestion on Main Street and providing the proper balance between the two ends of through routes, which is essential from an operating standpoint.

The outstanding defect with the present routing is its entire lack of crosstown facilities in all sections of the city. It is recommended that such routes be installed. Such crosstown facilities, in addition to the increased convenience to patrons, will serve the double purpose of decreasing the length of haul and removing crosstown traffic from the congested district.

In view of the lack of river bridges on the north side adequate for street cars, operation of a proposed motor bus crosstown line, if suitably extended, should be reasonably satisfactory. However, such buses should be operated on the same basis as street cars, without charging an extra fare, or the advantage would be largely lost. In a city territorially as small as Rochester, and with its favorable street railway conditions, a 5-cent fare with universal transfers should be expected. Such crosstown lines should be a source of considerable additional revenue derived from persons who now walk across town, especially in rush hours.



ROCHESTER TRAFFIC CONDITIONS—SAMPLE CHART SHOWING RESIDENCES OF INDUSTRIAL EMPLOYEES

(Solid squares show density to scale. Dark irregular area represents industrial district in which the workers are employed.)

Taking the traffic counts made by C. R. Barnes last year as a basis, it appears that as a whole during rush hours the railway is providing better service than is given in a great many other American cities as regards the proportion of seats operated to passengers carried at the maximum traffic point. The fact that loading on individual cars is sometimes excessive is probably the result of headway distortion rather than failure to operate sufficient cars.

In a city of the size of Rochester there are certain operating limitations which do not exist in a smaller community. Obviously it is impracticable for all cars to operate on or to cross Main Street. Also, too frequent stopping places result in low speed and irregular headway, and patrons should not object to a stop spacing in residence districts of from 400 to 500 ft. Cars should not be expected to wait or make more than one stop at a given locality to pick up passengers.

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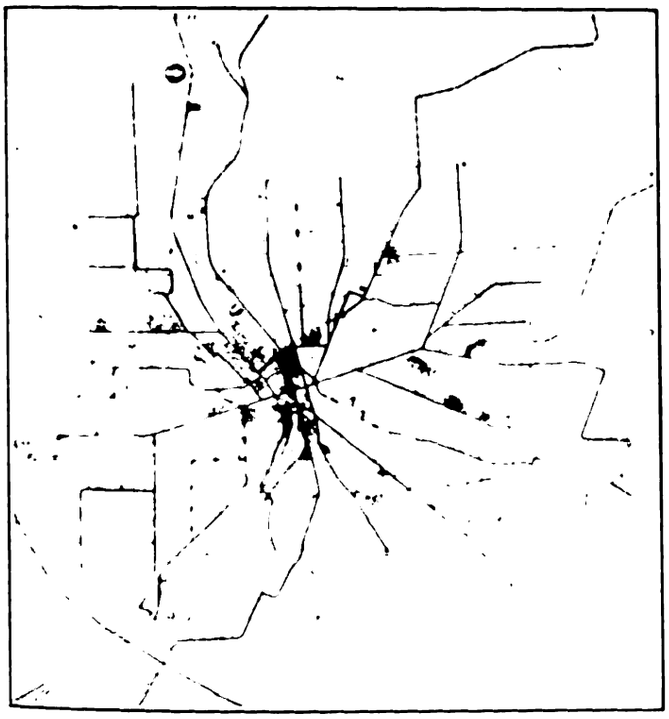
as traffic density has reached the point where "double-berth" or tandem operation is necessary downtown, and a car stopping in the second loading position should not be required to stop again at the first position.

Following the general statements abstracted above the report contains a number of detailed suggestions regarding conditions on the city lines. On the interurban situation it says that there is a pressing need for adequate interurban terminal facilities away from the streets used by urban cars. The present practice of using these streets as a station and for switching cars constitutes a serious interference with both street and local car traffic. One of the possibilities of the old Erie Canal right-of-way is for the development of an adequate interurban entrance and terminal.

General Characteristics of Rochester and Its Traffic Conditions

Rochester is a comparatively symmetrical city with the business, geographical and population centers very close together, which, from a street railway viewpoint,



ROCHESTER TRAFFIC CONDITIONS—CHART SHOWING DISTRIBUTION OF INDUSTRIAL EMPLOYEES

is advantageous, since the average passenger haul is less than if business and population centers were widely separated.

The area of the city is approximately 24 square miles, and in 1915 the census showed a population of 248,465, which, excluding the area of the 1916 Charlotte annexation, represents a density of about 18.8 people per habitable acre. For a city of 250,000 inhabitants this is a fair density, which again should make for short haul and profitable street railway operation.

The city is divided by the Genesee River, which presents a serious barrier between the east and west sides, particularly from a transportation viewpoint. Excepting in the downtown district, there is only one bridge within the city limits. On the south, at about the present city line, a range of hills presents a barrier to growth, although outlets are available for the Monroe and South Avenue car lines. A similar barrier is presented on the southwest by the new barge canal, but much vacant territory is still to be settled in that direction.

The street railway system of Rochester comprises 59.78 miles of line, all but 4.23 miles of which is double track. The radial plan has been followed, and at the present time the tracks occupy practically all the more important radial thoroughfares. No crosstown lines exist, although the system is much in need of such lines.

Several suburban and interurban railways focus at Rochester: the Buffalo, Lockport & Rochester Railway entering over Lyell Avenue; the Rochester, Syracuse & Eastern over University Avenue; the Rochester & Eastern over Monroe Avenue, and the Rochester & Sodus Bay over East Main Street. In addition, lines to Charlotte, Sea Breeze and Summerville are operated in connection with the local service.

During the period from 1906 to 1913 inclusive there was an average annual increase in the local street railway revenues of nearly 8 per cent. In the two following years, due to the business depression and competition of jitney buses, the revenues decreased an average of 5 per cent a year. Taking the passenger traffic in March as indicative of the fiscal year 1916, the revenue this year would amount to $3,540,000, representing an increase during the ten-year period since 1906 of 82 per cent. During the same period population increased only 37 per cent. As earnings usually increase as the square of the population, this would call for a revenue increase of 87 per cent, slightly more than has actually taken place. During the eight years preceding 1914, however, earnings increased faster than this so-called "law of the squares."

Assuming that Rochester keeps up its past rate of growth for another decade, and that rush-hour traffic increases only 75 per cent as fast as the total earnings, the present downtown streets now available as thoroughfares under present routing would probably be called upon to accommodate 60 per cent more traffic than at present, which would create intolerable congestion, even with the most efficient traffic regulation and car operation. With such improved operating conditions, the present volume of traffic should cause no difficulty. Future increase can fundamentally be provided by three methods:

1. Provision of additional downtown traffic arteries.
2. Diversion of traffic from the central district by the construction of crosstown lines.
3. Rerouting so as to turn cars back before reaching the central district, or divert them from the business section.

Of these only a combination of the first two will furnish reasonably permanent relief.

General Principles of Routing

Routing calls for much co-operation and mutual concession on the part of the riding public. Undoubtedly the greatest convenience to the shopping public at present would result if all lines were routed over Main Street. Limited track capacity on Main Street, however, compels diversion of some of the routes, and in view of the importance of this street first consideration should be given to an arrangement of routing which will tend to eliminate congestion thereon.

Through routes should, as far as possible, connect districts having a community of interest. Thus routes connecting two manufacturing sections or two important parks are not as desirable, other things being equal, as routes connecting a residence and a manufacturing district having a common interest, or a residence district and a park.

The two ends of a through route should have about equal density of traffic, particularly during non-rush hours. During rush hours, unbalanced traffic may be

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cared for by cars looped back or split between two otherwise independent routes if necessary. However, on general principles, every route should operate over the same line throughout the day unless distinctly signed otherwise.

Curve movements in and out of congested streets should be avoided as far as possible, particularly since clearance special work has not been provided in Rochester. Such movements take nearly twice as much time at an intersection as a straight through movement.

Indirect routings should be avoided. Likewise, whenever possible, routes should be brought directly into and out of the central district so as to permit transfer to other routes without carrying passengers needlessly out of their way.

Facilities should be provided for handling passengers traveling from one outlying district to another, without bringing them downtown—*i.e.*, by means of cross-town lines.

Obviously in a city with comparatively few downtown streets all of the above ideal conditions cannot be met. The street layout and the necessity for avoiding congestion on Main Street interpose too many limitations. Therefore some undesirable features must be endured in the interest of an otherwise good plan.

In view of the relatively large amount of traffic originating at the various industrial plants, stores and office buildings, it is desirable that routes be so arranged as to provide direct transit between these establishments and the residences of employees, if there is a marked community of interest between any particular residence district and any factory district.

To obtain data showing such traffic movement, a canvass was made of the more important business establishments, it being requested that employees fill out slips prepared for the purpose of showing their place of employment, place of residence and, in the case of riders, the car line used and any suggestions as to improvement in facilities. From these inquiries approximately 22,800 returns were obtained. These were charted as shown in sample diagrams such as reproduced on pages 1238 and 1239.

As a general rule, the indications are that many industrial riders are nearly as well served as is possible with present trackage, but there are certain districts showing a marked community of interest which are not directly connected.

APPLICATION OF FUNDAMENTAL PRINCIPLES OF LOADING, SCHEDULES, ETC.

After discussing general principles such as those abstracted above, the report takes up in detail the different routes and analyzes each in the endeavor to show the extent to which it meets the requirements. The concluding part is taken up with questions of loading, headway, car equipment, etc. It was pointed out that although Rochester rush-hour service as measured by relative seats operated and passengers carried is equaled by very few American cities, it does not follow that service on its individual lines could not reasonably be better apportioned or that some cars are not unreasonably crowded. A crowded car followed by two empty ones constitutes poor and inefficient service, even though the total seats exceed the passengers carried. Much of the complaint regarding service can undoubtedly be traced to non-uniformity in car loading, which in turn is due to irregularity of headway and failure properly to proportion service to traffic. Therein probably lies the most effective means of bettering service conditions.

Counts made in Rochester show that during the evening rush-hour period of ninety minutes, although 3 per cent more seats were provided outbound than there were passengers carried, nearly 18 per cent of the passengers were standing. As no excessive peaks exist within the ninety-minute-rush period, there should be no difficulty in scheduling cars closely to follow traffic variation.

Regarding gaps in service, an analysis of data from the 1916 Barnes report showed that for eleven routes the aggregate delay observed amounted to from 7 per cent to 30 per cent of the rush-hour period. Delays due to bridge openings were shown by the company's report to be quite serious, causing an average of about one hour per day per route. Delays due to defective equipment caused about forty minutes' delay in addition to 1.9 trips lost from the same cause. Broken trolley wires caused delays aggregating one-half hour per day. Of the total of 253 minutes' delay per day, 105 were due to cars off the track, defective equipment and to a certain extent broken trolley wires.

The records show that 6 per cent of the winter cars had to be changed each day in winter and 4.5 per cent in summer. This was considered to indicate that some of the equipment was too old to render satisfactory service or that the standard of maintenance was insufficient, particularly in winter. Old types of cars required changes of 9.6 per cent per day in winter and 8.4 per cent in summer, or nearly twice as frequently as the more modern cars.

The report listed as other possible causes of headway distortion the following: Vehicles failing to leave the car track on signal, faulty power supply, congestion, excessive number of stops, excessive car loads, poor car operation, lack of proper supervision and dispatching, lack of sufficient layover at termini to adjust schedules, mixed equipment not having uniform speed, and short headway on single-track lines.

Of the above some are quite beyond the control of the operating company, particularly track obstructions and vehicular traffic. In Rochester it is understood that snow is not removed from outlying streets except from the tracks, being simply swept to the adjacent roadway. Such practice causes vehicles to follow the track, makes it difficult for them to turn out and inevitably results in irregular headway. This condition is obviously a responsibility of the municipality.

Under present conditions a late car picks up more passengers than usual, the delay in loading making it still later, with a result that such a car is soon crowded with passengers. The use of a "Car Full" sign, although not popular in American cities, remedies this condition somewhat. The adjustment of the schedule of a car ahead of time by slow running on a track used in common with several other routes is a cause of irregular headway on other routes using that track. Cars on Main Street were frequently observed to creep along at half or quarter speed, thus holding up several cars immediately following. Such practice on the part of motormen should be strictly prohibited.

On the subject of schedule speed, the report states that the average is 8.73 m.p.h. as compared with 8.6 m.p.h. in 1911. This is considered low in view of the fact that as high as 9 to 10 m.p.h. is attained in other cities. The railway is commended for having made a good start in the elimination of a large number of stopping points during rush hours, but it is recommended that many of these be abandoned at all times. In residence districts a stop spacing of 400 ft. to 500 ft. is reasonable if applicable to existing block lengths. Where blocks are very short, or where streets offset, it is not necessary to stop at every intersection. It is further recommended that present far-side stops be replaced by near-side stops, for, as safety requires a car to slow down and sometimes stop at approaching an intersection, the near-side rule has the advantage of util-

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izing this slow-down or stop, which makes for increased schedule speed. The principal advantage of the far-side stop is that with equipment used up to recent years it is possible for passengers to board and alight at the crosswalk during bad weather. In the case of center-entrance cars or trailers, however, this advantage is entirely lost, while the new end-entrance, center-exit cars, the near-side stop has the advantage in that passengers can board the cars at the crosswalk. Also the present practice of educating passengers to use the forward-exit permits them to alight at a crosswalk with the near-side stop.

Such congestion and delay as now exists in Rochester is largely the result of the following causes: Lack of clearance curves, slow loading speed of cars together with heavy passenger interchange, imperfect traffic regulations at intersections, lack of multiple-berth operation, slow braking and acceleration of cars, and low speed across intersections.

Acceleration and braking rates, which determine the time required for a car to enter and clear a loading berth, have an important bearing on capacity. Observations made in Rochester with a special instrument recording acceleration and braking rates showed that the practice in this respect could be improved. Both rates averaged about 1 m.p.h.p.s. to 1.25 m.p.h.p.s., whereas in the downtown district rates of 1.5 m.p.h.p.s. to 1.75 m.p.h.p.s. should be attained, and outside of this district a rate of about 2 m.p.h.p.s. A marked failure was noted on the part of the motorman to approach a loading berth at fair speed before braking. The tendency is to creep into the loading position particularly if there is a car ahead. With double-berth operation this tendency would be removed.

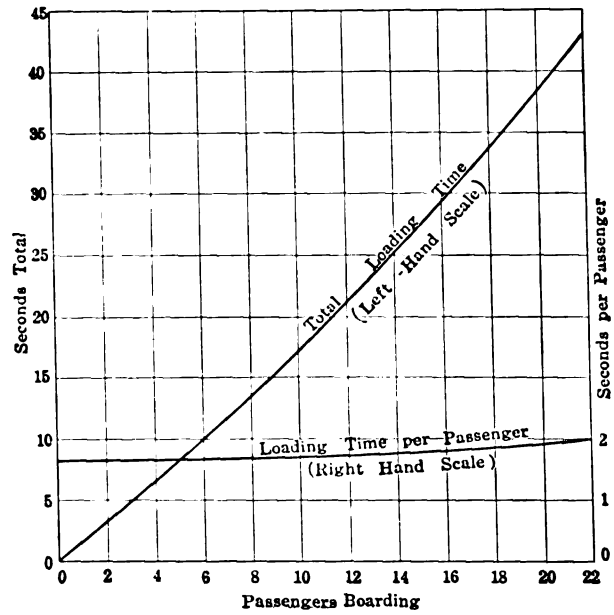
TRAFFIC REGULATION

Where any considerable density of car traffic is encountered the efficiency of street traffic regulation not only at intersections but also that governing parking of vehicles has a very marked effect upon operation, in fact the capacity of an intersection for handling car traffic may be in a large degree fixed by the efficiency of the traffic officer in charge. In Rochester observations of the signal interval during which crossings are kept open in each direction shows an attempt to clear one street entirely before opening the cross street for traffic movements, resulting in signal intervals which are frequently over a minute in length. As a general rule it is believed that conditions would be bettered by shortening the average interval to approximately thirty seconds, which is about the time required for passing two cars over an intersection in tandem operation. With shorter intervals their frequency would be greater and thus the time available for vehicle traffic in each direction would not be changed, whereas the delays at each intersection would be reduced and the capacity for car movement materially increased.

The report states that on wide streets, such as State Street and Main Street, the loading of cars was delayed because passengers usually had to find their way from the curb to the car among vehicles of various kinds. It was recommended, therefore, that safety zones be reserved on these streets approximately 100 ft. in length. Such zones encourage quick loading and remove the objection to double-berth operation. In addition, parking of vehicles on congested streets should be prohibited during mid-day hours within two car lengths of the near side of an intersection, for a time longer than that required to load or unload. Parking of freight vehicles should be entirely prohibited in the congested districts during rush periods.

Reference is made to certain ordinances governing car operation in Rochester, some of the provisions of which would work a hardship to the operating company and its patrons if enforced. For example, the 7 m.p.h. downtown speed limit would result in poor service, whereas street cars operating on a fixed roadway and under power-brake control should not be so limited as to speeds. Cars passing a standing car headed in the opposite direction are now required by ordinance to come to a full stop. It is believed that ordinary caution, such as a limited speed and ringing the gong should be sufficient in such cases. A rule prohibiting street cars from coming within 10 ft. of another car or vehicle at any mid-block cross-walk seems entirely unnecessary. There is no reason why such a limitation should apply to cars any more than to vehicles, as its enforcement would create additional congestion and delay.

In connection with the time of loading, the report calls attention to the fact that on the non-prepayment cars the loading time is greater than one and one-half seconds per passenger, and on the prepayment cars it



ROCHESTER TRAFFIC CONDITIONS—LOADING SPEED ON PREPAYMENT CARS

is one and eight-tenths seconds to two seconds exclusive of the time required for opening and closing doors. While the slowness of the passengers and their failure to have exact fare ready is partly responsible, the design of the platforms and the constricted passage is the most important factor.

On the few pay-within cars now operated by the company, loading speeds as high as one second per passenger were observed The new end-entrance, center-exit, pay-as-you-pass-the-fare-box cars, of which the company has now fifty on order, should load very rapidly. In fact, the delay if any will probably occur at unloading points, although this should not be serious.

CAR STORAGE FACILITIES AND LINE EXTENSIONS

In view of the objections which have been raised to the location of the downtown car house on State Street, the recommendations of the Arnold report are of interest. At present there are twenty-two ladder tracks branching directly off the southbound State Street track into this house, which cuts up the southbound roadway and is a source of delay to car and vehicular traffic. The company's plan to remodel and extend this carhouse is approved, except that one or more exits in addition to that on State Street are recommended. The company now plans to make this a double-end house with entrance

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tracks from Plymouth Street and extra tracks to State Street, with a "run-around" track from State to Frank on Commercial Street. The retention of the downtown house is approved, but it is suggested that as additional car houses are built in outlying sections, it should be used simply for storing tripper cars of many routes. By this means inbound trippers can be stored in the central district, ready to handle the evening rush-traffic promptly and with minimum dead mileage.

In making extensions into outlying districts, it is recommended that the radial plan be followed exclusively and that if routes are split both branches be radial. Crosstown lines serve a very definite purpose, but they should be constructed as such and not mixed with radial lines.

While probably the most desirable improvement in street railway facilities in Rochester is the construction of crosstown lines, few if any logical routes for such lines are now available due to the lack of bridges over the Genesee River. The report then suggests a number of suitable extensions of existing lines.

In conclusion, it is considered that the investment in city property of $3.26 per dollar earned per year is a reasonably low-investment ratio. The annual expenditure from maintenance depreciation of 13.9 per cent of the gross earnings is comparatively low for an urban property. Allowing 18 per cent for this purpose, and excluding certain debatable charges, there would have remained a net return of about 7.7 per cent on the investment in city property. This is not in excess of what has been allowed by commissions in similar cases, nor is it below what might be expected for a developed system holding a virtual traction monopoly. Thus even with a comparatively low investment ratio, the present service provided by the company would not leave a margin in net revenue sufficient to justify a very large additional expenditure without a corresponding decrease in the quality of service rendered.

P. S. R. A. Meets in Philadelphia

First Day's Speakers Discussed Insurance Topics—Papers the Second Day Covered Lightning Protection, Electric Welding, Taxation and Jitneys

THE main subject of discussion during the first day of the Pennsylvania Street Railway Association's convention in Philadelphia, Pa., on Dec. 12-13 was insurance, this being taken up from the general points of fire insurance and prevention, life insurance, and accident and casualty insurance. On the second and concluding day the program was more varied, for the topics included lightning protection, electric welding, taxation and the status of the jitney.

The convention was formally opened at a short morning session on Dec. 12 for the transaction of routine work. President Thomas A. Wright, vice-president and general manager Wilkes-Barre (Pa.) Railway, made a short address in which he recommended the appointment of a legislative committee whose function it would be to keep the association informed as to commission rulings, new laws and the like.

THE SESSION ON INSURANCE

The afternoon of Dec. 12 was devoted to the consideration of the various phases of insurance before mentioned. The first subject, fire insurance and prevention, was introduced in a novel way by H. W. Forster, general manager Independent Inspection Bureau, Philadelphia, Pa., assisted by C. L. S. Tingley, second vice-president American Railways, Philadelphia, Pa. These two presented an entertaining playlet, laid in the office of the general manager (Mr. Tingley) of the "Toonerville" Traction Company. The occasion was the presentation to him, in a twenty-minute interview, of a preliminary inspection report on the property. This interview brought out various practical points regarding the prevention of fires and of their spread.

For instance—to strip away all the theatrical framework—Mr. Forster first reported on the general subject of railway housekeeping, mentioning the collection of waste in pits, under benches and behind radiators. He recommended that the cleaning question be put up to the men for better co-operation, and he suggested ample bins for storing clean waste and also facilities for storing refuse until hauled away. In regard to conduit installation, he said that the fire hazard in main cables is not great, that conduit is expensive, may get moisture in it and is difficult to put into old cars, although it might be a different proposition for new cars. He spoke also of the advisability of keeping trolley poles down in the car-house, and of putting in a generous lighting system so as to make it unnecessary to keep the cars illuminated except when cleaning inside. In regard to pit illumination, Mr. Forster suggested for old pits conduit wiring run under the stringers supporting the track, with right-angle protected reflectors to throw light under the cars. Moreover, the care of inflammable liquids could be improved by keeping the gasoline supply in an oil house, by providing a cover for dip pans and by moving these away as far as possible from iron-heating furnaces.

On the subject of preventing fire spread, Mr. Forster mentioned the advisability of tearing out partitions preventing the easy entrance of fire hose, of removing wooden side wall sheathing that will carry fire from floor to ceiling, of using expanded metal partitions to allow free sight as well as easy play of fire streams, of eliminating unnecessary openings from a fire wall and equipping the other openings with standard fireproof doors, of having broken windows repaired promptly and of installing an automatic sprinkler system. It was said that the fire record of automatic sprinklers is exceedingly good, and such devices are rapidly being installed and very favorable insurance rates are almost always granted. If an entire sprinkling plant cannot be afforded, the car house should be equipped first. Furthermore, Mr. Forster said the hand extinguishing equipment should be kept in repair and the men should be instructed as to its proper use. Fire drills are also very important. Accidents to cars and derailments may properly be feared at such times, Mr. Forster thought, but he had seen very effective drills in which no damage was done and which undoubtedly would be of value in the case of actual fire.

In the ensuing discussion of the points raised, E. W. Bowman, supervisor of insurance Philadelphia (Pa.) Rapid Transit Company, emphasized the advantage of fire drills for electric railway employees. He mentioned how in one instance fire drills had made it possible for thirty-six cars to be taken out in four minutes without

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any derailments. Mr. Tingley said that a fire organization was just as essential as any other part of an electric railway system. There should be a fire chief, who had been taught what to do, and under him employees trained to obey. President Wright also thought that such a system was advantageous.

The second paper in this group was by Mr. Bowman, on "Co-operation in Fire Insurance." This will be abstracted in a later issue. After this, Mr. Forster described the work of the Underwriters' Laboratories, illustrated with excellent moving pictures taken in the main testing station in Chicago. He told how the laboratories make tests of samples, how they follow these up to make sure that the manufactured articles do not fall below the standard, and in general what the inspection label of the laboratories means. The pictures furnished by Mr. Forster showed in an interesting way some of the tests that are applied to fire-fighting apparatus, electrical apparatus, wire glass, safety doors and the like.

The remaining papers at this session included one on life insurance, *i.e.*, "Group Insurance for Electric Railway Employees," by W. F. Chamberlain, superintendent of group insurance division Travelers Insurance Company, Hartford, Conn., and three on accident insurance. In the latter group was one on "Precautions Against Accidents," by A. G. Jack, claim agent Southern Pennsylvania Traction Company, Chester, Pa., as well as one on "Public Safety Crusades," by Beatrice V. Clinch, the "Safety-First Lady" of the Philadelphia (Pa.) Rapid Transit Company. These will be published later in abstract form. Miss Clinch's paper was accompanied by stereopticon views used in her work in the Philadelphia public schools. The third accident insurance paper was by M. S. Bowman, accident and casualty department Travelers Insurance Company, who described the methods used in compiling manual rates under new compensation laws, and also explained how the average premium dollar to stock companies is used, as follows: Claims, 60 cents; taxes and licenses, 2.5 cents; accident-prevention service, 4 cents; investigation and adjustment of claims, 7 cents; general administration, 9 cents, and acquisition expenses, 17.5 cents.

A few special remarks upon the growth of the power of public opinion in this country and the general subject of electric railway publicity were then made by G. Henry Payne, New York, N. Y., and the meeting was adjourned.

An informal dinner was given on the evening of Dec. 12 by the association at the Hotel Adelphia, where the meetings were held. Part of the entertainment consisted of a series of moving pictures showing various electrification projects, these being furnished through the courtesy of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

THE FINAL SESSION

The convention was closed with a session on the morning of Dec. 13, the first paper being one on "Arc-Welded Track Joints," by E. A. Hoffman, engineer of way, Wilkes-Barre (Pa.) Railway. This is abstracted elsewhere. In reply to a query, Mr. Hoffman added the fact that a current of 150 amp. is ordinarily sufficient for electric welding of rail joints. The current varies with the character of the rails, but 200 amp. would be the usual maximum. President Wright said that his company had been much impressed with the results obtained in Wilkes-Barre.

Lieut.-Col. Chauncey B. Baker, U. S. A., had been scheduled to present an address on "The Use of Electric Railways in Pennsylvania in Connection with Mobilization and National Defense," but owing to unforeseen duties requiring his presence in Washington he was unable to be present. Three other papers, however, were read, as follows: "Taxation," by Boyd Lee Spahr, attorney, Philadelphia, Pa.; "Lightning Protection," by E. G. Newton, General Electric Company, Pittsfield, Mass., and "Status of the Jitney," by D. I. McCahill, general counsel West Penn Railways, Pittsburgh, Pa. These appear elsewhere in abstract form. Mr. Newton's paper was illustrated with stereopticon views showing various types of lightning arresters and points in connection therewith.

The only paper followed by discussion was that by Mr. McCahill. W. E. Boileau, general manager Scranton (Pa.) Railway, said that 130 complaints against jitneys operating illegally had been filed with the Public Service Commission. There are sixty-eight jitneys still operating in Scranton, according to the last check made, but only thirty of these are included among those against which complaints have been filed. He also mentioned the fact that some of the jitneys are being equipped with tops and claim to be heated so as to make a bid for winter business. President Wright stated that 240 complaints had been filed against Wilkes-Barre jitneys and that thus far fifty decisions against the jitneys had been handed down by the commission. He felt that the great problem is to find a way of following up and enforcing the commission orders.

J. Ralph Baker, attorney, Harrisburg, Pa., said that the railways had a very good chance to protect themselves in courts of equity against illegal competition and that the jitneys might be curbed by securing injunctions and laying the jitney owners open to contempt proceedings. While there are no legal decisions in Pennsylvania exactly along this line, he cited the case of one electric light company that has been prohibited by injunction from attempting to do business without the permission of the Public Service Commission. Mr. McCahill, however, thought that the ideal plan would be to have a law like that in Wisconsin, making illegal jitney operation a misdemeanor punishable by a fine, with imprisonment for non-payment. He was not sure whether such a law could be passed in Pennsylvania, but he did believe that the Public Service Commission should have the power to go into local courts in criminal proceedings to enforce its rulings. He also thought that a general commission order covering all jitney operation would have a good influence.

Mr. Tingley said that the association was confronted with two important questions—the first referring to the enforcement of jitney rulings of the commission and the other to the advisability of presenting at the next Legislature a bill authorizing electric railways to operate motor buses. J. A. Keppelman, attorney Reading Transit & Light Company, Reading, Pa., was of the opinion that the jitneys had brought into prominence the question of motor-bus operation by electric railways, and it would be an advantage in the future if they at least had the power to operate such auxiliaries. Morover, legislation to this effect would be a good influence for the enforcement of commission jitney orders. It was finally resolved that the executive committee or a special committee draft a special bill, authorizing the operation of motor buses by electric railways, to be presented to the next Legislature. The association also adopted President Wright's suggestion of a legislative committee of three members to keep the association informed along commission and legislative lines.

The next subject on the program was an open discussion on economies made necessary by present day

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problems in labor and materials, but there were no participants. The question box also evoked little discussion. W. A. Heindle, general superintendent Southern Pennsylvania Traction Company, Chester, Pa., thought that the time was ripe for securing the needed increase in fares for electric railways by raising the fare to 6 cents or charging 1 cent for transfers. Mr. Tingley said that a recording watt-meter used by one of his companies had cut down the cost of power and also the cost of maintenance because the employees now turn cars in just as soon as anything goes wrong. Mr. Hoffman stated that oxy-acetylene welding is too slow for economical use on track work, but that it is good for lighter work, sheet metal, etc. F. R. Phillips, superintendent of equipment Pittsburgh (Pa.) Railways, testified that the oxy-acetylene process is advantageous in making joints in fine sheet metal and for cutting rails and bars where an exact alignment is desired. For scrap and all material where no exact cut is needed electric welding is quicker and more economical.

The nominating committee then reported the names of all the existing officers and members of the executive committee for re-election, and these were approved. A proposal was then read to the effect that the association hold one regular annual meeting each year in May at the call of the executive committee. It was stated that under the by-laws this could not be acted upon until the next meeting in May, and the convention was then adjourned.

Arc-Welded Track Joints

The Author Points Out the Advantages of Welding Joint Plates to Rail Head and Base for Both New and Repaired Joints

BY E. A. HOFFMAN
Engineer of Way Wilkes-Barre (Pa.) Railway

ON the Wilkes-Barre Railway varied results have been obtained in building up battered special work by the electric arc. Ordinary built-up or cast-steel special work has been very successfully welded, but in the matter of welding manganese steel the chances of success and failure are about equal, and no amount of care seems to alter the chances. Manufacturers of manganese steel special work assert that this material can only be successfully welded if, after welding, it is subjected to heat treatment, and from three years' experience we are inclined to think that such is the case. For special work already installed this, of course, is impracticable.

The principal work for which our arc-welding outfit was used for the first three months was the building up of cupped joints which, after welding, were ground to a smooth running surface. But it was found that surface welding was only a temporary remedy for this defect, and the cause of the trouble, which was worn or loose joint plates, remained. Our present practice is, therefore, to weld the fishing surfaces of the worn plates sufficiently to keep the plates well away from the web of the rail and to grind to a good fit on both rails. After replacing the plates they are welded to the rails along the top and bottom edges whenever possible. The rail surface is then welded and ground. Joints repaired in this manner are still in excellent condition after two years of service on sections of track which, before being thus repaired, were sources of continual annoyance and expense.

In connection with the basic causes of such defective joints it may be said that in practically every mechanical joint there is a slight separation of the metallic surfaces of the rail and joint due to the presence of rust or mill scale or other poor conductor. Now if the copper bond joining the rails is insufficient or becomes defective, the return current will pass through the joint plates and may set up electrolytic action at the junction of the rail and plate surfaces. Defective bonds have been attributed largely to poor joints. May it not be that poor joints are caused by defective bonds?

To the same end it is safe to say that almost any modern mechanical joint is amply strong to carry the loads that pass over it. Its failure from purely mechanical causes is not due primarily to the weight which it has to carry, but to a movement of the parts that make up the joint including the rail. A perfectly-fitting joint is rare, and the effect of this is that when the plates are drawn up tight on one rail they are a trifle loose on the other. Although this looseness may be almost imperceptible, it does permit a slight vertical motion of the rails.

This rail movement causes the abrasion of the bearing surfaces of the plates and the adjoining rail, thereby permitting greater movement of the parts and may permit the receiving rail to be depressed so that the car wheel in passing from one rail to the other strikes with considerable impact, causing cupping of the receiving rail and battering of the top of the fish plate.

Still another cause of joint failure will be found in the stresses upon rails and joints which are produced by changes in temperature and which do not seem to be fully appreciated. The writer believes that this is one of the most important reasons for joint failure and most certainly must be reckoned with in the design of riveted or welded joints. Investigations show that rail temperatures follow very closely those of the air, lagging about 10 deg. Fahr. behind in the extremes of temperature. Assuming 0 deg. and 100 deg. to be the extremes for this latitude, there would be 80 deg. Fahr. as an easily attainable change of temperature in a rail embedded in a pavement. A simple calculation shows that such a change of temperature would produce a stress of 16,000 lb. per square inch of section of a restrained rail. In other words a rail weighing 100 lb. per yard, if laid in midsummer weather, would be subjected to a tensile stress of 80 tons when the temperature was zero.

The ordinary bolted joint will not withstand, nor is it designed to withstand, such a powerful pull, and the result is that the rail slips in the plates and the joint opens in cold weather. This slip does not occur at every joint, for obviously the weaker joints would yield first, thereby relieving the stress in the others. But this slipping has resulted in an abrasive action between the fishing surfaces of the rail and joint, and by frequent repetitions because of lesser changes of temperature, it results in the wearing away of these surfaces and the loosening of the joint.

It is contended by some engineers that the friction of the surrounding pavement relieves joints of the full theoretical temperature stresses. This restraining effect may reduce the width of the opening at joints, but it does not diminish the stress before slipping of the joint occurs, as the stress is caused by contraction of the rail and is therefore present in every foot of the track. That the restraining effect of the pavement is uncertain is shown by the fact that in one instance of record a broken joint in a welded track opened nearly 2 in., which would indicate a free movement of 300 ft. of the adjoining rail.

From the above analysis it appears that a properly-designed rail joint should comply with the following conditions: (1) It should be proof against chemical action; (2) Its conductivity (or that of the bond) should be sufficient to prevent electrolytic action; (3) Movement between the parts of the joint and the rail

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must be prevented; (4) It should have mechanical strength to resist the transverse, shearing and tension stresses caused by traffic and temperature.

All these requirements can be reasonably fulfilled by fish plates of the same general design as ordinary plain plates, welded along the edges to the rails, although some modification in shape is desirable to facilitate welding and to meet other conditions.

Such a joint could be made practically waterproof, as far as the fishing surfaces are concerned, either by welding the ends or filling the space between the plate and rail with tar or grout, and it would therefore be immune from chemical action. Tests show that such a joint has an electrical conductivity in excess of an equal length of rail. Electrolytic action would consequently be eliminated. The welds along the edges of the plates prevent any relative movement of the parts of the joint. The incipient movement in new joints is easy to restrain if not allowed to develop, but even on old, ill-fitting joints we have had remarkable success in stopping the "working" of the joint by simply welding the top and bottom edges of the plates to the rails.

The transverse strength of a pair of modern plain joint plates is nearly equal to that of the rail, while for vertical shear there is a very large factor of safety, even for the heaviest cars. Temperature changes in a joint thus welded will produce a shearing stress in the welds, and there is a question as to how much weld is required to resist this force.

To meet this question we have evolved from a number of experiments a very simple rule for field use: "The length of weld in inches on each rail should be equal to one-half the weight per yard of the rail." For example, rail weighing 140 lb. per yard, which is the heaviest in general use, would require a pair of plates 35 in. in length. Since 36 in. is quite a common length of joints for rail of this weight, it is apparent that a joint constructed according to the above rule does not require the use of plates of unusual length.

It will be noted that these top and bottom welds on plain plates distribute the stress very symmetrically over the cross-section of the rail. It might be said that we have experienced some trouble from eccentric welding. In one instance, where plates were welded to the base of the rail only, several rails broke during the first cold snap.

It has been argued by some opponents to welded joints that the heat of the weld seriously affects the integrity of the adjoining metal of the rail, and it is pointed out that failures in many welded joints occur just outside the weld partly because of internal stress set up by unequal heating of the rail section and partly to the deleterious effect of the heat. But in the arc-welded joint above described only a small percentage of the cross-section of the rail is affected by the heat of the weld, since experiments show that the effect of the heat of an ordinary arc weld does not extend further inward than about $\frac{3}{8}$ in.

On a 100-lb. T-rail with four welds, assuming this maximum depth, less than 10 per cent of the cross-section of the rail would be affected, and as even this affected area still retains considerable strength, it is safe to say that the strength of the rail is not reduced more than 5 per cent.

Track constructed with these modified plain joints can be laid, bolted and surfaced in the usual manner and then welded at convenience after traffic is resumed. This is a valuable feature on single track where traffic cannot be rerouted.

Riveting the joint plates instead of bolting them would of course greatly strengthen the joint, but many companies have not the facilities for economical riveting and we do not consider it essential, as a well-bolted joint will develop considerable frictional resistance in addition to the strength of the welds.

Taxing Electric Railways

Author Points Out Various Taxes Used in Pennsylvania Localities, in the State and in the Nation

BY BOYD LEE SPAHR
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TAXATION of street railway and traction motor companies may properly be classified into three groups: (1) local; (2) State, and (3) national. The purpose of this paper is to state briefly the various kinds of taxes in each of these three groups and to point out their more prominent requirements.

LOCAL TAXATION IN PENNSYLVANIA

Local taxation may be subdivided into tax on real estate, tax on personal property, licenses (which technically are not taxes), and the various requirements in consenting ordinances, which are simply another form of taxation. Real property of street railway companies is not subject to the same rule throughout the entire commonwealth. On the contrary, there is one rule for Philadelphia, another rule for Pittsburgh and a third for the rest of the State. In Philadelphia under an old special act of the Legislature, all real estate of street railway and traction companies is taxed with the exception of power houses, battery houses and converter houses. In Pittsburgh the street railways are even less fortunate, for there an early special railroad act made all real estate of railroad companies taxable except the right-of-way. In all other parts of the State all real estate which is essential to the operation of the franchise is exempt from local taxation.

The only kind of personal property peculiar to street railways which is subjected to a local tax consists of cars in cities of the third class, which are authorized by an act of the Legislature to levy such a tax. It is also lawful to impose licenses on street railways based upon the police power to inspect the condition of personal property, such as cars, poles, wires, conduits and cables. Municipalities, however, cannot impose a tax on such property in the guise of a license fee, which cannot be exacted for the purpose of revenue but only to cover the actual cost of police supervision and inspection.

The remaining kind of local taxation comprises the various requirements in municipal ordinances. These have occasionally taken the form of a tax on dividends; sometimes a tax on dividends in excess of 6 per cent and sometimes a provision for sharing any excess over 6 per cent with the municipality. An annual tax on cars or other property may be imposed as a condition of consent. The usual form, however, is a provision requiring either the paving or repairing of streets, or both. Apart from any provisions in any charter or ordinance, there is a common law liability on all street railways to keep in repair in a manner corresponding to the rest of the street, the space occupied by the roadbed. The charters and ordinances have enlarged this to include, in some cases, a certain number of feet on either side of the rails and in many instances the entire cartway from curb to curb. These requirements are among the heaviest operating expenses which street railways are called upon to bear, and are also those which the public at large least realize or appreciate.

FOUR KINDS OF STATE TAXES

State taxation in Pennsylvania is of four kinds, the charter bonus of one-third of 1 per cent of the authorized

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capital, the tax on capital stock at the rate of 5 mills on the dollar, the tax on loans at the rate of 4 mills on the dollar and the tax on gross receipts at the rate of 8 mills on the dollar. Corporations of all kinds are subject to the first of these taxes, and corporations of all kinds having loans are subject to the loan tax. It has long been the policy in Pennsylvania, however, to exempt manufacturing corporations from the capital stock tax. It is difficult to see on what principle this exemption should exist. Not only do street railways and other public service companies thus pay a tax from which a more numerous and, in general, a more wealthy class of corporations is exempt, but they also pay a tax of 8 mills on their gross receipts, thus becoming the most heavily taxed class of corporations in the State.

TAXES PAID TO NATIONAL GOVERNMENT

Taxes payable by street railways and traction motor companies to the national government do not differ from those paid by other corporations generally. On Sept. 8, 1916, Congress in amending the so-called war tax or emergency revenue act of 1914 re-enacted an excise tax against corporations with respect to carrying on or doing business. The tax under this new act is not based upon income but is levied at the rate of 50 cents for each $1,000 of fair value of the capital stock, with a general exemption from said value of the capital stock of $99,000. This act goes into effect on Jan. 1, 1917, and the tax under it will be payable during that month for the six months ended July 1, 1917, calculated upon the value of the company's capital stock during the year July 1, 1915, to July 1, 1916. The really interesting feature of the new excise act of 1916 lies in the phrase, "doing or carrying on business," which is identical with that in the old excise act of 1909. Under the old act the query speedily arose whether a street railway which had leased all of its property and franchises to another company for a long period of years was doing or carrying on business so as to be subject to the tax. To the great discomfort of the treasury department, the courts throughout the country have quite uniformly held that such a company is not subject to the tax. The mere fact that the lessor company receives a rental which is distributed among its stockholders as a dividend, that the interest on its bonds is paid by the lessee either directly or through the lessor company, that the lessor may have agreed to the extension or refunding of bonds or have acquired additional property rights or extensions to be operated by the lessee, that the lessor was itself the lessee of other underlying companies and that payment of the rental to such companies was made by the operating lessee to such intermediate company in the first instance and by it turned over to the companies under it, that the lessor company may have exercised the right of eminent domain—these separately or collectively are not sufficient under the decisions to constitute "carrying on" business. There can be only one result as to leased roads under the new excise act. While they will not ultimately be taxable, they will be put to a considerable amount of trouble in paying the tax under protest and taking the necessary steps to get it back. As the doing of business is a mixed question of law and fact in each particular case, there is no way in advance of avoiding the payment.

The other federal tax is the direct income tax first passed in 1913. By act of Congress of Sept. 8, 1916, the law has been re-enacted with considerable improvement in the phraseology, but the tax is now 2 per cent upon the net income instead of 1 per cent. Of all species of existing taxation, the income tax is probably the fairest, provided it is equitably assessed and collected. It is submitted, however, that the exemption to individuals of $3,000 or $4,000, depending on whether the person is single or married, is entirely too high and that instead of doubling the tax on other persons and on corporations, Congress should have lowered the exemption.

Lightning Protection of Electrical Systems

An Outline of the Fundamental Theory of the Subject, Its Application to Everyday Practice, and a Tabular Summary of Lightning Arrester Practice

BY E. G. NEWTON
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WHILE the lightning protection of electrical systems is only one of the problems in the general scheme of adequate protection of electrical apparatus, it is one of the most important. The term "lightning" means to the average mind visible atmospheric disturbances caused by electrical discharges from cloud to cloud or cloud to earth. As applied to electrical lines it includes what may be called external and internal voltage disturbances. These disturbances may directly or indirectly affect the operating conditions by producing destructive voltages.

In general there are four causes for voltage disturbances in an electric circuit, namely: lightning, arcing grounds, switching and resonance.

GENERAL RECOMMENDATIONS COVERING THE SELECTION OF LIGHTNING ARRESTERS FOR RAILWAY SYSTEMS

Railway Systems	Generating stations	A.c. aluminum arresters	Low-tension buses (0-7250 v.)
			High-tension lines (0-155,000 v.)
		D.c. aluminum arresters	Buses or feeders (0-3800 v.)
	Transmission lines	A.c. aluminum arresters at stations (0-155,000 v.)	
		Overhead ground wire for lines	
	Substations	A.c. aluminum arresters	Incoming lines (0-155,000 v.)
		A.c. multigap arresters	Incoming lines (0-37,000 v.)
			Outgoing feeders (0-7500 v.)
		D.c. aluminum arresters	Rotary converters (0-1350 v.)
	Cars and locomotives	D.c. aluminum arresters (0-3800 v.)	
		D.c. magnetic blowout arresters (0-3800 v.)	
	Trolley circuits	D.c. magnetic blowout arresters (0-3800 v.)	
	Telephone lines	Combined fuse, switch and lightning arrester	
		Horn gaps	
		Drainage	

Lightning: Lightning can be divided into two classes—direct and indirect strokes. Direct strokes are not common on lines, as there is less chance of lightning striking an insulated conductor than the towers or any other conducting objects connected to earth. Fortunately the effects of a direct stroke are less than many indirect ones, as they are of such intensity and voltage as to be localized. Before the impulse can travel along the line the insulation gives way and the abnormal energy is dissipated to earth. Hence direct strokes cause interruptions to service, but seldom affect the station apparatus unless the stroke is near the station.

Indirect strokes may be of any intensity or voltage, from the minutest impulse to practically the severity of a direct stroke. This class of disturbance may be induced electrostatically or electromagnetically, or the effects of both of these may be on the line at the same time.

Arcing Grounds: This class of disturbance is most dangerous to the station apparatus of all that affect an electric circuit, due to the fact that the frequency is relatively high and the duration of the disturbance is often a question of minutes, or even hours. An arcing ground is usually the result of damaged insulation. When the line voltage rises to the breakdown value of the defective insulation, an arc takes place to ground.

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which naturally short-circuits the electrostatic capacity of the wire. This necessitates a complete readjustment of the charging currents on that line, and in fact on the entire circuit. When the voltage on the defective phase falls below the voltage required to maintain the arc across the fault, the arc is extinguished, and the voltage again rises to the value required to re-establish the arc across the fault. This condition continues until the circuit is opened and repaired. The voltages of these disturbances are limited to approximately double potential.

Switching: In closing a switch, thereby connecting a dead line on to a system, we have two conditions which produce disturbances: First, the line must become charged by a wave of energy passing to the extreme end of the line. If the line is open at the end there will be a reflection at this point and the voltage will rise to approximately double value. This wave, after reflection, will pass back and forth along the line until it finally comes to rest as the result of being absorbed in the resistance of the circuit. The second effect of closing a circuit is due to the fact that this circuit represents additional capacity and inductance. If the circuit contains only inductance like a transformer, there would be a rush of magnetizing current if the circuit were closed at zero point of the potential wave. The value of this current would depend upon the saturation of the iron and the relation of the residual magnetism. In like manner, if a circuit contains only capacity there would be a heavy rush of current if the circuit were closed at the maximum point of potential wave.

GENERAL RECOMMENDATIONS COVERING THE SELECTION OF LIGHTNING ARRESTERS FOR ALTERNATING CURRENT SYSTEMS

A.C. Systems	Generating or substations	A.c. aluminum arresters	Low-tension buses (0-14,000 v. High-tension lines (0-155,000 v.)
		A.c. multigap arresters	Low-tension lines (0-14,000 v.) High-tension lines (0-37,900 v.)
		By-pass protectors	Current transformers (0-155,000 v.) Feeder voltage regulators (0-14,000 v.)
		Aluminum arresters Horn arresters	Constant current feeder circuits (0-9 00 v.)
	Transmission lines	A.c. aluminum arresters	Stations (0-155,000 v.)
		A.c. multigap arresters	Stations (0-37,900 v.)
		Overhead ground wires	Lines
	Telephone lines	Combined fuse, switch and lightning arresters Drainage coils Horn gaps	
	Pole transformers	A.c. multigap arresters	Low-tension feeder (0-300 v.) High-tension lines (0-14,000 v.)

Somewhat similar conditions occur when the circuit is opened, since it is impossible suddenly to change the electrostatic or electromagnetic conditions in a circuit without diminishing or increasing the stored energy. This requires a sudden readjustment, which takes place in the nature of a transient surge.

Resonance: Resonance is a condition which occurs when a circuit containing inductance and capacity oscillates at its natural frequency. Resonant conditions at fundamental frequencies are rare, but at the frequencies that occur at the higher harmonics resonance does frequently occur, particularly in sections of windings of high voltage apparatus.

Before attempting to provide adequate lightning arrester protection for an electrical system there are certain fundamental things which should be considered, such as initial investment in apparatus to be protected, liability of loss of this apparatus, and loss in revenue, penalties and prestige from interruption to service. Lightning arresters should be selected to give maximum protection for a given capital investment. This involves consideration of the arrester unit itself, of its location and connections, and of the method of grounding.

In considering the arrester unit itself, attention must be paid to the fact that electrical transients, whether from external or internal origin, travel along the transmission or distributing lines at the speed of light and must be dissipated to ground in the least possible time without any appreciable flow of generator current and without any after effect on the normal line conditions. As all lightning arresters operate on voltage they are practically independent of the capacity of the apparatus to be protected. This means that the degree of protection afforded by arresters similarly placed is primarily a question of their relative discharge ratios and whether or not the protective circuit is interrupted by the operation of the arresters. The discharge rate of an arrester is inversely proportional to its impedance. From this standpoint of protection, therefore, it is desirable to have the lowest values of resistance. In the well-known aluminum arrester the only resistance to abnormal potentials is that of the electrolyte, which is very low, and consequently this type gives the best protection. In the case of other standard types of arresters it is necessary to add a certain amount of shunt or series resistance to enable the arrester to function properly. Consequently these arresters have a lower discharge rate. In selecting arresters only those should be considered which have the lowest possible resistance that will enable the arrester to properly function and still keep the destructive voltage well below the tested insulation strength of the apparatus being protected.

After the selection of the lightning arrester the next step in the general scheme of protection is the proper location. Theory, tests, and actual operating records prove that maximum protection is obtained only when the lightning arresters are installed as close as possible to the apparatus to be protected. This means that in the case of generating or substations the arresters should be located at the buses, and on the incoming or outgoing feeders; or in the case of pole transformers at the terminal of each transformer. In addition to protection, arresters requiring daily or frequent attention should be located where they can be readily operated and inspected.

Next in importance to proper selection and location of the lightning arrester are the line and ground connections. These must be short and direct to give minimum impedance, for the degree of protection afforded by any arrester is inversely proportional to its impedance, which must necessarily include the whole arrester circuit. Sharp bends or small diameter conductors in the arrester circuit should be avoided. Also in car wiring, wire that carries lightning current should not be placed near and parallel, for any considerable length, to any of the other wiring, to prevent damage being done by an induced charge.

Special attention should also be given to the arrester grounds, which should be so made that they are always in the permanent moisture strata of the earth and so constructed and located that they will be low in resistance and permanent. Arrester grounds should be independent of apparatus grounds which carry power currents, as power currents tend to bake out the grounds with a resulting increase of the ground resistance. It is common practice to select and locate arresters carefully but to neglect the grounds. The resistance of the arrester grounds should be measured at regular intervals to see that they are in normal condition and all connections thoroughly made.

The accompanying outlines cover in general the recommendations for the selection of lightning arresters for alternating current and railway systems and serves as a summary of the subject.

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Status of the Jitney*

Although the Jitney Is on the Wane, There Is Need for More Extensive Jitney Supervision to Protect Established Utilities

BY DAVID I. McCAHILL, LL.M.
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IN my search of the English language for a word that would correctly describe the status of the jitney (aside from the use of profane language) I was able to find but one, "outlaw." What I mean by this is that except in very rare instances, the jitneys in Pennsylvania are openly operating in direct violation of the law. There might have been some excuse for the owners of automobiles in Pennsylvania beginning to operate as common carriers without first securing a certificate of public convenience from the public service commission prior to the time the commission decided what has since become known as the Scranton cases, but the decisions in these cases leave no doubt that before any jitney operator can lawfully carry passengers for hire, he must secure such a certificate. There is no more justification for him to begin his operations without such consent than there is for an electric light, telephone or street railway company to begin operation without the consent of the public service commission as evidenced by its certificate of public convenience.

The growth of our communities has been made possible only by having dependable transportation, and the future welfare and growth of all of our communities now depend and always will depend upon adequate and permanent means of transportation. But the jitney operator begins by sucking the life blood of the transportation company by taking away its revenues and profits so that it will be unable to perform its functions to the public. But if this should take place, the jitney could not step into its place and do for the community that which the street car company could have done and, except for the jitney, would have done.

STATES WITH PUBLIC SERVICE COMMISSION OVERSIGHT

I have found only five states that have subjected the jitney to the jurisdiction of the public service commission by express statutes. These are Colorado, Maryland, New York, Rhode Island and Wisconsin. There are fifteen other states, and the District of Columbia, in which the public service commission law is broad enough to cover the operation of jitneys, although the jitneys are not made so subject to any special provision. Of these fifteen states, only five and the District of Columbia have exercised their jurisdiction over jitneys as common carriers. These five states are Arizona, Georgia, Illinois, Pennsylvania and West Virginia. The remainder of the fifteen states, to wit, Connecticut, Idaho, Louisiana, Nevada, North Carolina, Ohio, Oklahoma, Vermont and Virginia, have not exercised the jurisdiction apparently conferred upon the commission to regulate the operation of jitneys.

The other states do not appear to have conferred jurisdiction upon the public service commission to regulate jitney traffic, although in many of them such control has been exercised by local municipalities. Many of these municipal ordinances have been contested in the courts and important principles affecting jitney regulations have been decided. Thus the Memphis ordinance was reviewed in *Nolen vs. Reichman, Sheriff, et al.* in 225 Fed. Rep. 812, also in *City of Memphis et al, vs. State ex rel Ryals* 179 S. W. 631; and P. U. R. 1916-A, 825, also in *Memphis Street Railway Company vs. Rapid Transit Company et al.*, 179 S. W. 635; P. U. R. 1916-A. 834. In these cases the court decided that the operation of jitneys in defiance of statutory requirement of license and execution of indemnity bonds against liability for injuries and in a manner to impair the safety of the public is a public nuisance that may be enjoined by a street railway that suffers material loss of revenue from illegal competition.

Other municipal ordinances which have been interpreted by the court are that of San Francisco in *ex parte Cardinal*, 150 Pacific, 348; P. U. R. 1915-E. 282; Fort Worth, Tex., in *ex parte Sullivan*, 178 S. W. 537; P. U. R. 1915-E. 441, and *Auto Transit Company et al, vs. City of Fort Worth et al.*, 182 S. W. 685, and P. U. R. 1916-C. 565; Huntington, W. Va., in *ex parte Dickey*, 85 S. E. 781.

Except in special cases, the jitney is on the wane. Its future, in this State particularly, seems to be confined to operation in good weather in and near summer resorts and places where people congregate temporarily and also, possibly, as a strike weapon. The unfairness of its use in the latter way is so apparent to electric railway men as to require no discussion here.

While the law in this State confers jurisdiction on the public service commission to regulate or forbid the operation of jitneys, as clearly decided in the Scranton cases, it seems to be unfair to expect the commission, with only seven members and with a limited appropriation, to give its time and attention to the details of the terms and conditions under which it will permit the operation of automobiles as common carriers. A statute similar to that passed in Wisconsin could be adopted in Pennsylvania with benefit to all parties concerned, and the commission would be called upon then only to determine whether there was necessity for the additional service in the community proposed by the jitney owner. The commission could well receive additional power, however, to deal primarily with all violators of the public service company law.

Finally, legislation throughout the United States, whether it has been state or municipal, which provides for the giving of a bond by the jitney operator, limiting drivers to those who have had previous experience, fixing the speed, fixing the number of passengers to be carried, fixing the license fee, fixing the minimum hours in which they will furnish such service, providing for a fixed route and a maximum fare, as well as penalties for the violation of such regulations, has been upheld by the courts in every instance.

*Mr. McCahill's paper was an extended discussion of the legal status of the jitney. It was in pamphlet form and included an index giving references to state statutes on the subject, to decisions by public service commissions, by federal courts and by state courts and to the text of ordinances in Harrisburg and Philadelphia. The abstract given in this issue is only an outline of the paper.

The October issue of *Trolley Topics*, published by the Louisville (Ky.) Railway, marked the completion of two years of its existence. This was one of the first electric railway house organs. Samuel Riddle, superintendent of transportation, and G. B. Powell, superintendent of employment of the company, are joint editors, while the men in the employ of the company contribute regularly. Several of the executive officers are usually represented in the leading articles, which discuss policies, etc.; there are occasional reprints from other publications; letters of interest to the company are published, and each department is represented by a column of notes. Part of the cost of publication is met by advertisements of Louisville concerns. On publication day the papers are done up in bundles and distributed to the heads of the various departments of the Louisville Railway, by whom they are supplied to each employee.

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C. E. R. A. A. Holds Annual Meeting

Accountants in Central District Consider Clearing House for Settling Interline Balances and Also Electric Light and Power Accounting—Power Outlook Makes Association Future Bright

THE Central Electric Railway Accountants' Association held its thirtieth meeting on Friday and Saturday, Dec. 8 and 9, at the Hotel Gibson, Cincinnati, Ohio. Two of the four papers presented were of a private character, but the other two, on electric light and power accounting and on a proposed clearing house for interline settlements on electric railways, will serve to indicate once more to all the constructive work that is done by the association.

SESSION ON FRIDAY

Before proceeding with the regular business at the first session on Friday, announcement was made of an invitation received from A. L. Kasemeier, auditor the Cincinnati Car Company, to visit their plant. It was decided that no adjournment should be made for lunch until the first paper on the afternoon program had been read and discussed and that the remainder of this program should be carried over until the session on Saturday in order that the members might take advantage of Mr. Kasemeier's invitation during daylight.

President F. T. Loftus, auditor Indianapolis & Cincinnati Traction Company, Rushville, Ind., in his opening address stated that the future of the association looked bright because many electric railways were entering the electric light and power field and new questions and problems would be presented, necessitating associated effort to solve. In comparison with the work done in some of the previous years, President Loftus said, the association had seemingly done very little during 1916. It had, however, added several good members to its organization, and its rules and agreements had been revised to meet all requirements presented, some for the future even being anticipated. The committee on electric light and power accounting was formed early in the year. The subject of settlement of accounts by bank draft was pushed forward as much as possible in an attempt to get the matter settled. In February President Loftus presented the matter before the Central Electric Railway Association and secured promise of their support. The recommendation of the passenger and freight committee as to a time limit on corrections was also approved. The Question Box was revived by appointing a new committee, but it now seemed that for various reasons this committee would not have any work, and President Loftus thought that it should be discontinued for the present. During the year the association took up with the Central Electric Railway Association the question of allowing an additional $100 to cover the expense of the secretary in attending the accounting meetings, which expense had not been anticipated at the time the original allowance was made because the former secretaries had always been company members. The additional amount was appropriated by unanimous consent.

The report of the standing committee on passenger and freight accounts was presented by Chairman Walter Shroyer, auditor Union Traction Company of Indiana, Anderson, Ind. It dealt at some length with the subject of settlement of interline account balances by bank draft. The report stated that all except three member companies were now using the plan, and these would probably adopt the recommendation at an early date. A complaint from a member company regarding the form of mileage coupons was referred to in this report. This question was discussed, and the committee advised to arrange a conference with the Central Electric Traffic Association to consider the matter further.

P. H. Diehl, district manager Railway Audit & Inspection Company, Chicago, Ill., then presented a paper on "Essentials of Street and Interurban Checking." Mr. Diehl pointed out the various conditions on railway properties in regard to the registration and collection of fares, and he explained the different methods of checking city and interurban railways in order to secure satisfactory results. Owing to the private nature of the subject it was decided to consider the association in executive session during the time consumed and no publication will be made of the paper or the discussion thereon.

The meeting then adjourned in order that the members might go on the Cincinnati Car Company trip. Automobiles took the party by a round-about route through the beautiful parks and residence districts of the city to the plant. The inspection of the shops, storeroom and offices was alone considered well worth the time spent.

THE FINAL SESSION

At the final session on Saturday morning the chairman of the committee on electric light and power accounting stated that no report could be made at this meeting as no questions of any moment had been presented for action, but that he hoped the committee would be continued, as its necessity would be apparent soon. A. E. Dedrick, auditor Youngstown & Sharon Street Railway, Youngstown, Ohio, then read a paper on "Electric Light and Power Accounting," presenting the subject in a very simple, easily understood and interesting manner. The opportunity for electric railways to sell their surplus current in the light and power field was dwelt upon, and the necessity of the accountants informing themselves upon the various phases of the whole question was particularly called to the attention of the association.

A. C. Van Driesen, chief accountant Toledo Railways & Light Company, Toledo, Ohio, next read a paper on "Recent National Legislation Affecting Electric Railway Accounting," strengthening his paper by references to rulings of the United States Treasury Department on the income tax laws as revised this year and by the quoted opinions of noted lawyers. The discussion of the subject and of the report-forms of the Interstate Commerce Commission was educational. On account of the intimate issues concerned it was decided that the paper and the discussion thereon should not be published in any manner.

The last paper was by E. L. Kasemeier, auditor Ohio Electric Railway, Springfield, Ohio, on "A Clearing House for Interline Settlements on Electric Railways." This appears elsewhere in abstract form. After considerable discussion the matter was referred to the standing committee on passenger and freight accounts for further investigation and action.

The report of the nominating committee was accepted

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unanimously, the new officers being as follows:—President—Oren A. Small, auditor Benton Harbor & St. Joe Railway & Light Company, Benton Harbor, Mich.; first vice-president—A. C. Van Driesen, chief accountant Toledo Railway & Light Company, Toledo, Ohio; second vice-president—A. E. Dedrick, auditor Youngstown & Sharon Street Railway, Youngstown, Ohio, and secretary and treasurer—A. L. Neereamer, secretary-treasurer Central Electric Railway Association, Indianapolis, Ind.

The new executive committee consists of the officers and the following members: B. H. Jacobs, assistant auditor Cleveland (Ohio) Railway; J. N. Tabb, treasurer Kanawha Traction & Electric Company, Parkersburg, W. Va.; E. O. Reed; auditor Western Ohio Railway, Lima, Ohio, and Ira E. Guthrie, secretary-treasurer Interstate Public Service Company, Indianapolis, Ind.

The meeting of the association was adjourned at this point. The executive committee met immediately afterward and decided that Fort Wayne, Ind., would be the place for the summer meeting, the date to be decided later.

Clearing House for Interline Traffic Accounts

Plan Is Suggested for Eliminating 90 Per Cent of Drafts Used for Monthly Settlements and Decreasing Bookkeeping Work

BY E. L. KASEMEIER
Auditor Ohio Electric Railway, Springfield, Ohio

THE plan of settling balances by drafts was before the Central Electric Railway Accountants' Association for two or three years, and was only recently adopted as the best method after being approved by the Central Electric Railway Association. I fully believe that the clearing house plan outlined hereafter would not only save a great deal of labor and unnecessary drafts but would be the means of overcoming the objections of those roads which formerly declined to adopt the draft plan for settling balances. It is not intended that settlement through the clearing house would be arbitrary for all members of the association, but its advantages might be used by such companies as cared to do so.

The function of a clearing house is to offset the debit balances against the credit balances. As a result, drafts for the minimum amounts would go through banks. The risk of loss would thereby be lessened, as very often drafts have to be forwarded through banks that are not financially strong and may fail before they account for the amounts collected by them.

The clearing-house plan would eliminate about 90 per cent of the drafts now being made for monthly settlements, with the consequent bookkeeping work in the treasury and accounting departments. Where formerly each railway paid or drew an average of twenty drafts, each would either pay or draw one draft. Instead of keeping separate ledger accounts with each company, the entire interline traffic accounts might be handled on one page of the ledger, under the heading of "Clearing House." The saving in postage and stationery would alone be sufficient reason for making the change.

The clearing-house plan seems well suited to member companies as it can be very easily handled through the office of the secretary-treasurer of the association at a nominal expense. To summarize the statements from all roads would take only a few hours of clerical work each month, and if twenty companies should go into the plan, the work could be done in four or five hours by one clerk.

To handle this properly, it would be necessary to have some blanks printed on which each member would submit to the clearing house its statement of debits and credits for each railway. These blanks would be printed by the association and furnished to the members free, as each company would use only one or two a month and should be relieved from the expense of having a few blanks printed. The clearing-house manager would enter on a large sheet, from the balance column of each company's statement, in the vertical column headed by the railway its debits against each other company and the total credit in the extreme right hand column. When the statements from each road had been entered, the totals of the vertical columns headed by companies would balance with the totals of the last vertical column. Balances showing the net amount due to or by the clearing house for each railway would be shown at the foot of the sheet.

The statement from each company should be sent to the clearing-house manager not later than the twenty-third of each month. On the twenty-fifth of the month the manager would draw on each road owing the clearing house and authorize the creditor road to draw on him on the twenty-seventh, or send out his check to the latter on that date. Railways sending monthly statements showing that they owed balances to the clearing house, might, if they desired, attach their checks or vouchers for the net balances due the clearing house, thereby avoiding the necessity of drafts being made against them later by the clearing-house manager. By paying in this manner, the railways could get the vouchers in the current month's account and prevent any interline balances from being carried over on their books.

Where differences existed between the balances, *i.e.*, the debits reported by one company against another did not agree with the credits reported by the other company, the manager would settle on the basis of the smaller amount and notify both companies. If adjustment should be necessary on account of the manager's changes, it should be taken up in the next month's statement to the clearing house.

There is a possibility that a draft drawn by the clearing-house manager might not be honored by the railway, such as when a receiver had been appointed. It would then be necessary for the clearing-house manager to secure funds from some source to meet the drafts of other companies on the clearing house, or to charge back to all companies credits taken by them against the receiver's line and make drafts for such amounts, leaving the individual railways to settle their claims with the receiver. It would be less work for both the clearing house and the member companies if the clearing house were in a financial position to carry these amounts until authorized by the receiver. At any rate, there would not be so much danger from loss to members on an occasion like this, where only the net balance from all companies would be at issue, as when each individual company made a separate settlement and some companies had probably paid the railway in receivership the balances due to it.

Formal dedication of the new $250,000 Ceramic Engineering Building of the University of Illinois occurred at Urbana on Dec. 6 and 7. Many prominent speakers including Gov. Edward F. Dunne, W. L. Abbott, president of the board of trustees, Dr. S. W. Stratton, director of the United States Bureau of Standards, and Claude Bragdon, author and architect, addressed the several meetings. The Ceramic Engineering Building is a three-story structure covering a ground area of 67 ft. x 189 ft.

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Coal Situation in Central States Remains Tense

Various Causes Contributing to Shortage Show Little Improvement—Hardship Created on Electric Railways—Price Likely to Continue High

IN spite of numerous instances of investigations and indications of apparent relief, the situation in the coal market remains acute or even tightens. The cause is manifold, although probably the most direct cause is the shortage of coal cars. The summary of car shortages for Sept. 30 showed a net shortage of 61,031 cars, of which 19,872, or nearly one-third, were coal cars. This seemed an exceedingly bad condition, but was eclipsed by the report for Nov. 1, which showed a net shortage of 108,000 cars—the greatest on record. Inadequate terminal facilities, insufficient motive equipment and the failure to secure prompt unloading of cars have together produced a congestion on many railroads which has effectually prevented anything like the normal movement of freight. This terminal congestion is further emphasized by the action of the Pennsylvania Railroad on Dec. 7, notifying the Western railroads that after midnight of that date no freight of any kind would be received for movement east of Pittsburgh. This indicates the worst terminal congestion America has ever seen, as a similar order has never before been issued. This accumulation of cars in the Eastern terminal, of course, seriously affects the supply of cars in the Middle West, and is partly responsible for the fact that some Illinois and Iowa mines are able to work only three and four days a week. In addition to this, the situation has been aggravated by the fact that the supply of coal cars has been absorbed to a considerable degree in other classes of railroad shipment, particularly in the movement of sand and gravel and of munitions and other war supplies. Instances are even heard of where Illinois and Iowa coal has been purchased in the East, not for the coal, but as a means to get the gondola cars for industrial shipments in the face of inability to secure box cars. The car supply at the mines during the summer months was estimated at not more than 80 per cent of normal, and this has now dropped to only 30 per cent in some cases.

Another common explanation of coal shortage is that industrial activities over the past year and a half, despite a very much enlarged coal output, have left surplus coal stocks in a depleted state. Eastern coal no longer moves to Western markets but is shipped farther East to industrial plants. Illinois coal is being shipped to Ohio and as far east as Buffalo. Because of the great profitableness of moving ore, lake boats which in former years carried eastern coal to the head of the lakes have been making the return trip empty to save time during the past season. As a result Illinois coal is also being shipped to St. Paul, where the supply has formerly been almost entirely from the East through Duluth and Superior.

Then there is the intimation that coal brokers have contributed to the rise in price of coal by certain manipulations, and the fact that the market shows a slight easement as the federal investigation gets under way indicates that there may be some basis for this accusation. With the closing of lake transportation, those who are buying coal on speculation may generally drift into other enterprises and possibly help to alleviate the present high prices. Another suggestion is that the high price of coal in Iowa is due not so much to the increased demand as to the increased production costs.

This combination of causes has meant a serious situation for the large coal users of the Central West. Those who have been buying coal in the open market have been forced to pay prices in some instances ten to fourteen times normal prices. Ordinarily through the months of August, September, October and the greater part of November screenings have dragged on the market, and coal which is now selling for $3.50 to $4.50 a ton has been bought for 30 cents to 40 cents a ton. This year, however, there have been no cheap screenings, and those depending on the open market for good buys find themselves in the high market time with no storage of coal from off-season purchasers on hand. Those who have purchased under long-term contracts have been more fortunate, but have not escaped the general tight condition of the market. While their purchase price has remained comparatively low, they have in most instances been able to get only a portion of the delivery called for in the contract and have consequently had to resort to the open market for the remainder of their requirements and pay enormous prices. The amounts of storage coal carried by the various electric railways have been as a general condition reduced to quantities of little consequence. Buying has been forced to comparatively small amounts. Limitations as to kind and quality of coal have had to be very generally removed, and companies making a practice of purchasing coal on B.t.u. basis have been glad to get coal of almost any heat value. The great demand has also caused a practical cessation of careful sorting of coal at the mines, and the companies receiving coal under long-term contracts have been forced to accept rather inferior grades.

The indications from various parts of the country give little encouragement from which to anticipate any reduction in prices. In the South during the past ten days the prices have increased. In the Northwest the shortage of coal is so pronounced that the docks, facing an early exhaustion, are beginning to distribute their coal only to the places where the needs are most urgent. The car supply in the anthracite fields, in western Pennsylvania, in Ohio, in Indiana and in Illinois is shorter than it was three weeks ago, when the market was at the climax of its rise, according to the *Black Diamond*. The Burlington Railroad last week fell short of its normal performance and compelled a group of its mines to close down for two days in mid-week. This is said to be an unprecedented situation on that line, which is classed now as perhaps the largest coal carrier in America.

The various commissions have advertised their efforts to relieve the situation so loudly that the people themselves have come to believe that cars are easier, and therein lies a danger. The fact is that the users, expecting relief, have to a degree stopped buying because the rush of orders was temporarily moderated. The buying movement week before last slowed down perceptibly, and in response thereto in some districts the price of coal went off as much as 50 cents a ton. However, this reduction in price was only in a few grades of coal but gave a softer tone to all the rest of the markets. This was only in the Chicago district, and when the situation is viewed as a whole the indications are that the market is not easing up as the prices in the central district would seem to indicate.

Jitney operators within the city of Houston, Tex., are required to have their routes permanently painted upon the windshields in letters 3 in. high, according to an amendment to the jitney ordinance which became effective recently. Objections were made to the passage of the amendment, but without effect.

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MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

Secretary Burritt Announces Program for Mid-Year Conference—Engineering Association Committee Appointments—Reports of Meetings of the Equipment Committee, T. & T. Executive Committee and Engineering Association Standards Committee—Company Section Activities

Mid-Year Conference Program

Secretary Burritt has announced the following program for the meeting which is to be held in Boston on Feb. 16, 1917, with sessions morning and afternoon.

(a) Reports of committees.
(b) Report of committee on social relations.
Dealing with
(1) The minimum wage.
(2) Old-age pensions.
(3) Employees' thrift.
(c) Prepared discussion of report.
(d) Paper: "Wage Arbitration and Contracts."
(e) Paper: "Salesmanship in the Electric Railway Business."

Committee Appointments

ENGINEERING ASSOCIATION

President F. L. Phillips has announced the following appointments to committees:

Equipment—W. G. Gove, Brooklyn, N. Y., chairman; L. M. Clark, Indianapolis, Ind., vice-chairman; Wm. E. Johnson, Brooklyn, N. Y.; H. A. Johnson, Chicago, Ill.; R. H. Dalgleish, Washington, D. C.; E. W. Holst, Boston, Mass.; J. J. Sinclair, Brooklyn, N. Y.; Daniel Durie, Connellsville, Pa.; J. R. Ayers, Utica, N. Y.

Heavy Electric Traction—Hugh Hazelton, New York City, chairman; E. B. Katté, New York City; W. S. Murray, New Haven, Conn.; C. H. Quinn, Roanoke, Va.; L. S. Wells, New York City.

Power Distribution—C. L. Cadle, Rochester, N. Y.; R. H. Rice, Chicago, Ill.; E. J. Blair, Chicago, Ill.; C. F. Woods, Boston, Mass.; C. R. Harte, New Haven, Conn.; E. S. Gillette, Aurora, Ill.; C. E. Fritts, Kansas City, Mo.; J. H. Libbey, Boston, Mass.; A. Schlesinger, Indianapolis, Ind.

Power Generation—J. W. Welsh, Pittsburgh, Pa., chairman; A. B. Stitzer, New York City, vice-chairman; F. S. Freeman, Boston, Mass.; E. H. Scofield, Minneapolis, Minn.; G. H. Kelsay, Anderson, Ind.; R. W. Eaton, Norwich, Conn.; C. W. DeForest, Cincinnati, Ohio; W. C. Slade, Providence, R. I.; E. F. Gould, Cleveland, Ohio.

Committee to Consider Safety Code of U. S. Bureau of Standards—C. L. Cadle, Rochester, N. Y., chairman (also chairman of Committee on Power Distribution); J. W. Welsh, Pittsburgh, Pa., vice-chairman (also chairman of Committee on Power Generation); C. S. Kimball, Washington, D. C. (also chairman of Committee on Buildings and Structures); W. G. Gove, Brooklyn, N. Y. (also chairman of Committee on Equipment); Hugh Hazelton, New York City.

JOINT COMMITTEE

Block Signals—J. M. Waldron, New York City, chairman; J. W. Brown, Newark, N. J., vice-chairman.

Engineering Association Members—John Leisenring, Springfield, Ill.; J. B. Stewart, Jr., Youngstown, Ohio; R. C. Johnson, Brooklyn, N. Y.

Transportation and Traffic Association Members—J. J. Doyle, Baltimore, Md.; G. K. Jefferies, Indianapolis, Ind.; J. J. Brennan, Fort Wayne, Ind.

Co-operation with Manufacturers Urged at Equipment Committee Meeting

At a meeting of the committee on equipment held in New York, Dec. 13, 1916, W. G. Gove, chairman, made a strong plea for co-operation between the committee on equipment and the manufacturers of equipment, of whom a number had been invited to have representatives at the meeting. Mr. Gove spoke first on the necessity for modernizing the Engineering Manual, emphasizing the need for consideration of various features on the part of the manufacturers' representatives, who were experts in the various branches of engineering therein treated. He thought the present time was opportune to change the entire tone of the Engineering Association, whose specifications for material would be of little value without the advice of the manufacturers, and he advocated taking full advantage of the opportunity afforded by their admission as members of the American Electric Railway Association. In fact, he would not care to see any action taken without the approval of the manufacturers' representatives, and for this reason wanted to have them attend sub-committee meetings and to have their opinions given such consideration as would permit unanimous action. If this was impossible, every opportunity should be provided for dissenting voices to be heard.

With regard to the detailed work of revision for the Manual, Mr. Gove advocated taking up no new work so that the necessary revisions and improvements in the association's standards could be cleaned up at the earliest possible date, although this would probably take two years' time. This, he said, was in itself an especially heavy piece of work and would no doubt demand great personal sacrifices on the part of those who would have to carry it out. Nevertheless the importance to the association was so vital that the committee's activities should not be circumscribed for any cause.

During the remainder of the committee's session, at which there were present L. M. Clark, Indianapolis, Ind., vice-chairman; J. J. Sinclair, Brooklyn, N. Y.; W. E. Johnson, Brooklyn, N. Y.; H. A. Johnson, Chicago, Ill.; Daniel Durie, Connellsville, Pa.; R. H. Dalgleish, Washington, D. C., and representatives of a number of manufacturers, detailed consideration was given to the various recommendations of previous committees on equipment. It was decided that a number of the more important suggested revisions be referred to sub-committees, which were to be appointed later.

T. & T. Association Executive Committee

A fully attended and enthusiastic meeting of this committee was held in New York on Dec. 11. There were present: L. C. Bradley, Houston, Texas, president; W. H. Collins, Gloversville, N. Y.; R. P. Stevens, Youngstown, Ohio; L. H. Palmer, Pottsville, Pa.; J. J. Dempsey, Brooklyn, N. Y.; R. B. Stearns, Milwaukee, Wis.; H. C. Donecker, Newark, N. J.; H. B. Potter, Boston, Mass., and E. B. Burritt, New York City.

The most important action taken at the meeting was the approval of a plan of organization whereby the supervision of committee work will be undertaken in

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groups, each of which will be presided over by a member of the executive committee. Details of this plan will be given in a later issue of the ELECTRIC RAILWAY JOURNAL.

Engineering Association Standards Committee

As this issue of the paper goes to press the above committee is in session in New York with the following in attendance: H. H. Adams, Chicago, Ill., chairman; C. L. Cadle, Rochester, N. Y.; C. H. Clark, Cleveland, Ohio; E. R. Hill, New York City; J. M. Larned, Pittsburgh, Pa.; John Lindall, Boston, Mass.; G. W. Palmer, Jr., Boston, Mass.; F. R. Phillips, Pittsburgh, Pa.; Martin Schreiber, Newark, N. J.; J. J. Sinclair, Brooklyn, N. Y. The association was represented by E. B. Burritt and C. W. Stocks.

After general consideration of the field before it, the committee appointed a sub-committee to prepare a new plan of procedure in the adoption of standards for presentation to the executive committee. This report was presented on Thursday and was scheduled for consideration on Friday afternoon. On Thursday the following statement of policy was adopted:

Recognizing that the standards of the American Electric Railway Engineering Association should be so framed as to meet the needs of the largest possible number of electric railway companies, and that material assistance in arriving at this end may be obtained from the criticisms and suggestions of the members of the association who may attempt to apply such standards to the conditions on their own property, the Convention of 1913 adopted as Rules 2 and 3 of the "Rules for the Adoption of Standards and Recommendations" the following:

"2. The executive committee shall determine what subjects shall be considered by the association for possible adoption as standard or recommendations. *Suggestions for new, or changes in existing, standards or recommendations may be submitted* in writing at any time to the president or secretary of the Engineering Association.

"3. The secretary shall submit such suggestions to the executive committee at a meeting or by mail. The executive committee may refer the suggestions to a proper committee with instructions to investigate the subject and report to the committee on standards."

At this time, when the question of a review and revision of existing association standards is up for consideration, the committee on standards calls the particular attention of all of the members of the association to these provisions.

The committee appeals for the assistance of every member company. It hopes that in the interests of the industry, and the interest of the member company itself, that each will make an investigation of the existing standards of the association, with the idea of their applicability to their own needs and uses, and that after such study has been made the association may have the benefit of the criticisms and suggestions which arise therefrom.

The desirability of erecting standards which can be generally adopted must be apparent to all executives and operators of electric railway properties. They are in the interest of economy and efficiency, and such assistance as your company may render in the perfection of those already created cannot but redound to the interest of every one concerned.

R. W. Perkins Addresses Connecticut Company Section

As was mentioned on this page in the issue for Dec. 2, one of the speakers at the November meeting of Company Section No. 7 was R. W. Perkins, president Shore Line Electric Railway. At the time the manuscript of Mr. Perkins' address was not available. Its topic was "County Bureaus to Encourage Agricultural Developments as They Relate to the Street Railway Industry." The purpose of the address was to interest the electric railway men in the opportunities and problems of the farmer to the end that they might co-operate in promoting the more intensive and extensive agricultural developments of their communities. Mr. Perkins showed by many statistics that the United States is far behind many other countries in agricultural production. He explained the plan of the "County League" which is organized to encourage agriculture said that the Shore Line had contributed to the formation and support of this league in four counties in the belief that the creation of any form of business activity along this company's line will add to its revenues and that on lines where the passenger business permits of operating only hourly service, some means must be provided for increased use of the investment. Intensive farming means the employment of more people and an increase in railway receipts. Mr. Perkins explained that the headquarters of the league are in the Chamber of Commerce Building, New Haven, and that the dues are $1 per year.

Nov. 6 Was Medal Day for Meralco Section

The feature of the meeting of the Manila Electric Railroad & Light Company Section held on Nov. 6 was a talk from Vice-President Duffy regarding his approaching visit to the United States and the presentation by Mr. Duffy to B. H. Blaisdell of the Doherty gold medal which had been awarded by the National Electric Light Association for the best paper presented before a company section. Ten new members were received, of whom nine were from the transportation department.

Mr. Duffy's talk was of a personal nature, beginning with the statement that he was leaving Manila for three months partly for business purposes and partly to spend Christmas with his family. He expected to attend the mid-winter meeting of the association. He took the occasion to review the two years' history of the section and congratulated it upon the facts that twice had medals been received for papers presented and that the membership is 118, which, considering the total number of employees (1600) and the cosmopolitan character of the membership, is very creditable.

In presenting the Doherty medal, Mr. Duffy exhibited the medal and described it in detail and also carried out his promise to present personally the sum of 100 pesos to the winner. Not to be outdone by Mr. Duffy in generosity, Mr. Blaisdell in turn promised to present a similar amount to the next member of the company section who received a medal from either the American Association or the N. E. L. A. The entertainment features of this meeting were rather unusual, one being a volley ball game between the Filipino team from the transportation department and the Filipino team from the electric department. There were also pillow contests, silver mining, apple float, four-arm wrestling and music from the transportation department orchestra.

Recent Hampton, Va., Meetings

At a joint meeting of the railway, gas and electric company sections of the Newport News & Hampton Railway Gas & Electric Company held on Dec. 5 the speakers were Martin Schreiber, engineer maintenance of way Public Service Railway, Newark, N. J., and William O. Stieff, Galena Signal Oil Company, Reading, Pa. Mr. Schreiber outlined the advantages of the company section to a company and its employees and, with the aid of lantern slides, described the new terminal in Newark. Mr. Stieff spoke on the necessity for co-operation in the maintenance of equipment which he illustrated by means of charts. He also gave technical information on

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the distillation of oils, illustrating this with charts and oil samples.

At the meeting of the railway section held on Nov. 3, Wilkie F. Collins, assistant engineer, lectured on units.

COMMUNICATIONS

Timber Preservation by Pressure and Open Tank Processes

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
FOREST PRODUCTS LABORATORY
MADISON, WIS., Dec. 9, 1916.

To the Editors:

The recent installation of a first-class pressure timber preserving plant by the Boston Elevated Railway, as described by E. W. Bright in the Nov. 18 issue of the ELECTRIC RAILWAY JOURNAL, is an important event in the wood preserving industry, as it shows the trend of the electric railways toward the use of treated timber. In the last year for which statistics were available (1911) only 15 per cent of the ties purchased by electric railway companies were treated, as compared with 24 per cent for the steam roads.

The Boston Elevated Railway is in a fortunate position in that it can use a comparatively large amount of treated timber, and is thus able to construct a wood preserving plant. This is beyond the resources of many electric railways. There are, however, numerous commercial plants which are in a position to furnish treated ties, and where it is impracticable for a company to own its own plant it should seriously consider the next best alternative of purchasing ties from a commercial plant. This is, as a rule, preferable to operating an open-tank plant. Where treated ties are purchased, however, a good specification covering the treatment should be used, and here the recent specification adopted by the American Electric Railway Engineering Association should prove to be of valuable assistance. It is also very important to have adequate inspection at the treating plant, and if it is impossible for the purchaser to hire his own inspector good service may be obtained from commercial inspection bureaus.

Ties should be thoroughly seasoned before they are treated and the order for treated ties should be placed from nine months to a year before they are needed, to enable the plant properly to season the material. In some cases it is, of course, possible to purchase thoroughly seasoned ties, but it will be very frequently found that commercial treating plants have no seasoned ties in stock, and then it is necessary either to treat green ones and obtain questionable results or to hold up the order until the ties can be properly seasoned.

In some cases it is not practicable for a company to invest the amount of money required for a suitable pressure plant or to purchase its treated ties from a commercial plant. In this case the only alternative is to install an open-tank plant. The penetrations and absorptions usually obtainable with an open-tank plant are inferior to those obtainable in a pressure plant and, hence, equally good results should not be expected. If a uniform penetration of an inch or more of creosote is obtained the ties may be expected to resist decay for fifteen or twenty years, provided mechanical wear is not sufficient to cause their removal sooner. If a penetration of ¼ to 1 in. is secured it is probable that the average life of moderately durable species under light traffic would be from ten to twelve years. A penetration of less than ¼ in. would, under light traffic, probably add from two to five years more than the average life that could be expected from the ties if used without treatment. The penetration which can be obtained by the open-tank process with different species will vary with the amount of sapwood present and the condition of the wood. In general, however, if well seasoned, such easily treated species as lodgepole pine, western yellow pine, and loblolly pine can be given a thorough treatment by the open-tank process, while Douglas fir, hemlock, tamarack, and spruce can be given a thin treatment with creosote. Hence, while the open-tank process has its limitations, its use should be considered by those companies not in a position to install their own treating plants or to purchase treated material under contract.

CLYDE H. TEESDALE,
In Charge, Section of Wood Preservation.

The Toledo Meeting of the C. E. R. A.

INDIANAPOLIS & CINCINNATI TRACTION CO.
INDIANAPOLIS, IND., Dec. 11, 1916.

To the Editors:

I read somewhat with surprise the first editorial in your number of Dec. 2, 1916. Your paper is usually so accurate and has always taken so much interest in and given so much support to the Central Electric Railway Association that I think the editorial referred to deserves some notice.

The meeting of the association held at Toledo on Nov. 23-24, 1916, was indeed a very notable meeting, especially in the character of the program, which was replete with excellent papers from start to finish and discussions of the various papers. The interest taken in the meeting throughout was much more than usual, although the association meetings always receive great attention.

The suggestion in your editorial that "real progress was made by the managers" is certainly correct, but it was not a managers' meeting only. As is always the case, a good many attending did not register, but the registration of attendance of railway men shows that there were 6 master mechanics, 3 power superintendents, 3 track superintendents, 11 general managers, 8 superintendents, 2 purchasing agents, 2 presidents and 27 miscellaneous. The registration of supply men shows that there were 7 engineers, 24 salesmen, 4 special men and 5 miscellaneous. From this you will see that the attendance was quite well distributed in the various lines and, in fact, the papers and the discussion of them disclosed this. It is seldom that as good discussion of papers is secured at any association meeting.

CHARLES L. HENRY, President.

[We are glad to give space to Mr. Henry's letter, as the editorial in question was upon a subject which we should be glad to see further discussed—namely, the best kind of an organization for a sectional association. There was no intention in the editorial of reflecting upon the character of the Toledo meeting. In fact, the excellence of the engineering papers presented there, as well as at previous meetings of the C. E. R. A., suggested the desirability of a larger attendance of engineers and the best means for securing it. There are so many active sectional associations to which the question of programs and best organization applies that the subject is an important one. Incidentally, the official registration at Toledo shows that the actual number of master mechanics and electrical engineers at the meeting did not differ materially from the off-hand estimate given in the editorial.—EDS.]

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

Inspecting and Recording Car Troubles Save Money on Interurban System—Different Stokers Show Highest Economy Under Different Loads—Inexpensive Cone for Pouring Pitch Joints in Pavements Proves Satisfactory in Brooklyn—Fare Recorder Shows Passenger Miles and Money Collected—Regulator Gives Constant Current for Car Lights

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Device for Pouring Pitch Joints in Pavements

The Sheet Iron Cone Described Costs About $4 and Greatly Facilitates a Troublesome Job

BY R. C. CRAM
Assistant Engineer Way and Structure Department Brooklyn Rapid Transit System

There has always been more or less difficulty in pouring pitch in pavements requiring pitch and pebble joints, due to the quite general use of some form of pail or can having a nose or spout. Such cans are rather unwieldy and in using them it is not easy to control the flow of pitch either as to direction or as to amount. Thus much material is wasted by being spread over the heads of the paving blocks instead of passing into the joints.

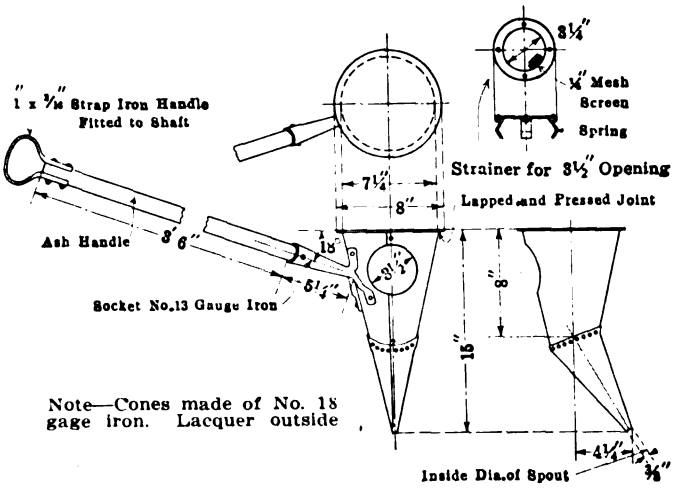
The device shown in detail in the accompanying sketches is called a "pitch-pouring cone" and it has been developed for the purpose of obviating some of the difficulties incidental to the use of pitch joints. The design was originated, according to the writer's understanding, by N. H. Johnson, who is connected with the Hastings Pavement Company, of New York City. It is now in quite general use for pouring pitch and pebble joints in granite pavement and has also been used for the same purpose in connection with pitch joints in wood blocks and asphalt block pavements.

The photograph reproduced herewith shows the tool

PITCH-POURING CONE IN OPERATION

in use pouring joints in a lug wood block pavement, where it was also used for pouring sand in the joints to a depth of about ½ in. prior to the pouring of the pitch, the sand being used to prevent the pitch from running under the blocks.

This cone can be used to advantage in windy weather



DETAILS OF PITCH-POURING CONE IN USE ON BROOKLYN RAPID TRANSIT SYSTEM

by setting up a three-leaf box screen similar to that used to screen the flame of an arc welder, on the windward side of the work. These tools cost about $4 each in half-dozen lots, and are made for this company by a local sheet-iron worker.

Modern Practice in Mechanical Boiler Stoking

The Author Sums Up the Situation and Mentions the Merits and Limitations of the Several Types of Mechanical Stoker

BY JOHN VAN BRUNT
Chief Engineer Combustion Engineering Corporation, New York, N. Y.

The study and application of scientific means for firing and burning coal is comparatively a new science. In the last few years it has undergone radical changes. Many improvements have been made in the leading types of automatic stoker on the market, and some four or five distinctly new stokers have been developed.

We may divide the various machines offered for the consideration of boiler plant owners into two general classes, overfeed and underfeed. Of the overfeed varieties we may further make a subdivision into four classes as follows:

1. The straight overfeed stoker, providing means for mechanically feeding the coal downward on an inclined grate by gravity to a dump grate set at the bridge wall in the rear of the furnace.

2. The side-feed types which, by means of placing the stoker out in front of the boiler usually in a "Dutch oven," provide charging boxes on each side of the grate which supply coal through movable gates to inclined grates. These have their lowest point in the center of the furnace, where a clinker grinder revolving slowly continuously discharges the refuse.

3. That type which provides for charging the coal

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from the front end of the furnace on an inclined grate built up in a series of steps or shelves, alternate grate bars having forward and backward motion which may be adjusted over a reasonable range. This provides means for agitating the fuel bed and working the burning coke toward the rear of the furnace, where the resultant refuse is deposited on the ordinary dump plates used in this type of stoker. In this type means are provided for cooling the grates by the circulation of water through pipes cast in them and connected with the water drum of the boiler. The water flowing into the bars is automatically checked when they are filled and discharge is made into the steam drum of the boiler. This stoker sometimes employs forced draft.

4. The chain or traveling grate, consisting of an endless series of links actuated in their travel by gears and sprockets which keep the fuel constantly moving toward the rear of the furnace and there discharge the ash.

The operation of these several types of stoker is excellent in many plants. They are logically the next step in advance of hand firing. They provide a means of introducing fuel into the furnace and consuming it without opening and closing the furnace doors, thereby increasing the economy and efficiency of the furnace, and one type further provides a means of cooling the grates. In many cases they leave nothing to be desired, especially where the load is steady and sudden demands for very high overloads are not made.

If we could point out any weakness it would be that practically all of these types depend upon natural draft, and are therefore limited as to capacity and not capable of the high degree of flexibility which we find in the forced draft apparatus; also that when forced they produce an objectionable quantity of smoke.

The principle of the underfeed stoker is radically different from any of the above. In all coal there is a larger or smaller proportion of gas. When green coal is charged into the furnace, the first thing that takes place is the liberation of this gas. Unless means are provided for igniting the gas, it passes on through the boiler and up the stack, as is the case in hand firing and to some extent in overfeeding. Inasmuch as some of the coals burned in ordinary practice have a gas content of about 32 per cent, it will be readily seen that the loss of this valuable combustible is a considerable waste.

In the overfeed types of stoker the means adopted for igniting and utilizing this gas embrace the construction of a firebrick arch over the fire, which becomes incandescent. The function of this arch is to ignite the gas as it travels upward when the furnace is charged. Although the overfeed stoker is cheaper in first cost than any of the underfeed stokers on the market, there is a question in the mind of the writer as to whether the up-keep cost of rebuilding these arches does not in the long run offset to a considerable degree any saving that may be made in the first cost of installation. The theory of underfeeding is based on the primary combustion of the coal in a manner that allows the recovery and utilization of these gases without employing expensive arches. In the first type of commercially practical underfeed stoker the coal was fed into the furnace by means of a screw conveyor. The fuel was then deposited on dead or open grates along the sides of the retort and air was admitted only through tuyere blocks on the retort sides. For boiler practice ten to twenty years ago such a method of firing was adequate. No means, however, for dumping refuse was provided, nor was air admitted under pressure at any point in the furnace except along the sides of the retort. Although in some rare instances side dumps were provided, absence of means for mechanically spreading the fire limited their usefulness.

With the increased use of electric power and the installation of stokers in power plants where the load is very irregular, the limitations of this type of stoker became increasingly obvious. It had very little flexibility and the refuse from the fire had to be hoed out through the furnace door in the same manner as with a hand-fired furnace. Therefore, while it was possible to increase the rating of the boiler materially by multiplying the number of stokers installed under a given sized unit and increasing the speed of the worm, there was no practical means provided for removing the refuse without throwing the boiler out of line.

Efforts were then bent toward developing a stoker which would satisfactorily perform the following functions: (1) Spread the fire mechanically and do away with hand manipulation; (2) provide for the admission of heated air over the entire furnace underneath the fire; and (3) discharge ash without interrupting the operation of the boiler.

These results are accomplished by a stoker introduced about ten years ago. The mechanical spreading of the fire is accomplished by means of alternately moving and fixed bars. Worms and plungers are done away with and the feed is accomplished by providing a sliding bottom with a pusher block at the throat of the hopper. This moving bottom extends the whole length of the retort and reciprocates with the movement of the grate bars. With this type of stoker an absolutely uniform feed from front to back and from side to side is assured in all furnaces. Unlike most of the stokers both overfeed and underfeed there is no considerable pitch to this stoker. It is level from front to back with a slight slope from the retort toward the side walls, but the fire bed is practically level. It depends in no degree upon gravity for any part of its operation, all of its function being mechanical. A feature of advantage in this stoker is adaptability to very wide furnaces without adding to the number of retorts.

The grate bars are hollow and air is forced from the wind-box opening at the end of the bar, along through the bar toward the side walls. It is then discharged underneath the grates into an auxiliary heated-air chamber, then passed upward through narrow openings between the grate bars, thus providing an intensely active grate area throughout the furnace and also cooling the bars.

Dump trays along the side walls collect the refuse as it is pushed down by the moving grate bars, which are the only parts of the stoker that are not under forced draft. This refuse is allowed to accumulate and burn out until the operator of the machine sees fit to clean fires. These dump trays are operated by the simple movement of a lever outside the furnace, which drops the plate and discharges the refuse into the ash pit or the hopper below. Cleaning periods vary with the conditions at various plants, depending somewhat upon the grade of coal used as well as the load.

Another type of underfeed stoker is known as the multiple-retort type, of which there are several on the market. The multiple-retort stokers take us back to the general principle involved in overfeeding; that is, the law of gravity is utilized to a greater or less degree in spreading the fuel. They differ from the overfeed type in the respect that the green coal is forced up underneath the front end of the fuel bed, instead of being introduced on a coking plate. This stoker also embraces the advantage, as do all underfeed stokers, of dispensing with the firebrick arch. After the coal has been forced underneath the fire at the front end gravity is depended upon almost entirely to accomplish the spreading of the fire.

At the back end of the furnace at the bottom of the

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inclined grates are dump plates. These are usually operated by hand-thrown levers at the front of the stoker, but in some cases where heavy duty is demanded they are mechanically operated. All of the refuse is concentrated at the extreme back of the furnace, and it is natural that the trend should be in the direction of a mechanical means for discharging refuse.

A feature claimed for this stoker is that it may be adapted to very wide boilers by simply adding retorts or units. Between retorts there is a space about equal to the width of a retort, which is filled with tuyere blocks, and these are slotted at the sides to admit forced draft. The air is not heated, but considerable overloads may be carried upon this stoker.

This description will in the main cover the other types of multiple retort stokers, noting such slight exceptions as a difference in the form and operation of the plungers and auxiliary plungers, and the fact that in some types corrugated tuyeres are used and in others the sides of the retorts have a movement forward and backward, which adds to the rapidity and positiveness of distributing the coked fuel. There are, of course, other stokers that embrace modifications of these ideas and combinations of the principles embraced in overfeeding and underfeeding, but the main lines of design are clearly exemplified above.

In considering the relative merits of various types of stoker, we should remember that the overfeed stoker is limited in its capacity as to overloads. Moreover, even with the forced draft stokers the general character of the fuel to be used and the overloads required should be carefully considered. A coal that is high in ash, having a soft clinker which is likely to form in great masses, should be burned upon a stoker which will be easy to clean and which will so deposit the refuse that it may be reached by the operator in the easiest possible manner and broken down and discharged with the least trouble and interruption to the boiler. Ability to handle high overloads is merely a matter of getting coal into the furnace with sufficient air for proper combustion and keeping the fire clean.

To sum the matter up in a few words, we find in the case of the overfeed stoker, low first cost with capacity limited to natural-draft conditions, and with the forced-draft stoker, somewhat greater first cost, but a very considerable increase in capacity and efficiency, and in at least one case practically equal simplicity of design and operation.

Fastening Feeder Pipes to Vertical Columns

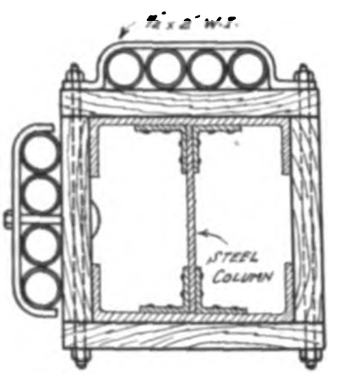
BY G. B. TANIS
Electrical Department, Brooklyn Rapid Transit System

Among the several possible methods of fastening feeder pipes to poles and other vertical members, the one shown in the accompanying illustration which was used for fastening a number of pipes to the column of an elevated structure is exceptionally neat and durable.

In the scheme illustrated, four 3-in. x 5-in. oak blocks are held in place by means of two $\frac{3}{4}$-in. bolts, which also hold the ends of $\frac{1}{2}$-in. x 2-in. wrought-iron straps clamping a row of pipes. The pipes on the adjoining side of the column are held in position by straps of the same size which, however, have only one bolt located in the center.

For the purpose of furnishing insulation, preventing the rivets from wearing holes in the pipes under vibration, and providing a ready means for attaching other pipes when desired, it has been found expedient to place wooden blocks between the pipes and the columns.

For 500,000 and 1,000,000-circ. mil feeders the pipes are usually 3 in. in diameter and galvanized. All bolts, nuts and washers are galvanized and the steel traps receive two shop coats of paint and one coat to match the structure when installed.



SCHEME FOR CLAMPING PIPES ON COLUMNS OR POLES

VIEW OF PIPES CLAMPED TO COLUMN OF ELEVATED STRUCTURE

In most cases only one holder is used, this being placed a few feet from the top of the pipes which are about 15 ft. above the ground. The lower ends of the pipes are concreted in the sidewalk or road.

Fare Recorder for Interurban Service Gives Passenger Mileage Direct

Twelve cars on the 45-mile Crawfordsville division of the Terre Haute, Indianapolis & Eastern Traction Company have been equipped with Bonham fare recorders for registering passenger fares and traffic data. These recorders provide a means of obtaining the passenger miles traveled, as well as a record of when and where the travel takes place. The recorders consist of a mechanism which prints on an ordinary adding machine

FARE RECORDER MOUNTED ON CENTER BULKHEAD OF INTERURBAN CAR

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paper strip the origin and destination of each passenger ride, and at the same time the mileage between these two points and the cash fare collected.

This is done by setting two hands on the dial of the register, one at the starting point and the other at the destination point and making the registration. The dial is marked to record the points on the line by ½-mile stops designated by number. As the conductor collects the fare he sets the two hands from any part of the car by means of rods extending the length of the car, and registers cash fares on one side of the device and ticket fares on the other. The ticket fares are recorded as to beginning and end of the ride and mileage, but with the cash item omitted. This is clearly shown on the accompanying record taken on a limited run between Crawfordsville and Indianapolis. At the top of the strip, when the conductor puts in his key, the date, train number, opening number of cash fares and opening number of total passengers are recorded. These are repeated at the bottom of the strip with the changes in fare numbers when the record is removed at the end of the trip. The titles to the several columns have been printed in to explain their significance for the purposes of this article. The conductors remove these strips from the recorder after each strip. This is an advantage, for they can check up and note any errors made on their part, or if any defects have developed in the recorder they can report at once to the dispatcher and have the car taken out of service.

Date	Train		Cash Fares Paid	Total Passengers
10 10	10 8		04944	08536
	From	To	Pass. Miles	Cash Collected
	68	1	335	67
	67	17	20	
	46	1	22.5	
	37	1	18	36
	30	9	10.5	21
	30	1	14.5	
	30	1	14.5	
	30	1	14.5	
	30	1	14.5	
	30	1	14.5	29
	30	1	14.5	29
	20	1	9.5	19
	20	1	9.5	19
	20	1	9.5	19
	18	8	5	10
	18	1	8.5	17
	18	1	8.5	17
	18	1	8.5	17
	17	1	8	16
	11	1	5	10
	11	1	5	10
	11	1	5	10
	11	1	5	10
	11	1	5	10
10 10	10 8		04962	08560

SAMPLE RECORD MADE BY FARE RECORDER

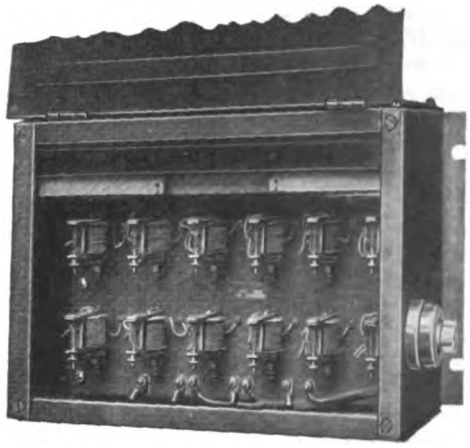
The record on this plain adding machine strip with six registrations to the inch introduces a saving in paper and printing over the common duplex receipt system and gives the total passenger miles directly by simply adding the mileage figures. The conductor himself checks by subtracting the differences between the opening and closing cash fares and total fares, giving a figure which should represent the number of tickets he should have for that trip. The cash figures are totaled on the T. H., I. & E. system by a girl and a comptometer in the auditor's office.

The ease of obtaining the passenger-miles by means of this recorder offers great possibilities for various traffic studies. The mileage may be compiled complete each day or the records kept and footed at any time when a traffic study is to be made. L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, has found it impracticable to compile such a study each day, but instead he keeps the individual conductors' reports, and when a traffic study is desired it is a simple matter to go through the particular runs in question and obtain complete data as to passenger-miles and time and places of heavy and light travel.

Regulating Voltage for Car Lighting

An Automatic Regulator Which Varies Resistance in Series with Car Lamps

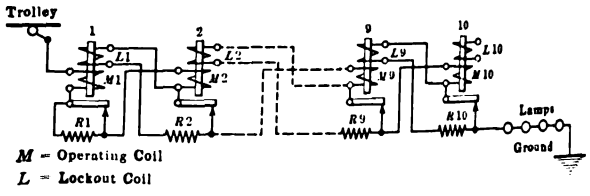
Voltage variation renders lighting unsatisfactory in many cases, particularly on interurban lines. Where through service is given, it is especially important to supply illumination suitable to permit reading. Where the density of traffic over a line is great enough to warrant the investment in sufficient copper, reasonably good lighting can be furnished. Otherwise there remains only the storage battery, which is expensive to install and maintain, or some kind of automatic regulating device.



REGULATOR INCLOSED IN STEEL CASE FOR MOUNTING IN MOTORMAN'S CAB

Two years ago the general manager of the Milwaukee Northern Railway, realizing the need of some means of voltage regulation for car-lighting, installed for trial the Watson car regulator on one of its cars operating in limited service between Sheboygan and Milwaukee, Wis. Later, when repairs and inspection made it necessary to take this car off the regular evening run, the complaints about poor lighting were so numerous and insistent that the management had ample evidence of the public's appreciation of the better lighting afforded by the car with the trial equipment, and proceeded gradually to equip all of the cars with the same system. Mention was made of this type of regulator in the annual convention number of the ELECTRIC RAILWAY JOURNAL of Sept. 30, 1916, page 612.

In general this system of regulation comprises a series of electromagnetic relays operating to cut in or cut out resistances in series with the lamps, as the line voltage varies to maintain a practically constant current. As the current ordinarily used with headlights is approximately 4 amp., this was adopted as the value best suited to the regulated system. The regulator consists of twelve relays, only ten of which are used for ordinary operation. Each cuts in or out of the circuit a resistance of 7 ohms. With full line voltage all of the resistors are in the circuit, and there are then 280 volts across the regulator. The Milwaukee Northern Rail-



SIMPLIFIED DIAGRAM OF REGULATOR CIRCUIT AND CONNECTIONS

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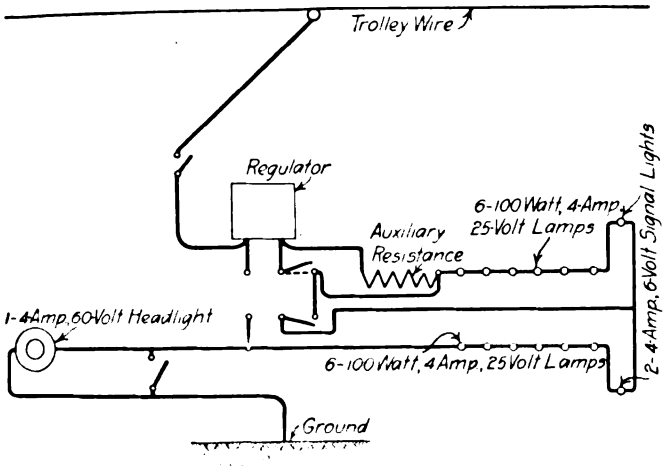
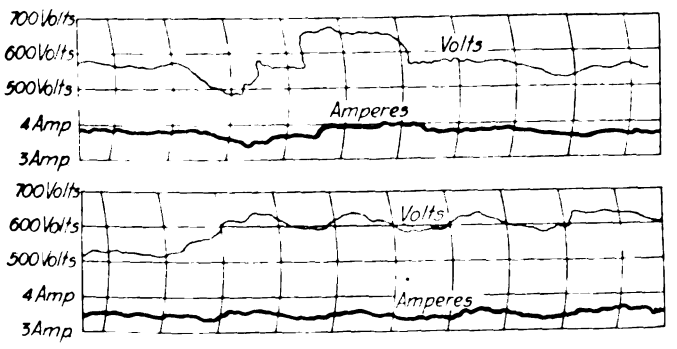
way operates with a 650-volt trolley pressure, so that the system includes the standard regulator in series with eleven 4-amp. 19-volt lamps and the 4-amp. 80-volt headlight, together with the four 80-volt marker lights, which are connected in parallel. Two extra 19-volt lamps are installed in the baggage compartment, and as the eleven interior car lights, the headlight, the regulator and the markers require the 650-volt trolley potential, each of the two baggage compartment lamps is cut into the circuit by means of a three-way switch, which, at the same time, cuts out a lamp mounted on the front



GENERAL WIRING DIAGRAM OF LIGHTING SYSTEM INCLUDING REGULATOR

bulkhead in the smoking compartment. The two lamps in the baggage compartment serve the purpose of affording an extra lamp which can be inserted in place of any of the interior car lamps in addition to giving the motorman light as needed.

All calculations for normal operation are based on ten relays, the two extra relays being provided to give added safety during voltage surges, or for use if some of the lamps are "shorted" out. With a maximum trolley voltage of 680 across the total lamp resistance of 100 ohms and the 70 ohms total regulator resistance the current is 4 amp. The relays are adjusted for a 10 per cent regulation. When the voltage drops to 612 there are 3.6 amp. flowing, at which time one relay operates, cutting out of the circuit a resistance of 7



SAMPLE SECTIONS OF GRAPHICAL VOLTAGE AND CURRENT RECORDS FROM ACTUAL RUN

ohms and permitting the current to increase to 3.75 amp. Continued drop of the trolley voltage causes each of the successive relays to cut out a resistor and bring the current back to nearly the normal value. For rising voltage the reverse operation takes place.

The average working current is about 5 per cent below the normal rating of 4 amp., insuring long life of the lamps.

The relays are interlocked, being made to operate in proper sequence by an electrical lockout coil on each relay, which strengthens the magnetic pull. The resistor, cut in or out by each relay when it operates, is wired in series with the lockout coil of the relay next to function, and both are short-circuited by the armature of the relay. The relays are all set at the same operating value, but when the current decreases so that, say, No. 10 relay functions and cuts out its resistor, R10, the armature also short-circuits the lockout coil, L9, of the next relay No. 9, leaving this relay with a weaker magnetic pull, and thus ready to operate if the current value decreases further. The consecutive operation of the relays is, therefore, entirely automatic and positive. When the trolley first makes contact, the inrush of current causes all of the relays to "pick up," because all are in series, and being de-energized, all armatures are down, keeping resistors and lockout coils cut out. Then as this action cuts in all of the resistors, and all lockout coils except that on the relay first to operate, No. 10, the current drops, and if the trolley voltage is not a maximum, the relays quickly adjust themselves to the existing voltage.

For dimming the headlights within city limits, a lamp is connected in parallel with the headlight, reducing the

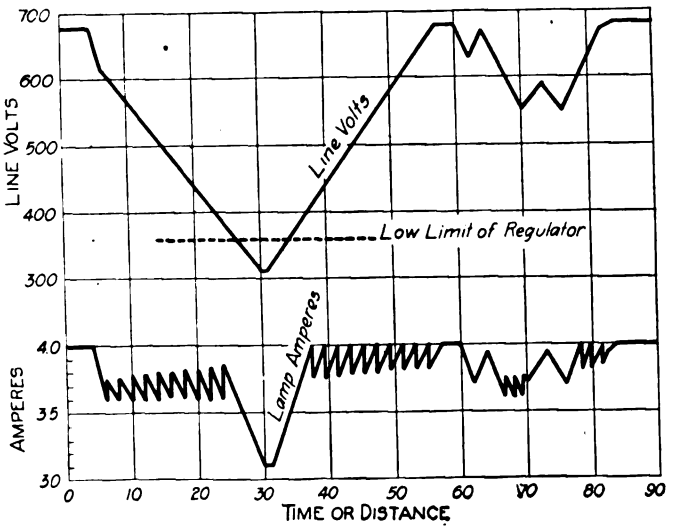


CHART OF CALCULATED VOLTAGE-CURRENT VALUES TO SHOW OPERATION OF REGULATOR

current flowing through the latter, since the total current is regulated to 4 amp. If the headlight burns out and no 80-volt lamp is available, the run is completed by inserting one of the spare 19-volt lamps and the two extra relays of the regulator take care of the excess voltage.

The installation of the regulator system may not require the rewiring of the car lighting circuit. If the series system has been used with a comparatively few large-size lamps, the rewiring consists in running a single wire through the car. Another wire is run from the regulator to the mid-point of the interior lighting circuit, to give precaution against the loss of the headlight and the car being thrown in darkness by the failure of one of the lamps in the series. This is done by the provision of a resistance equivalent to that of half of the car lamps, which the motorman can insert by simply throwing a single-pole, double-throw switch in his compartment. In either one position or the other this switch restores half the lamps of the car, and thus affords some light while the defective lamp is being located and replaced by the spare lamp in the baggage compartment.

The above description gives the particular application of the regulator to the Milwaukee Northern Railway, but the system is flexible and permits the use of many

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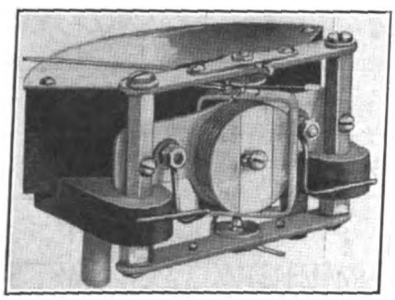
other combinations of lamp sizes and number of lamps the only limitations being the wattage available. From this amount must be deducted the watts dissipated in the regulator and headlight, leaving the wattage available for the interior car lighting. For this the possible combination of lamp sizes and number of lamps for the particular trolley voltage is determined by the simple law governing, *viz.*, that as lamps of higher voltage are selected fewer need be used. If fewer lamps are desired than one sufficient to dissipate the energy available for car lighting, the remainder can be dissipated in heat in a resistor or preferably for overlighting the car.

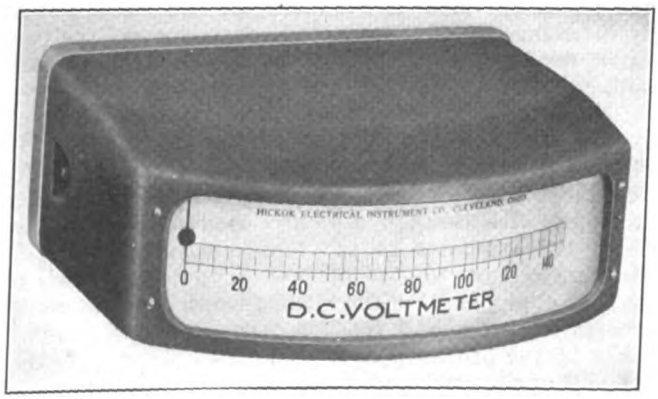
The Watson regulator is manufactured for the Car Lighting Improvement Company of Milwaukee by the Cutler Hammer Manufacturing Company, and Holden & White of Chicago are the general sales agents.

A New Type of Astatic Meter

A complete line of laboratory, portable and switchboard meters is now being made by the Hickok Electrical Instrument Company of Cleveland, Ohio. The laboratory and portable standard instruments are of the astatic dynamometer type, made in ranges up to 750 volts and 100 amp. The astatic feature is obtained by using two complete elements so connected that their polarities are 180 deg. apart. Any field increasing the torque in one element will decrease the torque an equal amount in the other element, and as the elements are in series, the deflection will not be affected. The moving coils are mounted as usual with their springs fastened to a fixed frame. The field coils, however, are manually revolvable by a button at the top of the instrument. A secondary pointer is attached to the field coils and by holding this pointer over the indicating pointer, the field coils are kept at right angles to the moving coils with any reading of the meter. This gives the wattmeters a uniformly spaced scale and the voltmeters and ammeters a scale which advances uniformly with the square of the current.



MOVING ELEMENT OF ALTERNATING-CURRENT SWITCHBOARD METER, SHOWING FIELD AND MOVABLE COILS

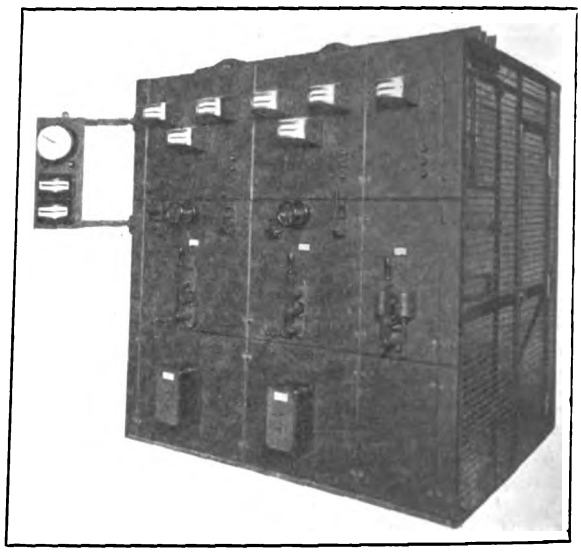


DIRECT-CURRENT SWITCHBOARD METER OF HORIZONTAL EDGEWISE TYPE

Horizontal edgewise patterns and round patterns are designed for switchboard work. The alternating-current type contains a dynamometer movement made up of a fixed field coil and a moving coil as the illustration on this page shows. The direct-current type, which is shown in another illustration, operates upon the d'Arsonval principle, and has a small, light and strong moving coil. A "dead beat" quality in all these models is secured by the use of a light aluminum vane.

Safety First in Switchboard Construction

Manufacturers of electrical apparatus have been among the foremost in propagating and practicing the safety-first idea. The General Electric switchboard shown in the illustration on this page is a product made with this idea in mind. All live parts except meter receptacles are inaccessible from the front of the board. A most important development is the mounting of the field switches on the back of the board. The switch is operated by a handle in front of the board and the operator is protected from injury by the arc or by coming into contact with live parts. For testing instruments the board is provided with calibrating receptacles into which may be inserted plugs connected to the standard instruments. Removable screw plug fuses provide for the replacement of secondary potential transformer fuses from the front of the board.



SWITCHBOARD SHOWING PROTECTED FIELD SWITCHES AND OTHER SAFETY FEATURES

Grillwork screens with locked doors afford protection against accidental contact with live parts in the rear. Disconnecting switches are used between all oil circuit breakers and busbars and provide convenient and rapid means for isolating the breakers when inspecting, changing oil or repairing.

The police authorities of Louisville, Ky., have been asked by the Louisville Railway and the school officials to undertake to control rowdyism on the part of school boys on their way to and from school. One of the favorite pastimes of the boys, especially where they ride on the trailers, is to "rock the boat" by jumping up and and down as if they were operating a see-saw. They have frequently rocked single truck cars off the tracks and otherwise made trouble. Their latest escapade, however, occurred recently when their "rocking" broke the trailer away from the motor car of the "school kids' special" from the Highlands. The motorman noticed at once that something was wrong and shut off the current. As he slowed down the wild trailer caught up with his car and in the collision that resulted at least twelve pupils were injured.

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NEWS OF ELECTRIC RAILWAYS

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

FRANCHISE PROPOSAL MADE IN MINNEAPOLIS

Horace Lowry, President Minneapolis Street Railway, Submits Tentative Ordinance—Surrender of Existing Grant and a Partnership With City Suggested

Horace Lowry, president of the Minneapolis (Minn.) Street Railway, on Dec. 8 submitted to the City Council, in response to its request, a draft of a proposed franchise together with an inventory of the company's properties and an explanatory letter. The draft has been referred to the franchise committee. Mr. Lowry's letter follows in part:

"We submit herewith draft of proposed franchise based on transportation at cost, together with detailed inventory and appraisal of the property of the company as of Jan. 1, 1916.

"The franchise ordinance which we submit should not be considered a complete and final instrument, for the reason that during consideration and discussion by your honorable body many items in the interest of the city as well as of this company will develop, but we hope it will be found reasonably complete and helpful, and the foundation for a final draft.

"The basis of the proposed franchise is the surrender of the company's existing franchise and entering into a partnership agreement between the city and the company to secure for the people of Minneapolis transportation at cost and proper control of the service, improvement and development of the street railway system, with the right reserved by the city to purchase and take over and operate the street railway system if it so elects.

"The necessity for a revision of the terms of the existing franchise is apparent from the constantly growing demands for new extensions to the present system. In addition there is the natural advantage to the city of making a new contract at this time, in order that it may participate in the company's surplus earnings, these earnings to be used either in fare reduction, creation of a fund for the ultimate purchase of the property, or for general reduction of taxation, as the city may decide.

"The entire surplus of this company, except the actual cash on hand, has, during the past few years, been invested in additions to plant and the extension of lines, and funds are not now available for that purpose. No additional bonds can be issued or sold under any existing mortgages or trust deed.

"It now seems proper and logical that we should briefly outline what, in our opinion, will be required in the way of additional capital prior to 1923. The normal growth of Minneapolis will require about fifty additional cars each year. The operation of these cars will make necessary additional power plant capacity, etc., at a cost of not less than $10,000 per car, completely equipped and placed in service. This alone means an annual cost for new capital of not less than $500,000.

"The constant additions to permanent pavements of the streets by the city adds another heavy burden, of which this company must bear its part. This, according to our experience, will amount to not less than 10 miles of single track per year. Under average conditions the new construction will cost $400,000 annually.

"All of the above will be required without building any new lines or extensions. The company is now confronted with a demand for the construction of new lines and extensions aggregating nearly 40 miles of track, or an increase of 20 per cent over the present track mileage in Minneapolis. The construction and equipment of these new lines and extension will cost not less than $3,000,000.

"In 1919 the management of this company must be prepared to pay a mortgage of $5,000,000.

"We summarize the above items as follows:

New capital required during the years 1917, 1918 and 1919:	
Normal requirements for additional cars, equipment and paving, at $900,000 per year	$2,700,000
Construction and equipment of new lines and extensions	3,000,000
First mortgage bonds, which must be paid, maturing in 1919	5,000,000
Total	$10,700,000

"It is our best judgment that this company must in the public interest be in a position to finance itself permanently to the extent of not less than $15,000,000 to meet its requirements for the coming seven years. It cannot finance itself on an economical or permanent basis without a satisfactory agreement with the city which will give investors confidence in its securities.

"The capital value of the company's property, as appraised by its engineers, is as follows:

Capital invested in the property, being cost to reproduce physical property new	$28,717,033
Capital invested in the development of the property	5,311,462
Value of water power leases	1,294,881
Total value of the property	$35,323,376

A detailed inventory and appraisal was submitted in separate volumes which accompanied the letter.

In the tentative franchise draft the company fixes the life of the new grant at thirty years from Jan. 1, 1918. The grant, however, would continue for another thirty years in the event of the failure of the city to condemn the property or to exercise its option to purchase. In section 2 is left a blank for the insertion of the details with respect to the extensions and new lines which the company may during the negotiations obligate itself to build. It is provided that the cost and expense of the new construction be borne and paid by the company, but that it be added to the capital value. These expenditures are to be certified by the city comptroller to the Council for approval.

It is proposed to fix the single fare at 5 cents for a continuous trip in one direction for each passenger more than six years old, non-transferable transfers to be given only on the payment of cash fare. The city is to have the right, however, to apply its share of the surplus earnings of the company to the reduction of fares, with power vested in the company to restore the original rate on thirty days' notice whenever the operating income is insufficient in either half of the year to pay one-half of the company's annual minimum interest return. In the event of the restoration to the original fare because of the inadequacy of any reduced rate, the losses to the company are all to be made good before another reduction is ordered.

A blank is left for the insertion of the capital value as it is finally agreed upon. It is proposed that the company be guaranteed a return of 7 per cent on the total capital value as agreed upon. After such payment to the company the remainder of the earnings is to be divided by the company and the city equally each year until July 1, 1923. For each of the remaining years of the original grant the city is to receive 75 per cent of the divisible surplus and the company 25 per cent. The right of purchase is reserved to the company on a year's notice on the basis of the value as agreed upon for the property as of the time of the dating of the franchise, plus the additions to capital value as certified to from time to time.

A city street railway commissioner is proposed. There are suggestions for the operation of a reserve for renewals and depreciation. In the event that the city shall not have purchased or acquired the property at the time of the expiration of the franchise, the city is to have the right to take over the property on the payment of the capital value or to transfer such right to others. The agreement in its final form is to go before the voters for their approval.

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ATLANTA'S REIGN OF TERROR

Law and Order Finally Prevail Over Campaign of Violence in Which Thirty-one Cars Are Dynamited

With the election on Dec. 6 of Asa G. Candler as Mayor of Atlanta, Ga., followed two days later by sentences of ten years each imposed in Judge Ben H. Hill's criminal court on the first two men to be tried on the charge of dynamiting cars of the Georgia Railway & Power Company, it may be said the attempt to compel organization of the motormen and conductors of the company came definitely to an end. Officers of the company are confident the campaign of violence inaugurated on Sept. 30 and referred to previously in the ELECTRIC RAILWAY JOURNAL will not be renewed in any form.

In many respects the Atlanta agitation was remarkable. It had its beginning in the discharge of three men from the line department of the Georgia Railway & Power Company. That department was made up almost entirely of members of the International Brotherhood of Electrical Workers. The union demanded the reinstatement of the men. The demand was refused. A strike was threatened, called, and put into effect, everybody going out. William Pollard, an agitator from Springfield, Ill., had arrived on the scene by this time and taken charge. Pollard's activities were constant but his success small. The line department of the company was reorganized thoroughly and permanently with non-union workmen, and Pollard turned his attention to the railway department in retaliation for his defeat. Out of his work there grew the walk-out of about thirty-six platform men at 6 o'clock on the evening of Sept. 30. These men abandoned their cars on downtown streets or elsewhere without previous demand upon or parley of any kind with the Georgia Railway & Power Company. That night crowds pulled loyal men from their cars, took their caps and badges from them, cut trolley ropes, blockaded tracks, threw bricks and other missiles, and indulged in other violence. How the company withdrew its cars from service for the remainder of that night, about 9:30 o'clock, how the rioting was resumed next morning, Sunday, with the same result of suspension of service about 10 o'clock, how the leading citizens of Atlanta protested that Sunday afternoon to a called meeting of the city police board that the police were not doing their duty to restore order, how the "citizens' committee on law and order" was formed next day in the Chamber of Commerce, under chairmanship of Asa G. Candler, Democratic nominee for Mayor—these details and others were told in the ELECTRIC RAILWAY JOURNAL for Sept. 16, page 509; Oct. 7, page 740, and Oct. 14, page 853. The rioting continued, however, with lessening intensity for days, but finally on Oct. 5 culminated in dynamiting. At that time all lines had been returned to normal night and day schedules.

THIRTY-ONE CARS DYNAMITED

From Oct. 5 till Nov. 17 dynamiting of cars was done promiscuously. In all, thirty-one cars were dynamited before the end came, on the night of Nov. 15, when a car was dynamited on one of the suburban lines. On that day, William Pollard, original agitator of the campaign against the company, was indicted by the Fulton Grand Jury on two charges, one a misdemeanor and the other a felony, growing out of the distribution by him of certain dodgers luridly descriptive of "strike breakers" and "scabs." On the same day Sam Gable, formerly a railroad switchman, was convicted of rioting in East Point, a suburb, early in September, and was sentenced to pay a fine of $1,000 or serve twelve months in the chain gang.

Less than twenty-four hours after what proved to be the final instance of dynamiting, or on the night of Nov. 19, six men were arrested by the city police. Judge Hill called a special session of the grand jury for the following day. The men arrested were Frank Cleveland Jarvis, a striking electrician; Claude Leatherwood, a locomotive engineer; Henry Harcrout, an engineer; G. A. Mitchell, a fireman; Ernest Ridling, a steamfitter, and C. J. Hamilton, a plumber. Next day all but Ridling were indicted for a felony, the charge being that they had dynamite and fuses and caps in their possession for the purpose of committing a crime. On the day of these indictments, labor leaders of Atlanta announced to the newspapers the discovery of dictograph installations behind the wainscoting in the joint office of *The Journal of Labor* and the Atlanta Federation of Trades.

Pollard, who had been in jail since his indictment, gave bond that same day. W. L. McWaters, a railroad clerk, charged with stabbing one of the power company's non-union linemen, was put on trial again that day, his former hearing having resulted in a mistrial. McWaters later was found guilty and was sentenced to twelve months in the chain gang. A fine of $500 was also imposed in his case.

From Nov. 20 till Dec. 8 developments came rapidly. On Nov. 21 five more men were indicted, and on Nov. 24 a striking lineman was indicted for having participated in the dynamiting of a street car.

POLLARD TRIED FOR FELONY

The selection of a jury for the trial of Pollard began on Nov. 24, and on Nov. 27 the trial of the felony indictment, one of the two against Pollard, started with the introduction of P. S. Arkwright, president of the Georgia Railway & Power Company, as the first witness for the State.

Even though it ended on Dec. 5 in a mistrial, the Pollard case was regarded throughout the city as a tactical victory for the company. It was the instrument through which, under Judge Hill's statement that the "bridle was off" and that the whole season of agitation might be gone into exhaustively, the State was enabled to reveal the details of a situation with which only the police and the power company and a few others were acquainted truthfully.

One of the features of the felony indictment against Pollard was that it was drawn under a section of the Georgia criminal code that rarely has been invoked in this particular application since its enactment in 1866. It was charged that Pollard had caused to be printed and circulated a dodger headed "The Strike Breaker," which, in lurid words, classified "strike breakers" and "scabs" as humans worse than the most infamous traitors in Biblical and civil history. The language was represented as that of "a prominent clergyman" (unnamed in the dodger or elsewhere). With thinly veiled purport, it implied that the duty of every self-respecting man impels him to the extirpation of "scabs" and "strike breakers." The charge was made further that Pollard's purpose in causing these dodgers to be printed and distributed was incitement of riot, and that the specific objects of the intended riot were the lives of the loyal street car men, inhabitants of the State.

At the outset of the trial Pollard's attorneys admitted in his behalf that he had ordered 10,000 copies of the dodger to be printed, but the prosecution put the evidence in the record, anyway. Judge Hill became tired of the testimony on both sides to prove or disprove rioting, and asserted as the dictum of the court that "everybody within the sound of my voice knows there was rioting," and asked the attorneys to devote their attention to other matters. Motormen, conductors, passengers, inspectors and division superintendents of the street railway department, and numerous other witnesses, adduced evidence in behalf of the State's contention. The defense introduced character witnesses, mainly from the ranks of organized labor.

One of the sensations of the trial was the introduction by the State of two confessed car dynamiters, I. G. Williams and J. R. Wilson, who left their cars at Pollard's order. Wilson testified that on the night of Nov. 27 he participated in the dynamiting of a street car, using three sticks of dynamite which were among a supply he had obtained from I. G. Williams. He said he had been influenced into acts of violence by the speeches of Pollard.

The defense later introduced J. L. Carver, financial secretary of the union, who brought the local's books into court with him, and by his testimony sought to prove that no money was paid out of the treasury for unlawful purposes. The State grilled the witness to develop the methods of distributing funds, and finally demanded that the union's books be impounded. This was ordered by the court. A number of linemen and street car men who quit their work were introduced by the defense to prove that Pollard never had counseled violence, but always advised the men to use lawful means to win.

H. W. Mills and A. W. Bruce, owner and driver respectively of a taxicab service, testified regarding trips to

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Gainesville and Lithonia for dynamite. Mills said the bill for the trips amounted to $40. He swore he explained in detail to Pollard what his men had done on the two trips, and that Pollard told him he would "take it up with the boys at the hall to-night and see what can be done." Mills swore a stranger came to him next day and paid the $40. G. S. Johnson, a general storekeeper of Lithonia, identified in court a suitcase as the one which some men who came in an automobile had filled with dynamite they bought from him. Johnson also identified a package of dynamite caps among its contents, but could not identify the dynamite or fuse or other contents. T. F. Johnson, superintendent of the transmission lines of the company, identified the suitcase and its contents as having been found beneath a line tower on which he and two other power company men captured two men, one a striking lineman, in the act of trying to ground the high-tension lines of the company.

AGITATORS DICKER FOR RECOGNITION

In his testimony in rebuttal for the State, President Arkwright of the company told of a visit to his office by W. C. Stradley, who represented himself as a member of the committee of strike sympathizers appointed to settle the contentions favorably to Pollard's followers. Mr. Arkwright continued that Stradley complained about the prolongation of the agitation, and urged the company to reconsider its flat refusal to meet any committee of outsiders on any phase of the matter; that Mr. Stradley said the expenses of the investigators that the union labor leaders had retained to probe the company's rates for electric light and power were very heavy, and that the committee would be glad to discontinue them, and would "call the whole thing off" at once if the company would recognize the car men's union. Mr. Arkwright testified that he replied that this offer to call off the rate agitation was a kind of blackmail similar to the dynamiting of cars, and that he refused to discuss it further. Mr. Stradley already had testified, under cross-examination, about this visit, but had said Mr. Arkwright's reply was that the company would give away light and power before it would recognize the union.

In a statement, not under oath, Pollard told the jury that he never dreamed "The Strike Breaker" dodger would result in rioting or violence, and that he did not believe it did so result, and that this was far from his purpose in distributing it.

While the Pollard trial was in progress the newspapers published that the police had received sworn confessions from J. Roy Gunter and J. W. Bolton, former conductor and motorman respectively, and A. L. Smith, former motorman, to the effect that they had participated, with J. R. Wilson and others, in the dynamiting of cars. During the progress of the Pollard trial, activities became general among the rank and file of organized labor and in jitney-bus circles in behalf of the independent candidacy of A. M. Corrie, a railroad engineer, for Mayor of Atlanta in opposition to Asa G. Candler, nominated by the Democratic city primary some weeks previously. Inasmuch as political contests in Atlanta are nearly always within Democratic party lines, Mr. Corrie's candidacy was a bold defiance of precedent. Moreover, Mr. Corrie announced his candidacy following organized labor's unsuccessful attempt to induce C. W. McClure, a local retail merchant, to run against Mr. Candler. While all this was going on, seventeen more men, nearly all former street car men or linemen, were indicted for having dynamite in their possession.

With the announcement of Mr. Corrie's candidacy for Mayor, the Candler forces reorganized and prepared to do the unprecedented thing of getting out a big Democratic vote on city election day. The Corrie platform was frankly pro-labor and anti-corporation. Behind it was the animus engendered in local labor minds by Mr. Candler's activity, following his nomination, at the head of the citizens' committee for law and order.

On election day, Dec. 6, immediately following the Pollard mistrial, J. R. Gunter, former conductor, was placed on trial for the street car dynamiting to which he already had confessed. He pleaded not guilty, but did not deny the confession, saying he made it because he was "scared." It took the jury six hours to arrive at a verdict of guilty, with recommendation to mercy.

Mr. Candler defeated Mr. Corrie for Mayor of Atlanta by a vote of 6164 to 3260.

J. L. Wilson, the second of the dynamiters, was tried on Dec. 7 for the street car dynamiting related in his signed confession. Like Gunter, he did not deny the confession, but said he made it after the detectives had drugged him. As in Gunter's trial, several witnesses were introduced by the State to corroborate the confession. The jury returned in forty minutes with a verdict of guilty, with recommendation to mercy.

On Dec. 8 Judge Hill sentenced Bolton and Wilson to ten years' imprisonment each, the maximum remaining to the court under the recommendation of the jury. In pronouncing sentence, the court said:

"This crime was deliberately planned and executed only because of a grievance against a corporation. Three people were injured and miraculously escaped death. It was a terrific case of dynamiting, a cowardly assault; and this court cannot conceive of any crime more enormous. While the jury has recommended mercy, I am compelled by a sense of duty—a profound sense of duty—to place a sentence on these men that will put a stop to the crime in the future."

The remaining accused car dynamiters in jail or under bond will be tried at the January term of court, to which Judge Hill deferred them all after the Wilson trial.

RAILWAY MAKES EDUCATIONAL DISPLAY

Louisville Railway Shows Operating Mechanism of New Modern Car at Local Electrical Exhibition

One of the most interesting of the displays at the electrical exposition held at Louisville, Ky., by the Jovian League during America's Electrical Week was that of the Louisville Railway. It was a display calling special attention to the developments which have been made in electric railway equipment in Louisville in the last twenty-five years. Signs painted on the walls of the booth referred to the display. On the rear wall of the booth was a sign with the dates 1890-1916. This read:

"Twenty-six years of electrical transportation. Cost of material has increased. Wages and supplies have advanced. Transfers were added. Rides are longer. Fare still 5 cents, the cheapest item in modern life."

On one of the side walls was the sign:

"1890—Cars not heated. No vestibules. Seated twenty. Cost of car, $1,500. One 20-hp. motor. See type of motor and equipment as shown in exhibit.

On the opposite wall appeared:

"1916—Cars now heated, vestibuled, and seat forty-one. Cost of modern car (Fourth Street type), $6,000. Four 50-hp. motors used. See type of motor and equipment as shown in exhibit."

Photographs illustrating present and former equipment, the various power houses and distributing stations, etc., were used largely on the walls. Another interesting display was that of sections of types of rails used by the company and its predecessors as far back as 1864. There were numbers of these sections which attracted a great deal of interest.

The principal exhibit was a mounted motor and wheel unit, together with the other equipment, resistance coils, air reservoir, pump, brake cylinder, controller, trolley pole, lightning arrester, circuit breaker, etc., as if in actual use on a car. For the display the company had led a trolley wire in from the street through a window and from time to time the man in charge of the display "started his car" greatly to the interest of the spectators. In contrast with the modern equipment thus displayed was one of the 20-hp. motors used on the cars of 1890. This was shown complete, with parts of the old-time controller, the lightning arrester, circuit breaker, resistance coils, hand brake, etc.

The display was worked out by Frank H. Miller, superintendent of motive power of the Louisville Railway, and was installed under his supervision. There was not another display in the exposition which got closer and more interested attention.

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HEARINGS ON STATE OR CITY CONTROL

Mr. Busby for Home Rule—Mr. Insull for State Commission Rule for Chicago Utilities

A committee of the State Legislature of Illinois headed by Medill McCormick has been conducting hearings in Chicago to gather data and learn public sentiment on the question of whether Chicago's utilities should be regulated by the State Public Utilities Commission, by a local commission, or by the Chicago City Council. Samuel Insull, president of the Commonwealth Edison Company, chairman of the board of directors of the People's Gas Light & Coke Company, and a member of the board of directors of the Chicago Elevated System, and Leonard A. Busby, president of the Chicago Surface Lines, appeared before this committee. They took opposite positions in their preference.

On Dec. 11 Mr. Insull said that he favored the retention of the present state commission with its broad powers for both state and local utilities and added that it was the business of his companies to adjust themselves to whatever laws were passed. Two striking experiences during the past year in relation to regulation had convinced Mr. Insull that the affairs of the local utilities would be handled more effectively by a state commission. He referred to the prompt approval of a rate change for the Commonwealth Edison Company by the state commission as compared with the dilatory action of the City Council, whose consent seemed advisable to a proposed change of rate for the gas company before making application to the state commission. The matter had been under consideration for a year with nothing accomplished as yet. Mr. Insull said he was much opposed to dealing with matters of this kind directly through the City Council. The trend throughout the United States was toward state regulating bodies. It was a question of efficiency. He said that if there must be local control, he preferred control by a small local commission rather than by a cumbersome City Council.

Mr. Busby, speaking before the committee Dec. 12, favored control by a local transportation committee such as Chicago now has. He said he had had many associations with members of the Council in recent years, and that at present a better and more practical attitude existed than before toward the right solution of the transportation question. The City Council reflected public sentiment in Chicago, and was quite competent to deal with the transportation problems. He summarized his views by declaring that the least preferable system of regulation was the state commission, and next to this was the city commission. A city commission, if established, should have all the power and authority of the state commission. The people must be educated to understand that a public utility was for the purpose of serving the people, and that it must be operated at a profit. The important thing was whether regulation was approached from a political or a business standpoint. There had been a tendency for those with responsibility to cater to the things which they deemed popular. The public utilities were business enterprises and any sound regulation must adhere to business principles. He did not believe the substitution of a commission for council control would solve that phase of the question. Mr. Busby said that more frankness on the part of the utility management with the people it served would do much to bring about a right understanding.

FREE INDIANAPOLIS

The Associated Employers of Indianapolis, Ind., is sending to newspapers, trade publications and magazines generally, a pamphlet dealing with the political defeat of union labor leaders in Indiana and a statement of about 5000 words dealing with the failure of the effort to unionize the lines of the Indianapolis Traction & Terminal Company. The pamphlet is by Andrew J. Allen, secretary of the Associated Employers of Indianapolis, Inc. The situation with respect to the effort to induce a strike among the employees of the Indianapolis Traction & Terminal Company was covered fully in the articles which appeared in the ELECTRIC RAILWAY JOURNAL Nov. 4, Nov. 18 and Nov. 25, but the pamphlet and the statement about the Indianapolis strike show that the employers regard the failure of the strike and the defeat of organized labor at the November election as removing the stigma of undue influence from unionism to which industry there has been subjected.

TOLEDOANS POSTPONE CLEVELAND INSPECTION

The inspection trip which the street railway commission of Toledo, Ohio, had planned to make to Cleveland on Dec. 6 was postponed to Dec. 13, as the Cleveland men with whom the members desired to consult were out of the city.

On Dec. 5, President John Thurston and Judge Emery presented to the other members of the commission a plan for amortization, to be included in the proposed franchise. This was discussed and its provisions were agreed to tentatively, pending its presentation to Mr. Doherty.

H. G. Wilson, traffic commissioner of the Commerce Club, appeared before the commission and requested information as to the terms under which the cars of interurban railways are to be admitted to the city. He suggested the possibility of new lines entering the city and argued that they should receive as much consideration as the existing roads. Mr. Wilson told the commission that interurban freight service was going to become a very important factor. Steam roads were better fitted for long hauls, but electric railways were becoming the natural medium for hauls within 75 miles of the city. Mr. Wilson was assured the ordinance would be sent to all civic organizations for suggestions and criticisms before final action was taken on it.

Plan to Put Electric Railways Under Texas Commission.—Labor leaders in Texas, working through the organized committees of the State Federation of Labor, are seeking legislation that will place all interurban lines in the State under supervision of the Texas Railroad Commission.

Cleveland Arbitration.—Fielder Sanders, street railway commissioner of Cleveland, Ohio, and Henry J. Davies, secretary of the Cleveland Railway, testified before the board of arbitration in the power contract matter on Dec. 11. The first arguments were scheduled to begin the following day.

Rhode Island Property Being Valued.—A valuation of the property of the Rhode Island Company, Providence, R. I., is being made by Ford, Bacon & Davis, New York, N. Y. Rathbone Gardner, one of the federal trustees now in charge of the road, under instruction from the court to sell it within a certain period, states that the valuation is being made so the road's earnings may be correctly ascertained.

Composite Cars in Use on Elevated.—The Interborough Rapid Transit Company, New York, N. Y., has placed in operation on the Third Avenue elevated line the first train of the "composite" cars which were removed from the first subway before April 1 of this year upon order of the Public Service Commission for the First District. This and other similar trains are to be used in express service on the Second and Third Avenue elevated lines.

Co-operation Posters.—The National Association of Manufacturers, New York, N. Y., has issued three new series of posters. They are intended primarily for use in industrial plants, but many of them are suitable for railway work. Three of them read as follows: "The Best Form of Monopoly for Capital or Labor Is Co-operation"; "The Efficiency of This Organization Depends Upon the Co-operation of Its Units"; "Industrial Prosperity Depends Upon Industrial Peace."

New Working Agreement on Seattle Suburban Line.—Following negotiations between Walter M. Brown, manager of the Seattle, Renton & Southern Railway, Seattle, Wash., and S. J. Wallace, president, and the executive officers of local No. 587 of the Amalgamated Association, a new scale of wages went into effect on the road recently. Under the new wage scale the maximum rate of pay will be reached after three years of continuous service. It is also provided that no run shall pay less than ten hours' wages, regardless of its length.

Cleveland Commissioner Designs Car.—Fielder Sanders, street railway commissioner of Cleveland, Ohio, has designed a car which he hopes will be adopted as the standard on the Cleveland Railway. He told the street railway committee of the City Council recently that from 150 to 200 of the company's 1052 motor cars were in the shops for repair all the time and that new cars must be secured in the near future. He asked that the fifty cars authorized by the Council some months ago be built to the new standard in the company's shops.

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Subway Emergency Exits Being Installed.—Following notices of approval from Fire Commissioner Adamson, the Public Service Commission for the First District of New York has directed the Interborough Rapid Transit Company to make an installation of additional ladders and stairways to be used as emergency exits from the first subway to the street in case of fire or accident. When these are installed all of the recommendations for changes in the subway made by the Public Service Commission following the accident at Fifty-third Street in January, 1915, will have been carried out or will be under way.

Cincinnati Entrance Proposal Renewed.—John E. Bleekman, of the White-Bleekman interests, New York, was in Cincinnati recently. He said that the interests which he represented stood ready to undertake the consolidation of the interurban roads into Cincinnati and build an entrance for them, sharing any profits that may result on a fifty-fifty basis with the city. They would not undertake to build a loop, because they did not believe that a loop could ever be operated at a profit, but they would give the city a rapid transit service in all directions, which would answer the purpose that is expected to be filled by the proposed loop.

Adamson Law Argument on Jan. 8.—The Supreme Court of the United States on Dec. 11 indicated its purpose to give prompt consideration of the Missouri, Oklahoma & Gulf Railroad injunction case, better known as the Adamson law case. Chief Justice White said that the court would hear the arguments on Jan. 8, 1917, and the hearing would be placed at the head of the calendar for that day. In the meantime the law itself, under the decision of Judge Pollock, United States District Judge for the western district of Missouri, and the agreements by the railroad and government attorneys, will be held in abeyance. The law was enacted on Sept. 9 last, to go into effect on Jan. 1, 1917.

Newlands Committee Inquiry Halted.—The Newlands joint congressional committee, which has been investigating railroad problems since Nov. 20, concluded its hearings on Dec. 9, until the end of the present session of Congress. The resolution under which it was commissioned provided that its work should end Jan. 8, 1917, and special permission from Congress will have to be obtained if it continues its sessions after that date. Congress is expected to grant the extension. It has been the understanding almost since the hearings began that the committee would not be able to complete its investigation within the time allotted. With the opening of Congress and the pressure for immediate railway legislation, the members of the committee have decided that they cannot give the investigation the attention it requires and they have determined therefore to postpone it.

Bill to Force Paving in Seattle.—A bill has been introduced in the Council at Seattle, Wash., directing Hugh M. Caldwell, Corporation Counsel, to bring an action against the Puget Sound Traction, Light & Power Company to require it to pave its right-of-way, at the same time and with the same material with which the rest of the street is paved, as soon as the Board of Public Works makes certification of such failure. The introduction of this bill followed the action of Mayor H. C. Gill in advising Corporation Counsel Caldwell that such an action should be brought only by authority of an ordinance, rather than on a report of the franchise committee as proposed. The company is seeking before the Public Service Commission to be freed from paving requirements, the payment of any part of the cost of bridges, and the payment of the 2 per cent tax of the city of its gross earnings.

Operation of First Trolley in Scranton Recalled.—Nov. 29 marked the thirtieth anniversary of the use of electricity in propelling street cars in Scranton, Pa. As the Scranton Suburban Street Railway, now the Scranton Railway, was one of the first roads to apply electricity successfully for the purpose of carrying passengers, the anniversary of the event was recalled by the Scranton *Times*, which published in its issue of Nov. 29 an article reviewing the history of the undertaking and recalling some of the vicissitudes attendant upon the opening of the line for service. E. B. Sturges, who promoted the road, contributed a letter in which he reviewed some of the incidents connected with the opening. The article was accompanied by portraits of W. E. Boileau, the present manager of the Scranton Railway, Mr. Sturges, and the first motorman and the first conductor on the road.

Sees Excellent Trade Possibilities in Brazil.—James A. Farrell, president of the United States Steel Corporation, president of the India House and chairman of the National Foreign Trade Council, believes that a great field for the application of surplus United States capital lies in Brazil. In an article written for *The South American* Mr. Farrell has outlined the reasons for his belief that there is a great chance for United States money and brains in the great South American republic. With respect to the prospects in the public utility field, Mr. Farrell says: "All cities of any importance in the interior are sooner or later provided with electric light, and a large proportion of the equipment for lighting plants has come from the United States. In the future this should be more largely American, and contractors should obtain first-hand information in regard to the numerous waterfalls which are suitable for the generation of power."

I. T. S. Again Seeks Terminal Connection.—The St. Louis Electric Terminal Railway Company, included in the Illinois Traction System, Peoria, Ill., began the presentation of arguments on Dec. 6, at the Planters' Hotel, St. Louis, before Eugene McQuillin, a member of the State Public Service Commission, in support of its application to connect its tracks with those of the Terminal Railroad Association. T. M. Pierce, general counsel for the Terminal Railroad Association, urged that the petition be denied, on the ground that "the Illinois Traction System has violated ordinance provisions made by the city." This was denied by Henry I. Greene of Urbana, Ill., attorney for the Illinois Traction System, who demanded that proof be given. Two attempts were defeated in the session of the Municipal Assembly of 1912-1913 to obtain a franchise making the Illinois Traction System a freight carrier on the Missouri side of the river. The system at the present time has connection with the rails of the Terminal Railroad Association in Granite City.

Subway Urged on Fulton Street.—The Fulton Street Subway League of Brooklyn has submitted to the Public Service Commission for the First District of New York a long statement of reasons why a "trunk line" subway should be built up Fulton Street to East New York. The commission and the Board of Estimate have also received a petition containing nearly 4000 names urging the subway. The league objects to the third-tracking of the Fulton Street elevated road because "a three-track road has at most a capacity only 20 per cent greater than a two-track road," and because a three-track road "is utterly inadequate as a means of caring for the traffic to be handled, obviously, therefore, within five years, the congestion on the Fulton Street line will be intolerable." The statement predicts great damage to the property owners if the proposed three-track road is built on lower Fulton Street. The attitude of President Williams of the Brooklyn Rapid Transit Company toward the removal of the elevated structure on lower Fulton Street and on elevated roads in general was reviewed in the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1915, page 71.

Leonard A. Busby Cites Need for Transportation Expansion in Chicago.—Before the weekly luncheon of the Chicago Real Estate Board, Leonard A. Busby, president of the Chicago Surface Lines, discussed the advance disclosures of the report of the Traction and Subway Commission, and emphasized the fact that it was a problem of concern to every citizen of Chicago, and to every business interest. He said the transportation problem could be solved successfully if the people of the city would look at it as a business proposition, to be settled in a business way. Chicago's population was increasing at the rate of more than 60,000 a year. The service requirements were increasing still more rapidly, as was shown by the rapid increase in riding per capita, an increase from 240 rides per capita in 1902 to 350 rides per capita at the present time. Within ten years the population of Chicago would be more than 3,000,000. To meet the demands of this larger population and increased service requirement would require a minimum increase in existing transportation facilities of 40 to 50 per cent.

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Financial and Corporate

ANNUAL REPORT

Aurora, Elgin & Chicago Railroad

The comparative income statement of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., for the years ended June 30, 1915 and 1916, with revenue and expense percentages based on gross revenues, is as follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Gross revenues:				
Revenue from transportation	$1,635,190	83.8	$1,632,083	82.9
Revenue from operations other than transportation	315,320	16.2	336,285	17.1
Miscellaneous	.....	...	581	0.0
Total gross revenues	$1,950,510	100.0	$1,968,949	100.0
Operating expenses and taxes:				
Maintenance of way and structures	$178,682	9.2	$194,590	9.9
Maintenance of equipment	100,448	5.1	132,555	6.7
Power	203,954	10.4	235,933	12.0
Traffic	19,265	1.0	20,896	1.1
Conducting transportation	417,682	21.4	411,506	20.9
Other operations	29,745	1.6	31,270	1.6
General and miscellaneous	297,845	15.3	295,596	15.0
Total	$1,247,621	64.0	$1,322,346	67.2
Less undistributed operating credits	2,868	0.2	4,955	0.3
Remainder	$1,244,753	63.8	$1,317,391	66.9
Taxes	54,749	2.8	41,956	2.1
Total operating expenses and taxes	$1,299,502	66.6	$1,359,347	69.0
Operating income	$651,008	33.4	$609,602	31.0
Other income	257	0.0	278	0.0
Gross income	$651,265	33.4	$609,880	31.0
Deductions	489,210	25.1	443,437	22.5
Net income	$162,055	8.3	$166,443	8.5

Although the annual report of this company does not contain any earnings figures for preceding fiscal years, a comparison of the 1916 returns with those previously published for 1915 shows that a substantial gain was made in gross income in the last year, while the net income dropped slightly. In 1915, it was stated that for the first time in the company's history the gross income had suffered a material decrease, the falling-off reaching a total of $89,512 or 12.8 per cent.

The better showing in gross income in 1916 was made mostly by savings in operating expenses. The revenue from transportation showed a slight increase of $3,107 or 0.2 per cent but the revenue from other operations decreased $20,965 or 6.2 per cent, so that the total revenues (including miscellaneous revenues) fell off $18,439 or 0.9 per cent. The total operating expenses, less undistributed operating credits, were cut $72,638 or 5.5 per cent, all the groups showing decreases except conducting transportation and general and miscellaneous. The saving made, however, was partly lost through an increase of $12,793 or 30.5 per cent in taxes. The operating income, therefore, increased $41,406 or 6.8 per cent.

The deductions from income increased $45,773 or 10.3 per cent, so that the final result was a decrease of $4,388 or 2.6 per cent in net income. The deductions from income in 1916 included an item of $31,493 for depreciation of equipment and $21,068 for amortization of debt discount and expense. The profit and loss surplus at the end of the year, with no dividend paid on the 6 per cent cumulative preferred stock amounting to $3,100,000, showed a total of $733,171.

During the year the company took advantage of the high price of scrap aluminum to replace all its aluminum high-tension lines (except from Wheaton to Lombard) with new copper wire equivalent to—and in some cases of greater carrying capacity than—the old aluminum wire. The proceeds of the sale of aluminum provided for the cost of the new copper wire and the cost of alteration, with a substantial margin of profit to the company resulting from the change in construction.

American International Corporation

The first report of the American International Corporation, New York, N. Y., or a preliminary report to the stockholders at the annual meeting, states that in the year's operations a definite policy has been persistently followed, always having in view the co-ordinated development of an export and import trade, the use of American materials and manufacturers abroad, the employment of American capital and engineers in constructive foreign enterprises, and finally the enlargement of a system of ocean transportation under the United States flag.

No less than 1230 propositions seeking financial support and development were presented to the corporation for investigation. Transportation and communication (railroads, tramways, shipping terminals, telephones) headed the list with a total of 332 cases, and public utilities (light, power, water, buildings) added 127 proposals. Of the total 917 propositions were declined, the remainder not yet being settled.

The proposals actually accepted and undertaken included the Uruguayan contract for the construction of waterworks and sewerage systems, the American International Terminals Corporation and the Chinese railroad concession. In addition, the corporation acquired interests in the Pacific Mail Steamship Company, the Allied Machinery Company of America, the International Mercantile Marine Company and the New York Shipbuilding Company. A special corporation was formed to take care of South American work; the Rosin & Turpentine Export Company was organized and an interest was acquired in the United Fruit Company and in the tea-importing business

RAILWAY EARNINGS FOR SEPTEMBER

Comparative Returns for 1915 and 1916 Show Improvement in Western District—New York Strike Had Bad Effect

A comparison of electric railway statistics for September, 1916, with figures for the corresponding month of 1915, made by the information bureau of the American Electric Railway Association, indicates an encouraging improvement in the traction business of the Western District of the United States. Labor disturbances in New York City, however, have had a considerable effect upon the returns from the Eastern District and consequently upon the returns for the United States as a whole. Data for September, representing 7067 miles of line of companies scattered throughout the country, show a decrease in operating revenues of 2.25 per cent, in operating expenses of 1.86 per cent and in net earnings of 2.80 per cent, while data representing 5706 miles of line indicate an increase in taxes of 8.15 per cent and a decrease in operating income of 5.71 per cent.

Of the three groups shown in the accompanying table the Eastern, represented by 4356 miles of line or about 60 per cent of the total mileage, suffered a decrease in operating revenues of 5.20 per cent, in operating expenses of 4.14 per cent and in net earnings of 6.60 per cent. Returns representing about 80 per cent of this mileage show an increase in the amount of taxes paid of 6.32 per cent and a decrease in operating income of 9.73 per cent. The returns from electric railways in the Eastern District, however, exclusive of those involved in the New York City strike, indicate an increase in operating revenues for this district of 8.49 per cent, in operating expenses of 4.35 per cent and in net earnings of 13.67 per cent. A similar elimination from the returns of those companies reporting taxes shows an increase in the operating income for the Eastern District of 15.21 per cent.

According to the reports of the Public Service Commission for the First District of New York, the electric railways involved in the New York City strike, exclusive of the Interborough Rapid Transit Company, earned in September, 1915, approximately $2,500,000 and expended, exclusive of taxes, about $1,500,000. A comparison with the corresponding figures for September, 1916, indicates a decrease in operating revenues of about 50 per cent and in operating expenses of about 30 per cent. The effect of these decreases upon the totals involved is thus self evident.

The Southern group, represented by 756 miles of line, showed increases in operating revenues, expenses and net

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earnings, the latter amounting to 5.43 per cent. Companies represented by 506 miles of line had an increase in the amount of taxes paid of 2.77 per cent, and in operating income one of 6.01 per cent.

Data for the Western group, represented by 1955 miles of line indicate an encouraging improvement. Operating revenues increased 4.53 per cent, operating expenses 2.11 per cent and net earnings 8.77 per cent. In spite of an increase of 13.95 per cent in the amount of taxes paid by companies represented by approximately 85 per cent of the above-stated mileage, the operating income increased 7.51 per cent.

Increases in the operating ratio became apparent, the operating ratio of the United States as a whole increasing from 58.29 per cent in 1915 to 58.52 per cent in 1916. Of the three districts the Western alone showed a decrease in the operating ratio, though its operating ratio was the highest of all.

REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR SEPTEMBER, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
*United States**	Amount	Per Cent Increase	Amount	Per Cent Increase
Operating revenues	$14,615,153	†2.25	$13,694,569	†3.06
Operating expenses	8,553,200	†1.86	8,025,889	†2.65
Net earnings	6,061,953	†2.80	5,668,680	†3.62
Taxes	.....	...	959,678	8.15
Operating income	.....	...	4,709,002	†5.71
Operating ratio, per cent:				
1915	58.52	...	58.60	...
1916	58.29	...	58.36	...
Miles of line represented	7,067	...	5,806	...
*Eastern District**				
Operating revenues	10,126,148	†5.20	9,661,525	†5.96
Operating expenses	5,813,153	†4.14	5,559,852	†4.81
Net earnings	4,312,995	†6.60	4,101,673	†7.48
Taxes	.....	...	660,048	6.32
Operating income	.....	...	3,441,625	†9.73
Operating ratio, per cent:				
1915	57.41	...	57.55	...
1916	56.77	...	56.85	...
Miles of line represented	4,356	...	3,549	...
*Southern District**				
Operating revenues	837,365	7.85	536,921	7.09
Operating expenses	466,600	9.85	282,150	8.56
Net earnings	370,765	5.43	254,771	5.51
Taxes	.....	...	38,101	2.77
Operating income	.....	...	216,670	6.01
Operating ratio, per cent:				
1915	55.72	...	52.55	...
1916	54.70	...	51.84	...
Miles of line represented	756	...	506	...
*Western District**				
Operating revenues	3,651,640	4.53	3,350,539	4.34
Operating expenses	2,273,447	2.11	2,143,796	1.87
Net earnings	1,378,193	8.77	1,206,743	8.74
Taxes	.....	...	229,501	13.95
Operating income	.....	...	977,239	7.51
Operating ratio, per cent:				
1915	62.26	...	62.46	...
1916	63.72	...	63.98	...
Miles of line represented	1,955	...	1,751	...

†Decrease.

* Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River, exclusive of Greater New York. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

BOSTON ELEVATED ISSUES CONCLUDING STATEMENT

At a hearing on Dec. 7 before the special commission investigating its revenue problem, the Boston (Mass.) Elevated Railway issued a concluding statement relative to points brought out in the recent sessions, in which the road replied to various statements in opposition to certain plans for increasing net earnings. The company pointed out that no justification existed for the statement that the probable increase in the road's business during the next three years would take care of the increased cost of operation and the increased charges which must be faced.

The federal income tax on net earnings had recently been increased from 1 per cent to 2 per cent. Congress had imposed a new corporation tax of 50 cents per $1,000 on the par value of the stock, after July, 1917. During the fiscal year 1919 a further increase in wages estimated to cost the company at least $200,000 more for the same amount of service rendered will become due and there will also be increased charges on additional capital. Sufficient income should be available to enable the substitution of new and improved equipment for existing equipment.

F. E. Snow of Gaston, Snow & Saltonstall, general counsel for the company, said that the management expenses of the company were reasonable. It was considered a measure of prudence to retain the services of the company's former president following the election of Mr. Brush to the chief executive office of the company. Mr. Snow also said that the legal department of the company was efficiently conducted. He cited the great volume of work handled by it annually.

The statement contended that the Public Service Commission was well informed as to the company's financial necessities, and that the board was in a position to advise the special commission without outside investigation. The company had no objection to the latter, but felt that its status was entirely clear, and that if any additional investigation was deemed necessary, it could be completed within so short a time as not to delay seriously the final action of the commission. The solution of the situation lay in the State designating a representative to sit on the board of directors and take part in the determination of questions of policy and expenditures when and as they are made. The company would welcome any such representative to its board.

RUNNING CANADIAN MUNICIPAL RAILWAYS—MOSTLY AT A LOSS

According to reports from Canada the Brandon Municipal Street Railway has proved an expensive luxury, and, it is estimated by the civic authorities, has cost the city approximately $50,000 this year, an average monthly loss of about $4,000. The street railway of Regina has cost that city $40,000 to operate so far this year. The Lethbridge Municipal Railway has cost approximately $8,000. In practically every city in western Canada the municipal street railways are said to be proving themselves merely sink holes for public funds.

The street railway system in Saskatoon, however, which at one time was regarded as a losing proposition, has so far this year shown a profit of $7,000. Part of the showing is due to the profitable operation of the exhibition route during part of last winter when the military were stationed at the grounds, but apart from that the railway has picked up. The Saskatoon *Phœnix* states that the Council became determined that the street car system must be made to pay and instructed the street railway superintendent to that effect. The kicks of particular sections of the city that wanted a street car service entirely out of proportion to the amount of traffic carried were disregarded to a great extent, and the system was run on "business-like" lines. The use of double-truck cars was discontinued in a great measure, and the routes were somewhat reorganized by competent men. As a result, it is claimed, the present service is on time, efficient and paying.

American Railways, Philadelphia, Pa. — The American Railways has deposited with the Pennsylvania Company for Insurances on Lives & Granting Annuities, trustee under the deed securing the three-year 5 per cent notes of the railway, the sum of $631,140 to redeem on Feb. 1, 1917, notes of a similar amount of the issue mentioned previously.

Bay State Street Railway, Boston, Mass.—The Massachusetts Public Service Commission has authorized an issue of $2,500,000 of 6 per cent serial notes by the Bay State Street Railway. The notes are to mature in from one to seven years. The proceeds are to be used to pay for reconstructing track and overhead equipment and for replacing rolling stock and other property. In the ELECTRIC RAILWAY JOURNAL of June 10, page 1107, mention was made of an application to the commission to issue $2,750,000 of 5 per cent coupon notes to be dated Aug. 1, 1916, and to mature serially on annual interest dates for seven years. These notes were to be part of $3,500,000 authorized on March 9, 1916.

Charlottesville & Albemarle Railway, Charlottesville, Va. —At a meeting of the directors of the Charlottesville & Albemarle Railway, held on Dec. 9, a semi-annual dividend of 3½ per cent was declared on the preferred stock, and 2½ per cent on the common stock. This makes a total of 7 per cent on the preferred stock, and 5½ per cent on the common stock, for the year.

Cleveland (Ohio) Railway.—The operating report of the Cleveland Railway Company for October shows overdrafts

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of $87,539 in the operating fund and $17,908 in the maintenance fund. The total operating revenue was $826,386. The poor showing was due to the fact that damage claims, resulting from the West Third Street disaster, amounted to $120,123 as compared with $35,981 paid out for the same purpose in the corresponding month last year. The revenue from the penny charge for transfers was $71,906. A small ordinance surplus was shown, but there was an actual deficit of $75,158. The total number of passengers for the month was 32,471,237, an increase of 8.78 per cent over the number carried in October, 1915. It is asserted that the increase in the service under the control of the city was 3.59 per cent, which meant that the cars were crowded much more than a year ago. The amount added to the interest fund was $4,290, which brought this fund up to $475,562. This must reach $700,000 before a reduction in fare can take place.

Electric Bond & Share Company, New York, N. Y.—William P. Bonbright & Company, New York, N. Y., have sold $2,000,000 of 6 per cent cumulative preferred stock of the Electric Bond & Share Company at $100 a share and the dividend. The company has authorized and outstanding $8,000,000 of preferred stock and $8,000,000 of common stock. The common stock is owned by the General Electric Company. The preferred stock is callable on ninety days' notice on any dividend date at the amount of 110 and accrued dividend.

Interborough Consolidated Corporation, New York, N. Y.—Henry V. Rice, a holder of preferred stock of the Interborough-Metropolitan Company, in his own behalf and for "other holders who may care to join him," has filed a suit in the Supreme Court in New York asking that a receiver be appointed for all the properties and funds of the company as constituted in June, 1915. He also asks that Theodore P. Shonts, Cornelius Vanderbilt, August Belmont and other directors of that period be compelled to render an accounting of all property turned over to the Interborough Consolidated Corporation, the successor to the Interborough-Metropolitan Company. Mr. Rice alleges, upon information and belief, that the directors effected a consolidation with the approval of the holders of a majority of the Interborough-Metropolitan shares and thereby "defrauded" the holders of the preferred stock out of 57 per cent in accumulated dividends. The aggregate of the 57 per cent would amount to $26,071,800. He further alleges that for the purpose of destroying the value of the company the defendants had the securities stricken from the list of Stock Exchange securities and as a result the stock became unmarketable and is not a collateral for banks. Mr. Rice asks that the consolidation be declared null and void and the Interborough-Consolidated Corporation be enjoined from exercising any control over the Interborough-Metropolitan property.

Knoxville Railway & Light Company, Knoxville, Tenn.—Reilly, Brock & Company, Philadelphia, Pa., and Bertron, Griscom & Company, New York, N. Y., are offering for subscription at 92¾ and interest to net 5½ per cent $1,556,000 of refunding and extension mortgage 5 per cent gold bonds of the Knoxville Railway & Light Company dated July 1, 1911, and due June 1, 1946.

Northern Ohio Electric Corporation, Akron, Ohio.—The Northern Ohio Traction & Light Company, the operating subsidiary of the Northern Ohio Electric Corporation, has petitioned the Ohio Public Utilities Commission for authority to issue $1,000,000 of common stock at par, the proceeds to be used for new construction and extensions. The new stock will be taken by the parent corporation, which owns 95 per cent of the present outstanding stock of Northern Ohio Traction & Light Company.

United Railways, St. Louis, Mo.—A committee consisting of L. H. McHenry, Louisville, chairman; J. A. Cheek, Danville, Ky.; George E. Dieckman, St. Louis; J. B. Downing, Jr., Middleport, Ohio; H. P. Wilson, New York, and A. J. Scharf, Louisville, has been organized in the interest of the holders of the stock of the United Railways, and is seeking proxies for use at the annual meeting of the company in February. Mr. Dieckman is quoted as follows: "Letters are being sent to the preferred stock holders asking them to send their proxies to the committee in order that we may be able to finish our investigation and be in a position to take some action at the annual meeting of the United Railways in February. Our investigation will be entirely friendly. There must be some way to put this corporation on a paying basis, and that is what we want to do." This is the third committee to be organized to secure proxies.

DIVIDENDS DECLARED

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

El Paso (Tex.) Electric Company, 3 per cent, preferred; quarterly, 2½ per cent, common.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., quarterly, 1½ per cent, preferred.

Interborough Consolidated Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.

Interborough Rapid Transit Company, New York, N. Y., quarterly, 5 per cent.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1½ per cent.

Springfield Railway & Light Company, Springfield, Mo., quarterly, 1¾ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 2 per cent.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Union Traction Company, Philadelphia, Pa., $1.50.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

West End Street Railway, Boston, Mass., $2, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Oct.,		'16	$173,987	*$115,884	$58,103	$35,819	$22,284
1 "	"	'15	167,520	*106,308	61,212	37,268	23,944
4 "	"	'16	764,826	*495,547	269,279	143,804	125,475
4 "	"	'15	713,317	*462,659	250,658	147,126	103,532

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

1m., Oct.,		'16	$77,173	*$40,480	$36,693	$18,131	$18,562
1 "	"	'15	71,610	*35,587	36,023	17,613	18,410
12 "	"	'16	815,966	*445,574	370,392	213,083	157,309
12 "	"	'15	785,895	*392,726	393,169	212,211	180,958

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Oct.,		'16	$109,024	*$82,197	$26,827	$29,925	†$3,098
1 "	"	'15	98,155	*62,535	35,620	30,240	5,380
12 "	"	'16	1,225,482	*786,082	439,400	355,838	83,562
12 "	"	'15	1,057,096	*723,875	333,221	356,814	†23,593

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., Oct.,		'16	$38,570	*$23,645	$14,925	$11,490	$3,435
1 "	"	'15	36,284	*18,613	17,671	11,083	6,588
10 "	"	'16	390,147	*220,471	169,676	114,042	55,634
10 "	"	'15	358,405	*195,016	163,389	109,841	53,548

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., Oct.,		'16	$251,683	*$155,117	$96,566	$69,144	$27,422
1 "	"	'15	226,793	*130,373	96,420	65,507	30,913
12 "	"	'16	2,828,567	*1,726,598	1,101,969	805,943	296,025
12 "	"	'15	2,598,663	*1,482,210	1,116,453	785,452	331,001

FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.

1m., Oct.,		'16	$201,809	*$121,866	$79,943	$48,708	$31,235
1 "	"	'15	194,227	*129,104	65,123	48,693	16,430
10 "	"	'16	2,062,032	*1,373,167	688,865	487,233	201,632
10 "	"	'15	1,917,058	*1,270,603	646,455	492,292	154,163

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Oct.,		'16	$136,113	*$84,878	$51,235	$36,521	$14,714
1 "	"	'15	118,314	*75,475	42,839	36,283	6,556
10 "	"	'16	1,343,126	*838,007	505,119	363,827	141,292
10 "	"	'15	1,150,649	*746,619	404,030	361,116	42,914

LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

1m., Oct.,		'16	$218,345	*$134,182	$84,163	$52,586	‡$42,029
1 "	"	'15	196,650	*110,709	85,941	55,129	‡42,010
12 "	"	'16	2,455,030	*1,493,810	961,220	631,503	‡465,980
12 "	"	'15	2,019,889	*1,185,108	834,781	664,890	‡305,812

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Oct.,		'16	$459,720	*$248,407	$211,313	$181,280	$30,033
1 "	"	'15	453,225	*257,246	195,979	182,766	13,213
12 "	"	'16	5,429,252	*3,043,952	2,385,300	2,178,247	207,053
12 "	"	'15	5,582,361	*3,080,788	2,501,573	2,209,207	292,366

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m., Oct.,		'16	$24,460	*$23,641	$819	$7,987	††$7,168
1 "	"	'15	28,216	*24,278	3,937	8,004	††4,067
4 "	"	'16	141,617	*105,238	36,379	31,948	††4,431
4 "	"	'15	161,567	*111,030	50,537	32,005	††18,532

*Includes taxes. †Deficit. ‡Includes non-operating income

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Traffic and Transportation

I. C. C. DECISION FAVORS I. T. S.

Government Body Holds That a City Cannot Indirectly Control or Regulate Interstate Commerce by a Franchise Condition

In the ELECTRIC RAILWAY JOURNAL of Dec. 9, page 1222, brief mention was made of the decision rendered by the Interstate Commerce Commission on Dec. 4 in which it found to be justified certain increases in fare proposed by the Illinois Traction Company, Peoria, Ill., for the transportation of passengers between St. Louis, Mo., and Venice, Madison and Granite City, Ill. In its ruling the commission held that interstate fares prescribed by a municipality are not conclusively presumed to be reasonable even if accepted by the interstate carrier as one of the conditions of a franchise. In addition to holding that the St. Louis Electric Terminal Railway, a subsidiary of the Illinois Traction Company, is a common carrier of passengers and freight in interstate commerce and as such is subject to the jurisdiction of the commission, that body tentatively approved the tariff item of the company providing for the sale of commutation tickets valid only during specified rush hours.

By the tariff under investigation the Illinois Traction System proposed to increase from 5 cents to 10 cents the fare for the transportation of passengers over its line between St. Louis, Mo., and points in the towns of Venice, Madison and Granite City, Ill., north of the Main Street station in Venice. New commutation fares and strip tickets were also proposed. Upon protests filed on behalf of the municipalities and by commercial organizations in St. Louis and Granite City the operation of the schedules in question was suspended until Dec. 29, 1916.

Prior to 1910 the lines of the system extended only as far south as Granite City, the southern terminus of the St. Louis, Springfield & Peoria Railroad, and it was deemed necessary or advisable to seek an entrance into St. Louis. The terminal company and the bridge company were then organized and an ordinance granting the necessary franchise rights was obtained from the city of St. Louis. Section 10 of the ordinance by which the municipal assembly of the city of St. Louis authorized the company to construct an electric railway along certain designated streets provided inter alia that "the charge for a continuous passage for an adult passenger between any point in said city of St. Louis on the line of said railway company and any point in Granite City and intermediate points in the State of Illinois, or return from said points in Illinois to points within the city of St. Louis on the line of said St. Louis Electric Terminal Railway shall not exceed 5 cents."

TEXT OF DECISION

In its decision the commission says in part:

"It is clear that the charging and collecting of the fare of 10 cents proposed in the tariff under investigation would directly contravene this provision of the ordinance. On behalf of the city of St. Louis it is contended that 'the rate incorporated in this franchise at the request of the St. Louis Electric Terminal Railway, and accepted by this company, is to be conclusively presumed by the commission to be reasonable as against any complaint made by the St. Louis Electric Terminal Railway.'

"The respondent replies that it accepted this provision of the ordinance because it was obliged to do so as a condition precedent to obtaining the necessary franchise rights; that it did so in good faith, with the expectation that so much passenger and freight traffic would be developed and so many benefits would accrue to the traction system as a whole, that the fare of 5 cents per passenger would prove remunerative; that the volume of freight and passenger traffic has been much smaller than was anticipated, with the result that for more than four years these companies have sustained heavy losses; and that, in any event, the provision in the ordinance fixing the maximum passenger fare at 5 cents is void because the traffic in question is interstate traffic, the fares and charges for which, it is said, the municipal assembly of St. Louis has no power to prescribe. The city's rejoinder is that the terminal company is not a railroad within the meaning of the Act to regulate commerce, but only a street railway, and that under the decision of the Supreme Court of the United States in Omaha Street Railway vs. I. C. C., 230 U. S., 324, this commission has no jurisdiction over the terminal company, and no power to regulate its fares and charges.

"The respondents have through rate agreements with the Missouri Pacific-Iron Mountain system, the Wabash Railway, the Chicago & Eastern Illinois Railroad, and with a number of other steam railroads. The terminal company makes reports to this commission as a common carrier engaged in interstate commerce, and it is shown in tariffs filed with this commission as participating with various steam railroads in the establishment of through interstate routes and joint rates. That interstate traffic was contemplated when the franchise was granted clearly appears in the third section of the ordinance, which provides that the terminal company's lines 'shall be connected and operated in connection with the said interurban companies.' The fourth section of the ordinance grants to the terminal company the right 'to operate Pullman or sleeping cars.' Such cars are regularly operated, trains sometimes containing as many as five cars in all. The terminal company owns no freight cars, its freight equipment being supplied by its connections. It is interesting to observe that the city of St. Louis, while contending that the terminal company is merely a street railway, and not a common carrier by railroad subject to the jurisdiction of the commission, earnestly insists that respondents' facilities are well adapted to the transportation of freight and that it should endeavor to recoup its losses rather by developing its freight traffic than by increasing its passenger fares.

"The protestants rely principally on Omaha Street Railway vs. I. C. C., supra, where the Supreme Court of the United States discussed the meaning of the word 'railroad' as used in the Act to regulate commerce.

"The facts previously detailed clearly show that the terminal company is a 'railroad,' as that word has been construed by the highest tribunal in the very case relied upon by the protestants. It may be noted also that the Omaha & Council Bluffs Railway was incorporated as a street railroad, with no right of eminent domain and no authority to haul freight. The terminal company, on the other hand, was incorporated under the general railroad law of the State of Missouri, and enjoys and has exercised the right of eminent domain. It is clear that this commission has jurisdiction over the terminal company, with authority under the act to regulate its fares and charges.

"Nor can we agree with the contention made by the city of St. Louis that the fare of 5 cents per passenger is conclusively presumed to be reasonable because it was fixed as a maximum fare in the municipal ordinance and accepted by the terminal company as one of the conditions of the franchise grant. However indisputable may be the right of a city to grant or withhold from quasi public corporations the use of its highways, it cannot indirectly control or regulate interstate commerce by attaching conditions to its franchises. The same conclusion must be reached if the municipal ordinance and the acceptance of its conditions by the terminal company be viewed as a contract between the city and the railway company. Not only has a railway company a recognized right to earn a fair return on the value of the property which it devotes to the public service, but the interest of the public demands that carriers engaged in interstate commerce, if properly constructed and wisely managed, shall receive revenues which will enable them to keep their property and equipment in good repair and maintain their service at the highest possible point of efficiency. The interest of the public in this respect is paramount to the private rights of the parties, whether obtained by contract or otherwise, and in determining the reasonableness and the propriety of proposed rates or fares in investigations of this character the commission cannot consider its authority limited or its judgment controlled by the terms of private agreements which

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the carrier or carriers respondent may have made with other parties purporting to fix the measure of the rates in question. Admitting the correctness of the city's contention that a contract between a common carrier and a municipality differs in kind from a private contract between a carrier and shipper for the establishment of a preferential rate, it is nevertheless clear that both kinds of contracts must be disapproved to the extent that they seek by special agreement to require the maintenance of rates or fares which are unreasonable, discriminatory or unremunerative, or to the extent that they seek to lodge in other bodies the jurisdiction over interstate rates and fares which has been expressly conferred upon this commission by federal law.

"The respondents maintain that the charge of 5 cents is low for a service of this character, especially when it is considered that under the provisions of the municipal ordinance the terminal company is permitted to charge 3 cents for a foot passenger crossing the bridge one way and 10 cents for an equestrian. Comparisons of the proposed fare of 10 cents with the charges of other electric railways radiating from St. Louis show that the fare proposed is relatively low. A maximum passenger fare of 2 cents per mile is prescribed by statute within the State of Illinois, the law applying as well to electric railways as to steam railroads. If, therefore, respondents' lines were wholly within the State of Illinois, they would be permitted to charge a fare of 15 cents for their maximum haul of 7½ miles. In the present case they propose a fare of 10 cents. The evidence of record in this proceeding not only shows that the fare proposed is lower than others charged for a similar service in the vicinity of St. Louis, but it fails to reveal a single instance in which a fare as low as 5 cents is charged for a service fairly comparable with that afforded by the respondents.

INCREASE JUSTIFIED BY VALUATION

"Most of the evidence of record has been addressed to the financial condition of the respondent companies. The respondents assert and the protestants deny that the financial condition of the companies is poor and that the proposed fare is necessary to insure a reasonable net return on the value of the properties devoted to the service in question. Anticipating the presentation of this case before the commission and realizing the impossibility of arriving at a satisfactory determination of the original cost of their properties, the respondents employed two disinterested and competent engineers to appraise their reproduction value. When the appraisal was finished and before hearing was had in this proceeding, the complete inventory was placed at the disposal of the consulting engineer for the city of St. Louis. In spite of rigid examination by the city's engineer it has not been shown, or even seriously contended, that the valuation placed upon the properties by the appraisers is excessive.

"The appraisal value of the bridge property is $2,657,112, while the value of the property of the terminal company is placed at $3,647,264, making the total appraisal value of the properties of both companies (exclusive of intangibles) $6,304,377. The total par value of the outstanding securities of both companies amounts to $7,316,000, which exceeds by approximately $1,000,000 the appraised value of their properties. The respondents feel that the good-will of these companies and the value of their intangible property amply cover this difference. The total property investment account of the two companies, as shown by their books, is $7,791,379, which exceeds by approximately $1,487,000 the value of the property as estimated by the appraisers. This apparent discrepancy is at least partially accounted for by various expenditures for rights and facilities which were subsequently abandoned.

The operating figures seem clearly to show that the unfavorable financial condition of these companies is due at least in part to the inadequacy of the revenues from suburban operation. It is estimated that the proposed increases in passenger fares would add between $60,000 and $65,000 annually to the revenues of these companies.

"The city of St. Louis maintains that these figures are misleading, and that they cannot properly be regarded as establishing the respondents' need of additional passenger revenue. Its principal contention in this respect is that the respondents' facilities are as well adapted to the transportation of freight as to the transportation of passengers; that they should increase their revenues rather by developing their freight tonnage than by increasing their passenger fares; and that in allocating the values of the property and the revenues and expenses due recognition should be given to the adaptability of the facilities to the handling of freight.

"The respondents admit that a more or less extensive freight traffic was anticipated when these lines were constructed. In considering this question it should be borne in mind that electric railway companies which are so similar to ordinary street railways as the terminal company is said to be cannot be expected under ordinary circumstances to derive as much revenue from freight traffic as from passenger traffic. Just how much additional investment was made in these properties to accommodate the freight traffic does not clearly appear of record. It is shown, however, that in the year 1915 the revenue which the bridge and terminal companies received for the transportation of freight amounted to approximately 15 per cent of their total transportation revenues. The respondents are endeavoring to increase their freight tonnage, but it is unlikely that the freight revenue will equal the passenger revenue, at least in the near future. Under these circumstances it is clear that in determining whether or not respondents should receive additional revenues from their passenger service, the allocation of property values, expenses and revenues should be made on the basis of the freight traffic now handled, or which may reasonably be anticipated in the near future, and not on the assumption, contrary to fact, that the respondents are actually carrying as much freight as it is physically possible for them to accommodate. The allocation of 60.5 per cent of the total appraisal value of these properties to freight traffic is obviously subject to criticism, especially in view of the fact that the lines were constructed primarily for passenger service, and since only 15 per cent of transportation revenues are derived from freight. It may be observed in this connection that the municipal ordinance permits only the transportation of passengers, mail and express matter and that respondents have no right to use the city streets for the transportation of carload freight.

"There is no evidence of record indicating that the interurban service is profiting at the expense of the suburban service. On the contrary, it is shown that the terminal company receives liberal divisions of the through rates and fares between St. Louis and points beyond Granite City located on other lines of the Illinois Traction System.

VARIOUS FARES DISCUSSED

"The respondents apparently would have no objection to maintaining the present fare of 5 cents within the city of St. Louis and increasing to 10 cents the fare between St. Louis and all points on the east side of the river. It is clear from the whole record, however, that the imposition of an extra fare for the service in crossing the river would be regarded by the people of St. Louis as an 'arbitrary' charge, and it was principally for the purpose of avoiding their displeasure in this respect that the respondents finally proposed to maintain the same fare to and from both sides of the river. No point on the east side of the river has been suggested which could with greater propriety be chosen as a point of division between the 5-cent and 10-cent zones.

"The tariff under investigation provides in one item for the sale of fifty-two-ride non-transferable commutation tickets between St. Louis and Granite City and intermediate points for $3. A commuter using one of these tickets for fifty-two rides would pay at the rate of 5.76 cents for one single trip. These tickets, which are good only on suburban cars, and for thirty days from the date of sale, may be presented between the hours of 5 a. m. and 8 a. m. or between 4 p. m. and 6:30 p. m. on any day except Sunday. These hours were chosen because they are the periods of heaviest traffic. The commutation tickets will operate particularly to the advantage of the workmen who commute daily between St. Louis and the tri-cities, but they are open to any passenger who may desire to make

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use of them. During one representative week in January of this year 58.96 per cent of the passengers carried in the suburban service were commuters. Upon the whole record it seems that the commutation tickets will benefit a large number of persons without operating to the undue prejudice of others.

"The suspended tariff also provides for the sale of six-ride strip tickets for 50 cents, or 8.33 cents per trip. These tickets are transferable and good on any suburban cars at any time for transportation between St. Louis and Granite City. No objection has been made to this provision of the tariff, except that it results in increasing the fare.

"We find and conclude that respondents have established the propriety of all the proposed fares. The protestants may later bring to our attention any instances in which the commutation tickets or the limitations attached to their use result in undue prejudice, and with more complete evidence before us we shall then consider the advisability of modifying our findings as the circumstances may appear to require. It will be understood that nothing here said shall in any way prejudice the subsequent determination by the commission of the value of the respondents' properties or the return which they should properly yield."

The commission has announced that it will enter an order vacating the orders previously entered suspending the operation of the schedules in question.

DETROIT COMPANY WINS FARE CASE

U. S. Supreme Court Sustains Company's Rights on Fares in Annexed City Districts—Text of Majority Opinion Withheld for Revision

The United States Supreme Court handed down a decision on Dec. 11 sustaining the contention of the Detroit (Mich.) United Railway with respect to the right of the company to charge extra fares for transporting passengers beyond the old city limits into territory which has since been brought within the city as at present extended. The court also held the company need not sell reduced rate "working men's hour" tickets in the annexed territory. The practical effect of the decision is to permit the company to charge a double fare on Jefferson Avenue, east of St. Jean Avenue, to the city limits at Alter Road; also to charge a double fare on Grand River Avenue west of the boulevard.

The controversy was carried to the United States Supreme Court by the railway on a writ of error, following decision by the Michigan Supreme Court in favor of the city. The decision of Dec. 11 by the United States Supreme Court was rendered for the majority of the court by Justice Pitney, who withheld the text for revision. The dissenting opinion was rendered by Justice Clark with the concurrence of Justice Brandeis, the text being made public. The majority of the court accepted the view presented by former Senator Elihu Root, who appeared on behalf of the railway when the case was argued on Oct. 20 last. The two dissenting justices take the view presented on behalf of Detroit by Circuit Judge P. J. M. Hally, former corporation counsel of Detroit, who argued that the writ of error should be dismissed and the Michigan Supreme Court decision affirmed.

The company's right to collect a double fare in the suburban territory is sustained by the majority of the court on the ground of the franchise granted the company by Grosse Pointe township, previous to the annexation of the territory to the city. It is held that the Legislature of the State of Michigan, by the annexation acts of 1905 and 1907, could not impair the company's contractual rights. The chief point made by the city attorneys before the Supreme Court, that the question involved was purely one of contractual relations and as such not subject to United States jurisdiction, is overruled.

The specific case decided is that of the city of Detroit vs. the Detroit United Railway, known as the Fairview case. The action was begun about 1907, as soon as it became apparent that the company would insist on its right to charge a double fare in the annexed territory. It was the conception of the city that the franchise granted by the city of Detroit in 1898, which required the company to give an 8-for-25-cent fare during workingmen's hours, required that these fares should be extended into new territory which might be annexed. Before the Supreme Court Judge Hally argued that the workingmen's ticket and the concession for extension of fares within the city limits constituted the specific and recognized price which the city received for permitting the company to continue to use its streets. The Michigan courts unanimously sustained the city contention with this regard, and the same view is taken in the dissenting opinion of Justices Clark and Brandeis.

CHEAP FARES BEGET CHEAP SERVICE

Fielder Sanders, street railway commissioner of Cleveland, Ohio, said on Dec. 8 that the service on Euclid Avenue would be increased by Christmas week. Cars of several routes are operated over part of the Euclid Avenue tracks, and on this account it is difficult to readjust the schedules in such a way as to give satisfaction. Mr. Sanders also said that additional cars would be placed on the Madison Avenue and Wade Park lines. The Cleveland *Leader* of Dec. 7 said:

"No one who has experienced the jams common at certain times of the day on some if not all of the lines could deny that conditions are worse than uncomfortable. Dignity, decency and health are disregarded as totally as is comfort.

"It is noteworthy that this condition has come about in a city where street railway service is absolutely dominated, prescribed and regulated by elective or appointive representatives of the voters, not by officers of 'soulless corporations,' or 'greedy special privilege' looking for big dividends. It is obvious that the people have the remedy in their hands and can apply it as expeditiously and extensively as they wish. It would seem that they should do so, if not in defense of their own comfort, health, self-respect, morals and the like, then in defense of the theory that the public is capable of managing its own affairs intelligently. Present conditions are the more discreditable in that they obtain in a department of public service in which Cleveland has specialized for years.

"It is also to be noted that the car crowding is not a new development. It did not begin last week or last month. It has been increasing through the years, as the city's population has been increasing. The reason why the public and its representatives, though possessing full power to act, have not provided increased traction service in proportion to increased population is perfectly obvious. For fifteen years, officials and voters alike have been encouraged to believe that the one great desideratum—to which all considerations of equipment, schedules, extensions and so on must give way—is not good service but 3-cent fares. Of course the service has its faults."

PENNSYLVANIA JITNEY CASES BEING SETTLED

Orders are being issued by the Public Service Commission of Pennsylvania disposing of jitney cases which are governed by the decisions handed down by Chairman Ainey of the commission in the Allegheny Valley Railway and Wilkes-Barre Railways' complaints, referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 9, page 1222. In both series of complaints there were numerous instances wherein the conditions were the same and formal orders to the owners to cease operating and secure State certificates have been prepared. It is estimated that there are about 115 jitneys in the Wilkes-Barre district controlled by the Parsons case, in which a certificate was ordered procured as a requisite to operation notwithstanding requirement of a city license will control. In the western cases probably a score will be affected.

The decisions rendered by the commission in jitney cases are being applied to complaints now on the dockets and where new angles arise hearings will be held. With exception of some administrative rulings it is probable that no additional opinions will be rendered on the cases in hand.

It was announced on Dec. 11 that the commission has declined the applications for the 250 jitneys for certificates of public convenience, claiming that there is adequate trolley service.

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HEARING ON BOSTON TRANSFERS

H. B. Potter, assistant to the president, appeared before the Public Service Commission of Massachusetts, Nov. 23, in support of a petition of the Boston Elevated Railway for a reduction of transfer facilities on various Summer Street lines in connection with the opening of the Dorchester tunnel from Washington Street to Dewey Square. Mr. Potter pointed out that through the abuse of paper transfer checks at Washington, Winter and Summer stations of the rapid transit system many passengers from residential districts made a round trip on a single fare between their homes and the most congested retail center in New England. It is proposed to issue transfers at South Station (under Dewey Square) between Dorchester tunnel trains and Atlantic Avenue, Dorchester Avenue and Summer Street extension cars, doing away with the local transfer facilities on Summer Street, which at present offer opportunities for abuse. It is planned to remove all surface-car traffic from Washington Street, from Essex to Franklin Streets, during the holiday season, and some of the diverted lines will connect with Atlantic Avenue trains at the Beach Street elevated station, where increased service will probably be inaugurated. The commission took the case under advisement.

Inaction on Seattle Jitneys.—The special committee of the City Council of Seattle, Wash., which was asked by the Council to submit a report on jitney regulation has done nothing on the proposition, according to recent announcements.

Plans Under Way for Portland Zone System for Jitneys.—Commissioner Daly of the department of public utilities of Portland, Ore., is at work outlining a "standard zone system" for taxicabs, as directed by the Council. The city will be divided into zones which must be adopted by all taxicabs and jitneys operating their cars on the zone basis.

Use of Elevated Lines Urged.—The city authorities of New York and the officers of the Interborough Rapid Transit Company, New York, N. Y., are urging the city travelers to ride on the elevated lines instead of in the subway, and if they must use the subway to take the end cars instead of the middle ones, pointing out that the adoption of these reforms will not necessarily make those who adopt them late for the office.

"A Safe Rule."—The Beaver Valley Traction Company, New Brighton, Pa., under the direction of W. H. Boyce, superintendent, who has evolved many practicable safety first ideas, is now distributing 1-ft. rules with the usual inch divisions under which is the legend: "A Safe Rule—Stop, Look and Listen Before You Cross a Street." On the reverse side of the rule over the name of the company is the legend: "Remember we seek your co-operation to prevent accidents.

Special Interurban Service for Shoppers.—The Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, on Dec. 9, put on "shoppers' express" cars for the convenience of persons who must go to one of the towns on its lines to do their shopping. These special cars run every two hours in both directions on the lines between Youngstown and Warren, and Youngstown and New Castle, Pa. They will be operated every week day until Christmas. The cars stop only at the principal stops. Dashboard signs are used to designate the stops that are made.

Wisconsin Troops Transported on Electric Line.—The Chicago, Milwaukee & North Shore Railway, Highwood, Ill., of which Britton I. Budd is president, secured a contract in competition with the steam railroads and transported approximately 800 soldiers and their equipment from Fort Sheridan, Ill., to Milwaukee, Wis., a distance of 60 miles, on Dec. 14. The movement was made necessary by the mustering out of service of the Wisconsin National Guard at Fort Sheridan. The contracts was made jointly with the Chicago, Milwaukee & St. Paul Railway, which took the troops at Milwaukee, and carried them to some eleven points over the State.

Heating Equipment Installed in Seattle.—In accordance with an order issued by the Public Service Commission, the Puget Sound Traction, Light & Power Company, Seattle, Wash., has completed the installation of heating equipment in the cars operating on the Alki, Ballard Beach and Fauntleroy Park line. Thirty-eight cars in all have been improved in this manner. The order of the commission called for six heaters in each single truck car and ten in each double truck car, to be installed by Dec. 1. The company is operating in Seattle eighty-five cars equipped with heaters. The commission's order also calls for installation of sashes and glass on open cars, in order that open cars could be operated as closed vehicles. This has also been done.

Free Ride Agreement Invalid.—Former Senator and Mrs. Mitchell B. Perkins of Riverton, N. J., and their family of five children are denied free transportation for life over the lines of the Public Service Corporation between Trenton and Riverton in an opinion filed in the Court of Chancery by Vice-Chancellor Backes. The family received this privilege from the company which the Public Service Corporation succeeded, the grant being made in exchange for a right-of-way for the electric railway over lands owned by Mr. Perkins, in Beverly Township, Burlington County. Perkins was the promoter of the original trolley line from Palmyra to Trenton. The opinion of the Vice-Chancellor says that to sustain the contract would open the doors wide to the very evils the public utility statute was intended to suppress and would make it impossible for the commission to regulate and fix rates.

Inquiry Into Brooklyn Surface Service.—On motion of Commissioner Travis H. Whitney, the Public Service Commission for the First District of New York, set Dec. 11 as the time for a hearing at which the commission will take testimony and consider the advisability of issuing a general order covering service to be provided by the Brooklyn Rapid Transit Company on all of its surface lines. Commissioner Whitney in presenting the motion for calling the hearing stated that the commission may now act definitely in regard to service order matters inasmuch as the Court of Appeals has recently outlined the powers of the commission as regards mandamus proceedings. He pointed out also that certain changes in traffic conditions in Brooklyn arising from the adjustments following the opening of new rapid transit lines were such that the disposition and use of equipment could better be determined now than ever before.

Preparing for Billy Sunday in Buffalo.—The International Railway, Buffalo, N. Y., is preparing to handle the crowds which will attend the Billy Sunday meetings in Buffalo in February and March. After conferences with E. G. Connette, president of the International Railway, and N. H. Brown, general superintendent of the company, the campaign committee has decided to construct the tabernacle on the grounds of the Buffalo Baseball Park in East Ferry Street. The park is reached by six local car lines and the Buffalo & Lockport, Buffalo & Rochester and the Buffalo & Tonawanda Interurban lines run within a short block of the grounds. The East and West Utica car lines will be connected as a through cross-town route. The close proximity of the Cold Springs carhouse also helps to make the site an ideal location for the big tabernacle. Mr. Brown says the company will rebuild twenty of its old style cars and that other equipment will be secured to handle the increased traffic. The company is now employing about 250 more trainmen than it did a year ago.

Jitney Matter Before Vancouver Council.—W. G. Murrin, assistant general manager of the British Columbia Electric Railway, addressed the City Council of Vancouver, B. C., on Nov. 20 in regard to the street railway and the jitney as economic factors in the community. The Council asked the company to send a representative to the meeting. Mr. Murrin said that older and more settled communities in the East had already expressed themselves on the question and that where a capable and impartial body had directed its attention to the question there had been little doubt as to the result of the deliberations. In this connection he referred to the decision of the Public Service Commission for the Second District of New York in the famous Rochester case. He referred to the obligations which the railway was called upon to meet by the city as compared with the almost lack of responsibility of the jitneys, and in conclusion said that the city should either put the jitneys on the same operating basis as the railway or readjust the obligations of the company so they would equal those of the jitney.

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Personal Mention

R. H. Merry has been elected secretary of the Mexico (Mex.) Tramways, Mexican Light & Power Company and Mexican Electric Light Company to succeed U. de B. Daly, resigned.

J. G. Swain, formerly general superintendent of power and shops of the Northern Ohio Traction & Light Company, Akron, Ohio, has resigned to become general superintendent of the rim plant of the Firestone Tire & Rubber Company at Akron, Ohio.

James Blaine Walker, secretary of the Public Service Commission for the First District of New York, will also serve hereafter as the secretary of the National Association of Railway Commissioners, a place made vacant by the death of William H. Connolly.

Robert C. Brown, a vice-president of the Mexico (Mex.) Tramways, Mexican Light & Power Company and Mexican Electric Light Company and formerly managing director of the Mexico Tramways, has been elected president of these companies to succeed the late F. S. Pearson.

Lafayette G. Rudd, who for several years has been superintendent of the East Lynne and Saybrook divisions of the Shore Line Electric Railway, Norwich, Conn., has had his jurisdiction extended to cover the New London lines of the company. He succeeds Peter Ashe at New London.

Peter Ashe, an assistant superintendent of the Shore Line Electric Railway, Norwich, Conn., in charge of the New London lines, has resigned to go into business for himself. Mr. Ashe has been connected with the company and its predecessors for twenty-nine years. He entered the service as a car cleaner.

I. B. White has resigned as superintendent of the Alexandria (La.) Municipal Railway to go into the automobile business in Shreveport, La. Irving McGinnis, commissioner of streets and parks of the city, under whose supervision the street railway is operated, will run the road for the present in addition to his other work.

T. Norman Jones, chief engineer of the maintenance of way of the Virginia Railway & Power Company at Richmond, Va., has been appointed assistant general manager of the Virginia Railway & Power Company in charge of its properties in Norfolk, to succeed E. C. Hathaway, whose resignation is noted elsewhere in this column.

G. E. Goldthwait, formerly load dispatcher and assistant to the electrical engineer of the Pittsburgh (Pa.) Railways, has been appointed associate editor of the *Railway Electrical Engineer*. Mr. Goldthwait was also connected with Gibbs & Hill on construction work on the Norfolk & Western Railroad, and remained with the railroad as power director at the Bluestone power station until June, 1916. He has been with the Standard Steel Works since then.

James H. Griffin, one of the employees longest in the service of the Kansas City (Mo.) Railways and superintendent of various divisions, has been made chief instructor of the company. He has three assistants at the school, and one man to go with the students on the cars after they have been assigned trips. There are also instructors at each carhouse and traveling instructors who follow up the new men and watch for opportunities to make suggestions to them.

Philip J. Kealy, president of the Kansas City (Mo.) Railways, has again been elected colonel of the Third Regiment, Missouri National Guard. Colonel Kealy was elected to this position a year ago, but when the regiment was mustered into the federal service he was rejected on physical examination. He had, however, got the regiment up to acceptable proportions, and had managed its movement to Nevada, Mo., before the rejection came. It is now planned to make the Third a cavalry regiment.

E. C. Hathaway, assistant general manager of the Virginia Railway & Power Company, Richmond, Va., in charge of the properties of that company at Norfolk, Va., has resigned, effective on Jan. 1, to devote all of his time to his private interests, among which is the Railway Audit & Inspection Company, Philadelphia, Pa., of which he is president. Mr. Hathaway has been in charge of the public utility properties in Norfolk for fourteen years and was connected with them in an advisory capacity for two years prior to that time.

Harry A. Bullock, secretary of the New York Municipal Railway Corporation and in general charge of the welfare work of the Brooklyn (N. Y.) Rapid Transit Company, was interviewed by Marguerite Mooers Marshall for the New York *Evening World* of Nov. 24 on corporation welfare work and labor. Miss Marshall quoted Mr. Bullock on labor as follows: "The key to the solution of the labor problem is simply a close personal understanding between the heads of any industry and its workers. Then any question that may arise may be settled in a frank man-to-man discussion, without the interference of outside forces. Then we can have promotions from the ranks only, and interested, permanent employees."

William S. Murray will on Dec. 31 terminate his connection with the New York, New Haven & Hartford Railroad, New Haven, Conn., as consulting engineer. Mr. Murray has been in the service of the company since April, 1905, in charge of electrical engineering, construction and operation with the title of electrical and consulting engineer. His recommendation of the alternating current single-phase system for the type of electrification to be applied to the New Haven was adopted and the electrical equipment was installed under his immediate charge. The severance of Mr. Murray's connection with the company is the outcome of differences between him and President Howard Elliott of the company regarding the basis upon which he re-entered the road's service in 1914 to devote a portion of his time to the company as a departmental officer but still retained his membership in the firm of McHenry & Murray, engineers, New Haven.

Sir Albert H. Stanley, managing director of the London Underground Electric Railways, London United Tramways, Ltd., Metropolitan District Railway, and the London General Omnibus Company, Ltd., London, England, who is well known in this country, has been named as president of the Board of Trade in the new English Ministry under David Lloyd George, Premier, and the head of the English war council. The usual custom of giving up their other positions will be followed by the men of the new government, and Sir Albert, it was announced by cable from London on Dec. 12, had resigned the directorships which he held in the London railways, and would sever all his connections with the companies until such time as he relinquished his post as president of the board. Sir Albert was knighted by King George on June 21, 1914, in recognition of distinguished public service. He was born in England about forty-two years ago, and began his career with the Detroit (Mich.) City Railway in the horsecar days. In 1902 he became connected with the Public Service Corporation of New Jersey as assistant general manager of the railway department. In the following year he was appointed manager of that department. In January, 1907, he assumed the duties of general manager of the corporation, but resigned soon thereafter to become general manager of the Underground Electric Railways of London. His appointment to the Board of Trade is further public recognition of the unusual abilities which he has displayed in his management of the London railways and of the success which has attended his efforts in this and other undertakings with which he has been identified.

A. H. STANLEY

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Oren A. Small, auditor of the Benton Harbor of St. Joe Railway & Light Company, Benton Harbor, Mich., was elected president of the Central Electric Railway Accountants' Association at the meeting of the association in Cincinnati, Ohio, on Dec. 8 and 9. Mr. Small was born in Wabash, Ind., and learned the trade of a flour-miller under his father. In 1902, he entered the employ of the Big Four Railroad Company at Benton Harbor, Mich. After several years in steam railroad work he entered the office of the Baker-Vawter Company, printers and manufacturers of office systems. In 1907, he entered the office of the Benton Harbor & St. Joe Railroad & Light Company as bookkeeper. Two years ago he was promoted to the position of auditor of that company. Mr. Small secured his education in accounting at the Eastman National Business College at Poughkeepsie, N. Y. He has been an active and tireless worker on the executive committee and on the standing committee on freight and passenger accounts of the Central Electric Railway Accountant's Association.

OREN A. SMALL

S. L. Tone, vice-president of the Pittsburgh (Pa.) Railways, the Beaver Valley Traction Company, the Pittsburgh & Beaver Street Railway and the Duquesne Light Company, Pittsburgh, has been elected president of the Pittsburgh Railways to succeed J. D. Callery, as noted briefly in the ELECTRIC RAILWAY JOURNAL for Dec. 9. Mr. Tone was graduated from Rensselaer Polytechnic Institute, Troy, N. Y., and has served the Pittsburgh Railways and its constituents continuously for about twenty-five years, except for the short term of his service as a member of the Pennsylvania Public Service Commission, to which he was appointed in 1913 by Governor Tener. The Pittsburgh Railways and the Duquesne Light Company are controlled by the same interests and the railway is operated with power purchased from the light company. The Pittsburgh Railways controls all the principal lines in Pittsburgh, Allegheny and adjoining towns. In the railway system are included 604 miles of line.

James L. Adams has been appointed superintendent of transportation of the Denver (Col.) Tramway to succeed William N. Casey. Mr. Adams entered the service of the Denver Tramway in 1890 as an office boy and was advanced through a number of positions in the auditor's office and transportation department until he was made division superintendent of the East Division. This position he held one year and returned to the auditor's office as general timekeeper for the entire system. In 1900 he left the auditor's office to assume the position of division superintendent of the West Division and was transferred after one year to the position of superintendent of the East Division, and then to superintendent of the North Division until April 1, 1915, when the two divisions were combined and he was made superintendent over both. He served in this capacity until Aug. 15, 1915, when he resigned to become vice-president and general manager of the Crown Hill Cemetery Association and of the Denver & Crown Hill Railway. He returned to the Denver Tramway on Dec. 1 as superintendent of transportation.

JAMES L. ADAMS

OBITUARY

Sir George White, Bt., of Bristol, England, is dead. Sir George was interested in many British railway and industrial projects. He was perhaps most closely associated with the Bristol Tramways & Carriage Company, of which he was in succession secretary, managing director and chairman.

W. F. Pascoe, promoter and builder of electric railways in Cumberland County, Pa., died suddenly in Carlisle on Dec. 14. Mr. Pascoe was for several years superintendent of the Carlisle & Mount Holly Railway and built the line between Carlisle and Newville. Recently he has been in business at Easton, Pa., where he made his home with his daughter. He was in Carlisle on a visit when he died. Mr. Pascoe was also interested in theatrical enterprises. He was fifty-nine years old and is survived by his widow and six children.

George S. Haley, president of the General Engineering & Management Corporation, New York, N. Y., died on Dec. 3 from injuries received in a street accident. Mr. Haley was born in Manchester, N. H., and was graduated from the University of Iowa. In 1902 he became manager of the City Electric Company, Rutland, Vt., and when the Rutland Light & Power Company was formed in 1908 Mr. Haley was appointed general manager of the company. In 1912 he became vice-president and general manager of the Texas Power & Light Company with headquarters at Dallas. He resigned that position in June, 1916, to become president of the General Engineering & Management Corporation.

William H. Connolly, secretary of the National Association of Railway Commissioners and chief clerk of the division of valuation of the Interstate Commerce Commission, died at his home at Bradley Hills, Md., on Dec. 5. Mr. Connolly was born in Lindsey, Ont., on Dec. 10, 1867. He came to the United States with his parents and settled in North Dakota. He was appointed a clerk to the commission in 1890 and was promoted until July 1, 1905, when he was made chief clerk. He remained in that position until the valuation division was organized, when he was transferred to that branch of the work and organized the clerical staff of that part of the commission. Mr. Connolly is survived by his widow and four children.

Frederic H. Reed, first vice-president of the J. G. White & Company, New York, N. Y., died in New York on Dec. 9. Mr. Reed was born in Stamford, Conn., on Aug. 22, 1865, and attended the Stamford High School. From 1881 to 1883 he worked as a draftsman and in 1884 he became first assistant engineer on the construction of the Tenth Avenue Cable Railway in New York City. In 1885 Mr. Reed left the railway company to accept the position of chief engineer of the Daft Electric Company, with which he remained five years. While with that company he designed and installed early electric railways in Ithaca, N. Y., Camden, N. J., Asbury Park, N. J., and elsewhere. Later, for some time, he practised as consulting engineer in New York as a member of the firm of Reed & McKibben, but in 1899 joined J. G. White & Company as secretary. Later he was elected treasurer and then first vice-president and served as director in many light and railway companies in this country and abroad.

Capt. Joseph T. Jones, president of the Niagara Gorge Railway, Niagara Falls, N. Y., died at his home in Buffalo on Dec. 7, after an illness of several years. Captain Jones was born in Philadelphia on June 11, 1842. He enlisted in the Federal Army at the outbreak of the Civil War and was mustered out of service as captain, by which title he was generally known. After his discharge, Captain Jones started his business career in the Pennsylvania oil fields. Later he engaged in manufacturing in Buffalo and Niagara Falls. He also promoted the construction of the Gulf & Ship Island Railroad and at the time of his death he was president of that company and of the Gulfport & Mississippi Coast Traction Company. Captain Jones always took an active interest in Niagara Falls, and he conceived the idea of an electric railway along the American side of the lower gorge. This road, the Niagara Gorge Railway, known as the Great Gorge Route, has become famous throughout the world. Captain Jones is survived by his widow and one daughter. An only son, Joseph Albert Jones, who managed the properties in Gulfport, Miss., died six years ago.

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Atlanta & Anderson Electric Railway, Atlanta, Ga.—A charter has been granted to the Atlanta & Anderson Electric Railway to construct a line from Atlanta to Anderson, S. C., about 140 miles. J. L. Murphy, Atlanta, is interested. [Nov. 11, '16.]

Union Traction Company, Coffeyville, Kan.—This company has filed a charter in Oklahoma and has been granted a permit to do business in this State. Headquarters in Oklahoma will be maintained at Oklahoma City.

FRANCHISES

Caldwell, Idaho.—The Boise Valley Traction Company has received a franchise from the City Council of Caldwell to construct a line along Cleveland Boulevard.

Averyville, Ill.—The Peoria & Chillicothe Electric Railway has received a forty-eight-year franchise from the Village Council to construct a line in Averyville. [Nov. 11, '16.]

Commerce, Mo.—The Oklahoma & Interstate Railway has asked the City Council for a franchise to construct a line in Commerce. John R. Rose, Oklahoma City, Okla., president. [Nov. 25, '16.]

Lima, Ohio.—The Ohio Electric Railway has received a franchise from the City Council of Lima to construct an extension of its tracks on East Grand Avenue to the Cincinnati, Hamilton & Dayton Railway.

Berea, Ohio.—In compliance with the wishes of citizens, as expressed in petitions, a special committee of the City Council of Berea has informed the Cleveland, Southwestern & Columbus Railway that it will be permitted to use its tracks through the town after Dec. 15, when its franchise expires, at a rental of $200 per month, provided it will pay half of the alleged damage to pipes from electrolysis which the town claims. The Council will act upon the matter at once if the company signifies its acceptance of the proposition. The City Council of Elyria has granted the Cleveland, Southwestern & Columbus Railway a twenty-five-year franchise in Elyria over the Mayor's veto.

Elyria, Ohio.—The Lake Shore Electric Railway has asked the Council for a renewal of its franchise in Elyria.

TRACK AND ROADWAY

Edmonton, Alta.—The Edmonton Hydro-Electric Power Company will begin work immediately on the construction of the proposed radial line.

British Columbia Electric Railway, Vancouver, B. C.—The Board of Trade of New Westminster, B. C., is negotiating with the British Columbia Electric Railway with a view to securing assistance in the construction of an industrial spur on Lulu Island. A. C. Eddy, engineer of the company, informed the board that it would cost about $65,000 to construct the tracks as outlined, this amount providing for 3 miles of trackage, 1½ miles on either side and paralleling the shore. A special committee headed by A. W. Gray has been appointed to interview officials of the British Columbia Electric Railway and ascertain what help, if any, may be secured in the construction of the proposed tracks.

Capital Traction Company, Washington, D. C.—Extension of the lines of the Capital Traction Company to afford transportation facilities to government buildings now built and being constructed south of Pennsylvania Avenue and west of Seventeeth Street was recently ordered by the Public Utilities Commission. The order authorizes the company to install necessary additional special work at Fifteenth Street and New York Avenue, so that Fourteenth Street cars may run west on Pennsylvania Avenue from that point, and the construction of a single track line in Nineteenth Street between Pennsylvania Avenue and Virginia Avenue, a single track line on Virginia Avenue between Eighteenth and Nineteenth Streets, and a single track line in Eighteenth Street between Virginia Avenue and F Street. The order provides that the company shall complete the extension authorized and commence operating cars over the new routes not later than Oct. 1, 1917. J. H. Hanna, vice-president of the company, said an order would be placed for materials at once and the work hurried through to completion. The company estimates the improvements will cost approximately $100,000.

***Atlanta, Ga.**—It is reported that bids are being asked by George O. Vanderbilt, Princeton, N. J., for the construction of 50 miles of railway in Georgia.

Southern Illinois Light & Power Company, Hillsboro, Ill.—Work will soon be begun by this company on the extension of its Taylor Springs line to the American Zinc Company's smelter, about ½ mile.

Illinois Traction System, Peoria, Ill.—This company has suspended business at Ridge Farm. Cars will operate only to the north edge of the village, and no freight shipments will be accepted into and out of that point.

Peoria (Ill.) Railway.—This company has been granted permission by the village of Peoria Heights to again operate cars on its Galena Road line through that village. The permission was granted following an order by the Council to the effect that the franchise was revoked and that the tracks must be removed. The village did not restore the franchise, but has given permission for the cars to be again operated.

Arkansas Valley Interurban Railway, Wichita, Kan.—It is reported that work will be begun in the spring by the Arkansas Valley Interurban Railway on the construction of three extensions: from Hutchinson to Kinsley and Great Bend, and from Newton to Salina. Equipment for these extensions is being purchased.

Hagerstown & Frederick Railway, Frederick, Md.—This company is considering an extension of its line at Hagerstown.

Bay State Street Railway, Boston, Mass.—The Public Service Commission has authorized the Bay State Street Railway to issue $2,000,000 coupon notes bearing interest at 6 per cent to pay for reconstruction of track, equipment and betterments.

***Lawrence, Mass.**—Sealed proposals for the furnishing of all material and labor for the construction of approximately 1500 lin. ft. of double track on the Central Bridge across the Merrimac River in Lawrence, will be received by the Lawrence Bridge Commission at the offices of John J. Donovan, rooms 507-508 Bay State Building, Lawrence, until Dec. 20. Detailed plans and specifications may be obtained at the office of B. H. Davis, consulting engineer, Whitehall Building, No. 17 Battery Place, New York City, upon the deposit of $5. A certified check for the sum of $1,000, payable to the city of Lawrence, must accompany each proposal.

Duluth (Minn.) Street Railway.—It is reported that this company plans to extend its line from Duluth to Proctor.

Trenton & Mercer County Traction Corporation, Trenton, N. J.—This company has agreed to contribute $10,000 toward the proposed new $100,000 tunnel to take the place of the grade crossing over the Philadelphia & Reading Railway tracks at Trenton Junction. At the present time the trolley tracks run only as far as the railroad. The tunnel will be 14 ft. high and 50 ft. wide.

New York, N. Y.—The Public Service Commission for the First District of New York has awarded a contract to the H. C. Stowe Construction Company, Brooklyn, N. Y., for building thirteen signal towers on the new elevated structures which are being built to extend the Manhattan subways into the Bronx and Queens Boroughs. The work is to be completed within four months, and the price for the whole is $110,651.

Northern Ohio Traction & Light Company, Akron, Ohio.—In order to complete the double track on the section be-

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tween Cleveland and Akron, the Northern Ohio Traction & Light Company has made application to the Public Utilities Commission for permission to increase its capital stock by $1,000,000.

Cleveland & Sharon Rapid Transit Company, Cleveland, Ohio.—This company has applied to the Ohio Public Utilities Commission for permission to issue $100,000 capital stock and $200,000 of first mortgage 6 per cent bonds for the purpose of constructing a line between Middlefield and Lockwood. The right-of-way for the entire line between Cleveland and Sharon was secured some years ago, and then the matter was allowed to lie dormant. The section of the road which the company now proposes to build is through a rich farming country, and it is said that it will ultimately be completed as first planned. C. A. Black, Cleveland, president. [Feb. 26, '16.]

Springfield Terminal Railway & Power Company, Springfield, Ohio.—This company has been organized to succeed the Springfield, Troy & Piqua Railway.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company contemplates the installation of automatic block signals on 12 miles of single track and 3 miles of double track between Youngstown, Ohio, and Sharon, Pa.

Mahoning Valley Railway, Youngstown, Ohio.—This company's line, extending south from Warren to the Trumbull steel mill, will be extended to Youngstown.

Youngstown & Suburban Railway, Youngstown, Ohio.—Plans are being prepared by this company for the construction of a double track to extend from South Side Park to Kyles Corners.

Perkiomen Valley Traction Company, Collegeville, Pa.—Construction has been begun by this company on a line between Collegeville and Schwenkville, paralleling the Perkiomen branch of the Philadelphia & Reading Railway. James L. Wolcott, Dover, Del., president. [Oct. 28, '16.]

Butler & Grove City Railway, Grove City, Pa.—This company reports that it has constructed about 5 miles of its proposed line between Grove City and Slippery Rock and will complete the line during 1917. The line will be about 9 miles long when completed.

Johnstown-Somerset Traction Company, Johnstown, Pa.—Negotiations have been completed by which a syndicate of Johnstown men, numbering more than a score, will take over the remainder of the work to be done in the completion of the Johnstown & Somerset Traction Company's line between Johnstown and Boswell. About $250,000 will be invested. Work on the line began almost two years ago, and has been held up at different times. A considerable amount of the grading between Johnstown and Boswell has been done. Probably one-half the work on the Windber branch, between Kelso Station and Boswell, has been completed. This includes a large amount of heavy grading, deep cuts and heavy fills. It is believed that the line from Kelso to Boswell will be completed in six months. [July 22, '16.]

Slate Belt Electric Street Railway, Pen Argyl, Pa.—A report from the Slate Belt Electric Street Railway states that the company expects to construct a new line between Wind Gap and Stroudsburg, 15 miles, during 1917.

Charleston-Isle of Palms Traction Company, Charleston, S. C.—This company reports that it will construct 1½ miles of new track during 1917.

***Columbia Railway & Navigation Company, Columbia, S. C.**—Surveys are being made by the Columbia Railway & Navigation Company for the construction of a railway which will probably be operated by electricity, from Columbia to Greenwood, about 70 miles. G. A. Guignard, Columbia, president.

Nashville Railway & Light Company, Nashville, Tenn.—The Nashville Railway & Light Company, the City Commission, and the Commercial Club of Nashville, are working together on a program for extension of the railway company's lines in the central part of the city, with the object of relieving existing congestion in the downtown section. Specifically it is proposed that Deaderick Street will be opened through to Capitol Boulevard and the railway company double-track along the boulevard to Church Street. Numerous meetings of committees and public meetings are being held, at which the subject is discussed.

Seattle & Rainier Valley Railway, Seattle, Wash.—Councilman Oliver T. Erickson of Seattle recently stated that as soon as an agreement is reached between the city of Seattle and the Seattle & Rainier Valley Railway, relative to certain changes and extensions proposed by the company, steps will be taken to acquire common user rights for the city for division "A" of the Seattle municipal line on Fourth Avenue, from Stewart Street to Jefferson Street. The agreement between the city and the Seattle & Rainier Valley Railway Company will relieve the company of some of the obligations of its franchise as to street paving and will also provide for a change at Times Square, where cars will be operated over a wye on Fourth Avenue, rather than on Stewart Street. Other provisions include construction of the main line on Dearborn Street, and the operation of cars over Fourth Avenue South, as far as Seattle Boulevard, and on Seattle Boulevard to the new tracks on Dearborn Street.

Portland, Vancouver & Northern Railway Company, Vancouver, Wash.—This company, which holds a franchise for the construction of a street railway line across the military reservation in Vancouver, Wash., states that it will construct and have the road in operation by June 1, 1917, providing property owners in the district most benefited will enter into bonus contracts with the company. Henry Crass, Vancouver, president. [Feb. 13, 15.]

Monongahela Valley Traction Company, Fairmont, W. Va.—An extension of this company's lines was authorized at a recent meeting of the board of directors. Surveys will be made at once of three routes, from Wolf Summit to Salem, from Bridgeport to Philippi and from Lumberport to Wallace. The line will be built during 1917.

SHOPS AND BUILDINGS

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—This company plans the erection of a freight terminal at the corner of Broadway, Erie and Milwaukee Streets and the river, in Milwaukee. The structure will be 43 ft. x 112 ft., and the entire ground floor will be used as a freight terminal for the company.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has set Jan. 3, 1917, as the date for the receipt of bids for the construction of station finish on six of the seven stations on the underground portion of the Southern Boulevard and Westchester Avenue extension of the Lexington Avenue subway. The Third Avenue station is already under contract. The stations included in the present contract are Brook Avenue, Cypress Avenue, East 143d Street, East 149th Street, Longwood Avenue and Hunt's Point Road.

Northern Ohio Traction & Light Company, Akron, Ohio.—It is reported that this company plans to construct a modern carhouse and substation on the site of the carhouse recently destroyed by fire at Massillon.

Oklahoma (Okla.) Railway.—Work will be begun at once by the Oklahoma Railway on the construction of a new brick depot in Norman. The structure will cost about $7,000.

Northern Texas Traction Company, Fort Worth, Tex.—Main Arcade and several other buildings at Lake Como, a pleasure resort at the terminus of the Arlington Heights street-car line, established ten years ago by the Northern Texas Traction Company, were destroyed by fire on Dec. 1, causing a loss of more than $6,000.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—Early next year the Arkansas Valley Railway, Light & Power Company will erect about 10 miles of 13,000-volt transmission line to serve several large irrigating projects in the Arkansas Valley.

Hagerstown & Frederick Railway, Frederick, Md.—This company plans to install a 5000-kw. generator, condensers, boilers, etc., in its power plant at Security.

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INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases **Business Changes** **Trade Literature**

A. H. ENGLUND DISCUSSES SUPPLIES CONDITIONS

Fall Orders Twice Normal—Rail Bonds Show High Sale Value—Gear Case Deliveries Normal—Headlight Sales Increasing Rapidly

A. H. Englund of the Electric Service Supplies Company was asked by a representative of this department for his views on market conditions so far as they applied to the products of his company. His statements may be summarized as follows:

The manufacturer of electric railway supplies is now confronted with producing and marketing conditions which call for extreme caution in buying and selling. This part of the electric railway industry finds itself face to face with the highest prices and unsatisfactory deliveries of raw material and with a dearth of skilled labor such as never before was contemplated. While production is the big problem to-day and selling prices are consequently higher, nevertheless orders are being received in large totals. For example, in normal years the months of November and December are usually very quiet, but now orders are being booked during these months in amounts equaling the orders usually placed in the active spring buying season. This indicates that business is now being placed at a rate twice that of normal years.

As for the special lines manufactured and sold by the Electric Service Supplies Company, when taken as a group the business for the year is from 60 to 75 per cent above that of a normal year. "Protected" rail bond sale values for 1916 will be higher than ever before, but the actual number of bonds has been exceeded in previous years when new construction was heavier. Copper prices have forced the sale price of bonds so high that measured in money the year is larger than actual installment requirements would at first hand indicate.

Exceptional Activity in Gear Cases

Gear-case sales have increased very materially as compared with those of 1915, but even so, this company has been able to make shipments on practically a normal basis. This has been due to the fact that orders for sheet steel placed well in advance of the congested market have furnished raw material in sufficient quantities and with such regularity that good deliveries have been made possible. This also applies to the sheet steel required for the manufacture of headlight cases. In the manufacture of Golden Glow searchlights, the problem of obtaining sheet brass has been difficult at times, but in general, ordinary material requirements have been fulfilled.

The Golden Glow headlight, which this company purchased about a year ago, has sold in a remarkably active way. The sales for 1916 will probably equal in number the total sales for this type of headlight in all previous years. Indications point toward a greatly increased sale among the electric railways for 1917. This is due to the fast recognition of the operating efficiency of the incandescent type of headlight, and the peculiar merit of the parabolic glass reflector used. Next year's prospects for sales of this headlight include the steam railways, which under a recent ruling of the Interstate Commerce Commission, will be called upon to improve their locomotive headlights. Our company is now at work developing a special high-powered Golden Glow unit that will meet all the government requirements.

The Electric Service Supplies Company, in looking toward expansion of the headlight business in the steam railway field, has recently purchased the turbo-generator business of the Darling-Henrici Manufacturing Company of Boston. Lewis A. Darling has joined the staff of the Electric Service Supplies Company as engineer of a new department which will manufacture, in Philadelphia, small turbo-generator units for locomotive headlights and the electric lighting of the locomotive cab and for special lighting on a limited scale wherever high-pressure steam is available.

Next Year's Business Prospects

The possibilities for business next year can hardly be stated without great speculation. Copper, now quoted above 35 cents spot cash for ingots and still going up, sounds the keynote for future prices of a great many electric railway essentials. It is doubtful whether the electric railways can continue to buy copper and copper products with the bare metal ranging between 35 and 40 cents. Money put into copper products might be classed as a perpetual investment, and roads can hardly afford to invest in more than the actual running necessities at the price which manufacturers, due to the cost of all raw material now quote.

Manufacturing difficulties to-day focus not only around the high prices of raw material but are embarrassingly involved because of the shortage of material at any price and the scarcity of skilled labor.

Malleable iron foundries refuse to contract on a long-period basis as formerly was done, and the manufacturer of electric railway-line materials and fittings calling for a multiplicity of small, light patterns can obtain malleable castings only at excessively high prices and with uncertain deliveries. On some shipments, in order to assist the customer out of extreme situations, the Electric Service Supplies Company has substituted cast brass and cast iron for malleable parts where service conditions and necessary strength would permit.

Because of the acquisition of the Golden Glow headlight and searchlight business and because of the general growth in sales of other lines, the Electric Service Supplies Company will shortly place contracts for a new wing to its Philadelphia factory. This will increase the floor space by about 75 per cent. The change will provide enlarged quarters for the gear case and headlight departments and also for the Garton-Daniels lightning arrester department. The latter department will shortly announce for sale a new type of lightning arrester for a.c. circuits.

ACTIVITIES IN CULVERT AND ARMCO IRON MANUFACTURE

Purchasers Favor Galvanized Material—Prices Have Been Stable—Armco Iron Used by Manufacturers for Various Purposes

According to B. G. Marshall, American Rolling Mill Company, Middletown, Ohio, the companies which manufacture Armco iron culverts report good business in their specialty. A year ago the spelter question was of great importance and caused some of this group of manufacturers to change the protective coating of their culverts from galvanizing to an asphaltic compound. Zinc for galvanizing has touched 27 cents per pound. It is now about 12½ cents and again it is possible to obtain deliveries on longer orders. This could not be done a year ago.

Thus, last year, the manufacturers investigated and determined upon the best available kind of asphaltic coating and methods for its application. Two or three companies are now supplying culverts with the special coating, but it is stated that galvanizing seems to be favored by the purchasers.

Prices to Consumers Have Been Stable

Culvert profits have been curtailed very greatly during the past year owing to the high prices of the constituent materials, but so far the manufacturers have treated the

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conditions as temporary and have raised prices to the consumers very little, if any.

The material used by the culvert manufacturers earlier referred to is known as Armco iron. It is the special product of the American Rolling Mill Company, Middletown, Ohio. During its last fiscal year this company, according to Mr. Marshall, made nearly 90,000 tons of Armco iron and thereby exceeded its production record for previous years. This form of iron is used by more than seventy-five stove and range manufacturers, principally on account of its rust resisting qualities, and because it is well adapted to enameling and welding processes. It is said to be almost free from included gases, and since gas blowholes are the cause of the largest number of culls which develop when enamel is baked on ordinary steel, the special iron is favored by manufacturers of enameled steel products. Among these are the makers of enameled steel signs, such as are used by electric railways.

Galvanized Armco iron is also used in a great variety of products where rust resistance is of first importance, as in culverts and tanks for water and oils, underground vaults, etc. In the ungalvanized state it is used as sheets and plates for passenger cars. A notable example of this use is the type of car built for the electrified division of the Erie Railroad.

ELECTRIC RAILWAY USES ARE VARIED

The Westinghouse Electric & Manufacturing Company uses large quantities of Armco iron in the manufacture of transformer cases, and W. N. Matthews & Brother, St. Louis, use it for the rods for their "Scrulix" guy anchors. Also, on account of its rust resisting quality, it has been a favored material in plate form for boiler plant stack construction, and in galvanized culvert form for condenser circulating water intakes. Probably the largest user of Armco iron culverts is the Pacific Electric Railway of Los Angeles.

A novel use is for third-rails and other electrical conductors. Mr. Marshall states that because of its purity and density this material has 50 per cent higher electrical conductivity than ordinary iron.

WESTINGHOUSE ELECTRIC WILL BUILD NEW PLANT AT ESSINGTON, PA.

Between $5,000,000 and $7,000,000 Will Be Spent to Provide Additional Manufacturing Facilities

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has made arrangements to build at once a large plant on the Delaware River at Essington, Pa.

According to a statement issued by Guy E. Tripp, chairman of the board of directors, the company's facilities are now taxed to capacity to manufacture its regular products, and in spite of the vigorous effort which has brought production to its present record output, it has been found impossible to keep pace with the growing demand so that much profitable business offered has had to be declined. Unfilled orders on hand for the regular products of the company, that is to say exclusive of rifle or shell contracts, amount to over $31,000,000, which is by far the largest amount the company has ever had on its books.

There are many factors contributing to this condition. Improvements in the large steam electric generating units have led to great increases in central station capacity near manufacturing centers, and have made profitable the sale of electric current at rates which have so stimulated consumption as to create an enormous demand for industrial motors. The coal shortage of the last six months has emphasized the comparative handicap under which the small steam plant suffers and can hardly fail to further accelerate the movement to substitute central station service for isolated plants. In railroading practically every class of heavy service is now performed successfully by electric power, and this field promises to be one of rapid expansion.

To provide additional manufacturing facilities needed there has been purchased on the Delaware River at Essington, Pa., just outside of Philadelphia, a tract of land having a deep water frontage and large enough to accommodate an ultimate factory development, several times as great as that of the East Pittsburgh works. It is planned to begin immediately the erection on this land of a new plant to cost between $5,000,000 and $7,000,000.

WHEEL AND AXLE STANDARDS ASSIST MANUFACTURE AND DELIVERY

Steel wheels and axles have been ordered and delivered in 1916 in large quantities, according to Mr. Robert Radford of the Standard Steel Works Company, Philadelphia, Pa. The electric railways, which have been regular customers, have been taken care of with wheels and axles even though it would have been far more profitable for the company to have used its raw material in other lines of manufacture. Mr. Radford also states that notwithstanding the extraordinarily high prices for steel, his company has not advanced the wheel and axle prices except when absolutely necessary to meet market conditions. He has received practically no complaint on account of unreasonable delays in delivery. It has been the policy in taking care of old customers of this company during the recent active months to keep them all fully informed of the trend of market conditions.

The Standard Steel Works Company some years ago settled upon a limited number of standard designs of wheels and axles. Special designs have not been sought for production. Adherence to this principle has made it possible to produce quality products more economically than if a great number of designs had been followed. Mr. Radford suggests that the electric railways should give active consideration to the anticipation of their 1917 requirements. The market fluctuates very rapidly and prospects for increases in price or restrictions in raw material are quite probable.

PULMOTOR NOW MANUFACTURED IN AMERICA

Pulmotors of the type manufactured by the Draeger-Oxygen Apparatus Company, Pittsburgh, Pa., are used by a number of the larger electric railway properties. These are designed for use in resuscitating persons who have been overcome by electric shock.

According to F. F. Morris, President of the Draeger-Oxygen Apparatus Company, pulmotors were formerly supplied very largely from Germany. The shipping restrictions and the delivery conditions since the war have necessitated the manufacturing of some of the parts in this country. Accordingly, the Draeger-Oxygen Apparatus Company has recently made satisfactory arrangements for the manufacture of pulmotors in this country and is now actively at work in catching up with its past orders. All parts are now made in this company's shop at Wilkinsburg, Pa.

LARGE MANUFACTURING COMPANIES ANNOUNCE BONUSES

In recognition of the fact that the purchasing power of the dollar to-day is considerably less than it was before the war in the matter of food and fuel, numbers of employers have been quick to respond to the needs of their employees.

According to the plan of the General Electric Company, which has just been announced, each employee receiving $2,500 per year or less will receive a monthly bonus of 10 per cent of his monthly salary. This is in addition to the bonus plan announced by the company last August whereby employees share semi-annually in the profits. The present plan will affect about 60,000 employees and will increase the company's payroll by about $500,000 a month or a total of $6,000,000 annually.

The bonus plan announced on Nov. 1 by the Westinghouse Electric & Manufacturing Company for East Pittsburgh salaried men has been enlarged to cover all offices as of Dec. 1. The plan has been in effect with the wor men since the fall of 1915.

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MERGER PLANNED AT PITTSBURGH, PA.

Westinghouse Air Brake Company and Union Switch & Signal Company Will Be Combined

The merger of two important companies engaged in the manufacture of railway supplies will be completed within a few weeks by the combination of the Westinghouse Air Brake Company, Wilmerding, Pa., and the Union Switch & Signal Company, Swissvale, Pa.

The directors of the two companies have unanimously approved a proposition to unite these two companies, and the matter will be submitted to stockholders of both companies for approval within a short time. It is proposed to increase the capital stock of the Air Brake Company from $20,000,000 to $30,000,000 and to exchange the shares at the rate of four shares of Air Brake for five shares of Union Switch preferred, and two shares of Air Brake for three shares of Union Switch common.

As both companies are controlled by practically the same interests, and are engaged in the same kind of business, the merger will reduce overhead expenses and will effect large economies. It is reported that a 20 per cent stock dividend will also be declared.

ROLLING STOCK

Scranton (Pa.) Railway is reported to be in the market for cars.

Denver (Col.) Tramways are reported to be in the market for twenty-five cars.

Boston (Mass.) Elevated Railway is in the market for thirty-five steel subway cars.

Tri-City Railway, Davenport, Iowa, has ordered ten cars from the American Car Company.

City Railway, Dayton, Ohio, is reported to be in the market for a number of cars.

Alton, Granite & East St. Louis Railway, East St. Louis, Ill., recently had one of its cars destroyed by fire due to an overheated stove. None of the passengers was injured.

Interborough Rapid Transit Company, New York, N. Y., is reported to be considering the purchase of a large number of cars.

Brooklyn Rapid Transit System, Brooklyn, N. Y., has been instructed by the Public Service Commission to purchase 250 additional surface cars and to place them in operation by Feb. 1, 1918. The cars required by the Commission are of the center entrance type, with a seating capacity of fifty-eight passengers each.

Long Island Railroad, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL as having ordered forty-five trail cars and fifteen coaches from the Pressed Steel Car Company, has specified the following details for this equipment:

	Motor Cars	Trailers
Seating capacity	72	80
Weight of car body	67,000 lb.	44,000 lb.
Bolster centers, length	39 ft. 9 in.	39 ft. 9 in.
Length of body	54 ft. 3¾ in.	54 ft. 9¾ in.
Length over vestibule	63 ft. 4¾ in.	63 ft. 4¾ in.
Width over sills	9 ft. 9¾ in.	9 ft. 9⅝ in.
Width over all	9 ft. 11½ in.	9 ft. 10¾ in.
Body	Steel	Metal
Interior trim	Steel	Steel
Headlining	Steel	Steel
Roof	Clerestory	Arch type
Underframe	Steel	Steel
Air brakes	Westinghouse	Westinghouse
Couplers	Sharon special	Sharon special
Window fixtures	O. M. Edwards	O. M. Edwards
Curtain material	Pantasote	Pantasote
Door operating mechanism	None	Pneumatic
Hand brakes	Ry. Standard	Ry. Standard
Heaters	Steam heat—Gold traps	None
Journal boxes	Ry. Standard	Ry. Standard
Paint	Valentine	Valentine
Sash fixtures	O. M. Edwards	O. M. Edwards
Seats	Heywood Bros. & Wakefield Walk-over	Heywood Bros. & Wakefield Walk-over
Seating material	Plush	Rattan
Springs	Union Spring & Mfg. Co.	Union Spring & Mfg. Co.
Step treads	Diamond Pressed Steel	Diamond Pressed Steel
Trucks	Ry. Standard	Ry. Standard
Varnish	Valentine	Valentine
Ventilators	Deck sash	Automatic Ventilator
Wheels	Rolled steel	Rolled steel

Detroit (Mich.) United Railways has ordered from the Standard Motor Truck Company fifty pair of its type 0-50 outside-hung motor double trucks and fifteen pair of M. C. B. steam railroad arch-bar trail trucks for delivery in April, 1917.

East St. Louis & Suburban Railway, East St. Louis, Mo., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 2, 1915, as being in the market for forty-five car bodies, expects to order five new arch-roof interurban cars. The company will also rebuild five city cars.

International Railway, Buffalo, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 2, 1916, as reported to have purchased sixteen cars, has ordered twenty double-end center-entrance car bodies from the G. C. Kuhlman Car Company and twenty pair of Brill 27 M. C. B. trucks.

Detroit (Mich.) United Railway, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 18, 1916, as being in the market for fifty trail cars, has ordered this equipment and fifty additional motor cars from the G. C. Kuhlman Car Company. This company has also purchased eight interurban cars from the Jewett Car Company.

Hodenpyl, Hardy & Company, New York, N. Y., has ordered twenty-five pair of type 0-50 motor trucks from the Standard Motor Truck Company, ten pair to be distributed in Akron, Ohio, and fifteen pair to be distributed in Grand Rapids, Mich. This company has also ordered from the Baldwin Locomotive Works five pair of W87-30 AA trucks for high-speed electric passenger service on the lines of the Michigan Railway Company.

TRADE NOTES

Walter E. Hinmon, sales manager of the Cooper Heater Company, Carlisle, Pa., has been elected a director of that company.

Economy Fuse & Manufacturing Company, Chicago, Ill., has opened a branch sales office in Seattle, at 936 Henry Building. W. E. Jones is district sales manager for the Pacific Northwest.

D. L. Sacks, who for the past five years has been associated with the St. Louis branch of H. W. Johns-Manville Company, has now taken charge of the advertising department of the Walter A. Zelnicker Supply Company.

H. M. Byllesby & Company, New York, N. Y., and Chicago, Ill., announce that illustrated literature bearing upon the intrinsic durability of public utility investments when the properties are operated by experienced specialists will be sent to inquirers upon request.

Ohio Brass Company, Mansfield, Ohio, announce that 200 Crouse-Hinds headlights are specified on 100 new Boston Elevated cars. These headlights are of the mirror-reflector gold glass type. High power incandescent lamps will be used with these headlights.

Railway Improvement Company, New York, N. Y., announces that its Rico anti-climbers have been specified on the ninety-five cars recently ordered from the St. Louis Car Company by Hodenpyl, Hardy & Company. They have also been specified by the Public Service Railway, Newark, N. J., for the 100 cars to be built during the early part of 1917 by that company.

Lord Manufacturing Company, New York, N. Y., has received the following orders: Fourteen Horne double-acting brakes for Japan from the E. G. Long Company; four differential brakes for Australia from G. S. Ackley; six screenless air cleaners from Westinghouse Air-Brake Company and five air rectifiers from the Rutland Railway, Light & Power Company.

Steel Car Company, Cleveland, Ohio, recently incorporated in Ohio, with a capital stock of $500,000, has purchased thirty acres of land east of Cleveland, where a plant will be erected. The company will manufacture steel cars, and will repair both steel and wood cars. Patrick Joyce, president of the Illinois Car & Manufacturing Company and of the Indiana Car Repair Company, is president of the new company. Several Cleveland men are also interested in it.

Bayonet Trolley Harp Company, Springfield, Ohio, reports through R. A. Garlough that the sales of this company will show an increase of 30 per cent this year as compared with the year 1915. Some difficulty at times has

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been experienced in obtaining springs and brass washers, but all deliveries have been made within reasonable time. The problem of obtaining malleable castings, which has embarrassed so many manufacturers, has not been a difficult one for this company because it is not located in a great industrial center and has been well supplied by a local foundry. Enough materials for manufacturing the Bayonet trolley harps and detachable pole clamps are now on hand to assure that there will be no embarrassment in the near future. The first detachable harp and pole clamp were sold twelve years ago to the Dayton, Springfield & Urbana Electric Railway, now a part of the Ohio Electric Railway. These are still in active use on an interurban express car. The latter company has more than 100 Bayonet harps in use, all limiteds being equipped with them.

W. R. Garton Company, Chicago, Ill., will on Jan. 1, 1917, change its name to the Electrical Material Company and move from its present quarters at 11-17 South Desplaines Street to 618 West Jackson Boulevard, having outgrown the present quarters. The company was organized in 1898, by William R. Garton, now of New York City, and Ray P. Lee, and specialized in street railway and electric mine supplies and equipment. Mr. Garton retired from the company in the fall of 1907, to enter the manufacturing field in the East, and Mr. Lee bought out his interest succeeding to the position of president and treasurer. A. F. Henderson, who has been associated with Mr. Garton and Mr. Lee since 1900, was made secretary at that time. In the organization of the new company, Mr. Lee will continue as president and Mr. Henderson as secretary. E. Lewis, with ten years' service for the company as sales representative in the Iowa district, will be vice-president and G. J. Traner will be treasurer. The latter has been auditor and credit manager for the Garton Company for about ten years. The new company will continue to represent the same well-known manufacturers as it has in the past, and will continue its sales work in the Central Western States of Minnesota, Iowa, Wisconsin, Illinois, Michigan and Indiana.

The Paducah Pole & Lumber Company, Paducah, Ky., has just completed arrangements with the A. B. Smith Lumber Company for 200,000,000 ft. of cypress stumpage for the manufacture of cypress crossarms. A new crossarm factory at Bondurant, Ky., has been completed, and equipped with saws, boring machines and other appliances in order to manufacture crossarms at the rate of 5000 10-ft. arms a day. John L. Fay, sales manager of the Paducah Company, has completed an analysis of the characteristics of different woods available for crossarm purposes. He says that cypress is recognized as one of the longest-lived woods in existence, and that its extraordinary natural strength is afforded largely because of its small capillary tubes, which give it a peculiar cellular, close-knit, fine-grained structure. This cellular structure and close-knit grain is well adapted to receive preservative treatment, since the size and form of the cells tend to retain the treatment and prevent the leaching which is common where the cellular structure is larger. Cypress has not been generally used for crossarms, it is said, because the demand upon it for general building work has been unlimited. This company proposes to put out 75 per cent or more of heartwood, as arrangements have been made to dispose of the surplus slabs. With the production of this type of crossarms possible, and the owning of large timber stumpage rights, the company expects to be a factor in the crossarm field.

ADVERTISING LITERATURE

Hemingray Glass Company, Covington, Ky., has issued catalog No. 28 on its standard glass insulators.

G. Drouve Company, Bridgeport, Conn., is distributing a pamphlet on its straight push sash operator.

New England Oil, Paint & Varnish Company, Boston, Mass., is distributing a pamphlet on pole paint.

Q. & C. Company, Chicago, Ill., has issued a bulletin on its Type 1M shop saw for either belt or motor drive.

Chicago (Ill.) Pneumatic Tool Company is distributing catalog No. 43 on its Rockford railway motor cars.

Holland Trolley Supply Company, Cleveland, Ohio, is distributing a pamphlet on its ball-bearing trolley bases.

Watson-Stillman Company, New York, N. Y., is distributing catalog No. 94 on its hydraulic valves and fittings.

General Bakelite Company, New York, N. Y., is distributing its new publication, "Bakelite on the Automobile."

Anglo-American Varnish Company, Newark, N. J., is distributing a pamphlet on its weathering enamels for semaphores.

Searchlight Company, Chicago, Ill., has issued a bulletin on its oxy-acetylene process for manufacturing and repair purposes.

National Lead & Oil Company, Pittsburgh, Pa., is distributing a booklet on "Why Highly Oxidized Red Lead Is Superior."

Hyatt Roller Bearing Company, Newark, N. J., is distributing bulletin No. 1100 on its flexible roller bearings for railway cars.

Railway Utility Company, Chicago, Ill., has issued a pamphlet on its utility thermometer control of electric railway car heaters.

Jeffrey Manufacturing Company, Columbus, Ohio, has issued bulletin No. 179 on its Jeffrey Randall graphite lubricating bearings.

Standard Corporation, Philadelphia, Pa., distributors of Lefax pamphlets, have moved to new quarters in the Sheridan Building.

Van Dorn Electric Tool Company, Cleveland, Ohio, has issued a pamphlet on its Universal electric drill for all drilling requirements.

Ohio Brass Company, Mansfield, Ohio, is distributing a pamphlet on its process of "gas-weld bonding" in paved streets, on open track, and on the elevated.

Railway Storage Battery Car Company, New York, N. Y., has issued an illustrated pamphlet on its self-propelled passenger cars equipped with the Edison non-acid storage batteries.

International High-Speed Steel Company, New York, N. Y., manufacturer of high-speed steel, tool and metal alloy steels, has issued an attractive booklet on the manufacture of its products.

Beaudry & Company, Inc., Boston, Mass., has just issued a sixteen-page booklet on its "Champion" and "Peerless" power hammers. Several pages are devoted to specifications and useful data on motor-driven power hammers.

Chicago Pneumatic Tool Company, Chicago, Ill., is distributing its bulletin 34-K on its class N-SO fuel oil engine-driven compressor. These compressors are furnished in two types, one stationary and the other with the tank mounted on wheels.

Manganese Track Society and the Manganese Steel Founders' Society, Chicago, Ill., have just issued booklet No. 6, giving rules and detailed design for laying out manganese steel rail-bound frogs which have been adopted by these societies as their recommended standard.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is distributing pamphlet 3952 on 1200-1500-volt, direct-current railway equipments. The pamphlet illustrates and describes a number of schematic diagrams of high-voltage equipment showing changeover switches, motor connections, dynamotor compressor and master controller.

Electric Service Supplies Company, Philadelphia, Pa., has just issued an attractive thirty-two-page booklet on its "Golden Glow" headlights, searchlights and projectors. The theory underlying golden glow light and its adaptation to headlights is given, as are reasons for the design of golden glow and parabolic reflectors. In addition, the different headlights for city and suburban service are described and illustrated.

NEW PUBLICATIONS

Proceedings New York Electric Railway Association, 1916. Published by the association. William F. Stanton, Schenectady Railway, secretary. 208 pages. Cloth.

This volume constitutes the thirty-fourth annual report of the New York association, and covers the quarterly meeting held in Albany on Feb. 24-25 and the annual meeting in Niagara Falls on June 27-28, 1916.

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Electric Railway Journal

Published by the McGraw Publishing Company Inc.
Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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HIGH COST OF LABOR IMPOSES NEW PROBLEMS

The higher the unit cost of labor the more important is the need for using it economically and supplementing it with mechanical devices. At present labor is probably more expensive than it has ever been before, and the chances for material reduction in its cost, at least in the near future, are not very bright. All who are responsible for the expenditure of labor must, therefore, consider most carefully every means for reducing it. In general, human labor is, considered purely as a matter of mechanics, very expensive. To illustrate, we may assume that by working continuously a man could not produce more than a kilowatt-hour per day, which if drawn from an electric circuit would cost the railway from 1 cent to 3 cents. It is true that the ancient Egyptians, Chinese and other peoples accomplished wonderful mechanical feats with human labor by employing armies of men. The Chinese, for example, were able to transport objects of great weight by means of elaborate wood framework which could be grasped by the requisite number of men. They were able thus to do the same kind and magnitude of work as is accomplished by a modern crane or derrick. In the early days, however, slave labor was very cheap, the time element in work was not seriously considered, and there were few devices for utilizing nature's stores of energy. With these primitive peoples low labor cost was coupled with a prohibitive cost of mechanical energy from other sources, whereas at the present time we have expensive labor and cheap energy.

REPLACING HUMAN LABOR WITH MACHINES

In any mechanical operation we pay for brains, manual skill and mechanical energy. These are utilized in varying amounts depending upon the nature of the operation and the intelligence with which the work is laid out. In this there is much to be learned from the manufacturers, who have long recognized the advantage of doing everything possible with the aid of machines. To be sure manufacturing is different from railway work, but wherever operations can be concentrated and standardized manufacturing conditions can be approximated. With the conviction that much more can be done on electric railway properties to reduce the consumption of labor, and thus offset the rising unit cost of labor and materials, the ELECTRIC RAILWAY JOURNAL has endeavored to bring out all possible information regarding labor reducing practices. An article by R. C. Cram appearing in this issue is an example. Mr. Cram shows how track and road materials can be handled most cheaply. The same principles apply in other departments. It is possible that the present shortage and high cost of labor, combined with the unsatisfactory character of much that is obtainable, will drive home the lesson that we have been buying very expensive energy in the past. If some of the money thus spent can be invested in skill and brains the result will be a good return and better working conditions for the men. Many a way engineer or master mechanic has asked for a machine or tool which he knew would save money only to be refused because first cost rather than ultimate saving influenced the decision. One lesson in all of this is that if the present organization of departments of the electric railway employing much labor is not conducive to the use of machinery, this organization should be changed if possible in the interest of economy.

STUDYING POWER ACCOUNTING

A. E. Dedrick, according to a C. E. R. A. A. paper on "Electric Light and Power Accounting," abstracted elsewhere this week, believes that electric railway accountants would be better officials for knowing about accounting methods in a field so closely connected with electric railways, and in this we concur. Such knowledge, of course, is essential for accountants of combined lighting and transportation companies. Knowledge of lighting and power accounting should also be sought by accountants of interurban lines that are adopting the plan of selling power to consumers along their routes. Only as a result of an intimate acquaintance with the principles of power cost accounting are the charges for such service likely to include a proper demand allowance covering the investment cost, as in the case of separate electric companies. Aside from its usefulness in such cases, however, a working acquaintanceship with the theory and practice of electric light and power accounting would be another excellent example of that wider vision that characterizes the modern accountant. The main reason for the rise of electric railway accountants to a position of vital importance in company organizations has been the fact that they have not been satisfied to remain mere bookkeeping clerks but have become students of finance, law, transportation and accounting and to some extent engineering. For the progressive accountants who are still seeking to broaden their knowledge, however, no better field could be found than the general accounting work of closely allied industries. The electric lighting and power field in particular is one of phenomenal growth and progressiveness, and many a hint as to improved methods and general efficiency might be found by the electric railway accountant who does not keep his interest narrowed down to the confines of his own field.

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THE PLACE OF DEFINITENESS IN ASSOCIATION WORK

In last week's issue of the ELECTRIC RAILWAY JOURNAL brief reference was made to the new organization of the executive committee of the Transportation & Traffic Association, under which committee work in groups will be supervised by members of that body. The essentials of this plan, which appears to us to be a very commendable one, are definiteness of object, plan and schedule on the one hand and provision for supervision on the other. Definiteness or concreteness of purpose is essential to success in any line of work, the first question to ask being: What are we striving to accomplish? Next in order is a concrete, intelligible and workable plan involving these questions: What is to be done? and When is it to be done? Given a definite object and a comprehensive plan, it is necessary to supplement this with effective supervision. Without such supervision any work is sure to suffer and particularly general work such as that of a national society. The work of the American Association has undoubtedly suffered in this particular in the past, and this was perfectly natural. Committee members are busy men; they would not have been selected for their responsibilities otherwise. Chairmanships are likely to be occupied by men busiest in the work by which they earn their daily bread. These men are accustomed to follow-up schemes in their business, and they expect and appreciate similar systems in association work. It is particularly appropriate that the Transportation & Traffic Association should promulgate a plan for more systematic committee work. The specialty of the transportation officer is schedule making and checking. Under the direction of President L. C. Bradley this association expects to set an example of thoroughness and promptness this year. Properly supported by the companies which have permitted themselves and their employees to be honored by committee appointments, the association cannot but have a profitable year's work.

A THOROUGHLY BAD BILL

A serious tax upon the spread of intelligence and upon the extension of business efficiency in this country was proposed in Washington on Dec. 9, when the House committee on post-offices voted to include in the current post-office bill a rider which places second-class mail matter on the zone basis. The present second-class mail rate, as most of our readers know, is 1 cent a pound, but if the proposed change is made, this charge will apply only to the first 300 miles. For the next 300 miles the charge will be 2 cents a pound and the rate then increases by stages to 6 cents a pound, which is the charge for postage when the distance is more than 1,800 miles. This is an increase to subscribers living more than 1,800 miles from the place of publication of 5 cents a pound, and, in the case of the ELECTRIC RAILWAY JOURNAL, would mean for such subscriptions an increase in postage over that at present of from $2 to $2.50 each per year. As there is no increase to subscribers within the 300 mile zone it is obvious that the effect of the added clause will be confined almost entirely to publications of country-wide circulation such as the national literary and scientific reviews, the proceedings of the technical associations and the business papers like this journal which are devoted to the effort of increasing business efficiency in some selected industry. The daily papers will hardly be affected partly because most of them use other means of distribution than by mail and partly because the greater part of their circulations, especially of the small papers, is within the proposed 300-mile limit.

Now there are very serious objections both to the discriminations thus made between publications of different character and to the unscientific rate of charges adopted. One of these objections is that the tax is laid upon the very class of periodicals which it should be the purpose of the national government to foster. The engineer, the physician, or the railway manager, who is distant from the large centers of population and supply, is handicapped sufficiently by being out of personal touch with the progress made in his line of work and should not be obliged to pay more for the information which will lead to higher professional skill or greater business efficiency than those more favorably situated. Again, the proposed plan tends toward sectionalizing the intelligence and thought of the country and defeating the spirit of unity in national affairs and uniformity in progress in material affairs which the federal government above all should stimulate. The principle here is entirely different from that in the parcel post charges. In that instance, a uniform postal rate for distance might enable the big mail-order houses in the larger cities to compete very seriously with the smaller distributing houses in local centers. The national periodicals, however, from the very nature of things, must always be published in the large centers of population and for that reason there is no small dealer to protect.

Another defect in the bill, as will immediately be recognized by all transportation men, is the unscientific nature of the proposed charge. It is based on the theory that the cost of mail transportation varies with the distance traveled and ignores entirely all terminal charges. Actually, when mail in New York is placed in a pouch marked San Francisco it probably has to be handled no more times or sorted than if it had been sent from New York to Hackensack, N. J., or to any other point within the 300 mile limit, and it is the sorting and distribution of mail rather than its actual transportation after it is placed on the railroad train that is expensive. In this respect the proposed bill differs from the parcel post law, which recognizes a terminal charge.

Altogether the bill is about as bad as any which has ever been seriously proposed for our postal service, and it has not even got the redeeming feature that it might be considered necessary to eliminate a deficit, because Postmaster-General Burleson, within a few days, has reported that his department had earned a surplus during the last fiscal year. Those subscribers to this paper who would be affected by the proposed bill can well make their protest heard in Washington.

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What Does the H in Your Name Stand For?

For Heaven's Sake Tell Him Where to Put the H

WHAT is the public attitude toward the electric railway company in your town? Is it friendly, unfriendly or indifferent?

When a controvery arises affecting the railway's interests where does the public (knowing little or nothing about the merits of the case) usually stand?

All of us hear of people and institutions that we don't like and about which we are willing to believe the worst.

Then we get to know these people and institutions and find to our surprise that they are not so bad after all.

This sort of thing is due largely to lack of knowledge and partly to that inclination of the human mind illustrated in that story about "Gath."

George Alfred Townsend told a ministerial dinner companion that the first three letters of his pen name were his initials and that the H stood for where he was going.

"Oh, don't say that!" the clergyman exclaimed. "Heaven is within reach of all."

"Gath" once said that he had tried this psychological experiment on 4000 people, of whom 3996 thought that his H prophesied a hot destination.

Why the clergyman and 999 men out of every 1000 should jump to the conclusion that the H stood for hell rather than heaven is more or less of a mystery.

But as we know that this is merely the manifestation of a general tendency, it becomes necessary to replace ignorance with information and to tell people that the H in our name, strange as it may seem, stands for heaven.

Otherwise they will go on involuntarily putting it in front of 'ell instead of 'eaven, although it is before the latter (let us hope) that it really belongs.

Any railroad man with the imagination of a mud-turtle can apply all this to his problems without further directions.

IGNORANCE is the cause of misunderstanding and distrust.

Add to this the inclination of the human mind unconsciously to think the WORST rather than the BEST.

And the need to put strong foundations of knowledge under popular opinion about public utilities is too plain to be postponed.

The kind of mason who does this foundation work best is known in the trade as a publicity man.

If his employment is too long postponed the whole house sometimes falls down under the weight of public disapproval.

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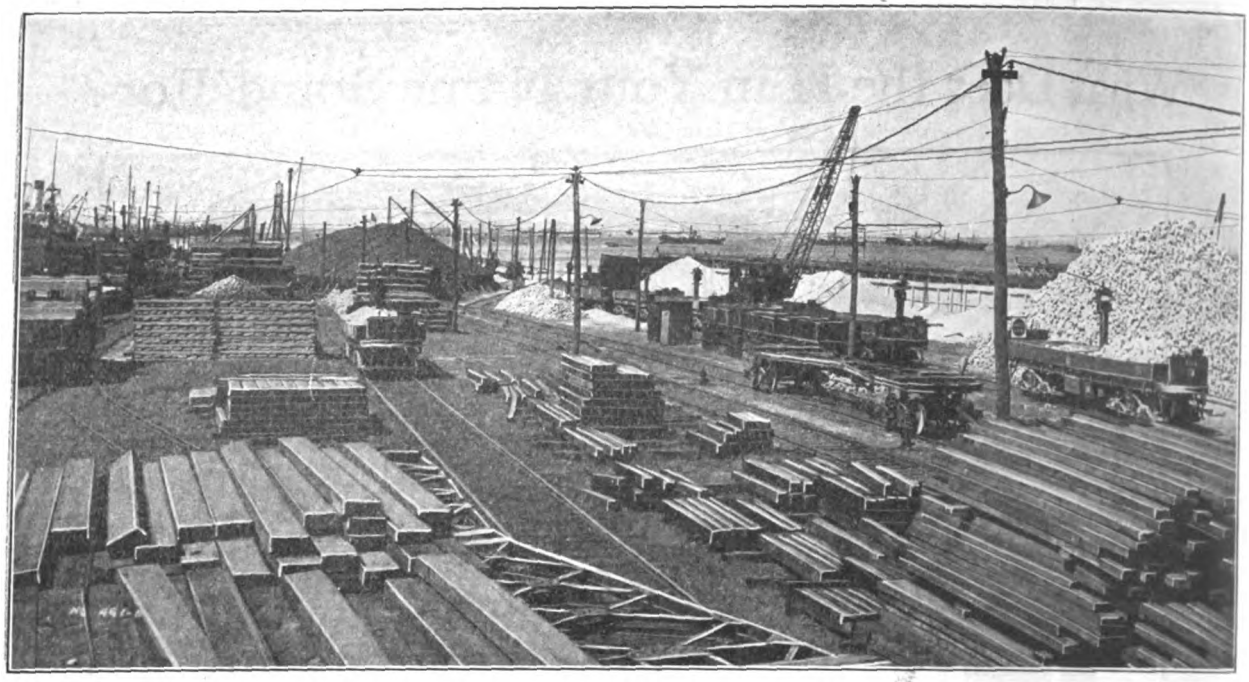


STORAGE YARDS—FIG. 1—GENERAL VIEW IN SIXTY-THIRD STREET DOCK STORAGE YARD, B. R. T. SYSTEM

Cutting Costs in Storage Yards

Use of Yard Machinery Conduces to Reduction in Cost of Handling Rails, Ties, Paving Material, Etc.

By R. C. CRAM

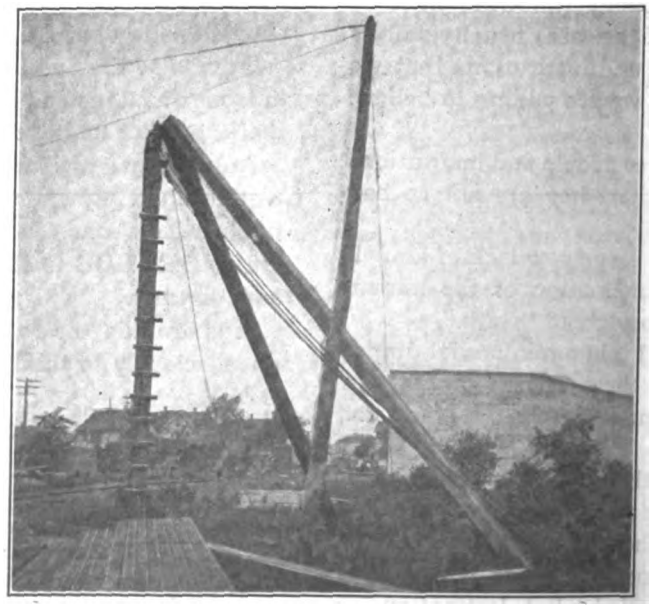
Assistant Engineer Way & Structure Department, Brooklyn Rapid Transit System

THE storage yard itself plays an important part in the consideration which should be given to the general subject of cost for handling and storing materials. It should be big enough to permit the purchase and storage of large quantities of materials in advance of actual need, thus allowing time for buying under suitable specifications and guarding against delays due to shortage of materials, to say nothing of the price savings usually effected through buying in bulk.

The location of the yard requires a careful study. In general it should be as nearly central to the system as practicable after proper weight is given to the factors of steam railroad and water connections and value of real estate. The latter item should not be allowed to control the selection of the site in most cases because the lack of proper rail and water connections to facilitate immediate storage will soon offset even very high real estate charges by the extra costs due to secondary hauling charges.

The arrangement of the yard, with respect to location of tracks and the location of the several materials so as to reduce handling to a minimum, should also have close attention. The need for machinery in yards is quite apparent, but it may not be out of place to emphasize this by referring to the following table of approximate quantities of certain materials handled in 1914 for surface track reconstruction in the Sixty-third Street dock storage yard of the Brooklyn Rapid Transit System.

Material	Tons
Granite paving blocks	27,600
Standard yellow pine ties	2,540
Paving gravel	17,700
Grooved girder rail	3,400
Total	51,240



STORAGE YARDS—FIG. 2—STIFF-LEG DERRICK IN STORAGE YARD OF CONNECTICUT COMPANY, BRIDGEPORT, CONN.

There is now a general tendency to equip yards with labor-saving devices, chief among which are the various types of cranes in use for piling, hauling and storing bulky materials. There are four types of cranes which may be used for this purpose, *viz.*, stiff-leg derricks, guy derricks, jib cranes and gantry cranes. The stiff-leg type is the one in most general use, and one or more of these will be found almost indispensable in yards of all but the smallest roads, as the operation is simple, the range of use greater and the cost nominal in proportion to its serviceability. Such a derrick as that shown in

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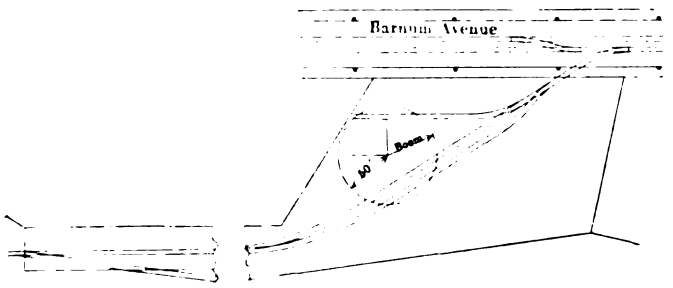
Fig. 2, which has a capacity of 10 tons, can be made and erected complete without motors for about $500. This includes labor and all fittings. This is a stiff-leg derrick located in a moderate-sized yard, the Summerfield yard of the Connecticut Company at Bridgeport, Conn. It is operated by means of a motor car, hence no other hoisting machinery is required with the derrick itself. The use of the motor car obviates the necessity for the purchase and maintenance of hoisting apparatus. A general plan of the layout of this yard with its steam road connection is shown in Fig. 3. Figs. 2 and 3 are from a photograph and a drawing furnished by W. R. Dunham, Jr., engineer maintenance of way of The Connecticut Company. A 15-ton wooden stiff-leg derrick with iron fittings, the general details of which are shown in Fig. 4, is said to



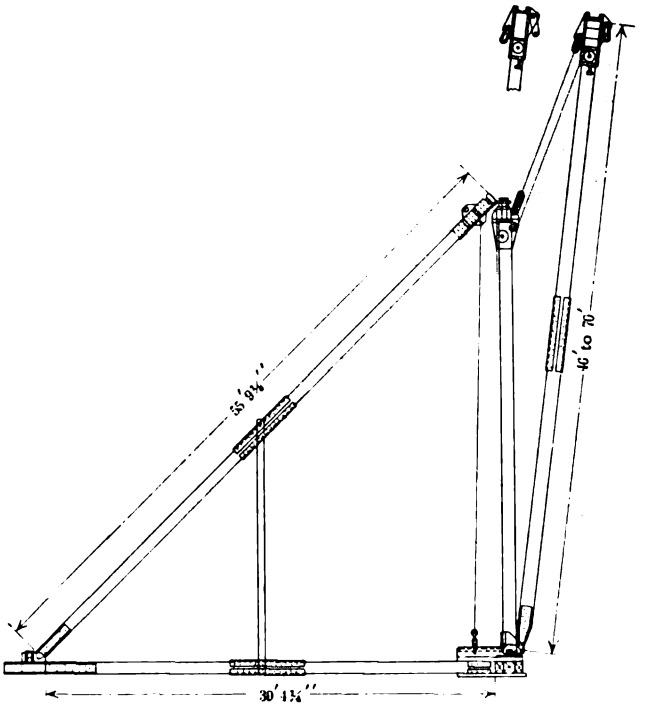
STORAGE YARDS—FIG. 3—SMALL STORAGE YARD OF CONNECTICUT COMPANY, BRIDGEPORT, SHOWING TRACK CONNECTIONS

have cost as follows in 1913: Lumber, $256.23; irons, $213.52; paint, $3, and labor, $35.25, a total of $508.

When space is limited the knee type of stiff-leg derrick can be used to advantage. This is illustrated in Fig. 6 which shows a wooden derrick of this type used by the Brooklyn Rapid Transit Company. Fig. 8 is a design, of knee-type full-circle derrick, built by the G. H. Williams Company, Cleveland, Ohio.

The guy type may be favored where conditions require the maximum range of action. A guy derrick is shown in Fig. 7. The location is such that ample head room for cars and wire is obtained under the guys. Unless sufficient area is available for properly locating the guys to provide such clearances, this type of derrick becomes less useful than the stiff-leg type. The illustration shows a guy derrick in use at a girder-rail storage pile. Its particular location in a large storage yard is shown in Fig. 10, which is a general layout of the yard track and derricks of the Sixty-third Street dock storage yard of the Brooklyn Rapid Transit System. In the drawing small arrows marked respectively *A*, *B* and *C* are given to show the points from which the accompanying photographs were taken.

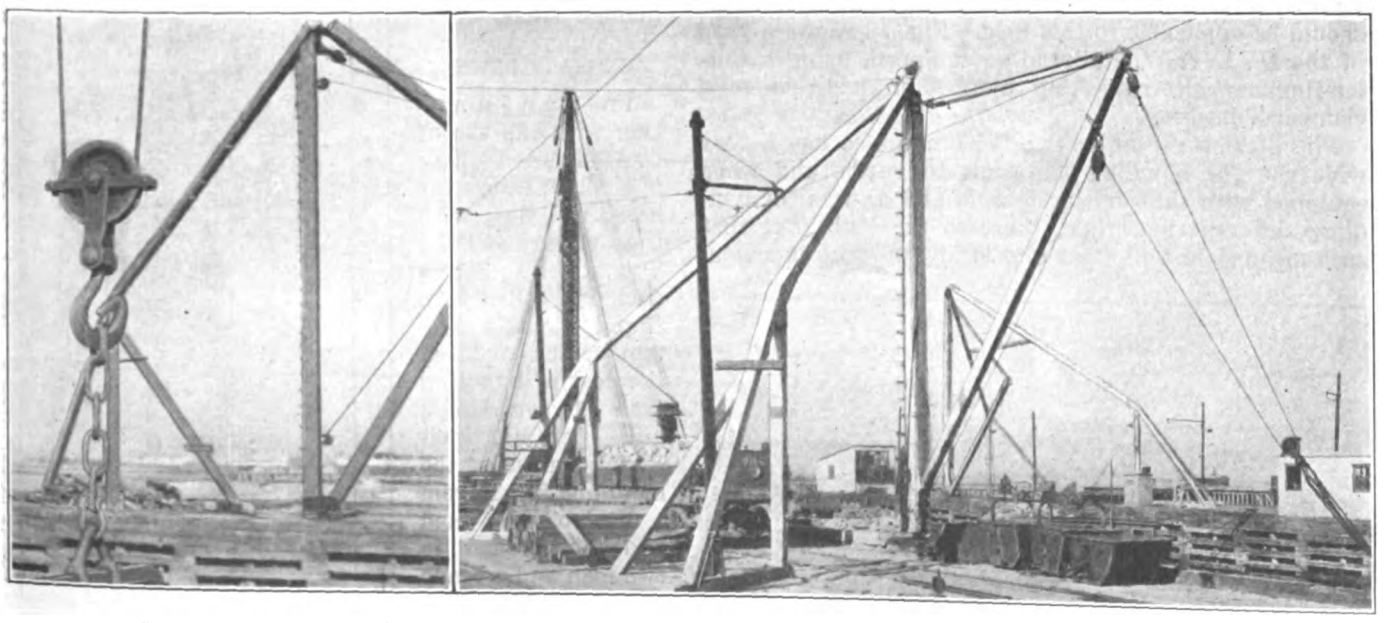
The jib crane will be found useful where it is desired to transfer loads in large bulk from one car to another,



STORAGE YARDS—FIG. 4—FIFTEEN-TON STIFF-LEG WOODEN DERRICK WITH IRON FITTINGS

or for use in a fixed position at a rail pile, especially where ground space required for derrick legs and sills or for guys is at a premium. Such a crane is shown in Fig. 11. It will be noted that this outfit is quite similar to that now coming into favor for use upon crane cars, although the one illustrated is very much larger in capacity.

The gantry crane has had a limited use in yard work owing to the interference of overhead wires, and the writer is aware of only one important installation of



STORAGE YARDS—FIG. 5—SAFETY HOOK USED IN B. R. T. YARD; FIG. 6—KNEE-TYPE STIFF-LEG DERRICK

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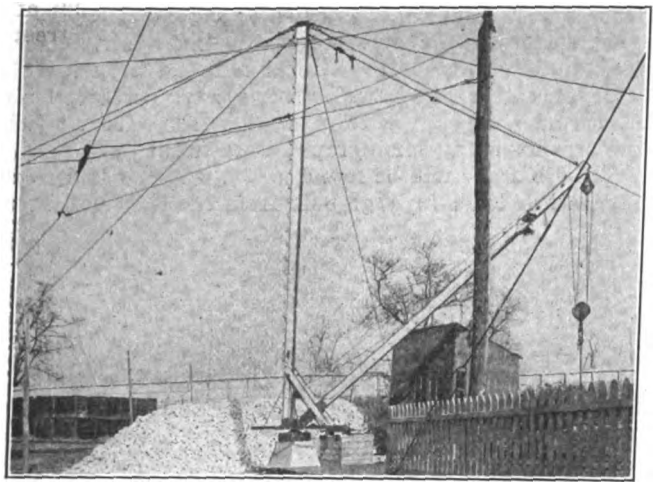
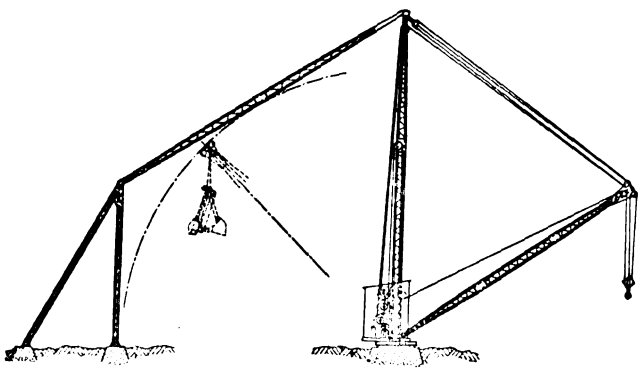


STORAGE YARDS—FIG. 7—FULL-CIRCLE GUY-TYPE DERRICK

this kind on electric railway property. It is probable, however, that by the use of long cables or some other means of getting power to the cars and eliminating the wires, the advantages of this type of crane could be made more available. The installation referred to is that of the Cleveland Railway Company at its Harvard Avenue shops, which is shown in Fig. 12, made from a photograph furnished by E. M. T. Ryder, engineer main-

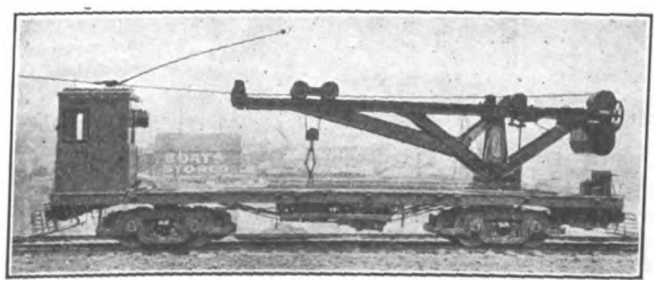


STORAGE YARDS—FIG. 8—FULL CIRCLE STIFF-LEG DERRICK FOR USE WITH LIMITED CLEARANCE

tenance of way Third Avenue Railway System, New York City.

The type of traveling crane running on elevated rails, such as is used ordinarily in shops and power stations, should be applicable to this field. Fig. 13 shows a yard of the D., L. & W. Railroad so equipped, using a Cutler-Hammer electro lifting magnet in addition to a clam-shell bucket.

The derrick car or locomotive crane also has a very wide use for handling materials in yards, and when equipped with the various buckets and devices for handling different materials, there is no doubt but that such a car alone will serve almost any purpose in a comparatively small yard and will be available also for occasional use upon the road away from the yard. Fig. 14 shows a locomotive crane of the Chicago Surface Lines, handling gravel. It is from a photograph also furnished by Mr. Ryder. For yard use only it is probable that a derrick car of the boom-crane type has the greatest range of use, while for combined yard and road use the jib-crane type will be found best. The one particular advantage of the latter in road work is the non-interference with overhead work. A typical jib-type crane is shown in Fig. 9. Both types are, of course, designed for electrical operation. These equipments cost from $6,000 to $7,000 complete, ready to run.

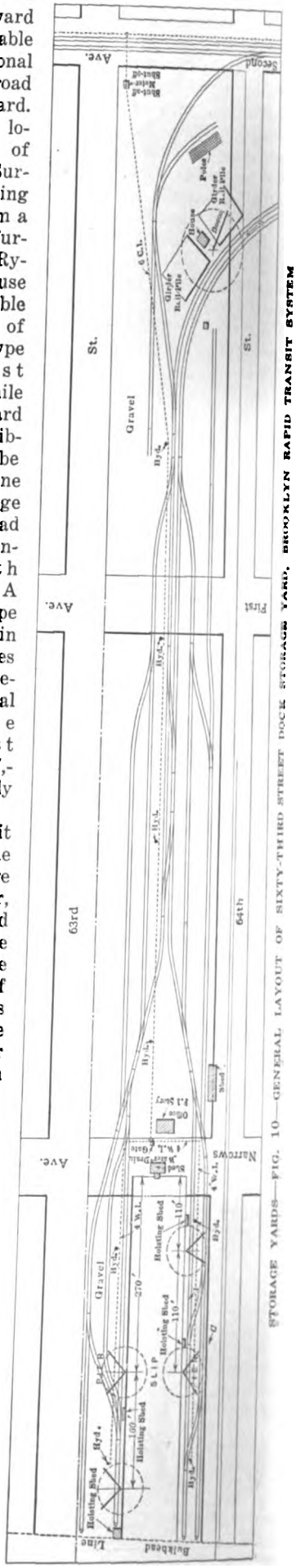


STORAGE YARDS—FIG. 9—JIB CRANE MOUNTED ON WORK CAR

From the table it is evident that the crane has saved more than $2,200 per year, and therefore paid for itself in a little more than three years. A crane of the boom type has been found to save its cost in one year as compared with manual labor.

AUXILIARY DEVICES

In conjunction with the use of cranes in yards there is a device in use for handling ties with the crane at the Sixty-third Street dock of the Brooklyn Rapid Transit system which reduced the cost of handling from 1 cent to 3 mills per tie, incidentally reducing the handling force from a crew of nine men and one foreman to two men and a crane operator. There has



STORAGE YARDS—FIG. 10—GENERAL LAYOUT OF SIXTY-THIRD STREET DOCK STORAGE YARD, BROOKLYN RAPID TRANSIT SYSTEM

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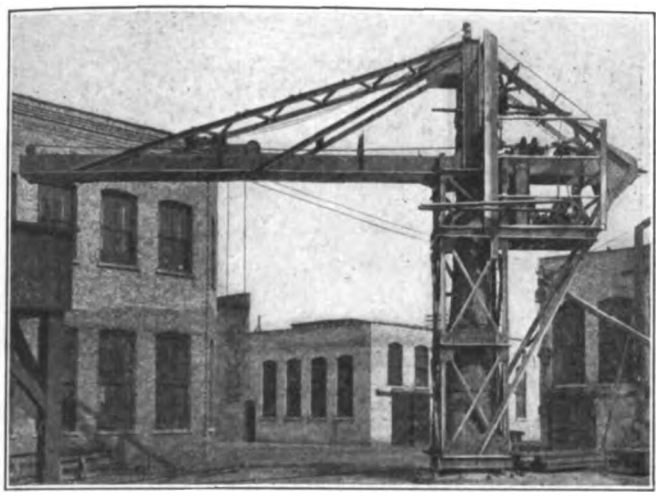
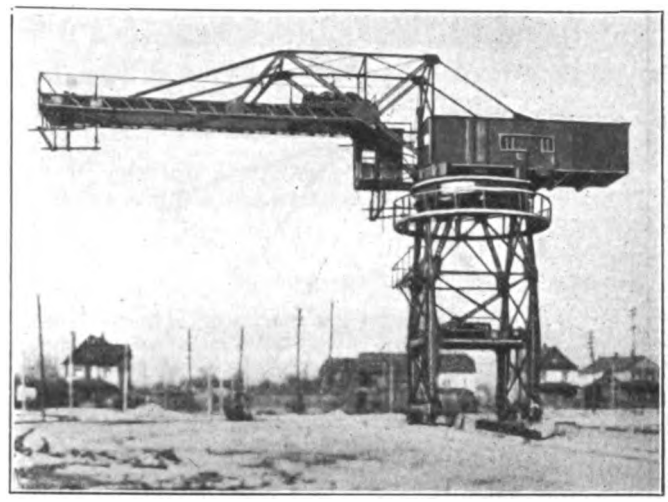


STORAGE YARDS—FIG. 11—JIB CRANE FOR USE WITH LIMITED CLEARANCE



STORAGE YARDS—FIG. 12—FULL-CIRCLE, HAMMER-HEAD SWING CRANE

also been a great reduction in accidents and the ties may be piled much higher, thus saving ground space. The device, which is shown in Figs. 15 and 17, was designed by John Ferguson, dock master South Brooklyn Railway. The cost of these tie-bales is between $50 and $60 each.

Another saving effected through the use of machinery has been made in the handling of granite paving blocks. It was found that handling the blocks entirely by hand cost 22 cents per ton, which has been reduced to 7 cents per ton with the aid of machinery.

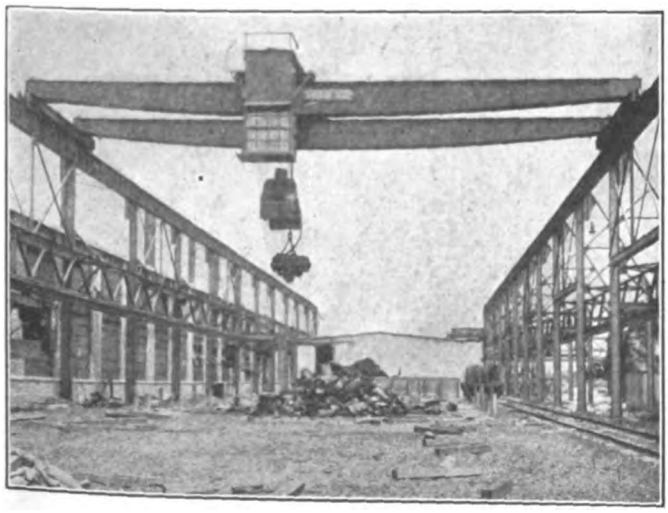
With respect to reduction in accidents, attention is directed to the safety hook shown in Fig. 5, page 1285, designed for use with derricks. This hook was also designed by Mr. Ferguson, after a fatality had directed forceful consideration to the need for such a device. It is practically impossible to detach the ring from this hook without deliberate intent. With the ordinary hook a sudden release of load on the fall lines or the fouling of the load in one of several ways would release the ring from the hook, thus creating a constant accident hazard which has been eliminated by the safety hook.

Among the devices coming into use in lifting iron and steel about the yards is the electromagnet. One of these has already been referred to. Figs. 18 and 19 are from photographs furnished by E. H. Berry, engineer of roadway, Cincinnati Traction Company. These show the application to the handling of special work and scrap, respectively. This company has found the magnet very serviceable. This particular magnet was made by the Browning Engineering Company of Cleveland, Ohio, whose crane and grab bucket are also included in the Cincinnati equipment.

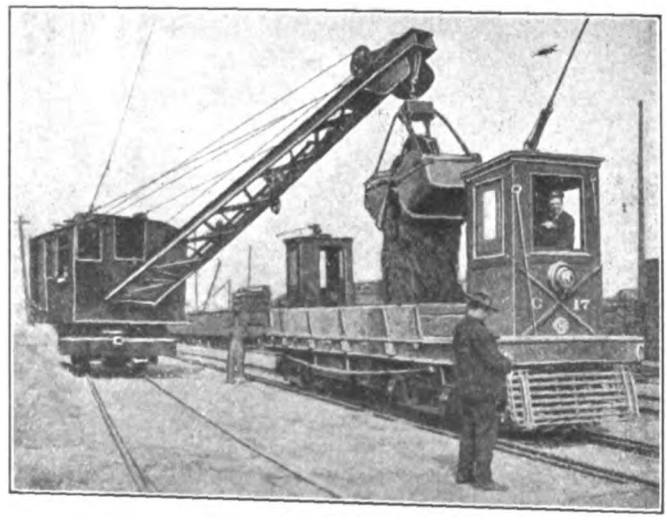
Another item of yard equipment found in some yards is the stone crusher, generally constructed in the portable type, such as that shown in Fig. 16, for convenience on occasions when it may be found advisable to have the outfit out on the work in order to lessen haulage charges. Where the cost of stone or gravel is high, it may be found advantageous to install stone crushers for producing ballast, and concreting material from old cobble granite and brick pavements or from old concrete. However, the installation of a crusher plant must be carefully considered because the maintenance, repairs and renewals of parts are expensive.

SAVING EFFECTED IN FOUR YEARS BY USE OF 3-TON PILLAR CRANE CAR ON ELECTRIC RAILWAY SYSTEM

Number of Tons Handled	Cost of Handling Without Crane	Cost of Handling With Crane	Total Saving
4000 tons miscellaneous	$1.00	$0.25	$3,000.00
3324 tons load on cars	.75	.20	1,828.20
3324 tons to yard	1.00	.25	2,493.00
6340 tons unloaded	.50	.20	1,902.00
6340 tons to job	.75	.25	3,170.00
			$12,393.20
Cost of crane car, ready to run	$7,000		
Depreciation 5 per cent, four years	1,400		
Interest 5 per cent, four years	1,400		
Upkeep 2½ per cent, four years	700		
			$3,500.00
Net saving four years, one car			$8,893.20



STORAGE YARDS—FIG. 13—OUTDOOR CRANE USED IN STOCKYARD OF D., L. & W. RAILROAD WHICH MIGHT BE APPLICABLE TO ELECTRIC RAILWAY YARDS



STORAGE YARDS—FIG. 14—LOCOMOTIVE CRANE USED ON CHICAGO SURFACE LINES FOR LOADING GRAVEL ONTO FLAT CARS

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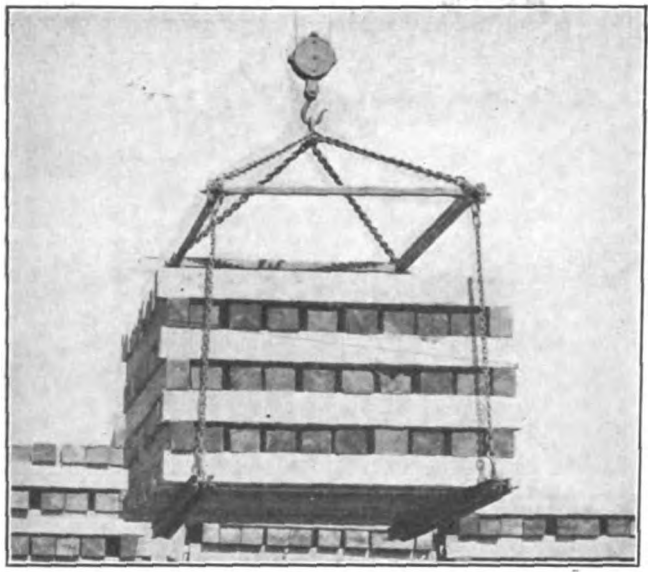
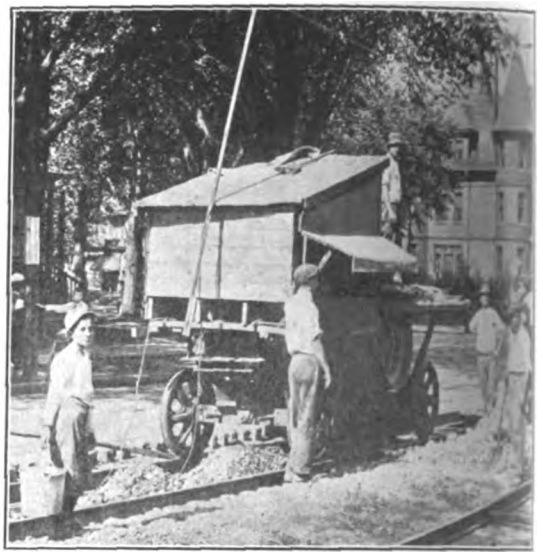
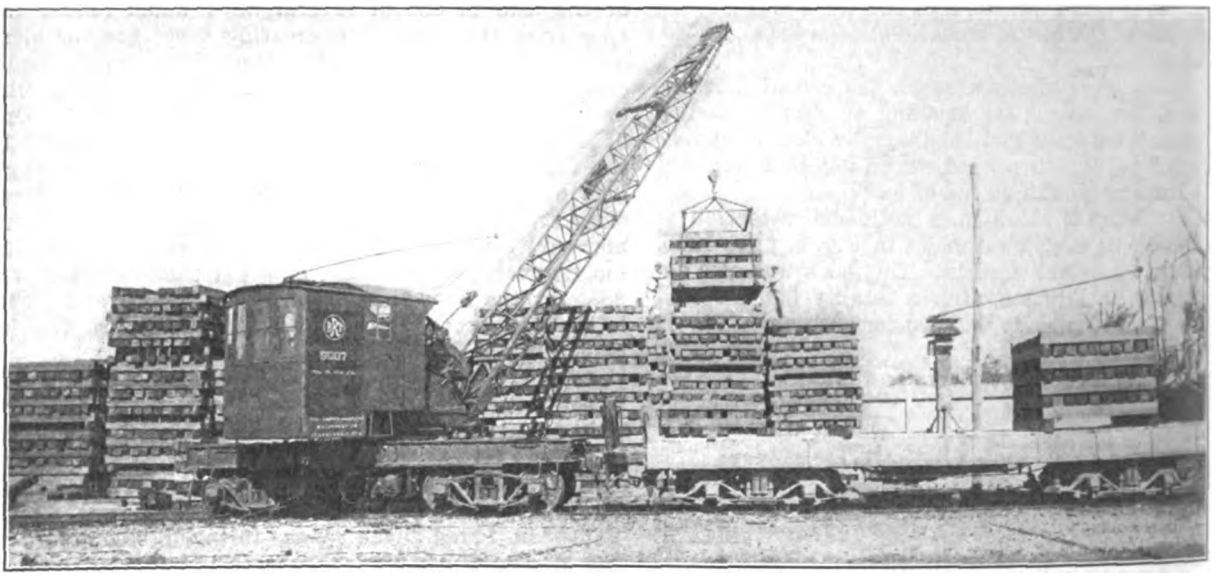


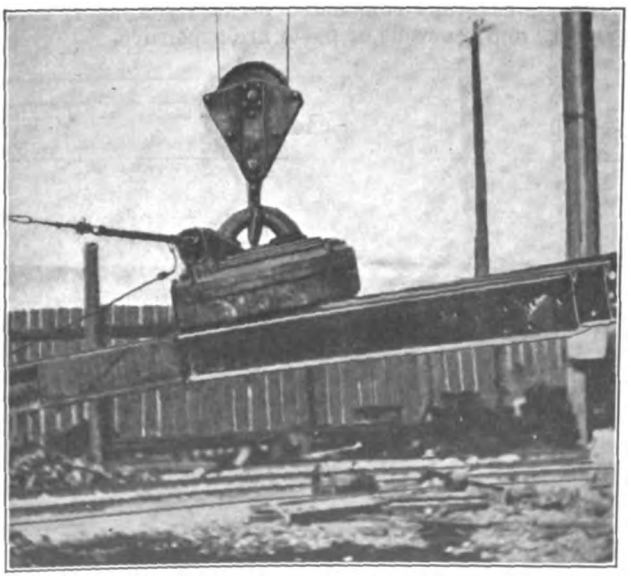
STORAGE YARDS—FIG. 15—CLOSE VIEW OF BALE AND LOAD OF TIES, B. R. T. STORAGE YARD



STORAGE YARDS—FIG. 16—PORTABLE STONE CRUSHER IN OPERATION ON STREET IN ROCHESTER, N. Y.



STORAGE YARDS—FIG. 17—LOCOMOTIVE CRANE IN USE IN GENERAL STORE YARD B. R. T. SYSTEM



STORAGE YARDS—FIG. 18—ELECTROMAGNET USED BY CINCINNATI TRACTION COMPANY, LIFTING SPECIAL WORK

STORAGE YARDS—FIG. 19—ELECTROMAGNET USED BY CINCINNATI TRACTION COMPANY, LIFTING SCRAP MATERIAL

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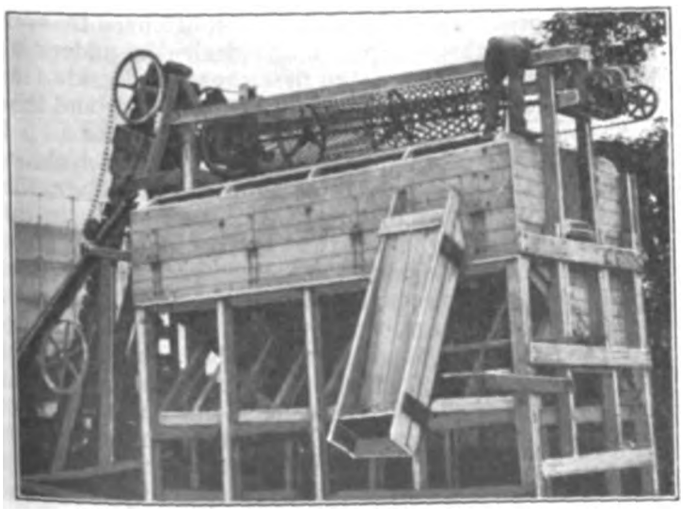
STORAGE YARDS—FIG. 20—STONE CRUSHER IN USE IN YARD OF NEW YORK STATE RAILWAYS, ROCHESTER, N. Y.

The plant is apt to be idle for quite long periods and if the average haul to and from the plant is too long, these factors, combined with operating and maintenance costs, will probably offset other savings to such an extent that it may even be found cheaper to purchase new ballast and concreting materials. Sometimes, where the operation of the plant by the railroad company does not appear economical it may be advantageous to allow an outside contractor to erect a plant at the yard and deliver all of the company's old paving material to him for crushing at a fixed rate based upon a price per cubic yard of crushed material produced. This method effects a salvage for otherwise useless material and the arrangement can be made to profit the contractor because he can also secure supplies from other sources which will keep the plant in practically continuous operation.

Figs. 20 and 21 show a stone crusher in service in the yard of the New York State Railways at Rochester, N. Y. They are from photographs furnished by D. P. Falconer, engineer maintenance of way Rochester lines.

An important part of a storage yard equipment, although it may not be considered as strictly yard machinery, is the track scale. No general yard of any size to-day should be without one, as there are so many bulky materials which require weighing as the most effective method of accounting for the loss materials such as sand, gravel, crushed and paving blocks.



STORAGE YARDS—FIG. 21—CLOSE VIEW OF STONE CRUSHER USED BY NEW YORK STATE RAILWAYS, ROCHESTER, N. Y.

Efficiency and Habit of Mind

Instances Are Given of the Savings Possible in Corporation Expenditures When an Economical Habit of Mind Has Been Developed

BY MAJ.-GEN. WILLIAM A. BANCROFT
Chairman Board of Directors, Boston Elevated Railway

IN response to your request for my views upon what might be denominated the psychology of efficiency, the following points appear to me of general interest to electric railways at this time.

In the effort to obtain additional net revenue, electric railways are obliged to practice in the conduct of their affairs the most rigid economy consistent with safe and adequate service. Apart from perfunctory economies there are many ways in which this object may be sought. Latent possibilities exist in the mental attitude of employees toward economy, and the cultivation of a habit of mind favorable to efficient practices is more important than is generally realized.

Every large company employs a considerable number of highly paid and capable persons, whose talents should be able to create more favorable conditions. Operating costs may be too high and revenues too low, in which case every opportunity should be sought to reap the benefits of such minds, encouraging by reason of their intelligence and cleverness such suggestions as will either reduce expense or increase revenue without expense, or do both. Naturally a man's thoughts relate to the particular service in which he is engaged, but in some other branch he may discover an opportunity to add to the company's net revenue.

By planning to have every man working to advantage and so far as possible eliminating waits, as in drawing pay, much can be done to realize the benefits of higher efficiency in the minds of executives of every rank. Fewer people can accomplish a given result if kept busy. A saving may be effected if provision is made so that equipment and tools will last longer and if work is done promptly instead of being put off. The development of new business is another subject worthy of study from the economic standpoint if accompanied by a habit of mind which separates costly from profitable results.

Before the present necessities for closer economy arose, it did not appear necessary in considering a thing to pay much attention to the cost of incidentals, such as stationery, typewriting, telephoning and traveling expense. A complete change in the habit of mind when regarding these matters has become essential. In the past it has not been sufficiently considered, for example, whether the main purpose could not be accomplished without expenditure, or, at most, with only small expenditures. Correspondence can be cut down to the great advantage of all in companies where the economical habit of mind toward incidentals has not been well developed. In other words, the habit of mind has been to consider the main object sought, not its cost, nor even the incidental cost of consideration and study, much less whether the object could be gained with no outlay whatever.

Not enough has been made of existing resources.

This habit of mind must be changed and consideration given to all expenditure, whether small or large. Ingenuity must be exercised, and ways of accomplishment found that will involve little or no expense. Plenty of instances have occurred where this has been done; enough to warrant the belief that it can be done in many other instances. In our own company, the articulated car and the pavement plow are representative illustrations.

Aside from the possibilities in rolling stock, track

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and buildings, the efficient habit of mind includes such matters as abstaining from ordering new stationery if old can be made to answer; avoiding hiring an outside stenographer when one's own can be utilized; refraining from using company stationery and postage stamps for private purposes and from ordering new filing cases, furniture, utensils, etc., when the existing equipment will satisfactorily answer the purpose.

In short, the efficient habit of mind constantly seeks the avoidance of waste both in material and effort and strives to reduce expenses both in small and large matters by the use of the inventive faculties.

Insurance and Publicity Discussed

One Session of Pennsylvania Street Railway Association Was Devoted to Papers on Fire, Life and Accident Insurance, and Publicity

IN connection with the proceedings of the convention of the Pennsylvania Street Railway Association, held in Philadelphia on Dec. 12-13, the ELECTRIC RAILWAY JOURNAL published in the issue of Dec. 16 the various papers on lightning protection, electric welding, taxation and jitneys that were presented at the second day's meeting. On the first day the main topic of discussion was insurance, this being taken up along the lines of fire insurance and prevention, life insurance and accident and casualty insurance. The papers that were presented at this session are now printed in abstract. There is included also an abstract of a special address on publicity by George Henry Payne, recently assistant to the vice-president and general manager, Wilkesbarre (Pa.) Railway.

Publicity and the Ills of Street Railways

Publicity, Now Practised by Most Large Companies, Is a Logical Development

BY GEORGE HENRY PAYNE

SO many nostrums that are offered as cures turn out so frequently to be fatal that an analysis, or diagnosis, of any proffered panacea seems but reasonable. Just at the present time there seems to be a general belief that publicity is the cure for all the ills that have grown up, and the manifestations of that belief would have shocked the good old souls who fifty years ago saw the beginning of corporate and transportation development in this country. We can all imagine what the blunt old J. Pierpont Morgan would have said if he had read, as we now occasionally read, that "the press agent for the house of J. P. Morgan said yesterday, etc." I sometimes drop into the New York Central Building to see an able gentleman there who directs and guides all things in relation to public matters—the polite title for the press agent, and I wonder as I pass the corridor of the president of the road what the irascible old Commodore Vanderbilt would have said to these modern efforts in publicity, when to a complaint from the public fifty years ago his reply was "the public be damned!"

Only the other day we read in the papers that the heads of the five biggest industrial establishments in America had held a conference on business conditions, especially in relation to labor, and it was decided or recommended that hereafter every big business firm have a vice-president whose business alone would be to look after the welfare of the employees. One of the biggest banks is paying its publicity man $25,000 a year, a salary that a generation ago would have been ample for a bank president himself. The National City Bank, I am informed, has made it an unwritten rule that no one hereafter shall be elected a vice-president unless he is able to make a speech. The newly-appointed executive assistant to one of the big railroads here in the East was being introduced to the heads of the departments when a young man in charge of some minor department, thinking to make light and pleasant conversation, exclaimed. "Glad to meet you, Mr. Blank. Glad to meet anyone who can talk to reporters. I had one bothering me this morning—I gave him hell."

"The next time you give a reporter hell, you give me your resignation," said the president, and the dumfounded young man wandered away wondering what had come over the spirit of the "Old Man" who was known in his day as having among capitalists the long distance record for throwing a reporter.

John D. Rockefeller told a friend one time that not until he was put to it did he realize that after all a reporter could be a friend and from that time on he took a page out of the book of his friend Andrew Carnegie. Carnegie, long before the idea was popular, had a press agent and with true Scotch canniness saved the salary and was that press agent himself, and one of the best this country ever knew. The one-time popularity of the New York Central Railroad was undoubtedly due to the geniality and personal cleverness of its president, Chauncey M. Depew. It is now the fashion, more or less and, in fact, has been in recent years, to decry the ability of Depew, who at one time was prominent as a possible candidate for president. But men much less in ability and worth have been president, and few men have lived in this country who through sheer force of good-will and love for fellow kind have created about them an atmosphere that was a help to all that came in contact with them.

The inevitable question is: Why is this so? The answer is, it has been found to be "good business." It has been found that it pays. The answer I don't think is satisfying. The mere acceptance of a condition is not the best preparation for future conditions. In every healthy mind there is a genuine desire to understand the fundamental causes, the first cause, and aside from the real pleasure of having firm mental grasp and thorough understanding, there is the fact that after all it is only the historical method, this tracing of the evolution of things, this searching into the origin of things, that is going to guide as to the future. And surely in this day no one can say, when the future in so many directions looks so dark, that we should ignore or overlook any help that may seem at hand.

The emphasis on publicity to-day, the absolute necessity for it in many departments of the industrial world, is the logical development of the movement that began a little more than 100 years ago—the government of nations by public opinion. There were democracies in the world before ours, but they were democracies for a limited number, as with the Greeks, the Romans and the governments of the Italian cities in the Middle Ages. Under Jefferson, this became a government, the first of its kind in the world, where all citizens had a share in its privileges and where almost everyone was a potential

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citizen who was not already in jail—a remarkable experiment in the history of the world, unquestionably, and foredoomed to failure by European critics.

But along with the development of this government there grew up, also for the first time in the world, an extra-legal, an extra-constitutional check, as it were, both on the government and the citizens, the force of public opinion. And public opinion to-day rules the government, rules the nation but doesn't always succeed in ruling the source whence it comes.

It was public opinion, led by Greeley in the New York *Tribune*, and William Lloyd Garrison in the *Liberator*, and other great Americans who brought about the fight for the freedom of the slave and the election of Lincoln. It was also Greeley's desire to conduct the war that led to his cry "On to Richmond," with the result that Lincoln was obliged to send his untrained troops into the field, and the defeat of Bull Run followed.

After the Civil War there was a great development along material lines, and the native ability that had shown itself so conspicuously in the Greeleys, the Lincolns and the Sewards in the moral awakening before the war, now showed itself in the industrial giants who girdled the continent with railroads and drew out of the earth wealth up to that time more fabulous than that of Ormus or of Ind. The country was prosperous and happy when new leaders appeared, leaders of public opinion. From 1885 to 1905 there was a terrific agitation against every form of corporate wealth. The captains of industry who had once been our proudest possessions were the excoriated of the land; and I remember fifteen years ago a banker telling me at dinner that he had once been proud of his profession, but the thing that was worrying him now was how he was going to explain to his children when they grew up the terrible way in which he earned his living.

During the last ten years, or rather the last seven years, there has been a change, not a change on the part of those who were attacking corporations and capital, but a change on the part of the attacked. They have gone over, not in a body but in large numbers, to the other side, and have joined in the attack on capital. The son of one of the men who was most vehemently attacked throughout the country during the early years of the fight on capital is the financial backer of a Socialist organ whose most distinguished contributor once described his father as a malefactor of great wealth. A former member of the largest banking house in America is the financial backer of another magazine with similar, if not so strongly developed inclinations.

So, we have the philanthropists at the top and, what J. Pierpont Morgan called the anarchists, at the bottom. But between philanthropy and anarchy there is the great division of the middle class corporations and Americans who haven't enough money to join the one class and don't belong with the other. In their dilemma they are looking to publicity as a means of checking the ills that have grown up, along with the seemingly accepted idea on the part of a large part of the public that there is such a thing as definite evil and virtue in our industrial relations—the evil all on the side of capital and the virtue all on the side of labor. And in that seeking I think they are right, but the times I believe call for more than publicity of the "watch your step," "safety first," "don't cheat the poor subway" variety. They call for thought; they call for dispassionate scientific investigation. It is well and it is necessary that you have business leadership among business men, but you must have also intellectual leadership, leadership that will by force of its intellect and its thought command not only the respect of those to be led but the respect of those to be opposed.

A great financial institution of New York for years boasted that it did not advertise and would not advertise, until it saw other financial institutions of less reputation and stability encroaching on its domain. Then, it woke up, and two years ago, aside from the $50,000 or $60,000 spent in other channels of publicity, spent $20,000 alone in furnishing free advice to those who were perplexed by the provisions of the income tax law. Now that great institution boasts that it would rather have the good-will of the public than its deposits.

Publicity, yes, if it is publicity that commands respect and drives home thought. Not long ago, a traction company in a city not far from here in appealing to a more or less somnolent citizenry to awake and stop open—I might say official—outlawry and rioting, used in one of its advertisements a verse of Shakespeare dwelling on the value and power of truth and justice. A week later the rioters had a public parade, and one of the signs bore the taunt "Shakespeare never saw a trolley car." But there's where they made their mistake. Shakespeare did see a trolley car, for he seemingly saw everything that was in the heart and mind of man, and he saw and he knew that men and generations and centuries and eons would come and go, and whether men were evil or races failed, the principles of right and justice and truth would prevail. He had visions—the details of the inventions that were to come after are in accord with these visions.

And the visions that were fundamental in him were fundamental in the men who founded this government. They were of the very prophetic soul of the fathers.

Group Insurance for Electric Railway Employees

Most Profitable Investment in Handling of Employees—Has Great Value as Medium for Publicity

BY WILLIAM F. CHAMBERLAIN
Superintendent Group Insurance Division, Travelers Insurance Company, Hartford, Conn.

COMPENSATION insurance and group insurance manifestly differ in objects and results. Compensation insurance obviously provides compensation for employees only for accidental injury or accidental death occurring at occupation and during the hours of employment. Group insurance supplements compensation insurance, giving indemnities to employees for loss of time resulting from accidental injuries which occur away from employment or for any disease, and providing mortuary benefits to the dependents of a deceased employee without regard to cause, time or place of death. Group insurance can be written to afford protection for loss of time resulting from accidents at occupation as well as away from occupation. Where compensation insurance prevails it is unnecessary and undesirable to duplicate indemnities by group insurance.

Group insurance has proved by experience to be in many respects the most profitable investment in the modern method of the management of employees. It is a most satisfactory kind of welfare work because its results are observable. The aims and results of group insurance may be briefly stated as establishing good-will between employer and employee, cementing relations, discouraging misunderstanding and preventing industrial disturbances. It presents a most practical means for employers to show a personal constructive interest in their workers; it is an expression of interest which cannot be conveyed in so great a measure by other branches of welfare work.

Group insurance is a solution of the transient prob-

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lem, especially when the contract is so written as to recognize individual worth and service by continued increase in the insurance. This adhesive influence is accentuated in the employee's home, where the dependents realize the value of the provision for their needs in event of the death of the wage earner.

Moreover, there is a publicity value resulting to the employer. This, of course, is a by-product, but it is of especial importance to utilities where favorable public sentiment is a desirable and valuable asset. A loyal satisfied employee renders the public a better and larger service. The public is interested in everything of economic significance which pertains to large numbers of persons.

There is also a monetary saving to the employee. A comparatively small percentage of industrial employees is insured for either life or accident insurance, for where insurance is purchased by the operative it is usually at a very high cost. Some employers believe that there rests on them the responsibility for arranging for these necessities either in whole or in part by group insurance. This cannot be counted as a substitute for wages, but with adequate wages it may properly be considered as an increase in remuneration.

Co-operation in Fire Insurance

If Electric Railway Fire Insurance Were Controlled by One Central Body the Cost Would Be Reduced

BY E. W. BOWMAN
Supervisor of Insurance Philadelphia (Pa.) Rapid Transit Company

THE subject of co-operation in fire insurance matters was brought to the attention of the American Electric Railway Association in September, 1913, and recommended for consideration at that time. It seems, however, that no action and probably but very little thought was given to it, as it does not appear to have been mentioned in any of the annual reports since that date.

The success of New England men in establishing factory mutuals seems never to have been duplicated elsewhere. Any number of mutual companies have been organized, mostly for the purpose of taking general risks, which for the lack of co-operation in fire prevention and general upkeep have proved practically failures. But no special class of manufacturers or public utility plants has attempted to follow in the footsteps of the New England pioneers.

Statistics from eighteen electric railways in Pennsylvania show the following results for the last five years: Total insurable value, $42,556,404; total premiums paid, $897,460; total fire losses, $90,208, and percentage of losses to premium, 10.05 per cent. If these eighteen Pennsylvania companies had agreed to co-operate at the beginning of this five-year period and had paid the same premium to an insurance board representing all the members the results would have been as follows: First year premium (average), $179,492; less expense (say 15 per cent), $26,924, and fire loss (10.05 per cent), $18,039—$44,963, or a net reserve the first year, $134,529. For the five-year period they would have a net reserve of $672,646, plus interest of $85,154, or a total of $757,800. These figures are based upon the payment of the full premium for the entire five years, after which time a sufficient reserve would have been established to warrant a return dividend at the end of each current year.

It might be said that there is no provision here for a catastrophe which might wipe out all funds on hand. If this fear is dominant, it would seem wise to take another course; *i. e.*, carry the first loss and re-insure all over that amount. Under these conditions large risks are carried at less than one-half the regular rates. The results on this basis, assuming a first loss of $200,000 and a rate of approximately 15 cents, would at the end of the five-year period be a net reserve of $353,473 plus interest of $44,748, or a total of $398,221.

For large quantities of any article better figures can be obtained. This prevails in the matter of insurance as well as in any other commodity. If all the electric railways in Pennsylvania were under one central control in so far as concerns upkeep, fire prevention and general supervision, there would be a prestige and a volume of business which would compel consideration by the rate making bureaus. The reputation for general care having once been established, the insurance companies would soon acquire that confidence which would without doubt result in a lower rating to all interested.

One more point should be mentioned. There is room for a closer co-operation between the mechanical department and the insurance department. All repairs to cars or buildings, all remodeling or building of cars should conform to the rules of the underwriters, even if by doing so the cost is slightly more. It is also well to establish a spirit of co-operation between company engineers and the insurance department whereby the true values of properties can be more nearly obtained. These values, once obtained, will through the application of a unit for depreciation and appreciation produce the real insurance value, which value should be the amount of insurance carried. By the same spirit of co-operation between the insurance department and the insurance adjusters, this unit can easily be arrived at before any loss occurs, thereby preventing any disagreements or delays at the time of loss by fire.

Safety Crusades

How the Work Is Carried On in Philadelphia—Safety Patrol Is Most Efficacious Means

BY BEATRICE V. CLINCH
Safety Bureau, Philadelphia Rapid Transit Company

AT the Ad Men's convention, which was held in this city this year, I learned that it is the spectacular which attracts attention. Hence I have brought with me this afternoon the safety banner which I display in every school room that I visit. Safety first was not meant to tickle one's wits, but to set them to working.

Perhaps the first industrial campaigns were accused of being conducted principally because of the great financial economy to be attained. A safety campaign in the schools has been a gradual but natural development from the industrial phase of the work, and may be an economical procedure in one sense, but its great human side cannot be questioned. The youth of Philadelphia is being trained to caution and not fear and to recognize the dangers on the streets and the perils of modern life. There has been adopted by the Board of Education of Philadelphia this fall a course of civics for children below the eighth grade. Incorporated in this course is the subject "Safety First"—or fire and accident prevention. With this step accomplished it can truly be said we are nearing the goal of safety—everywhere—always.

During the past four years the management of the Philadelphia Rapid Transit Company has been active in urging the safety movement among the children. "Safety first" literature, blotters and stickers have been

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distributed in the schools. Money prizes were offered to the school children for the best stories on accident prevention. In the spring of this year the activities of the company in the interest of the children along this line were extended by having illustrated lectures given in the schools. During the summer months the story-telling hour in the playgrounds was utilized to acquaint the children by means of stories with the perils of the city streets.

Because of the stupendous waste of economic social assets in our city, especially during the summer, due to avoidable accidents, the P. R. T. extended a helping hand to the Play Street Grounds Committee, of which I am a member, which decided upon an aid to the solution of this problem pertaining to children. With the aid of the city departments and the Board of Recreation, play streets were opened. This was distinctly a "safety first" scheme, for it was decided if the children in our city, and especially in the congested districts, could be provided with enough safe places for play there would be fewer accidents on our streets. All people agree that children should play. Still they complain of the monopoly of the street and sidewalks by the children. Times have changed since father was a boy. In his day there were back yards, which meant trees to be climbed, tennis and ball playing, as well as abundance of space for hide and seek. Then there was an occasional stable or shed, which increased the possibilities of a good time tremendously. In the city's congested districts, such a thing as a back yard is almost unknown, there are not enough playgrounds, and the streets are more dangerous than ever before. Owing to the ever increasing traffic, the higher speeds with which vehicles move, the greater multiplicity of street cars and automobiles, and the higher speed of trains, the dangers which confront not only the child, but also the adult, are becoming greater and more numerous. More playgrounds are being opened every year, but until such time as there are enough playgrounds, the Play Street Ground Committee will rope off certain streets to vehicular traffic during the hours from 9 a. m. to 5 p. m. during the summer months. These streets are kept clean and turned over to the children for play. Two experimental streets were opened this year. The apparatus for these two play streets was provided by the Philadelphia Rapid Transit Company, and 21,000 children were entertained under the guidance of teachers. These experimental streets were a tremendous success, and the press of Philadelphia was very enthusiastic about the movement and gave hearty co-operation and splendid publicity.

The future of the safety movement lies with the education of the children. The child of to-day is the patron of to-morrow. The child mind is more impressionable and plastic than the mature mind, and lessons learned have a deeper imprint. At the same time the lessons must be imparted in a way that will appeal to the juvenile imagination. The following is some of the advice and information given to the children:

"To show you how necessary it is to look before attempting to cross in front of a car I will give you an idea of the speed of cars between squares in the city block. In order to enable people to get from one point to another it is necessary for cars to travel fast between squares, as they must slow down or stop at principal streets. Do you know that a street car ordinarily travels at about 12 m.p.h., covering 17 ft. of ground at every tick of the clock?

"It is dangerous to cross in the middle of the square or at small streets as the fast speed of cars at such points will not enable the motorman to look out for you or save you if you dash across directly ahead of his car. If you do this you alone are to blame if you are hurt.

"Persons passing behind standing or moving cars or vehicles should be very careful to look for objects moving in the opposite direction before attempting to cross the other track. The car or vehicle coming in the opposite direction cannot be seen until you cross to the other track, and this is dangerous, so it is best to wait until the standing car has started away so that you will be able to see the other car while you are standing in a safe place.

"I want to point out some of the difficulties which the motormen have to meet. I want to ask your friendly interest in these men. I am sure those who have never had an experience in operating a car can hardly know how hard it is to operate it on a greasy rail. Let me explain. You know how fast you can go over the ice on the narrow runners of a pair of skates, and how your weight carries you on without movement after you have made the start; it is just the same with the car, which weighs many tons and which has only a 2-in. rail to run on which may be greasy or slippy. When you think of the distance you can go without movement on your skates, you should understand why this much heavier car cannot be stopped in a few feet even if it is running slowly. With sand it is possible to stop quicker than without, but it takes time for the wheels to reach the sand after it has dropped on the rail, and the car moves forward during this time and may reach you before the sand takes hold.

"No matter whose the responsibility may be for an accident, what chance has a man, woman or child who has lost an arm or leg in the battle of life when compared with others who are not so afflicted and who are fighting for places worth while? To whom is the keeping of your body most vital, to you or to the motorman of the car, to you or the chauffeur of an automobile?"

THE SAFETY PATROL

Lectures, talks and stories are all good, but the most efficacious means, I believe, is to educate school children through the safety patrol.

The safety patrol consists of from eight to ten boys, selected by the principal of the school, whose duty it is to take up a position assigned them on the sidewalk a few minutes before the assembly in the morning and afternoon; also before dismissal of either session. These boys wear a badge. They are to see that no child leaves the sidewalk except at the main street crossing. This is one way of teaching the children that the main street crossing is the only safe place to cross the street. The patrol members also have duties while children are at play on the playgrounds. They are ever to be alert to aid in the elimination of dangerous practices and unfair play. The benefits of this plan will be the elimination of a great percentage of the avoidable accidents to children, and it will train a citizenry having the safety first movement at heart.

You can help if you will, and even though your part seems tiny to you, all working together it would mean much. The safety first movement is a twenty-four-hour job, and clock watchers need not apply. Also there is no room in the safety movement for the small man, but there is need of the broad-gage man who can see a principle and who is not afraid of his present job. The world was not finished in a day, and the safety first movement will not be concluded in a day. The movement needs many more big men to help, such as those already engaged in the work. Yes, we need more such men, because they are the fellows who believe that the life of the lowliest child is necessary in the onward march of progress.

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Taking Precautions Against Accidents

The Author Points Out Various Points that Are Often Overlooked in Safety Work

BY A. G. JACK
Claim Agent, Southern Pennsylvania Traction Company, Chester, Pa.

WHILE there are many accidents over which electric railways have no control, there are others against which precautions may be taken, some of them apparently trivial. Careless or indifferent inspection is one cause of a number of minor claims which in a few years cost an appreciable amount. The innocent little tack and the projecting screw rend the passenger's clothing. A projecting bolthead catches the skirt of an alighting passenger and she is thrown off her feet. A shopman forgets to remove the impress of his greasy hand from the car seat, and it is shortly transferred to somebody's garment. An insecure grab-handle yields to the stress of a weighty person. Trap-door rings and floor screws, unless closely watched, stick up and catch the prevailing high-heeled shoes with danger of a spill. Stopped-up sand boxes and faulty gong-taps have contributed to more than one accident. The faulty controller has been a fruitful source of injury and consequent damages. These and similar oversights could readily be avoided by closer attention.

In this connection attention is called to the hazard of a metal roof on steel cars. Even though provided with a wooden foot board, the possibility of current contact through a misstep is always present to employees obliged to go on the roof for trolley trouble. A wooden roof is a much safer construction and should be provided.

The average trackman, while he may have a good eye to the general condition of his track, is often proverbially blind to many minor details of safety. Ruts along the rails should not be allowed to exist until a horse catches his foot or a wheel gets twisted. The projecting ends on an unused track should be so protected that a wheel could not get caught. Unsafe culverts should be repaired before something goes through. Temporary crossings over track construction should be made "fool proof," and all openings should be guarded. On bad grades all grass should be cleaned from track, leaves kept off and track sanded regularly in the autumn if the topography makes dangerous conditions. At all regular stops plank or cinder platforms to make a safe landing are a paying investment. A wooden marker, painted white, placed at either end of platform to indicate the position of the front of the car when at rest, aids the motorman so to stop his car that passengers alight safely. A desirable safeguard, especially for new men, is a white band painted on poles a certain distance from curves and switches.

A conductor does not have to learn any long set of rules to avoid accidents for which he is responsible, but only has to have present always the thought, "Watch your step and watch the bell." Similarly, passengers can be injured by the acts of the motorman in only one of the two ways, either by being thrown in the car by careless operation or by collision. Therefore, if the motorman heeds the admonition, "Watch the controller and look out for curves," he will eliminate injuries to passengers from the first cause. As to collisions, carelessness alone is responsible for most of the rear-end and right-angle ones. The only precaution possible is the knowledge acquired by experience and practice. In the case of the front-end collisions there enters the human element, over which there is no control. This would seem to be a situation where precautions are unavailable.

The question of precaution against vehicular accidents is one of the most serious problems. The placing of warning signs at railway crossings should be more general. Furthermore, municipalities regulate by ordinance the speed of vehicles on the streets and often prescribe a certain speed for trolley cars at intersections, while the state makes a certain speed legal on the highways. Why, then, should not certain requirements as to the speed of vehicles at all track crossings be made a state law? Such an enactment would be the most efficacious precaution that could be taken.

One contributing cause to many vehicular accidents is the pronounced indifference of motormen to use the gong or whistle. In many cases no alarm is sounded until just as the collision is about to occur, and then it is too late as a precautionary measure. Another contributing factor is the proneness of trainmen to discuss affairs at the front of the car, so that in an emergency the motorman is not on the job until too late.

A Safety-First Week Held in Richmond, Va.

Under the auspices of the Boy Scouts, a safety-first week was conducted in Richmond, Va., from Nov. 6 to 11, according to the plan mentioned by C. C. Johnson of the Virginia Railway & Power Company, at the National Safety Congress. This was referred to in an article in the ELECTRIC RAILWAY JOURNAL, Oct. 23, 1916.

The scouts patrolled every busy corner, distributing circulars and helping old people and small children across the streets. About 75,000 circulars were given out, among the most effective being a list of "Little Tragedies" comprising epigrammatic stories like the following: "He speeded up to see if he could beat the train to the crossing. He couldn't." "The man struck a match to see if the gasoline tank was empty. It wasn't." The school children were given circulars, and lectures with moving pictures were presented at the high schools, including a demonstration, by members of the fire department, of the correct method for sending in an alarm. The Virginia Railway & Power Company aided the work extensively by placing signs on the cars, distributing pamphlets and devoting the week's issue of their publication, *Public Service News*, to safety-first topics. The police department adopted a new system of traffic regulation at corners, lines being painted across the street to indicate the proper path for pedestrians and the proper stopping point for vehicles. The Richmond Automobile Club contributed to the work by pasting on the wind shields of all cars paper pennants bearing the safety-first motto. The newspapers indorsed the movement and helped to impress the public with its important purpose.

Standardization of Electric Motors

Among other activities of the Electric Power Club, through which the manufacturers of electric motors work toward standardization, a table of shaft diameters, keyways and certain tolerance limits for machining dimensions of large power motors was recently adopted as a standard for future design. A table of brush standards has also been adopted. The specifications for nameplate marking for large power motors were revised so as to include temperature and overload guarantees, and the allowable change in speed due to heating on fully inclosed direct-current motors was put at 15 per cent as compared with 10 per cent which is allowed for open or semi-inclosed machines.

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Transporting the Third Wisconsin Infantry the Electric Way

Chicago, North Shore & Milwaukee Railroad Carries 762 Troops from Fort Sheridan, Ill., to Milwaukee, Wis., with Comfort and Without Delay

IN open competition with the steam railways interested, the Chicago, North Shore & Milwaukee Railroad obtained the contract by the quartermaster, Central Department, United States Army, for transporting troops of the Third Wisconsin Infantry from Fort Sheridan, Ill., to eleven points in Wisconsin in conjunction with the Chicago, Milwaukee & St. Paul Railway beyond Milwaukee. The electric line was the low bidder on these eleven points out of seventeen destination points in Wisconsin, on which bids were called for in the general circular of Dec. 6, advertising for sealed proposals in supplying transportation to this government. In all, the electric line handled 762 out of 1036 officers and troops, requiring twenty-one passenger cars and nine cars of baggage. The latter was moved principally on the night of Dec. 13, in advance of the troop movement on Dec. 14, when a train of seven box cars of baggage and a caboose with an escort were hauled to Milwaukee by an electric locomotive. Two cars of baggage followed the next morning.

The troops were handled with no delay or crowding in the all-steel and best equipment owned by the company. Only forty men were carried per car in order that there might be plenty of extra seats in the fifty-passenger cars for the luggage and equipment of the troops.

The troops were paid off in the quartermaster's department at Fort Sheridan and released a company at a time. They marched by companies out to the station and boarded the cars, and as fast as a three-car train was loaded, it was pulled away and dispatched to Milwaukee. This eliminated all delay, so far as the electric line was concerned, for the soldiers were carried on their way as rapidly as released. But three cars to the train were run, since this number could be taken to the unloading point in Milwaukee without breaking up into sections. The troops were unloaded from the cars on the sidewalk only one-half block from the St. Paul depot in Milwaukee and the cars were removed as rapidly as unloaded so that no delay resulted to following trains or regular traffic. That the movement was prompt and conveniently suited to the rate of mustering out of service is indicated by the following table giving the time the various three-car sections left Fort Sheridan and arrived at Milwaukee:

A COMPANY OF THE THIRD WISCONSIN INFANTRY MARCHING TO STATION TO BOARD ELECTRIC TRAINS FOR MILWAUKEE

Left Fort Sheridan	Arrived at Milwaukee
10:02	11:30
10:35	11:51
10:54	12:36
11:35	12:47
12:30	1:59
12:54	2:20
1:54	3:35

The handling of baggage was facilitated at Fort Sheridan by the use of two motor-truck moving vans supplied by the electric railway company to transport the baggage from the fort to the railroad. The basis of competition to the railway company for the transportation was $1.15 per capita less 8 per cent, and the distance from Fort Sheridan to Milwaukee was approximately 60 miles. This represented a substantial saving to the government over the lowest bid of the steam railroads.

Negotiations between the electric line and the War Department were conducted by F. W. Shappert, traffic and industrial agent.

Particular significance is attached to the securing of this business, as it is said to be the first time an electric line has been able to run the gantlet of opposition and break down the barrier which has apparently been placed between the regular army officers and the electric railways.

When interviewed by a representative of the ELEC-

SEVEN-CAR TRAIN OF BAGGAGE WHICH PRECEDED THE TROOPS ON HOMEWARD TRIP

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TRIC RAILWAY JOURNAL, A. D. Kniskern, colonel, and K. J. Hampton, major of the Quartermaster Corps, Central Division, United States Army, responsible for the troop movement, said that the service had been entirely satisfactory, that the movement had been made smoothly and with no delays and that so far they had received no adverse comment in regard to the movement of the troops from any of the field officers.

Second Annual Convention of Safety First Federation of America

C. Loomis Allen Reported for Committee on City and Interurban Railways and James R. Pratt Presented the Street Railway Point of View

UNDER the auspices of the Safety First Society of Baltimore, Md., the second annual convention of the federation was held in that city Dec. 7-9, 1916. There was a business session on the morning of Thursday, Dec. 7, a discussion on street traffic on the afternoon of that day, a discussion on the railway trespass evil on Friday morning, and a discussion on fire prevention on Friday afternoon. The Saturday morning session was occupied with several topics including that of city and interurban railways, which was covered in a report by C. Loomis Allen, chairman of the committee on this subject. James R. Pratt, assistant general manager The United Railways & Electric Company, Baltimore, Md., also addressed the convention on "The Safety First Movement from the Street Railway Point of View."

REPORT OF COMMITTEE ON CITY AND INTERURBAN RAILWAYS

Mr. Allen reported that the greatest task before the committee at present is a comprehensive investigation of the following: (1) The laws and ordinances enacted by various municipalities to reduce accidents on and by electric railways, both city and interurban. (2) Means of co-operation between railway companies, civic authorities, and other bodies looking toward the education of the public in the matter of street accident prevention.

The committee recommended that for the ensuing year it take up definitely the following lines of work: (1) Obtaining ordinances and laws governing the movement of electric cars. (2) Careful study and analysis of these ordinances and laws, which should point clearly the desirable features which make for safety of passengers, employees and pedestrians, as well as pointing out the undesirable and dangerous features of these regulatory ordinances. In this study the experience of public officials, as well as operating officials of electric railways should be ascertained. (3) From this study it may be possible to arrive at certain fundamental principles which should govern the framing of codes.

The committee also recommended that as a means of bringing about a better understanding of methods of educating the public it communicate with chambers of commerce, and city and interurban street railway companies which have conducted safety first campaigns, and that, from the data thus obtained there be compiled a simple set of suggestions which might be of service to such organizations in the future.

In gathering data as above, attention should be given to the following: (1) The value of chamber of commerce leadership in this field as compared with leadership by the railway company itself. (2) Use of boy scouts in campaigns. (3) Use of motion picture theaters. (4) Use of local newspapers. (5) Use of schools. (6) Use of posters, blotters, stickers, etc. (7) Actual subjects to be taught, including use of crosswalks, use of safety zones, elimination of "jay-walking," elimination of trespassing on interurban railway property, teaching children the danger of hitching on the street cars and other vehicles, teaching children the danger of coasting across tracks, teaching children the danger of roller skating and of using coasters on down-grade streets across which cars operate, and right and wrong ways of boarding and leaving cars.

SAFETY FROM THE STREET RAILWAY POINT OF VIEW

Mr. Pratt first called attention to the accident risks which are inherent in the use of the street by electric railway cars, illustrating his point with numerical data. In Baltimore, for example, there are at least 1,500,000 boardings and alightings each day. Transportation companies long ago realized the weakness in the average person in failing properly to safeguard his movements while endeavoring to gain a few seconds of time. It therefore devolved upon the companies to surround their patrons with such safeguards as would in a measure offset this carelessness.

Among the many ways in which the electric railways are striving to reduce the number of accidents he mentioned the care with which platform men are selected, instructed and followed up; the safety committees which are endeavoring to stimulate watchfulness; the improvements in car equipment from the safety standpoint, etc. At the same time an endeavor has been made to impress the public with its part in accident reduction.

In illustrating the influence which automobile traffic has had upon street accidents, Mr. Pratt quoted from the Atlantic City paper by H. G. Winsor, in which a statement was made that whereas in 1910 there were 414,678 automobile registrations in twenty-six states, in these same states in 1915 there were 1,186,116 registrations, an increase of 355 per cent. He believed that the prevalence of street accidents from automobiles is due to rapid running over street crossings, and that no vehicle should have a superior right over other vehicles at street intersections, but that all should be required to operate with due regard for the rights of others.

Among other traffic regulations which Mr. Pratt considered would be conducive to safety, the following may be mentioned: In congested districts vehicles should not be allowed to stand on streets upon which street cars are operated except for a very limited time, say fifteen minutes. In such sections, when conditions permit, one-way operation on certain streets should have a good effect. In the licensing of automobile drivers the ability of a person to handle an automobile should be put to a higher test than that of his own judgment. All persons should be willing to supplement the efforts of the employees of the motor vehicle commissioner by reporting violations of the law which come to their notice. Pedestrians should not be permitted to cross public highways in the large cities in the middle of the block but should be limited to street crossings, and should be considered not to have discharged their duty when they have looked in both directions upon leaving the sidewalk, but should be expected to continue to look not only in front, but both to the right and to the left in crossing public highways.

In closing, Mr. Pratt stated that The United Railways & Electric Company has adopted as its slogan the following: "The United spirit stands for safe service—courteous service—efficient service."

RELATIONS WITH THE NATIONAL SAFETY COUNCIL

While at this convention no final plan of co-operation with the National Safety Council was adopted, the matter was very carefully considered. The federation has expressed its willingness to meet the Safety Council at least half way, and it is hoped that some plan of co-operation may be worked out in the near future.

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Chicago's Traction Commission Report Transmitted to Council Committee

Completed Main Report Places Valuation of Elevated System at $70,400,916 and Total Purchase Price to City of Elevated and Surface Lines at $217,876,417—General Plan of Financing Given—Terminable Franchise Recommended with City Council Control and Rate of Return Fixed Between Limits of 6 Per Cent and 8 Per Cent—Traction Fund to Be Put Into Property with Interest Return at 6 Per Cent—New Legislation Recommended as Necessary to Plan

THE main report of the Chicago Traction and Subway Commission authorized by the ordinance of Dec. 20, 1915, was completed and transmitted on the afternoon of Dec. 20, 1916, to Alderman Henry D. Capitain, chairman of the City Council committee on local transportation. The supplement to the report, which will present all the supporting detailed studies and analyses, is not yet finished, but the signed report as presented at this time gives the recommendations and plans of the commissioners as to final conclusions and serves to put the entire matter before the City Council. The final plans arrived at by the commissioners involve and are based on three fundamentals:

1. A physical plan of transit development covering elevated and surface lines and future subways.

2. The unification of these facilities along lines of maximum economy in construction and operation; and

3. A financial plan "based upon the present valuation of the surface lines and the valuation to be made of the elevated lines," which will present to the people of Chicago as accurate a prediction as possible of the probable results to be expected in the future if the commission's recommendations should be acceptable to both the city and the companies and put into effect immediately after the necessary legislative enactments have been secured to effect such a permanent and efficient consolidation.

The report takes up not only the traffic requirements upon which the proposed physical plan of surface line, subway and elevated development is based, but also the existing limitations—legal, financial and operative—with which both the city and the railway corporations are now handicapped in the execution of the desired plan. The commission has also considered the reasonable limitations of excessively rapid development of the transportation facilities in Chicago as compared with other cities, in order that the difficulties elsewhere encountered in transit development and finance may be avoided in Chicago and a reasonable, logical and efficient system be thereby assured for years to come.

The specific recommendations of the commissioners and their findings are intended to form the basis of an enabling ordinance to be passed by the City Council, under which the proposed unification may be carried out in accordance with amendatory legislation to be secured from the State Legislature. It is contemplated that this ordinance will cover in detail all of the provisions necessary to render secure future operation of the plan from both the viewpoint of the city and of the new corporation. This is, of course, in accordance with the City Council's instructions that the commissioners "shall consider fully the financial, economic and engineering aspects of the problem, having in mind the present and future transportation needs of the city."

PRESENT SYSTEM

Area covered (within city limits) .....199 square miles

Miles of track.....1109.36

Passengers carried per day.4,060,000

Per cent of passengers carried in rush hours.....Over 50 per cent

Average length of haul on surface lines .....4.16 miles

The problem confronting the commission presented in some respects unusual difficulties due to the conflict on the one hand of the demands for improved transportation from every part of the city and, on the other, to the great area to be covered and the limitations of revenue from the thinly settled areas. At present, the 199 square miles of area included within the city limits contains 1109.36 miles of revenue single track (surface and elevated), and the normal daily traffic over the elevated and surface lines of the city is 4,060,000 passengers, of which 2,520,000 are cash and 1,540,000 are transfer. In addition, 157,000 steam and electric suburban passengers are carried to and from the suburbs of the city daily. Of the 4,060,000 elevated and surface line passengers, more than 50 per cent require transportation during the morning and evening rush hours, and 25 per cent of these travel to and from the loop district. With these conditions existing, the problem calls for a solution quite different from that which would be possible and practicable in a city more compact and densely settled and developed along a comparatively limited number of transportation routes.

The solution of the problem presented by the commission aims to abate the present loss from duplication which results from the competitive operation of the surface and elevated lines by encouraging a readjustment of traffic which will give to each system the passenger haul which it is best adapted to serve and thus convert the saving into additional service. At present it is found that the approximate average haul on the surface lines for a single fare—4.16 miles—is fully as long as the average passenger haul on the New York elevated lines which are primarily designed for long haul rapid transit.

In the determination of its findings the commission conducted very extensive traffic surveys in order to locate accurately the entire 2,500,000 residential population of the city, the origin of over 350,000 employees in the city's offices and factories, the actual routes of travel followed by over 500,000 elevated passengers, and the approximate routes of 1,500,000 surface line passengers. The destination of about 50,000 electric suburban passengers and 107,000 steam suburban passengers residing within an hour's ride from the center of the city were also located. Having in mind both the results of these surveys and the existing conditions by

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which the passengers are more or less arbitrarily directed—along existing routes of travel, as well as the financial and other considerations, the commissioners arrived at the physical plan which was set forth in the ELECTRIC RAILWAY JOURNAL of Dec. 9, 1916. The nine-year initial construction program there outlined involved a total expenditure of approximately $100,000,000.

The development of the financial plan hinges upon the unified operation of surface and elevated lines and subways under one management by a single corporation organized to take over the existing lines and construct future extensions thereto. It is also dependent upon new legislation which will permit the formation of the new corporation comprising all present transportation companies and make it possible for existing companies to surrender all present definite franchises and receive in lieu thereof a franchise to the new corporation terminable at any time by city purchase, by amortization or by forfeiture if the corporation fails to comply with the provisions of the ordinance. Legislation is also required to permit the city to grant such a terminable franchise and to empower the city to purchase the combined properties of the new corporation at any time in the future. Further legislation is needed to empower the city to procure the consent of abutting property owners where needed to carry out the extensions recommended in the report.

The commissioners' recommendations in connection with the financial plan include the provision whereby the partnership management now existing between the city and the surface lines under the 1907 ordinances shall be extended to include the elevated roads so that the city shall have a share in the divisible net receipts of the rapid transit lines on the basis of 55 per cent to the city and 45 per cent to the corporation. The city's traction fund is to be used for the construction of subways which are to be owned by the city in fee from the start. The city's share of future divisible net receipts should be applied in such a way as to facilitate acquisition of the properties by the city. It is planned that the present traction fund and all additions to it shall be invested on the same terms as new capital furnished by the corporation at the same time, except such parts as the city may find it expedient to invest under authorization of a board of control in urgently needed facilities which will not produce directly a definite revenue, such as street openings over or under rivers, railroad yards, parks, public utility galleries, etc.

The commissioners recommend that the corporation should receive 6 per cent on its present certified investment, consisting of a combined valuation of the existing surface and elevated properties as fixed and specified in a new ordinance to be drawn and based upon the commission's valuation of the elevated lines and the existing purchase price of the surface lines. This investment is to be ultimately reduced by amortization or otherwise under the financial plan adopted. On new money, the corporation should receive the actual interest paid by it on all obligations issued to raise such new money as may be authorized by a board of regulation and control, this provision applying to refunding as well as to existing and new securities.

Provision is made for the establishment of an amortization fund which will act to reduce progressively the outstanding valuation or purchase price to the city, comprising both old and new investments. This fund would be increased from time to time by such portion of the traction fund as was not required for new construction, and by any excess of the corporation return over 8 per cent, as described below.

The rate of return to the railway corporation is planned to be confined between the limits of 6 and 8 per cent on its then investment in road and equipments by an automatic provision in the financial scheme which provides for cumulative reductions in the corporation's interest and share so that its return shall never exceed 8 per cent. Any excess that may be earned over and above 8 per cent is to be paid back into the amortization fund. Such use of the traction and amortization funds is recommended as will establish a practical and feasible method of ultimate acquisition of the entire local traction system by the city, without necessarily burdening the taxpayers with additional mortgage indebtedness for transit construction.

The financial plan provides that on the new capital to be furnished only the interest actually paid is to be allowed. The commissioners recognize that the ordinary commercial risk of the business is, of course, one that falls on the railway corporation, and that there must be an opportunity for profit as an incentive to economical operation and for a margin to provide against catastrophe. It is accordingly recommended, in order to furnish protection against other risks, that the franchise should provide no burdens, such as orders for the construction of new lines, the imposition of additional taxes, or any other requirement on the part of the city, which would so reduce the corporation's share of the divisible net receipts that it would fall in any one year below 1 per cent of the gross receipts. If any deficit results, either to the city or to the corporation in the payment of their respective shares of the divisible net receipts, this deficit is to be carried forward and made up to the city or the corporation out of the subsequent divisible net receipts of following years, after the payment to the corporation of its minimum of 1 per cent of the gross receipts. In the event of such a deficit, the recommendations provide that it shall be the duty of the board of regulation and control to impose an increased charge for transfers between the surface and the rapid transit lines sufficient to make up this deficit. This charge may be reduced or abolished by the board of regulation and control when, in its judgment, the earnings have so developed that the full minimum payment of their respective shares can be paid to both the city and the corporation.

The full details of this financial plan and careful analysis of its operation are withheld for a later issue of ELECTRIC RAILWAY JOURNAL, when the final checking shall have been completed. The plan comprises some new and extremely interesting features which will be later carefully treated.

The necessity for new enabling legislation arises from the fact that the elevated roads and the surface lines are organized under state and city authority respectively, and consequently cannot be merged without new legislative grant. Also, the existing legal conditions whereby a single property owner has the power indefinitely to obstruct needed public improvements by refusing frontage consents, even though the work may be an essential element or link in an improvement affecting a large part of the city, makes legislation in this respect necessary.

Further, in order to enable the railway corporation to raise the large sums of money needed for the recommended improvements and to sustain its credit to permit the financing of future extensions, it is recognized that the franchise situation must be placed upon a more assured basis than at present. With the surface lines' franchises expiring in ten years and the elevated franchises expiring in various periods from thirteen to twenty-eight years, and in view of the uncertainty of the city being able to purchase the surface line properties in 1927 without further legislation, the commissioners recommended as the most practicable course open the surrendering of all present franchises and the

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issuance of a new franchise in which the equalization of franchise terms would be automatically brought about. The terminable type of franchise was determined upon by the commissioners as the only one which would avoid the financial embarrassment usually encountered at the end of a short-term franchise, or at some future time near the end of a long-term franchise, and at the same time secure to the city the legal right whenever it elects to take over the properties at any time upon a basis fair and equitable to both parties, should the city desire to acquire the properties or should the companies fail to fulfill the terms of the franchise grant.

The commissioners have recognized that the value of the purchase clause is in effect nullified to a large degree when the city finds itself unable to pay the agreed purchase price by reason of the debt limit imposed upon it by law. This is the situation which confronts Chicago at the present time, and unless the future debt limit is raised by legislation, it would also be the case in all probability ten years hence when the city would be confronted with the alternative of purchase or extension of the 1907 ordinance term.

AMORTIZATION AND REGULATION

These difficulties are believed by the commissioners to be met in the terminable form of franchise grant recommended, when combined with the amortization features above enumerated, which for the first time will then become a new element of the utmost importance in securing the financial and operating stability of the Chicago traction properties. This amortization is brought about in two ways: first, by the regular amortization fund to which annual payments are made prior to the division of net receipts, and second, by the investment back into the traction property of the city's entire traction fund with its annual additions and interest for which no new actual obligations would be issued for it. That is, all traction fund investment by the city representing prior contributions from the revenue fare will continuously operate to reduce the purchase price to the city below the total investment in the traction system, without adding additional mortgage liabilities or burdens upon the taxpayers for construction which would otherwise have to be financed by the companies themselves. The amortization fund alone will retire a very considerable proportion of the outstanding investment within the next twenty years. Thus it appears that Chicago's foresight in establishing and conserving a traction fund, which by the time the actual subway construction begins will approximate $21,500,000, will result in the possibility of automatically transferring to the city within a reasonable term of years the entire equity of the entire Chicago traction properties, including subways and further extensions, so that acquisition by the city will eventuate in fact as well as in theory.

The commission finds that "a reasonable forecast of the results obtainable under this financial plan indicate that by about 1937, or at the end of twenty years, there will have been amortized actually or in effect nearly $120,000,000 of investment, or about 30 per cent of the then total investment in combined properties. The continuation of this forecast indicates that about 1947, or in thirty years, not only will all of the additional capital furnished by the corporation as contemplated in this report be paid off, but the operation of the amortization fund and the city's traction fund will probably begin to reduce the original 1916 valuation of the combined properties; and * * * * possibly by the year 1960 the whole of the corporation's then investment will have been retired. The city of Chicago would then become the actual owner in fee of a combined system of subway, surface and elevated railroads which, in accordance with the orders of a board of regulation and control, and the provisions of the ordinances, will have been maintained at full efficiency and will have cost about $490,000,000, which the city can then operate or lease to an operating corporation as public opinion at that time will determine."

After considering various methods of insuring the city its full rights in all administrative matters, the commission concluded that a non-political board of regulation and control, organized largely along the lines of the existing board of supervising engineers (under the 1907 ordinances), but with added duties and powers, would best fulfill the needs of the situation in carrying out the provisions of the proposed ordinance. This board would also be empowered to administer the manifold details of finance, organization, construction, service and extensions, "reserving to the City Council such general authority as it should retain." This board, thus clothed with the necessary powers of enforcement would order into execution and supervise the various steps in the construction plan outlined in the report or such amendments thereto as the development of the city might require. It would ascertain and certify to the cost of the corporation's investment, pass upon the obligations issued therefore, certify to the city's investment, supervise plans and specifications, exercise general powers of supervision and audit over the corporation's account, regulate the transfer charge, order on its own initiative such expenditures for road and equipment as necessary or appropriate for furnishing proper service, and report to the City Council on request as to the reasonableness of service ordinances which might be pending therein. The commissioners contemplate that the enabling ordinance specifying the powers of this board will confine its provisions to the fundamental questions covering construction, operation and administrative matters of a contractual character, leaving to the board the decision on all points, the character of which necessarily will vary from time to time.

In making the historical study of the values of the elevated system, the commissioners were largely confined to the book accounts of additions, extensions, betterments and rehabilitations since the beginning of actual operation. In the absence of the original cost of acquiring the rights-of-way, it was impossible to trace the financial development of the properties from the beginning of operations to the present time. The only direct course open, therefore, was to determine and start with the cost to reproduce new the properties as they exist to-day and then deduct the accrued depreciation to arrive at the present value. By this process, and omitting many details which will be presented later upon the completion of the supplement to the report, the commission arrived at the valuation for the elevated properties as they exist to-day, and placed the figure at $70,400,916. This is recommended as the "agreed purchase price" to the city to be combined with the purchase price of the surface line properties which is $147,745,501, as of June 30, 1916, in both cases, to make the total purchase price for all local traction properties to be written into the proposed ordinance $217,876,417.

"So far as the surface lines are concerned the method of determining the purchase price was fixed by the existing ordinances, and the ordinance appointing the commissioners direct that it accept this valuation." In the financial negotiations between the companies "the commissioners do not attempt to fix the amount of $70,400,916 as the proper basis of adjustment of values between the companies themselves, but only as a part of the total purchase price to the city of $217,876,417, the commissioners' function being to see that the total purchase price is fair to the city and not unjust to the companies."

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Light and Power Accounting*

Interesting Subject, and Electric Railway Accountants Will Be Better Executives for Studying It

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WHEN it is considered that this paper on electric light and power accounting is presented before a body of accountants identified with the electric railway industry, it assumes an especially important aspect. It is another indication of a growing tendency on the part of various associations to broaden out and absorb some of the things closely akin to their own profession or work that may have been neglected, largely because no particular immediate need has been felt for information along such lines. During the last five years many such changes have been brought about. In the parent association we have as examples various committees, engineering-accounting, transportation-accounting, etc., that were born of the necessity of knowing something more than mere "railway accounting." We must also have, however, a knowledge of "electric lighting accounting," and other companies doing a freight and express business must have accountants of still broader experience in "freight and express accounting." We might even point out that, as a requirement of the future, the far-sighted accountants wishing to progress to the "seats of the mighty" will absorb a fair knowledge of "engineering."

The principal difference between railway and electric lighting accounting was described by one of our collectors of bygone days. He said: "In the railway business you collect your money before you render any service, but in the lighting business you extend the customer liberal credit and then play tag with him until you get him in a corner, and he pays you, usually under protest." This is, no doubt, the viewpoint from the collection department, but it is not the true difference as far as the general subject of accounting is concerned. The same fundamentals apply in both cases, but the details vary.

The old way of computing lighting bills by hand has given way to a more efficient method of comptometer calculating. The ledgers are posted, both debits and credits, by a bookkeeping machine which automatically carries over the unpaid balance. The bills are turned out neatly, quickly and uniformly by the Addressograph and Burroughs billing machines, which print both the body of the bill and the duplicate stub with one operation. The more mechanical the operation, the greater is the efficiency of the operators, a factor that is of prime importance at this time on account of the scarcity of clerical help. Moreover, the more mechanical the work, the lower is the standard of experience required, with a corresponding saving in the cost of operation.

This last may seem like a broad statement, but it can be proved by referring back to the days when all the office work was, with the exception of letter writing, done "by hand," so to speak. The general books were kept by a man, usually one of the oldest in the department, and the young clerk who had the opportunity of posting journal entries, to say nothing of preparing them, after two or three years of service, thought he had reached the pinnacle of fame. At the present time, by the careful selection of employees and the proper routing of work, the thinking element is transferred to suitable clerks hired and trained for the purpose of thinking, while the routine work is turned out by clerks whose efficiency is high because they are not required to puzzle their brains over problems that break into the routine of their work.

*Abstract of paper presented at meeting of Central Electric Railway Accountants' Association in Cincinnati, Ohio, on Dec. 9.

The details of light and power accounting are rather more complicated than those of railway accounting. A complete and revised-to-date history must be kept of each consumer, of the dates when the meters were set and removed from his premises, of the make, type, number, etc., of the meters. Similar information must be kept for transformers, some companies handling all data on meters and transformers through the same department.

A customer's file, in which is kept all correspondence and records pertaining to the account, complaints, adjustments, etc., is quite necessary. The data so compiled must be available for instant use, as customers have a habit of calling on the 'phone and asking questions that must be answered or explained at once. If you call up your butcher or grocer about an error or discrepancy in your account, he may safely say that he will have the bill checked and report to you later on, but this procedure will not do for the average lighting customer.

Better results are obtained if the subject in question can be explained at the time the inquiry is made, and the customer made to feel that he is receiving attention and consideration. The company with which the writer is connected makes a typewritten report of each complaint, and when this is adjusted, the full data are attached so that a complete record of the customer may be kept. This permits of comparison of the departments by months and is a valuable guide to ascertain how the different departments are progressing, for it must be borne in mind that no matter how efficient the different units are working within the company's organization, the work is for naught if the customer is dissatisfied.

Meters must be routed and accounts arranged in sequence, so the same account will be read as nearly as possible on the same day each month, and collections must be systematically followed in the same way. Many companies sell washing machines, portable lamps, flatirons, toasters, vacuum cleaners, etc., on the installment plan, and care must be taken to insure collections on schedule time.

Costs may be kept by groups that will be found of great value in determining whether or not it is advisable to make extensions to serve other groups. Moreover, to comply with many franchise conditions requires accurate and detailed costs, for without full and sufficient data it is a guess as to whether or not the requirements can be met and leave a profit to the company. Many railway companies, too, are supplying light and power to small groups of customers along their lines, and this class of business is expanding very rapidly. The gross income from this class of business in many instances seems hardly sufficient to warrant keeping separate costs, yet if such costs are kept, in accordance with the uniform system of accounts promulgated and issued by the National Electric Light Association, the results will amply repay for the time spent.

The lighting and power business generally requires more statistics and is subject to greater exactions along certain lines than railway accounting, but the basic principles being the same, it is not a serious problem for the accounting officers of interurban roads especially to become familiar with light and power accounting methods and problems. Many of them have use for such knowledge in connection with the extension of lighting service into the small towns in their territory. Aside from being quite necessary in many instances, however, it is an interesting subject to study and electric railway accounting officers are better executives for knowing accounting methods so closely connected with their industry. The lighting and power field offers much for the student in efficiency and office management.

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COMMUNICATION

Converting Indifferent Passengers into Loyal Customers

PHILADELPHIA, PA., Dec. 20, 1916.

To the Editors:

I am glad to notice the attention which you are giving by cartoons and otherwise to the subject of public relations. In this day when manufacturers and merchants steadily strengthening their businesses by improving service to customers, why is it that some electric railway companies still handicap themselves by methods which efficient commercial men have discarded?

To the executives of such railways obviously it is not apparent that they are marketing transportation with an attitude toward their passengers unpleasantly similar to that which prevailed years ago among merchants, namely, "We have the goods, you can't get them anywhere else in town, and the price is so much." Such merchants trained their salesmen to meet customers by acquainting them rather thoroughly with the stock, drilling them on price-ticket symbols and saturating them with fear of a hundred penalties devised to prevent mistakes in sale checks, shortages on inventory and what not. So the railways to which I refer train their conductors by teaching them something about a trolley car's construction, drilling them in handling money correctly and rapidly and impressing upon them a bookful of rules (with penalties) about ringing up fares, seeing that everyone is safely aboard before starting the car and getting the names of at least three witnesses every time the slightest accident occurs. So also do they show the motorman how to operate the car with maximum safety and how to make his time with minimum wear on the expensive machinery.

When a customer of the old-time store expressed dissatisfaction, the merchant's first move was often to see how that complaint could be most skillfully smothered. Railways are still smothering complaints, often politely, it is true, and the "investigator" who can secure signatures of "eye-witnesses" or injured persons to what seems an airtight accident statement is still a valued employee, notwithstanding the ventilation frequently given such statements when a damage suit jury retires to discuss the case.

Well, what has an electric railway—intrenched behind a long-term, exclusive franchise—to gain by spending some money to supply genuine service with its transportation; to wear an every-day attitude toward its passengers like that worn to-day by a great retailing corporation whose president, one afternoon, telegraphed each of thousands of salesmen this amazing question: "Have you said 'thank you' to every customer to-day?"

Mr. Average Citizen can answer the question. Suppose I, the average citizen, depend upon electric cars to ride the 3-mile distance between my downtown office and my home in some attractive residential section. My family must use the cars, and we all ride down to the theaters. We use the interurban when we spend a Sunday with friends in the next town. If the railway company seems to be running cars with reasonable frequency, regularity and speed; if the cars are comfortably warmed in winter and sufficiently lighted on dark afternoons to give me a chance at the evening paper, I probably will stand uncomplainingly when all seats are taken, but I shall feel no interest in the railway company.

Now, suppose my evening newspaper commences publishing a monthly statement about traffic on the system as a whole—a moderate-sized advertisement over the signature of the railway company's president. The statement is so simple, clearly set and prominent that I cannot help reading it. By figures and interestingly written information I am frankly told about the volume of business done during the month just ended, and why the service given was the company's best.

Likely as not I see that statement shortly before I reach my corner. Its favorable impression lingers as I press the signal button opposite me and start pushing through the crowd toward the rear door. If the conductor holds his car ten seconds for me to get off, instead of starting the moment those who were actually at the door are on the ground, thus carrying me a block past my corner, I cannot help linking that obliging act to the company's advertisement. If he smiles instead of saying sharply, "Lively, please," that, too, makes an impression.

Suppose, also, when I reach home my wife relates how she and other passengers traveling to the next town that day on the interurban were compelled to walk several hundred feet where repair work was in progress, and that the only reason she reached her destination in presentable condition was that a rough plank walk had been built above the mud by the company. Her story recalls to my mind an advertisement in the morning paper announcing that in the interests of safety and time saving the company would commence that day to straighten and renew a certain stretch of track on the line in question, but that meeting schedules and transfer facilities had been so arranged as to give passengers no more than slight delay and inconvenience.

Suppose I continue noticing that this company's employees almost invariably serve as if they felt pride in their efficiency and courtesy; that every little while its president had something to say about its administration; that I learned from a merchant friend how fairly and frankly the company dealt with him in adjusting his claim for a smashed delivery wagon, while not neglecting its own rights in the matter.

Now isn't it reasonable to presume that the average citizen would respond to a railway policy expressed through many such examples as those just mentioned? Often enough he has selected for his patronage one out of several good stores because he likes its policy, and he speaks of it with pride as a credit to his town. Should he not feel the same way about his electric railway system?

Isn't it logical to suppose that, having gained his good-will, the railway company can borrow his money upon proper security and can hold his patronage by its safety and assurance of carrying him comfortably, in all weathers, to his destination when irregular transportation competitors arise? Isn't it likely that his influence will bear strongly enough upon his alderman or State legislature representatives to disarm political or other demagogues having unworthy designs?

Conditions which the electric railway industry will be called upon to meet in future are uppermost in the minds of operators and investors to-day. What is there about the industry to prevent strengthening it by more skillfully cultivating loyalty among its employees and respect among its customers; to do these things systematically instead of just hiring men and giving the public the most economical service that can "get by"; with very little effort made to create public interest and support for so splendid an asset as a good electric railway is in any community?

Free from competition, as a rule, the electric railway can concentrate upon supplying the best service its income affords and upon winning prestige. If its em-

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ployees are systematically impressed with their proper importance as the company's representatives in handling customers, have fair wages and working conditions, and some extra competitive incentive for sustained efficiency, and are thoroughly supported when attacked by unjust complaints, they should improve steadily in pride, competence and courtesy to passengers. There is in almost every honest American workman a potential response to appreciation and support from his employer.

If it be true, as many think, that there is no limit to which regulation of public utilities can be carried if the people so wish, then, conversely, there should be no limit to the good-will which utilities can create by practising frankness with the people and cultivating their interest. ROBERT HOLMES ELMENDORF.

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

Secretary Burritt Announces American Association Committee Appointments—Recent Meetings Indicate General Activity on the Part of the Various Committees—Biographical Sketches of New Company Section Officers—General Company Section News

American Association Committee Appointments

Secretary Burritt has announced the following appointments to American Association committees. Other committee lists will be announced as completed.

Previous committee appointments as completed were announced in the following issues of the ELECTRIC RAILWAY JOURNAL: Transportation & Traffic Association, Nov. 25, page 1115, and Dec. 9, page 1207; Accountants' Association, Dec. 2, page 1162, and Dec. 9, page 1207; Engineering Association, Dec. 9, page 1207, and Dec. 16, page 1252.

Company Sections and Individual Membership.—Martin Schreiber, Newark, N. J., chairman; W. J. Flickinger, New Haven, Conn.; C. S. Kimball, Washington, D. C.; E. J. Blair, Chicago, Ill.; H. H. Norris, New York City.

Compensation for Carrying United States Mail.—Henry S. Lyons, Boston, Mass., chairman; George H. Harries, Omaha, Neb.; P. N. Jones, Pittsburgh, Pa.; F. R. Coates, Toledo, Ohio; M. S. Sloan, New Orleans, La.; F. T. Griffith, Portland, Ore.

Constitution and By-Laws.—George H. Harries, Omaha, Neb., chairman; R. I. Todd, Indianapolis, Ind.; Harlow C. Clark, New York City.

Education.—H. H. Norris, New York City, chairman; H. A. Bullock, Brooklyn, N. Y.; Martin Schreiber, Newark, N. J.; W. L. Robb, Troy, N. Y.; D. D. Ewing, Lafayette, Ind.; A. M. Buck, Urbana, Ill.

Electrolysis.—Calvert Townley, New York City, chairman; R. P. Stevens, Youngstown, Ohio; L. D. H. Gilmour, Newark; J. E. Woodbridge, San Francisco.

Federal Relations.—Arthur W. Brady, Anderson, Ind., chairman; F. W. Brooks, Detroit, Mich.; L. S. Cass, Waterloo, Iowa; H. E. Chubbuck, Peoria, Ill.; E. G. Connette, Buffalo, N. Y.; R. I. Todd, Indianapolis, Ind.; Frank R. Ford, New York City; E. C. Foster, Manchester, N. H.; F. T. Griffith, Portland, Ore.; George H. Harries, Omaha, Neb.; Marshall S. Morgan, Philadelphia, Pa.

Mid-Year Meeting and Dinner.—M. C. Brush, Boston, Mass., chairman; C. R. Ellicott, New York City; C. Loomis Allen, Syracuse, N. Y.; Charles C. Peirce, Boston, Mass.; T. S. Williams, Brooklyn, N. Y.; E. L. Janes, New York City; John J. Stanley, Cleveland, Ohio; B. A. Hegeman, Jr., New York City; Myles B. Lambert, Pittsburgh, Pa.; C. P. Dennett, Boston, Mass.; H. E. Reynolds, Boston, Mass.; C. V. Wood, Springfield, Mass.; Harlow C. Clark, New York City; E. B. Burritt, New York City.

Operation of Motor Vehicles.—Britton I. Budd, Chicago, Ill., chairman; William A. House, Baltimore, Md.; Henry G. Bradlee, Boston, Mass.; C. L. S. Tingley, Philadelphia, Pa.; Frank Silliman, Jr., Philadelphia, Pa.; A. M. Patten, Topeka, Kan.

Subjects.—J. D. Mortimer, New York City, chairman; R. I. Todd, Indianapolis, Ind.; Calvert Townley, New York City; J. H. Pardee, New York City; M. R. Boylan, Newark, N. J.; R. E. McDougall, Rochester, N. Y.; F. R. Phillips, Pittsburgh, Pa.; L. C. Bradley, Houston, Tex.

Committees Active All Along the Line

During the past few days many association committee meetings have been held. On Dec. 14 and 15 the Engineering Association committee on standards met in New York City; on Dec. 15 the joint committee on block signals met in Newark, N. J.; on Dec. 15 and 16 a largely attended meeting of the committee on schedules and time tables was held in Boston; the American Association executive committee met in New York on Dec. 20. Other meetings were scheduled but reports of all of the meetings held are not yet available. A brief report of the latest meeting follows.

Reports of the other meetings mentioned will appear in a later issue.

AMERICAN ASSOCIATION EXECUTIVE COMMITTEE

At the meeting of the executive committee held in New York on Dec. 20, the status of manufacturer members in the association was fully discussed and the representatives of the manufacturers in the executive committee were appointed a sub-committee to consider the carrying out of the recommendation contained in President C. L. Henry's Atlantic City address and to report at the midwinter meeting. These referred to provision for the more active participation of the manufacturers in the management of the association.

Those in attendance at the meeting were as follows: Officers, L. S. Storrs, New Haven, Conn.; T. S. Williams, Brooklyn, N. Y.; J. J. Stanley, Cleveland, Ohio; E. B. Burritt, New York City. Representing affiliated associations, M. R. Boylan, Newark, N. J.; R. E. McDougall, Rochester, N. Y. Past-presidents, A. E. Lang, Windsor, Vt.; C. S. Sergeant, Boston, Mass.; W. Caryl Ely, Buffalo, N. Y.; James F. Shaw, New York City; George H. Harris, Omaha, Neb.; C. Loomis Allen, Syracuse, N. Y. Representing manufacturers: E. W. Rice, Jr., Schenectady, N. Y.; Samuel Curwen, Philadelphia, Pa.; James M. McGraw, New York City. Ex-Secretary H. C. Donecker was also present.

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Photo by Harris & Ewing
FLAVIUS MORRILL
President
Capital Traction Co. Section

Photo by Clinedinst Studio
J. E. HEBERLE
Secretary
Capital Traction Co. Section

ARTHUR T. WARNER
President
Public Service Railway Section

FRANK J. DAVIS
Secretary
Public Service Railway Section

Some Facts Regarding New Section Officers

Following its usual procedure, the ELECTRIC RAILWAY JOURNAL will give this year some biographical notes regarding the presidents and secretaries of the several sections. Several such sketches are given below.

CAPITAL TRACTION COMPANY SECTION

Flavius Morrill is president of company section No. 8 this year. He is roadmaster for all the lines of the Capital Traction Company and was vice-president of the company section until elected president this fall. Mr. Morrill has been in the street railway business for about twenty-eight years, the preceding thirty-one years having been spent on a Michigan farm and in a Missouri grocery store. In 1889 he went to Kansas City to work for Edmund Saxton, a cable road contractor, in the construction of the Holmes Street Cable Road. He accompanied Mr. Saxton to Washington in the same year to assist in the construction of the Seventh Street cable road of the Washington & Georgetown Railroad. Upon the completion of that work he was employed by Henry Hurt, then president of the road, to take charge of the track work of this line. In 1892 when the cable was installed on the Pennsylvania Avenue and Fourteenth Street lines of this road, he was transferred to the Peace Monument and took charge of the auxiliary machinery which operated the short cable from this point to the B. & O. Railroad depot. In 1893 he was made roadmaster for all the lines of the company and was continued in the same position by its successor, the Capital Traction Company.

J. Edward Heberle, the secretary of this section, is a native of Olean, N. Y., and he is exactly one-half the age of the president of the section. He was educated in the Olean parochial and public schools and in Westbrook's Commercial College. He entered the employment of the Capital Traction Company in 1907 and was appointed chief clerk at the beginning of 1916.

PUBLIC SERVICE RAILWAY SECTION

Arthur T. Warner, who after effective service as secretary of Section No. 2 was recently promoted to the presidency, was graduated in the electrical engineering course at Lafayette College in 1910. He immediately entered the employ of the Public Service Railway as cadet engineer and completed the full two-year course. Immediately thereafter he was made a traffic investigator, and on Jan. 1, 1916, became traffic engineer. He is attached to the time-table department, in all the problems of which he takes a lively interest. In addition to having been secretary of the company section for two years, was for three years secretary of the Public Service Railway Athletic Association.

Frank J. Davis, report clerk of the company, is Mr. Warner's successor as secretary of the section. Immediately after completing his grammar school course in 1903 he entered the employ of the North Jersey Street Railway, one of the predecessor companies of the Public Service Railway, as mileage clerk. He afterwards completed a secretarial course in a local business college, was appointed as stenographer in the accounting department in 1904, and in less than two years thereafter was made head stenographer in charge of the stenographic and typewriting department.

CHICAGO ELEVATED SECTION

E. J. Blair, who is president of Company Section No. 6 this year, is electrical engineer of the Chicago Elevated Railroads. He has been with the Elevated Com-

E. J. BLAIR
President
Chicago Elevated Ry. Section

M. W. BRIDGES
Secretary-Treasurer
Chicago Elevated Ry. Section

JOHN T. MOFFETT
President
Washington R. & E. Co. Section

R. A. VETTER
Secretary
Washington R. & E. Co. Section

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panies since his graduation from Cornell University in 1905. At first he was put to work in the car shops of the Metropolitan West Side Elevated Railway and, after spending a few years in the equipment, maintenance-of-way and power departments, he became electrical engineer of this company in 1909. At the time of the consolidation of the elevated railroads in 1911, Mr. Blair became electrical engineer of the several companies. He has been active in the work of the local section since its inauguration and has also devoted much time and energy to the larger work of the Engineering Association. His appointment to membership on the electrolysis and power distribution committees was mentioned in recent issues of this paper.

M. W. Bridges, secretary-treasurer of this section, is chief clerk to the master mechanic of the Elevated Railroads. He has been with the companies for about six years, having started work as timekeeper in the transportation department of the South Side Elevated Railroad. He was later transferred to the shop department as shop clerk and, at the time of the consolidation of the elevated lines, he was assigned to the master mechanic's office and was later made chief clerk. Before going into electric railway work, Mr. Bridges was in the general offices of the Chicago & Alton Railroad.

WASHINGTON R. & E. CO. SECTION

Jacob T. Moffett, this year's president of section No. 4, has grown up in the transportation division of the industry, having continued to serve his present employer more than twenty-five years. He rose to the position of superintendent of transportation by the following route: He began as a conductor, but after less than one year of service was promoted to the position of night clerk, and after three years more to that of day clerk in which position he remained until 1899. In this year he became division superintendent and during the following four years served in several divisions, at the end of this time being made superintendent of transportation. He is an enthusiastic company section man and his associates say that he has greatly helped in developing a progressive spirit in the local section.

R. A. Vetter, who is serving his second year as secretary of this section, is law clerk for the legal department, which office is also general counsel for the Washington-Virginia Railway. Mr. Vetter has been in the employ of the company for six years, serving first as clerk in the office of the general manager, and later being transferred to the accounting and treasury departments. When the legal and claim departments were reorganized in 1914, he was assigned to the office of the general attorney. While in the employ of the company he followed an evening law course in Georgetown University, secured the degree of Bachelor of Laws in 1915, and was subsequently admitted to the District of Columbia bar.

Connecticut Company Section

Secretary W. E. Jones reports a very profitable meeting of Section No. 7, held on Dec. 14. The papers read were as follows: "Prolonging the Life of Old Rail in Connection with Permanent Pavement," by M. E. Stark, roadmaster Bridgeport Division; "Reminiscences of the Old Horse-Car Days," by John A. Crilly, claims adjuster, Hartford, and "Car Ventilation," by George H. Ford, Automatic Car Ventilator Company, New York. The meeting was preceded by a dinner at the Hotel Garde, New Haven. The company section orchestra played several times and there were also some vocal solos.

In his talk Mr. Ford explained why provision for ventilation is necessary, and he cited many interesting statistics on car ventilation. He also explained how ventilation systems are in most cases expected to perform under the most extraordinary conditions. In view of the fact that at this time of year the public becomes critical of car ventilation, due to the necessary use of closed cars, Mr. Ford's talk was considered particularly appropriate and it provoked considerable discussion.

Near-Side Stop Discussed in Denver

With an attendance of 150 the December meeting of the Denver Tramway Company Section, held on the 17th, was one of the most successful meetings of this section. James L. Adams, recently appointed superintendent of transportation to fill the vacancy caused by the resignation of William M. Casey, first addressed the meeting briefly. H. S. Robertson, attorney, then read a paper on near-side stop operation, supplementing it with an explanation of a related important city ordinance which becomes effective on Jan. 1, 1917.

"Stunt" Program of Capital Traction Section

Company Section No. 8 held its meeting on the regular date, Dec. 14, but with a decidedly unusual program. About 130 members and guests were present.

The first feature was a talk by W. H. McCarty, master mechanic, on the operations of the mechanical department and the relations of that department to the other branches of the company's organization. Following this there were brief discussions of several phases of the work of the mechanical department, comparing horse-car days with the present. The meeting was then turned over to the entertainment committee, which had provided a number of surprises. A Christmas tree had been set up in the meeting room and Attorney Frank J. Hogan distributed gifts with accompanying appropriate witticisms, convulsing the audience with laughter. Wilson buttons were presented to very good Republicans, hair tonics and combs were distributed in quarters where they were hardly required. Cradles for the newlyweds, rattles for the playful, and a small bowl and shovel for the professional alibi producer were among the gifts. There were also character sketches presented by a local entertainer, and at the close of the meeting a buffet luncheon was served.

A Plea for Clean Stations

Tram-o-Grams, published by the Denver (Col.) Tramway, contained in a recent issue the following appeal:

"The boy stood in the Tramway Loop, eating peanuts by the scoop; the empty shells he scattered round, four thousand shells to a single pound. There in the Loop the junk lay prone, 'midst remnants of an ice cream cone, cigars, torn paper and banana skins, lacking only tomato tins to make it look like Hogan's Alley after a family reunion rally.

"And then some gink in the Tramway got up nerve enough to bray: 'Perhaps this Loop would cleaner be, more like what we'd like to see, if we put in a big waste can to hold this trash for th' old rag man.' The can is labeled: 'Keep City Clean,' and that is something we take t' mean applies to ice cream cones and shells strewn by the boy from Cheyenne Wells. Help keep the Loop neat, spick and span, by throwing trash in the big tin can. PLEASE!"

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

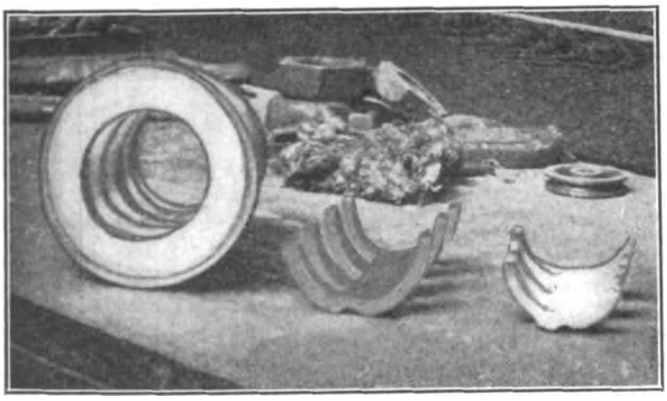
This Week Three Master Mechanics Give Practical Suggestions for Reducing Maintenance Costs—The Power Plant Operator Will Also Find Valuable Information Regarding the Steam Turbine and the Return Tubular Boiler

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Bronze Insert for Armature Bearings Saves Stripping

BY A. BLANCHARD
Master Mechanic Boston & Worcester Street Railway

Stripping of armatures by contact with pole pieces on GE-57 motors has been practically eliminated on the Boston & Worcester Street Railway by casting a bronze insert, as shown in the accompanying halftone. This insert is of the same composition as the journal brasses used by the company, and it consists of a casting of approximately semi-cylindrical shape, with curved lugs on each side, around which the babbitt is poured when forming the bearing. The usual boring out to diameter with smooth interior surface follows the casting. In case the bearing overheats and the babbitt melts, the armature shaft is held in place and lubricated by the use of the bronze insert, which can be seen in the interior of the bearing as photographed. The bronze insert is of such composition that it will not cut the armature shaft.



BRONZE INSERT FOR BABBITTED BEARINGS

Fireproofing Cables in Manholes

BY "CONDUIT"

In the Nov. 18, 1916 issue of the ELECTRIC RAILWAY JOURNAL, page 1068, the writer was particularly interested in the article concerning the use of asbestos listing for fireproofing cables in manholes, protecting them against the explosion of adjacent cables, etc., and he noticed closely this statement: "If water ran in and covered the cables, the silicate (of soda) was dissolved and the asbestos loosened."

While it is true that water might have a slight softening effect on the silicate, nevertheless its softening effect is of very little consequence, and where the asbestos has become unfastened, this is readily taken care of on inspection by the application of a piece of tape. The writer of the article in question also stated that "when material as expensive as asbestos is used some provision should be made for salvaging the covering when it is removed from the cable." Most of the silicate of soda can be removed from the asbestos listing by the following method:

Make a solution of carbonate of soda by using 10 lb. of soda ash in 100 lb. of water. Do not use a galvanized iron vessel, as the solution will attack the zinc. Iron is best, but a wooden vessel or tank would answer. Keep the solution near the boiling point, which can be accomplished by the use of a steam line. Immerse the asbestos in this solution for about two hours, or until the asbestos is sufficiently pliable, then rinse well in clear water and allow it to dry.

The solution is not expensive to make and can be used over and over until it fails to give results within a reasonable length of time. Workmen should not put their hands in the solution. A wooden stick or iron rod could be used to agitate the solution and to remove the asbestos.

Exacting Inspection a Good Investment

The Author Describes an Effective Plan of Keeping Oiling and Repair Records and of Placing Inspectors on a Basis Which Promotes Vigilance

BY K. L. WILCOXON
Lately Master Mechanic The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.*

Just how far it is feasible to go in the inspection of cars is somewhat dependent on the value of the equipment likely to be damaged as the result of wear which becomes too great between inspections for safety. For instance, the Chicago, Lake Shore & South Bend Railway, with its very large and heavy single-phase motor equipment can afford to be more vigilant in its inspection routine than could a short direct-current road with comparatively much cheaper equipment. If this road by frequent and careful inspection can save one armature in six months from getting down on its bearings and being seriously damaged, the saving will pay an inspector's wages for a considerable period. This is one of the reasons why this company is investing more than the usual amount in keeping an inspector at both ends of its 76-mile line and rigidly maintaining the practice of placing every car over the pit at each end of the line after every trip. As the car comes into the terminal—Pullman at one end and South Bend at the other—it is run over the pit and another car is pulled out of the yard to take the return trip. Each car thus

*The approving of this article for publication was one of the last acts of Mr. Wilcoxon, who met his death on Nov. 22. A note to this effect appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 2.

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The Chicago, Lake Shore & South Bend Railway Company
DEFECT & CAR FAILURE REPORT

Car No..... Date.....
Train No..... Mins. Delayed.....
Time Inspected..... If defect is O. K., mark here.....
Motorman..... Conductor.....
State below defects found on inspection, making a separate report of each defect found on the car and any failure of equipment while car is in service.

Inspector..... At.....

FIG. 1—FORM USED BY INSPECTORS FOR REPORTS

lays over one hour while the inspector goes over it, makes out his report and "O.K.'s" it for the next run.

The complete inspection system includes one inspector at each end of the line for light repair work, and a crew of four inspectors at the centrally located shops at Michigan City, where each day's program includes the thorough general inspection, oiling and cleaning of three motor cars and two trailers, this number of cars coming in each day on a 1000-mile inspection basis. With these three points of inspection on the system, a plan has been evolved whereby the two ends are worked against the middle, so to speak, as the work of the shop inspectors is a check on the two end-of-the-line inspectors, and these two are also a check on each other, all reports clearing through the master mechanic's office. This is brought about by requiring each man to send in a signed report card covering his inspection of each car. Certain minor defects which are allowed to be passed by the Pullman and South Bend inspectors must appear in the reports of all inspectors, if their work is as thorough as it should be, and any failure to make such report by one, when it is reported by another, gives the master mechanic evidence of the grade of work being done by the several men involved. The system in detail is as follows:

The men at South Bend and Pullman have as their duty the finding of any trouble or near trouble, but not its removal unless it involves such light repairs as the replacing of a brakeshoe, a motor brush, etc., They look out for the brake adjustment, armature clearance, hot bearings, etc. As they go over the car they write out a separate report on the form Fig. 1 for each defect, and note if any supplies, such as signal fuses, markers, lanterns, etc., are missing and replace them. This same form serves the trainmen to make their trouble reports on. These reports are sent in to the master mechanic's office at Michigan City on the last car at night. The next morning the four inspectors in the Michigan City shops go onto the cars which are in for general inspection and any defective car, and their report when turned in to the master mechanic gives a check on the work of the men at the ends of the line by comparison of the several reports. This arrangement puts the men in competition with each other and thorough conscientious work obtains.

The general inspection on the 1000-mile basis in the shops is divided between the four men in the crew. They go onto a car, each inspecting certain parts of it and making his report on the car inspection record, Fig. 2. The report of all four men is put on the one card, and each signs his name, checking off as O.K. his part of the work as he finds it in good condition or makes repairs. On the back of this same card is printed a list of all material likely to be used, and the men check off on this what they use and note the quantity. With these signed cards, it is a very simple matter to check back the source of negligence among the shop men in case a car goes out and fails on the road. When the work of the four men is completed on a car, the foreman writes in on the card the time O.K.'d for service and the number of miles run since the last inspection, signs his name and turns the card in to the master mechanic's office.

REPORT OF MISCELLANEOUS CAR TROUBLES

	January	February	March	April	May	June	July	August	September	October	Total
Armatures rewound	1	0	0	0	0	1	0	0	1	1	4
Armature trouble	0	3	0	0	0	3	1	2	3	3	15
Motor field trouble	1	0	0	2	3	1	0	1	1	2	11
Brushholders broken	0	0	0	0	0	0	0	0	0	0	0
Transformers and wiring	0	0	0	1	0	0	1	1	0	1	4
High-tension cable	1	2	0	0	1	2	1	3	1	0	11
Pantograph and trolley ins	2	0	0	2	3	5	2	4	1	0	19
Reversers and wiring	1	0	0	0	1	2	1	0	0	0	5
Switch group	2	1	1	0	0	0	0	0	1	0	5
Line switch	0	0	0	0	0	1	0	0	0	0	1
Air compressors	0	0	0	1	3	0	2	0	0	0	6
Hot bearings	2	2	2	6	3	2	9*	0	1	1	28
Head light	1	0	0	0	0	0	0	0	0	0	1
Broken gears and pinions	0	0	0	0	0	0	0	0	0	0	0
Car bodies damaged	0	2	1	2	0	0	3	1	2	2	13
Motor truck trouble	0	0	0	1	0	0	0	1	0	0	2
Speed relay	0	0	0	0	0	0	0	0	0	0	0
Preventive coil	0	0	0	0	1	0	1	2	1	0	5
Control wiring	0	1	1	1	1	0	0	0	0	0	4
Pantograph trouble	1	0	0	0	0	0	1	2	1	1	6
Flat wheels	0	0	1	0	0	0	0	0	0	0	1
Total failures	12	11	6	16	16	17	22	17	13	11	141

*High number caused from a run of defective bearing metal.

The oiling on the system being done on the 1000-mile basis, naturally goes hand in hand with the general inspection. This is done entirely at Michigan City. It is entrusted very largely to a man old in the company's service, who is paid a trifle more than usual for this class of work in order to keep him interested. The oiling of the cars is governed entirely by gaging the amount in the wells and the amount put in each bearing is recorded by this oiler on a card, Fig. 3, for record and file in the master mechanic's office. The packing of axle, armature and journal bearings is left to the oiler, who keeps a record on a blackboard ruled for the purpose and placed on the wall out in the shop. A space on the blackboard is provided for each car and the car number painted in the space. Opposite the car number the oiler writes in the date he packed the bearings so that the next time the car is in he can refer to the board to know just what attention he gave it on the previous inturn.

These several inspection and oiling record cards used on the system are filed in the master mechanic's office in two pigeon-hole cabinets fastened on the wall, one for the oiling records and one for the inspection re-

CAR INSPECTION RECORD

CAR No.——

INSPECTION TO BE MADE DURING 24 HOURS, ENDING AT 6:00 P. M. ON
..... 19 ...

Car Miles Run Since Last Inspection .....

We hereby certify that we have carefully inspected all parts of the car opposite our respective signatures and have left said parts O. K.

Armatures	Control
Brush Holders	Batteries
Brushes	Motor Gen. Set
Motor Covers	Reversers
Motor Leads	Line Switch
End Housing	Light Circuit
Axle Cap Bearings	Head Light
	Gen. Signal
Pinion	
Resistors	Pantagraph
Center Plates	Trolley

Remarks .....

Car O. K. for Service at ..... M. on 19

Oiling Record of ..... Date .....
Car No. .....

Journal No. 1	Journal No. 2
Journal No. 3	Journal No. 4
Journal No. 5	Journal No. 6
Journal No. 7	Journal No. 8
Armature No. 1	Armature No. 2
Commutator	Commutator
Pinion	Pinion
Armature No. 3	Armature No. 4
Commutator	Commutator
Pinion	Pinion
Motor No. 1, Axle Caps	Motor No. 2, Axle Caps
Commutator	Commutator
Pinion	Pinion
Motor No. 3, Axle Caps	Motor No. 4, Axle Caps
Commutator	Commutator
Pinion	Pinion
Compressor	Blower

Gear Grease, No. lbs. to each Motor

Remarks .....

Oiler

FIG. 2—FORM FOR 1000-MILE INSPECTION REPORTS: MATERIALS RECORD ON BACK; FIG. 3—FORM FOR KEEPING CAR-OILING RECORD

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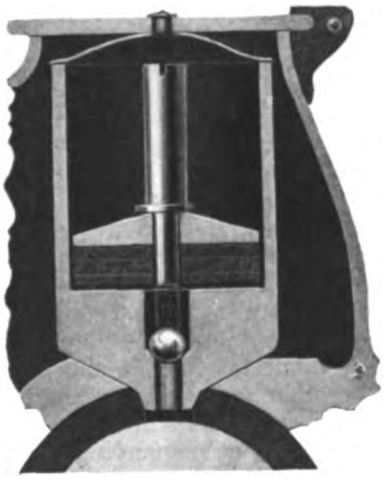
ports. In these, a pigeon hole is allotted to each car and the car number painted on the front.

The result of this rigid inspection work is reflected in the table on page 1306 of equipment failures during the ten months ending Oct. 31, 1916, and also by the knowledge that during last summer the inspectors at the ends of the line caught a number of armatures low on their bearings which would have been damaged by another trip were it not for this frequent inspection. The mileage of the cars during these ten months was 1,231,338 and the miscellaneous car troubles which developed were as listed in the table.

Oil Cup for Lubrication of Old Type Motor

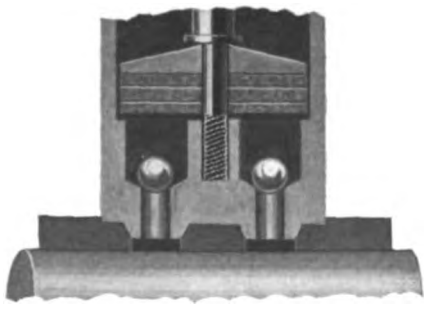
BY E. W. ELGEE
Master Mechanic Cumberland County Power & Light Company, Portland, Me.

For the purpose of permitting the use of oil instead of grease for the lubrication of the armature bearing of a G.E.-80 motor, the oil cup shown in the accompanying illustrations has been devised by the writer, and it is in successful operation on this road.



OIL CUP FOR OLD TYPE ARMATURE BEARINGS

This oil cup consists of a cast-iron square box in the bottom of which is a felt pad through which the oil works into the two wells which form part of the bottom of the box. The flow of oil through the pad is regulated by means of a threaded screw and a heavy iron washer which rests on the felt pad. Varying the pressure on the pad by turning the screw changes the flow of oil, since the more the felt is compressed the slower the oil can work through it. From the wells the oil drops on to the bearing through two ports which are closed by steel balls when the motor is still. The movement of the motor displaces these balls and allows the oil to reach the bearing. The oil cup rests on the bearing and is held in position by a flat spring which presses against the top lid of the bearing housing.

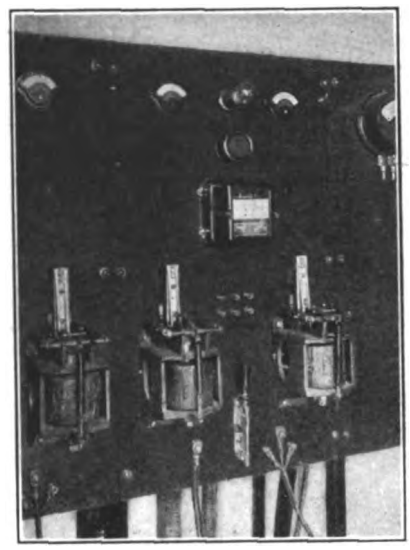


LONGITUDINAL SECTION SHOWING DETAILS OF OIL WELLS

A Constant-Current Arc Welding System

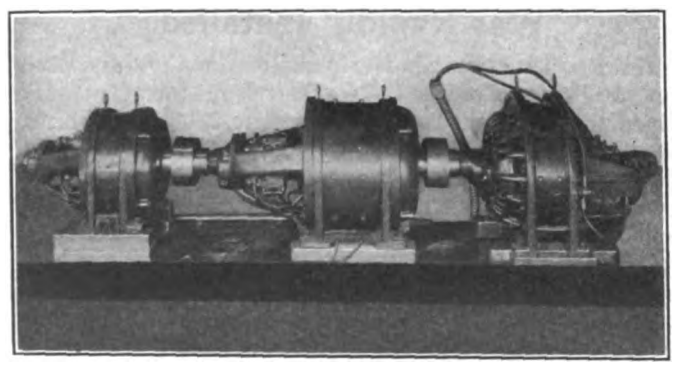
Regulator Is Used to Maintain Constant Current and Prevent Overheating at the Weld

In an attempt to reduce the waste of power and improve the conditions at the arc for welding, a new system has been brought out by the Electric Welding Company of New York. This company has been in the welding business for a number of years. The welding arcs are wired in series and power is supplied from a motor-generator set, which includes a regulator for maintaining the current at any predetermined value. At each arc is an automatic regulator which performs two functions. In the first place, it maintains the continuity of the circuit, and, in addition, controls the amount of heat which can be put into the arc. The controller operates by automatically adjusting resistance in shunt with the arc, utilizing the variation in voltage across the arc as the ultimate controlling element.



AUTOMATIC ARC HEAT CONTROLLER AND INSTRUMENTS

In the series circuit switches are located at such points as may be suitable for welding and an arc controller is plugged across a switch when welding is to be done at any point. The accompanying illustrations show the regulator and generator driven by the motor, and also a panel containing the controller and switch together, with the measuring instruments.



SELF-REGULATING GENERATOR FOR ARC WELDING

The manufacturers claim for this equipment that not only are the usual large losses in ballast and distribution lines eliminated, but the arc does better work because it is steady and cannot be drawn out to excessive lengths. It can also be extinguished by short-circuiting. For the purpose of extending the use of this apparatus

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a special company known as the Arc Welding Machine Company, New York, N. Y., has been formed quite recently.

Steel Lockers Reduce Fire Risk

Wooden lockers are unsanitary and, since greasy overalls, waste and similar materials as well as the mechanic's smoking supplies are often crowded into them, they are the cause of serious fires. Steel lockers are a great improvement. Besides being fireproof they are more easily kept clean, ventilation can be readily provided, and they are proof against rats.

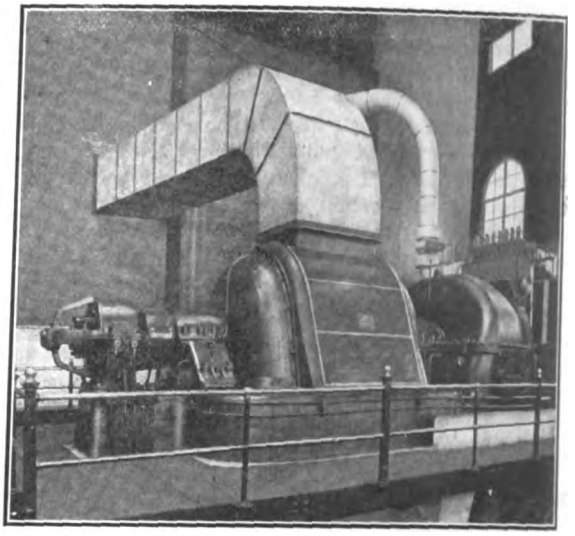
The accompanying illustration shows one of the lockers made and used in the shops of the Galveston (Tex.) Electric Company of which M. B. Osborne is master mechanic. It is built of heavy iron screen supported by a steel frame and tilted so that the doors will close themselves. The use of the screen insures good ventilation, and practically everything in the locker is visible without opening the doors. Three of these lockers have been built by this railway, one for the head machinist, another for the blacksmith, and the third for the storage of lubricants.

STEEL LOCKER BUILT AND USED IN THE RAILWAY SHOPS, GALVESTON, TEX.

Largest Steam Turbine in Virginia Was Rapidly Installed

The Reeves Avenue power plant of the Virginia Railway & Power Company, Norfolk, Va., formerly contained three 4000-hp. turbines and one 2000-hp. turbine, all of the vertical Curtis type. The foundation of the 2000-hp. unit had been so constructed as to permit the installation of another 4000-hp. unit in its place. The appearance of the section of the turbine-room containing the 4000-hp. units is shown opposite. As light and power demands increased it became necessary in 1915 to add to the capacity of the plant. An order was therefore placed with the General Electric Company, for a horizontal turbine of modern design to be rated at 12,000 kw. to replace the 2000-hp. unit, and to occupy practically the same floor space as the small one which was to be removed. The rapid progress of the installation is shown in the following table:

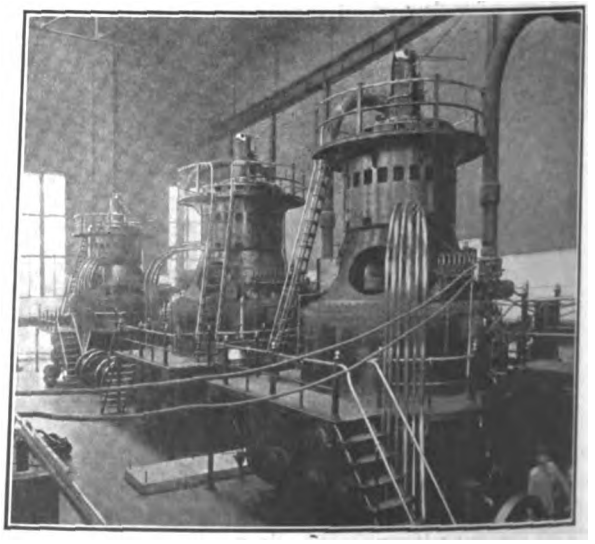
Contract for turbine signed	Sept. 2, 1915
Removal of old turbine begun	March 15, 1916
First car of machinery arrived	July 6, 1916
First turbine parts arrived	Aug. 1, 1916
Turbine running with load	Sept. 13, 1916



12,000-KW. TURBINE WHICH REPLACED OLD 2000-HP. TURBINE, VIRGINIA RAILWAY & POWER COMPANY, NORFOLK, VA.

Just one year and eleven days from the signing of the contract, and one month and twelve days after the arrival of the first car of turbine parts the machine was in operation carrying a load of 9000 hp. In view of the statement made in a recent issue of this paper to the effect that turbines must now be ordered for 1919 delivery the above table is doubly significant.

The turbine is designed for operation at 200 lb. steam pressure and 150 deg. of superheat and is of the condensing type. It is direct connected to a 60-cycle, three-phase alternator rated at 11,000 volts. A view of the new unit as it now stands in the station is given in an accompanying illustration. The condenser has 19,600 sq. ft. of condensing surface. The pump for circulating water is connected on one side to an electric motor and on the other to a small steam turbine, thus being doubly guarded against interruption in operation. The condenser and accompanying apparatus were furnished and installed by the Alberger Condenser Company. The boilers were designed for a larger output than that of the original turbines, and as the efficiency of the machine just installed is high compared with that of the old machines, the boilers proved to be large enough to supply the present demand. With the installation of the turbine a new section of busbar was added to that already in place and the two sections



VIEW OF THE THREE 4000-HP. TURBINES IN THE REEVES AVENUE STATION, VIRGINIA RAILWAY & POWER COMPANY, NORFOLK, VA.

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were connected in the form of a ring. The feeders were arranged so that they can be supplied from more than one place on the ring. This permits any section of the bus to be cut out for repairs without interrupting the service. J. P. Keeney is chief engineer in charge of the station, and the installation of the new unit, with the related changes in the electrical switching arrangements, was carried out under his supervision.

Combination Fare Box Registers

New Design Fare Box Registers and Cancels Tickets and Counts Coin

A combination coin and ticket fare box and fare register has been designed by the American Railways Equipment Company, Dayton, Ohio, which collects and registers coins and paper tickets as received direct from the passenger through a single opening and drops them into the same examination box The mechanism of the fare box is so designed as to separate the coins and tickets, and register the trip fares and total fares, and the value of the cash fares, separately. It also has a means for registering transfers and all other fares collected over the box. Every fare of whatever class is registered immediately upon being paid. The operation of the registering handle causes the coins and tickets to be discharged simultaneously from the examination box into the coin-registering and ticket-cancelling mechanisms.

FARE BOXES OF NEW DESIGN, WITH AND WITHOUT OVERHEAD TRIP REGISTER

By this same operation the trip-passenger and total-passenger registers are actuated to register one unit with each movement of the handle, serving to indicate at all times on the respective counters the full passenger load and the total registration. The same operation also delivers the tickets through the cancelling mechanism into a locked box and carries nickels and dimes through the coin-registering mechanism, which automatically registers the value of the coins. The latter then pass into a change drawer, where they are accessible to the conductor. Pennies and mutilated coins are segregated from full fare coins and are deposited in a locked box. Each operation of the hand lever causes a bell to ring to indicate a fare registration.

This registration of each fare as it is paid is claimed to prevent accumulation of fares in the registering mechanism, and also to permit of a complete registration of the full passenger load on each trip, and total passenger registration, without using a separate register. This enables the conductor to give his undivided attention to the fare box upon which all fares, whether collected through or over the box, are registered. The trip-passenger register is so located on the fare box that an inspector upon entering the car and paying a fare can read it at a glance. He can then check all fares paid and all fares registered while he is on the car by observing passengers taken on and by noting the fare box bell. By this arrangement, it is claimed, every requirement of prepayment fare collection is provided for in a simple, single-unit machine which requires but one operation for each fare paid, and which safeguards ticket fares as fully as cash fares by registering and cancelling them through the fare box without intermediate handling.

The construction and appearance of the new fare box are similar to those in present use. The box may be operated by turning a handle or if desired by means of a treadle mechanism. The working parts are of simple construction and made of hardened steel, and the casing is of enameled steel. The fare boxes will be furnished in three types: the complete coin-ticket registering fare box as described, a coin-registering fare box without the mechanism for handling tickets, and a locked-box type, which is the same as the box described, except that the mechanism for registering the value of coins is omitted. The first fare boxes of the different types will be ready for delivery in February, and will be installed at that time in cars of representative railway companies preliminary to filling orders.

Increasing the Capacity of Return Tubular Boilers

A furnace system for return tubular boilers, which utilizes a steam jet for furnishing a supply of air to the combustion chamber of the boiler for the purpose of minimizing smoke, has recently been placed on the market by the United Furnace Corporation, 120 Broadway, New York, N. Y. In addition the general scheme includes the installation of circulating piping.

In applying this system one of the tubes is removed and a tee connection is made to the shell, a 4-in. pipe extending to the end of the grate bars, where it is joined to a 6-in. pipe by means of a 6-in. to 4-in. return bend reducer. The 6-in. pipe extends across the grate and is joined to a 4-in. pipe by means of a 6-in. to 4-in. reducer. This pipe runs diagonally across the bottom of the combustion chamber, and through a riser with tee connections at the top and bottom connection is made with the rear of the boiler, completing the circulating system. The cross pipe and that portion of pipe which extends over the grate are directly exposed to the hot flames and gases, thus causing the water to circulate rapidly.

Just in front of the bridge wall a baffle wall is constructed so that the flames will be forced up against the boiler shell at the extreme end of the grate. The air and steam from a header are combined with the gases at the point where they pass over the bridge wall, as shown in the accompanying illustration, and thus produce better combustion than is possible under ordinary furnace conditions.

As shown in the elevation of the boiler at the left of the illustration, the air inlet to a header, which is closed at one end, is tapped at the ell and a connection is made with a $\frac{3}{8}$-in. steam pipe in the line of which is a globe valve. Steam is injected at the point from a steam drum or steam line and induces the air flow. This

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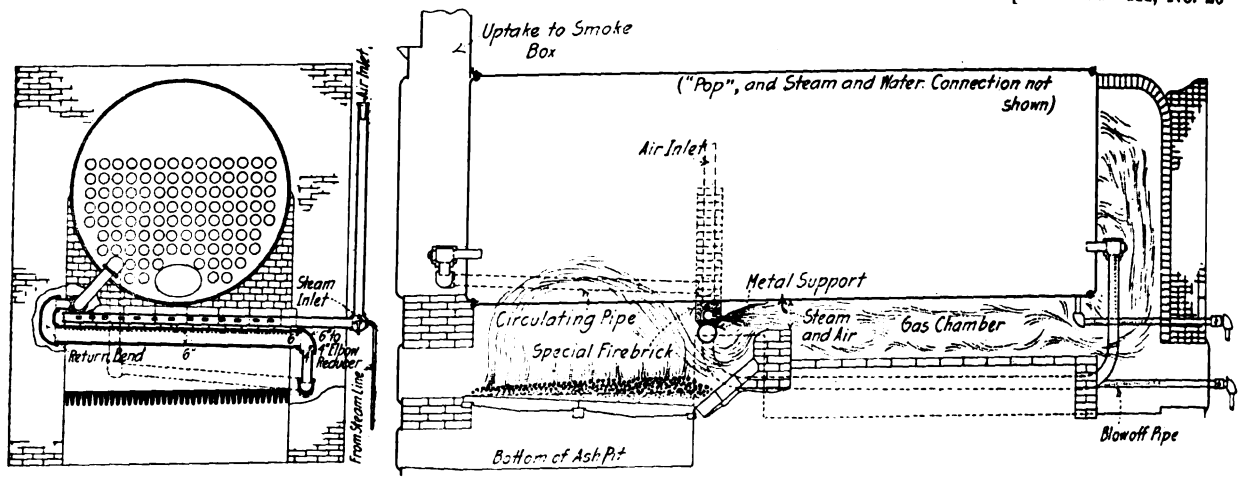

SCHEME FOR OBTAINING COMPLETE COMBUSTION AND RAPID WATER CIRCULATION APPLIED TO A RETURN TUBULAR BOILER, SHOWING PIPING AND PATH OF GASES

header, which has approximately the area of a 3½-in. pipe and is inclosed in a firebrick cap, has openings facing the bridge wall. It rests on a saddle which supports the baffle wall, the cross pipe being directly below the saddle. The edges of the openings in the header are curved and smooth so that the friction of the air and steam passing through the openings will be small. The amount of air drawn in at the air inlet is controlled by the globe valve in the steam line, and the amount of air and steam which combines with the gases in the combustion chamber is regulated until a smokeless condition of the fire is obtained.

A number of reports of tests have been received showing considerable economies obtained in industrial and municipal lighting and power plants where this system is in use. According to the claims of the maker its use will produce fuel saving of at least 10 per cent and a material increase in the water evaporated per pound of coal. The boiler furnace will also be rendered smokeless, as is required under many city ordinances in localities where bituminous coal is burned.

According to the last report of the American Railway Engineering Association there are in use on fifty-six railroads in this city, 65 per cent of the total, electric motors to the number of 16,992, with an aggregate capacity of nearly 300,000 hp. Of the motors reported those using direct current represent 52.4 per cent in number and 47.4 per cent of the total horsepower. Three-phase motors constitute 39.9 per cent of the total number and 45.3 per cent of the total horsepower.

Demand Meter Operated on New Principle

A new type of demand meter used in connection with a watt-hour meter, which records graphically the energy consumption during a definite time interval, has been developed by the General Electric Company.

Essentially it consists of a demand-registering element and a timing element. The demand-registering mechanism is actuated when a cam in the watt-hour meter closes the circuit of an electromagnet in the demand meter. The armature of the electromagnet moves forward turning the ratchet wheel by means of a pawl, which may be seen at the right in the accompanying diagram. When the circuit is opened a spring returns the armature lever and pawl to their original positions. The motion of the ratchet wheel is transmitted through gearing to the pointer, moving it forward for each closing of the circuit until the end of the time interval is reached. At this point a cam driven by the timing element causes a trip lever to disengage a sliding pinion from the gear with which it mashes, thus opening the gear train and allowing a spring to return the pointer to the zero position. Further rotation of the cam returns the sliding pinions to its former position and reestablishes the gear train. The mechanism is now in a position to measure the energy consumption during the next time interval. These meters are built both indicating and graphic, a view of each being shown in the illustration below, and for alternating and direct current, with time intervals of fifteen, thirty or sixty minutes.

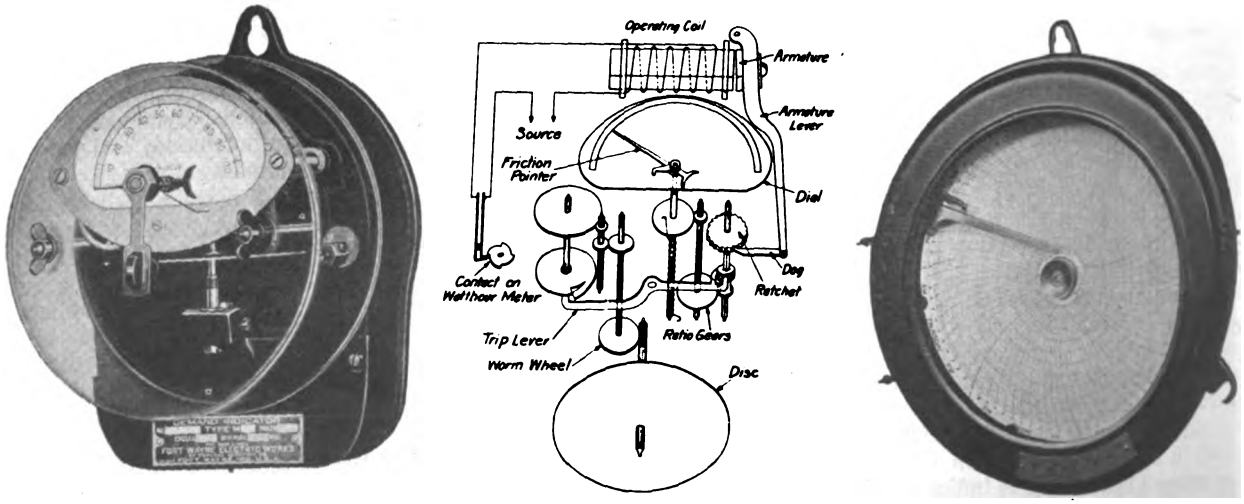

DIAGRAM SHOWING MECHANISM OF INDICATING METER AND VIEWS OF INDICATING AND RECORDING DEMAND-METERS

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NEWS OF ELECTRIC RAILWAYS

Traffic and Transportation

Financial and Corporate **Personal Mention** **Construction News**

OFFER TO ELECTRIFY CHICAGO SUBURBAN LINES

Electrification Plans Include Subway Under Grant Park for Joint Use with Local Transportation—Work to Be Completed Within Five Years, Dated from Time Construction Begins on New Twelfth Street Station

An ordinance has been prepared by the Illinois Central Railroad and presented to the Chicago Terminal Commission which proposes the electrification of the company's suburban service from Randolph Street south to the city limits on the main line, and a portion of this beyond the city limits as far as the Matteson Station, and three branches to South Chicago, Blue Island and Kensington. This electrification plan comprises only a small part of the proposed ordinance which takes up the consideration of establishing harbor district No. 3, securing park development, bathing beaches and streets over the tracks communicating with these, and providing for the new passenger station at Twelfth Street, and other public advantages and benefits—points of vital importance to the Illinois Central Railroad in connection with its occupancy of the lake front. The complete ordinance includes concessions on the part of the city and company, among the latter being the electrification plan.

Among the concessions asked of the city are permission to construct a four-track subway not over 100 ft. wide, beneath Grant Park from Twelfth Street north to Monroe Street, and a loop in the territory between Monroe and Randolph Streets, and between Michigan Avenue and the present right-of-way of the Illinois Central Railroad. The right is also asked to construct track for storage of railway passenger equipment within the last-named territory. Provision is then made in the proposed ordinance that any right as to the use of the space beneath the surface of Grant Park between Monroe Street and Randolph Street shall be subject to joint use as a part of any subway system of transportation that may be constructed by the city or its licensees in this territory. The plan for such joint use and the compensation to the Illinois Central Railroad for the use of its track are to be agreed upon between the city or its licensees, the park commissioners and the Illinois Central Railroad.

The electrification plans are not made to include the through-train service coming into the Twelfth Street Station, for the reason that it is considered vital to the possibilities of the new Twelfth Street terminal, that provision be made whereby other railroads may use this new station. It is expected that some of the railroads now using the Dearborn and La Salle stations will use the new lake front station, but if the service into this station was completely electrified, this would prevent these roads from coming in, at least for a number of years, or until complete electrification of railroads around Chicago was consummated. For this reason the proposed ordinance of the Illinois Central Railroad plans that the through trains will still be brought into the station under steam power.

GALVESTON CAUSEWAY RECONSTRUCTION DECIDED

Galveston County, the Galveston-Houston Interurban Railway and the three steam railroads entering Galveston, Tex., over Galveston Bay will soon award contract for the restoration of the Galveston Causeway, destroyed in the storm of August, 1915. The new structure will be of concrete-arch construction all the way across the bay, and the work will be done at an estimated cost of $1,500,000. The style of architecture to be employed was decided on by a board of arbitrators as agreed by all parties at interest. The members of the board were: George F. Swain, Boston, selected by Galveston County and the interurban railway; Arthur N. Talbot, Urbana, Ill., selected by the three steam railways, and Lincoln Bush, New York, chairman of the board, who was selected by the other two members. The type of construction will be similar to the concrete portion of the causeway that was left standing after the 1915 storm. The length of the portion left standing is 2446 ft., making the total length more than 8000 ft. Of the estimated cost of $1,500,000, the three steam railroads will pay 55 per cent, Galveston County will pay 33 per cent and the Galveston-Houston Interurban Railway 22 per cent.

OFFICIAL STATEMENT REGARDING RUMORED BALTIMORE CHANGES

In connection with the recent reports concerning the possibility of an election of a new president of the United Railways & Electric Company, Baltimore, Md., to succeed William A. House, so much has been said in the press of Baltimore that is entirely incorrect that, after conferences with George J. Jenkins, of the Jenkins interests, and C. E. F. Clarke, of Aldred & Company, the management of the company through B. Howell Griswold, Jr., a member of the banking firm of Alexander Brown & Sons, Baltimore, made public on Dec. 20 a statement in regard to the situation. This statement follows in part:

"It seems to us that many people have failed to recognize the fact that Mr. House has been for many years a very hard working and loyal official of the United Railways. He has given the best that is in him to its service and has been on the job night and day. The directors have recognized this fact and from time to time have cautioned him, but it was not in his temperament to share his work or responsibility. The result has been that at times he has been under very severe nervous strain.

"It is only natural, then, that some suggestion should be made in his interest, as well as that of the company, which would compel him to give up the detail work which is now wearing him down and at the same time reserve the benefit of his long experience and activity for the company. We say it is not surprising that such a suggestion should be made, but we want to repeat that no such suggestion has been adopted.

"The story grows out of the creation of a committee appointed by the board for the purpose of bringing the company into closer touch and better relationship with the public and with all public officials. This committee has not yet reported. When we say that the committee has not yet formulated its report, that it does not know that the report when formulated will be adopted by the board, it will be seen how purely conjectural are all of the somewhat positive statements which have been made about what is going to be done in the United Railways. It can be positively stated that the presidency of the United Railways has not been offered to anyone.

"As for the statement often made recently that Mr. Aldred dominates the policies of the United Railways, anyone who really knows the situation knows that this is incorrect. His interest in the United is proportionately small. Since his election to the board and executive committee Mr. Aldred has attended very few meetings, owing to the pressure of duties elsewhere. There has been nothing but the most complete harmony in the board. The company, since the fire of 1904, has spent many millions of dollars for the improvement of its service. These improvements were inaugurated by and carried out under the supervision of the board which, practically without change of membership, has directed the policies of the company for many years past. This board is fully alive to the recent developments in our city and can be relied upon to further in every way the city's development."

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WILKES-BARRE STRIKE SETTLED

Fourteen Months of Terror Ended by Employees Accepting Terms Secured by the Mine Workers

The Wilkes-Barre strike, in progress since Oct. 14, 1915, is at an end. The settlement was brought about by the men formerly in the employ of the Wilkes-Barre Railway voting to accept the terms of settlement proposed by the mine workers. Two ballots were necessary. At the first the men rejected the proferred terms by 111 to 108. There was a further parley, and after T. A. Wright, vice-president and general manager of the company, had consented to a few minor changes the men voted again on Dec. 16 and then made unanimous their decision to accept the terms of settlement. These terms follow:

"1. That 190 trainmen be taken back at once; of this number as many as possible, not less than 130, be given regular runs, the remainder to be placed on the extra list, and of the latter, those reporting twice daily for work to receive one dollar a day, and more if earned.

"2. That the remainder of the trainmen who were in the employment of the company at the date of suspension of work, except as hereinafter stipulated, shall be placed on a waiting list to be called for as vacancies occur, and to be given fifteen days' notice in which to return.

"3. The company to agree with Division No. 164 of the Amalgamated Street Railway Association that a committee representing said employees be permitted to divide the time of those men who are taken back and given regular runs with those men who are taken back and placed on the extra list, provided, always, that such substitution shall be arranged for not less than one week at a time.

"4. No new men to be employed until all of the old men taken back have been offered regular runs.

"5. The men to be taken back and given regular runs and put on waiting list shall be given runs upon such divisions as may be designated by the general manager, and the men to agree to accept such runs on such designated divisions. The seniority rights of the men so taken back and assigned to said divisions shall be maintained upon said divisions as such rights have been defined by former contracts between Local No. 164 and the company. It is understood that full seniority rights shall be accorded the men April 1, 1917, provided that at that time the general manager of the company shall decide that it is for the best interests of the company that such rights ought then to be restored. If seniority rights are not restored on April 1, 1917, the company to agree that such rights shall be restored as soon thereafter as in the opinion of the board of directors such restoration can be made to the best interests of the company and its employees.

"6. The wages to be paid all of the men taken back and given regular runs, from the time of their return until Jan. 1, 1917, shall be those which were paid the men by the company on Oct. 1, 1915.

"7. All suits against members of the labor movements and the injunction proceedings to be dropped by the company.

"8. No men to be taken back who by their personal acts have made themselves objectionable for re-employment. Objectionable personal acts shall not be held to mean mere membership in the Amalgamated Association or official connection therewith or membership on any committee.

"9. As of Jan. 1, 1917, a three-year working agreement in line with the agreement of Jan. 9, 1915, except as to Section 8 therein, and except as herein agreed, fully executed by the respective parties attached hereto shall go into effect.

"10. Wages to be paid for the three years from Jan. 1, 1917, to Jan. 1, 1920, to be 25 cents for first-year men, 26½ cents for second-year men, and 28½ cents for third-year men and over.

"11. When employing new or additional trainmen for car service that during the first two weeks of training they shall be paid the sum of $1 a day and during the third week shall be paid $2 a day. It is understood that applicants are not finally accepted for service until the expiration of the three weeks and only if then qualified.

"12. The men upon settlement to call off every action in opposition to the company and Local No. 164 by resolution to ratify the action of the executive committee in calling off the strike, and, also, by resolution to request the people to patronize the road and the men to use their honest efforts to restore riding upon the cars. The company to agree that there shall not be any prejudice held against any man taken back who went out on strike, nor any discrimination against such a man, nor any interference with or against him for his membership in the Amalgamated Association, and the men agree not in any manner to interfere with the present employees."

The terms of the peace pact were drawn up by the United Mine Workers. They are the ultimate in concessions that could reasonably be expected from the company, and the mine workers, looking at the matter from the third-party standpoint and realizing this, are said to have threatened to withdraw support, unfalteringly given for months to the men on strike, unless they accepted the peace proposal as contained in the agreement which was signed.

REVIEW OF CONTROVERSY

In all struggles similar to this that extend over any considerable length of time the original issues are submerged and lost sight of in the light of subsequent developments. Thus, in the Wilkes-Barre case the chronicle of events after the first few days turned from the main issues at stake to the disorder that followed, the boycott and its effect on trade, and other issues growing out of the struggle. For months now there has been nothing to report except such developments as concerned the local parties in interest, and on that account the strike has not been referred to in the ELECTRIC RAILWAY JOURNAL for some time past. The present account of the settlement, however, would hardly be complete without at least a brief review of the attending circumstances.

The corporation and its employees were bound by a working agreement that expired on Dec. 31, 1914. The company paid the men a flat wage scale of 24 cents and permitted a man to work as long per day as necessary. As the time for the termination of the agreement approached Dennis McCauley, president of the local union; Thomas Hatch, treasurer, and other members of a committee conferred with the railway representatives regarding the renewal of the contract. The men declared that they could not work under the terms of the old agreement, but wanted 32 cents an hour as a wage scale. After threatening to strike unless their demands were honored, the employees and the company finally reached a basis of settlement on Jan. 9, 1915. A new working agreement was drawn, in which both sides to the controversy decided that the men should be worked in shifts of nine hours, and that no motorman could work more than nine hours a day, unless conditions compelled the extra labor. The new pact also provided that when a man was suspended or discharged he should be permitted to ask for an investigation. He should have the right to be present personally and to have the charges against him made fully known to the employee. After this hearing the general manager was to decide whether or not the man was at fault. If guiltless, he was to be reinstated and paid for the time that he had lost through discharge or suspension. In case, however, that the decision of the general manager failed to meet the approval of the employees' committee asking an investigation, conciliators could be selected who would rule on the question. These mediators, it was determined, should be provided by the Secretary of Labor at Washington and the State Bureau of Labor and Industry. The matter of a wage scale was referred to arbitration. The new agreement was to exist for three years.

The decision to submit the wage scale to arbitration afterward became the nubbin of the controversy. It was distinctly provided in the agreement that "the decision of the board of arbitrators, or a majority of them, shall be final, and without appeal, and shall be binding and conclusive upon the said Wilkes-Barre Railway and said employees of said company."

The selection of the umpires was a matter that languished over months. The railway company chose Samuel D. Warriner of Philadelphia, president of the Lehigh Coal & Navigation Company. The men selected Thomas D. Shea, a lawyer of Wilkes-Barre. It was incumbent upon these arbitrators to select the third. Here came the hitch. Although several hundred names were submitted by both sides

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for the third umpire, none of these seemed to suit. This failure to agree on the third member bred an acute situation, which resulted in the men going on strike on April 1. Meanwhile the negotiations were pending. Finally John Price Jackson, State Commissioner of Labor and Industry, was chosen as the third arbitrator. The board was organized, and on April 10, 1915, the strikers returned to work. The arbitrators heard both sides to the controversy. Finally, on July 10, 1915, the arbitrators handed down their decision. All this while, pending a decision by the umpires, the men remained at work and accepted the old wage scale for the time.

The arbitrators' decision provided a sliding or graduated scale of wages. It stipulated that the carmen should be paid on the following scale: First-year men, 24 cents an hour; second-year men, 25; third-year men, 26; fourth-year men, 26½, and fifth-year men, 26¾ cents an hour. In addition, the men were to participate in a profit-sharing plan with the passenger revenue per car hour for the fiscal year ended Dec. 31, 1914, as the basis on which this new income was to be computed. This was $2.786. Under this decision from each 2½ cents additional revenue the motormen and conductors were to receive an additional compensation of one-fourth of a cent per hour.

This arbitration was retroactive and went into effect as of Jan. 1, 1915. The first two weeks of July were paid on the new scale, and on July 27 the corporation had a special payday, which gave to the men the increase to which they were entitled from the new year to the first of that current month. This amounted to $10,949.

Shortly after completing their duties, however, Samuel D. Warriner, the arbitrator for the company, received from Commissioner Jackson a lengthy letter, in which the latter declared that the arbitrators had not fulfilled their functions legally. The plaint of the local union men, it appeared, was that no sliding scale could be adopted by the umpires, as such a decision was not germane to the questions raised. In other words, as the old agreement provided for a flat scale, the arbitrators in determining whether or not the carmen were entitled to an increase could only have provided such an agreement as would have increased the wage scale based on the old flat rate.

Mr. Warriner replied that he agreed with none of Dr. Jackson's deductions, and that even if he were in accord with the commissioner's views the umpires were powerless to take further action. Mr. Warriner based this statement on his belief that once the arbitrators submitted their scale and findings, and these were accepted, the board automatically ceased to exist. For that reason any further consideration of the controversy would only be *ex parte* and have no judicial foundation or legal value.

Dr. Jackson then conferred with Attorney Shea, the umpire chosen by the men. On Oct. 1 they announced it as their unofficial opinion that the men should get 27 cents an hour for a flat scale. This was only a recommendation, the former umpires were compelled to state. For three days after the unofficial act the employees' representatives and the officials of the railway dickered over the matter and neither yielded. On Oct. 14, 1915, the strike was declared. To the company the whole issue lay in the refusal of the trainmen to abide by the arbitration.

SEATTLE COUNCIL ACTS AGAINST COMPANY

The City Council of Seattle, Wash., has passed a bill directing the corporation counsel to begin an action against the Puget Sound Traction, Light & Power Company to compel it to comply with the terms of its franchises, and pave its right-of-way at the time and with the same material as the rest of the street. Since the company petitioned the Public Service Commission of Washington to be relieved of certain of its franchise obligations because of impaired earnings, due in part to jitney competition, planking has been substituted for paving, pending a hearing on the petition. The 2 per cent gross earnings tax, from which the company also prayed to be relieved, has been paid under protest. The action of the Council in passing the bill directing the action stated is expected to be resisted by the company. The hearing on the part of the Public Service Commission of the original petition has been delayed because the commission has not completed the valuation of the properties of the company.

CINCINNATI TRAFFIC REPORT PRESENTED

More Than 25,000,000 Passengers Will Use Proposed Rapid Transit Loop Annually

Frank S. Krug, chief engineer, submitted to the Cincinnati (Ohio) Rapid Transit Commission on Dec. 15 a report of the traffic survey, made last August to secure information relative to the location and construction of the proposed loop. Mr. Krug estimates that 25,266,734 passengers will use the rapid transit loop annually.

Included in the survey is the area served by the Cincinnati Traction Company and the Ohio interurban lines entering Cincinnati, covering the city of Cincinnati, Norwood, St. Bernard, Elmwood Place, Cheviot, Wyoming, Reading, Lockland and Glendale. It is estimated that the traffic on all lines and interurban lines is 118,234,483 passengers of whom 106,629,830 are city surface line passengers and 11,234,483 are interurban passengers. The additional area that will be brought into the thirty-minute time zone from Fifth and Walnut Streets is greater than the area at present within that zone under existing conditions. The area of the territory now within the zone is 9242 acres and the population is 297,044, while that of the additional territory is 10,363 acres with a population of 59,876. Mr. Krug prepared a table showing the average time saving from the various sections to the intersection of Fifth and Walnut Streets, as compared with the present service. He pointed out that points where no time will be saved are within the loop and that here passengers will use the surface cars.

The report estimates that 51.2 per cent of the passengers using the loop will ride only on the east side of it; 39.4 per cent will ride only on the west side; 5.1 per cent will ride between the east and west side at the south end, passing through Fountain Square, and 4.3 per cent will ride between the east and west side at the north end between Paddock and Greenlee stations. A table is included in the report which gives an estimate of the rapid transit and interurban passengers boarding cars daily at rapid transit stations for both directions of operation from Fountain Square.

The estimate of interurban passengers who will ride annually in interurban cars over the loop is 1,854,644 for the east side of the loop, and 2,800,335 for the west side of the loop, making the grand total 4,654,979

In making the estimates Mr. Krug assumed that the rapid transit cars will be operated locally at high speed and in train units of such length as the traffic may require, and that the interurban cars from all lines will be operated over the loop line to Fountain Square.

The final joint session of the Rapid Transit Commission and the conference committee from the Council committee on street railroads was held on Dec. 13. The question of whether it is necessary to receive competitive bids for the lease of the proposed loop was discussed. The opinion that the Cincinnati Traction Company should operate the loop seemed to prevail, in order that there should be a unified system. W. L. Woodward, chairman of the transportation committee of the Federated Improvement Association, also expressed this belief.

Attorney Henry Bentley insisted that competitive bidding was out of the question unless the City Council fixed a price on the property of the Cincinnati Traction Company. Mr. Bentley said he represented himself, but that a bid would be made if the terms were open to competition. Walter Draper, secretary of the Cincinnati Traction Company, said that a price would be made on its property, if Mr. Bentley wished to buy it. Charles Mayer, a real estate man, made a proposition to lease the east half of the loop and operate it at a rate of seven tickets for a quarter. He said the west half could be operated by the Cincinnati Traction Company in connection with the surface lines.

Chairman Edwards of the commission stated that he would begin the preparation of a proposition to the Cincinnati Traction Company at once, but first he would submit a list of questions in order to secure information needed in formulating the proposition. Mr. Draper informed him that the company was ready to consider a proposition and that action would be taken upon it as quickly as possible. He said the company had followed the discussions closely and already many of the points had been decided. If possible the lease will be submitted to referendum vote in April, 1917.

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ST. LOUIS PREPARES COUNTER PROPOSAL

Summary of Unofficial Terms Which the City Feels Should be Imposed in the Traction Settlement

The counter proposition of the city of St. Louis, Mo., to that of the United Railways looking toward the settlement of all the differences between them was formulated and adopted by the committee on public utilities of the Board of Aldermen on Dec. 12. It will be submitted to the joint committee composed of city officials and representatives of the company at a meeting to be held in the near future.

It was not intended that the conditions as adopted by the committee should become public, but the newspapers secured and printed what purported to be an outline of the counter proposal of the city. These reports said that it was intended to limit the proposed new franchise grant to the company to twenty-five years for all lines; to determine the actual value of the property and limit the return to the company upon the basis of a fixed percentage on that valuation; to include in the grant a provision for the future acquisition of the company's property by the city; to dispose of any surplus earnings of the company over and above that needed for the guaranteed return to the company by dividing them between the city and the company, by allowing the employees to share in them, by placing the sum in a fund for the future development of rapid transit, by using it to accomplish a reduction in fares or by disposing of the surplus by some combination of the methods just mentioned; to limit the board of directors to twelve members with five from the city; to give the director of public utilities of the city general control over the service and operation of the company; to require the company to report to the city in accordance with conditions prescribed by the city; to charge in as operating expenses of the company all expenditures made by the city in connection with the affairs of the company; to continue the mill tax, the tax up to Dec. 31, 1916, with accrued interest to be paid to the city in annual instalments.

The committee on public utilities, which will make the above report, is composed of the following: Aldermen Eugene B. Gregory, chairman; William F. Otto, Adam Reis, Otto A. Hampe, Barney L. Schwartz, Gus A. Baur and Alfred Bergmann. Together with Louis P. Aloe, president of the board, and Richard McCulloch and Murray Carleton of the railways company, they were appointed a subcommittee, Nov. 22, by Mayor Kiel, to consider the proposition made by the company's officials to the board of estimate and apportionment and the public utilities committee.

Mr. Gregory, the chairman of the committee, was greatly displeased with the publication of the alleged terms of the tentative counter proposal from the city. He called off the meeting of the committee set for Dec. 14 and refused to be quoted as to when the committee would meet next.

Richard McCulloch, president and general manager of the United Railways, refused to discuss the report of the committee. He said that the matter had not come before him officially, and that to discuss it before such time would be an act of discourtesy to the committee. He did, however, discuss some of the details necessary for a readjustment of the capital liabilities of the company without the need for receivership and foreclosure.

In this connection, it is being urged in certain quarters that the present market value of the securities of the company which are outstanding furnish a good criterion as to the value of the company as a going concern. At present the United Railways and its constituents have outstanding more than $57,000,000 of bonds, $16,383,200 of preferred and $24,913,800 of common stock. As against these par values, however, current market quotations give these securities the present market value: Outstanding bonds, $36,450,000; preferred stock, $3,100,000; common stock, $1,000,000. Thus the securities outstanding with a par value of about $100,000,000 have a market value of only $40,500,000.

Ephrim Caplan, a member of one of the committees appointed in the interest of the security holders of the company, returned to St. Louis on Dec. 18 from New York after conferring with representatives of the North American Company, which controls the United Railways, through ownership of approximately $18,400,000 of the common stock of the company. Mr. Caplan announced that Horace Havemeyer, New York, and Charles C. Harrison, Philadelphia, had been added to the committee of which he is a member. The other members are August Heckscher, New York, and Charles S. Farnum, Philadelphia. Mr. Caplan said the committee represented nearly 30 per cent of the outstanding preferred stock. Included in the plan of the committee as laid before the North American Company, Mr. Caplan is quoted as saying, was the following program:

1. That the mill tax question should be settled in some manner.
2. That the franchise question should be adjusted.
3. That a radical change in the legal department of the United Railways must take place.
4. That fullest publicity and examination must be made of the power contracts to which the United Railways is a party, and that these contracts should be readjusted squarely for the benefit of the company.
5. That preferred stockholders should have representation on the board of directors.

The St. Louis *Post Dispatch* is publishing for the benefit of its readers brief reviews covering the terms and conditions of the recent traction settlements in Chicago, Kansas City and other places.

RAILWAY OFFICIAL LOST IN ADIRONDACKS

All the efforts have proved unavailing which were made to locate Carleton Banker, superintendent of the electric division of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., who disappeared on Nov. 10 during a short hunting trip in the Adirondacks such as he was accustomed to take. On Nov. 7, in company with F. A. Bagg, chief engineer of the Fonda, Johnstown & Gloversville Railroad, and four other hunters, Mr. Banker went on a trip to Truman Lawrence's camp at Piseco Lake, Hamilton County, N. Y. On Nov. 10 Mr. Banker and Mr. Bagg packed into the "Foxy" Brown's camp, some 6 miles distant, to enjoy a few days in the company of Mr. Brown, with whom Mr. Banker had hunted and fished for twenty years. Friday morning, Nov. 10, the three men started to hunt, walking from 7 a. m. until about 3.30 p. m. Mr. Banker then complained of being very tired and was left by the other two at a certain spot, while they were to tramp around the northwest end of the Lunkazu Mountain, on which they were to make a drive to Mr. Banker.

After making the drive and returning where Mr. Banker had been left, Mr. Bagg and Mr. Brown found no trace of him and presumed that he had either returned to camp because of his fatigued condition or had followed the trail of a deer or bear. As darkness was fast approaching, Mr. Bagg and Mr. Brown returned to camp, staying for about an hour. They then started out to search for Mr. Banker, thinking perhaps he had become turned around and would signal to them. They roamed the woods where he was last seen, and fired signal shots until 11 p. m., but without getting a response of any kind to their signals. Mr. Bagg then walked to Piseco and gave a general alarm. Within a few hours searching parties to the number of 150 men had started in all directions. The searching extended over a period of six days, but was without result. To those who know the Adirondack wilderness, it is easy to understand how a man lost through straying, and overtaken by some physical ailment, brought about by fatigue, might lie almost within sight and touch and still be missed by the most painstaking searchers.

Carleton Banker was born in Fonda, Montgomery County, N. Y., fifty-six years ago. He was educated in the schools of that town and until he was about twenty-three years of age lived on the Banker farm at Fonda with his parents. He then went to Staley, Neb., which was at that time located on what was known as the Burlington & Missouri Railroad. His position with that company was as station agent and he remained in railroad work in the West until 1893, when he returned east to take up a position as general bookkeeper of the Cayadutta Electric Railroad, operating between Fonda and Gloversville. In 1903, Mr. Banker was made superintendent of the electric division of the Fonda, Johnstown & Gloversville Railroad upon the merging of the Cayadutta Electric Railroad with the Fonda, Johnstown & Gloversville Railroad. He was married and had two daughters.

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CHARGE AGAINST EDITOR AND PAPER SUSTAINED

The United States Circuit Court of Appeals at Cincinnati, Ohio, handed down a decision on Dec. 15 sustaining the decision of Federal Judge John M. Killits of the Northern Ohio district against the Toledo Newspaper Company, publishers of the Toledo *News-Bee*, and against N. D. Cochran, editor of the paper, on the charge of contempt of court. The newspaper and its editor were charged with having written and published articles and editorials calculated to interfere with the court's rulings in connection with a temporary injunction to prevent the enforcement of a 3-cent-fare ordinance passed by the City Council of Toledo and affecting the Toledo Railways & Light Company. The decision of the Court of Appeals states that the articles in question tended and were intended to provoke public resistance to an injunction, if one should be made, and one of the findings is to the effect that they constituted an attempt to intimidate or, at least, to influence the District Judge with reference to the decision in the matter pending before him. The court held that it is of no importance in such a case that the effect that may have been produced in the Judge's mind was irritation instead of fear, as had been claimed in the hearings. Judge Killits assessed a fine of $7,500 on the newspaper company and $200 on Mr. Cochran. The case will be appealed to the United States Supreme Court.

Cleveland Car Type Unsettled.—Fielder Sanders, of Cleveland, Ohio, street railway commissioner, made an effort to have the City Council on Dec. 18, approve an all-steel trail car as the permanent type to be used. Council is undecided as between this car and the semi-steel car with center entrance which is now used. The Cleveland Railway favors the present type of car and the street railway committee had recommended its adoption as a permanent model.

Accident in Boston Elevated Power Plant.—A piston rod on a vertical cross-compound Westinghouse engine in the Lincoln power station of the Boston Elevated Railway broke on Dec. 19. As a result service had to be shut down temporarily on the Atlantic Avenue elevated line. An employee at the station was injured from escaping steam. The breakage of the piston rod was followed by the blowing out of a cylinder head, which fell upon a steam main carrying 180 lb. pressure. Services by additional equipment was restored in about ten minutes at the third rail.

Recommended That Station Be Scrapped.—The board of arbitration, to which the dispute between the Cleveland (Ohio) Railway and the city of Cleveland over a proposed power contract was submitted, announced on Dec. 12 that the Cedar Avenue power station should be scrapped and that a new substation should be built. The points yet to be decided are how the value of the power station shall be charged off and from what source the company shall receive its power supply. The company desires to close a contract with the Cleveland Electric Illuminating Company, while the city insists that the municipal light plant furnish the power necessary to take the place of the old station.

Increase in Wages in St. Louis.—The United Railways, St. Louis, Mo., has announced a 5 per cent wage increase, effective on Jan. 1. It is estimated the increase will cost the company $150,000 a year and will give each motorman and conductor about $50 a year more. The old scale was 23 cents an hour for first-year men and 1 cent more an hour for each additional year's service until six years, after which the scale stood stationary at 28 cents. Under the new scale first-year men will receive 24 cents an hour. One cent an hour increase will be paid in each year after the first until the seventh year, when 29½ cents will be paid. Thirty cents an hour will be paid the eighth year, 30½ cents an hour in the ninth year and 31 cents an hour in the tenth year and thereafter. Since 1904 the company has increased the wages of its trainmen 37 per cent.

PROGRAM OF ASSOCIATION MEETING

Central Electric Railway Association

The annual meeting of the Central Electric Railway Association has been changed by letter vote of the executive committee from Feb. 22 and 23, 1917, to March 8 and 9, 1917, at Indianapolis, Ind.

Financial and Corporate

ANNUAL REPORT

Chicago Elevated Railways Collateral Trust

The combined statement of income, profit and loss of the Metropolitan West Side Elevated Railway, the South Side Elevated Railroad and the Northwestern Elevated Railroad, which are controlled by the Chicago (Ill.) Elevated Railways Collateral Trust, is as follows for the years ended June 30, 1915 and 1916:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Gross operating revenue	$8,435,008	100.0	$8,045,264	100.0
Operating expenses:				
Way and structures	$184,837	2.2	$163,679	2.0
Equipment	459,679	5.4	334 927	4.2
Power	991,533	11.8	911,093	11.3
Conducting transportation	2,270,081	27.0	2,042,388	25.4
Traffic	20,610	0.2	6,479	0.1
General and miscellaneous	408 321	4.8	411,737	5.1
Total operating expenses	$4,335,061	51.4	$3,870,306	48.1
Net operating revenue	$4,099,947	48.6	$4,174,958	51.9
Taxes, city compensation and other items	722,115	8.6	700,243	8.7
Operating income	$3,377,831	40.0	$3,474,715	43.2
Non-operating income	*135,694	1.6	*117,905	1.4
Gross income	$3,513,525	41.6	$3,592,620	44.6
Deductions—interest and rents	*2,247,407	26.7	*2,188,409	27.2
Net income	$1,266,118	14.9	$1,404,211	17.4
Dividends	1,135,543	13.4	1,105,373	13.7
Surplus	$130,576	1.5	$298,837	3.7

*Intercompany rentals deducted.

The combined gross operating revenues of the three controlled companies increased $389,744 or 4.8 per cent. The operating expenses, however, increased $464,755 or 12 per cent, so that the combined net operating revenue for the last year showed a falling off of $75,011 or 1.8 per cent. All the operating expense divisions except general and miscellaneous showed increases, the largest being $124,752 or 37 per cent in maintenance of equipment and $227,693 or 11.1 per cent in conducting transportation. Taxes and income deductions also increased, with the result that the net income for the year suffered a loss of $138,093 or 9.1 per cent as compared to the preceding period. The net income secured in the last year was equal to about 305 per cent on the $36,292,500 of pledged capital stock of the controlled companies.

The report of the Chicago Elevated Railways Collateral Trust, which is for the calendar year 1915, states that the combined net earnings of the three controlled companies for 1915 showed a decrease of $252,344 as compared to the previous year. For the first ten months of 1916, however, the combined gross earnings of those companies increased from 9 to 10 per cent as compared with the corresponding period of 1915, and it is expected that the net earnings for 1916 will show an increase of from 8 to 9 per cent over 1915.

In 1915 the collateral trust received dividends on stocks owned amounting to $1,027,045 and interest amounting to $125,585, making a total income of $1,152,630. Interest charges were $1,120,000 and general expenses $26,212, making total disbursements $1,146,212. The net income, therefore, was $6,417, which practically meant nothing available for dividends on the preferred certificates of the trust. In the year preceding the net income was $484,698, permitting dividend disbursements of $480,000.

During the year the trustees acquired the following securities classed as current assets: $73,000 of joint 5 per cent equipment trust certificates, series B, issued by the Metropolitan, Northwestern and South Side companies, dated Aug. 1, 1914; $254,000 of receiver's certificates, issued by the receiver of the Chicago & Oak Park Elevated Railroad; $16,000 of 6 per cent equipment notes of the Chicago & Oak Park Elevated Railroad and $5,362 of 5 per cent mortgage note secured by mortgage on property of the Chicago & Oak Park Elevated Railroad.

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CAPITAL TRACTION COST ADJUSTED

Company and Commission Compromise on $10,996,214 as Main Reproduction Cost—Some Items Excepted

A formal agreement to adjust the differences in the reports of their two sets of engineering experts on the reproduction costs, which varied less than 5 per cent, has been reached by the Capital Traction Company, Washington, D. C., and the Public Utilities Commission of the District of Columbia. The established cost of reproduction is only one element of fair value, but it affords a working basis for further valuation determinations.

The agreement provides that the Capital Traction Company will accept the adjusted figures, *i.e.*, $10,996,214, as representing the total reproduction cost of that part of its physical property which is included in the commission report of Charles L. Pillsbury, as estimated under conditions named in said report, excepting land, interest, taxes and insurance on land, and working capital. The amount mentioned represents the estimated cost of the reproduction of the physical property referred to as of June 30, 1914, the Capital Traction Company reserving the right later to introduce evidence showing changes in such cost since that date.

The figure of $10,996,214 was arrived at by an increase of $754,039 in the figures in the revised report of Mr. Pillsbury, dated Nov. 22, 1916. This amount was derived by making the following adjustments:

1. By the acceptance on the part of the commission of the estimate for materials, tools and supplies on hand included in the J. G. White Engineering Corporation report for the company.

2. By the acceptance by the commission of the differences in base figures, this concession of the total net difference in base being made after a comparison of the detail figures between Mr. Pillsbury's report and the report of the J. G. White Engineering Corporation, made jointly by Mr. Pillsbury and the company's engineer, in furtherance of the adjustment next mentioned. This difference, amounting in all to $386,740, is an increase of 4.97 per cent over Mr. Pillsbury's figures.

3. By mean adjustment between the methods of applying localized costs and general costs resulting in an additional increase in Mr. Pillsbury's figures of $274,646, accompanied by a reduction, amounting to $274,646, in the localized and general costs as shown in the J. G. White Engineering Corporation report.

The agreement, however, makes a specific reservation that the adjustments above stated do not carry with them the acceptance on the part of the Captial Traction Company of the land values as submitted in Mr. Pillsbury's report. Nor do they in any wise affect the right and privilege of the Capital Traction Company to put in evidence items of physical cost which may or may not have been referred to in Mr. Pillsbury's report, but which items are not included in the total estimated cost of reproduction as reported by him.

The land values, etc., in Mr. Pillsbury's report to which exception is made amount to a total of $783,934. These include land, $618,116; insurance on land, $1,236; taxes on land, $12,362; interest on above items, $44,220, and working capital, $108,000.

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—The Arkansas Valley Railway, Light & Power Company is negotiating the purchase of the business and system of the Ordway Electric Light & Power Company, which serves the communities of Ordway and Sugar City, Col., electrically.

Ashland Light, Power & Street Railway Company, Ashland, Wis.—P. W. Brooks & Company, New York, N. Y., are offering an additional amount of first mortgage 5 per cent gold bonds of the Ashland Light, Power & Street Railway Company, making the total outstanding amount of such bonds $761,000.

Carolina Power & Light Company, Raleigh, N. C.—An initial dividend of one-half of 1 per cent has been declared on the common stock of the Carolina Power & Light Company, this being payable on Feb. 1 to stockholders of record on Jan. 16.

Interstate Railways, Camden, N. J.—John A. Rigg, president of the Interstate Railways, has issued a statement, saying in part: "There was mailed recently by the Real Estate Title Insurance & Trust Company, Philadelphia, trustee, to the holders of United Railways 4 per cent gold trust certificates and Interstate Railways 4 per cent collateral trust gold bonds a circular letter notifying such holders of a proceeding in equity to have the tripartite agreement of Dec. 20, 1902, declared terminated and ended and of the right of such holders to intervene in the equity suit and defend the same, inclosed being copies of the bill in equity and of the answers of the Interstate Railways and the Real Estate Title Insurance & Trust Company, of Philadelphia. The holders of United Railways 4s and Interstate 4s, we are assured by United Power & Transportation Company, need have no apprehension concerning their securities, for the purpose of the proceeding is not to impair their value in the least, but really to prevent a recurrence of the difficulties through which Interstate Railways passed from 1907 to 1910."

Iowa Southern Utilities Company, Centerville, Iowa.—The bond department of the Chicago Savings Bank & Trust Company, Chicago, Ill., is offering for subscription at 101 and interest, yielding more than 5.90 per cent, $550,000 of first mortgage sinking fund 6 per cent bonds of the Iowa Southern Company. The bonds are dated Oct. 2, 1916, and are due Oct. 1, 1933, but are callable on any interest date at 105 and interest. They are part of a total authorized issue of $2,500,000 and are followed in order by $200,000 of 6 per cent serial debenture mortgage bonds, $300,000 of 7 per cent preferred stock and $500,000 of common stock, all outstanding. The Iowa Southern Utilities Company was organized under the laws of the State of Maine in 1905, under the name of Centerville Light & Traction Company, and owns and operates the public utility properties serving Centerville and a street railway serving the city and extending to the town of Mystic. The company has just acquired all the property of the Centerville, Albia & Southern Railway, which operated a passenger and freight electric railroad between Centerville and Albia. D. C. Bradley, the president of the company, in his statement to the bankers, outlines as follows the purposes of the financing: "Up to the present, the above properties have been financed by the owners from their own resources and from earnings. The rapid growth of the business, however, and the desirability of providing for acquisitions of a number of neighboring public utility properties have made it advisable to finance the corporation along customary lines. The present financing will provide for the retirement of existing floating indebtedness and will furnish the company with ample working capital."

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—As stated in the ELECTRIC RAILWAY JOURNAL for Aug. 26, page 375, the Lake Erie, Bowling Green & Napoleon Railway was sold on Aug. 5. The report subsequently became current that the road was entirely dismantled. This is not the case. That part of the road between Tontogany and Bowling Green, and between Pemberville and Woodville is entirely dismantled. The balance of the road namely, between Bowling Green and Pemberville, 11½ miles, was taken over by the Toledo, Fostoria & Fremont Railway and will be operated by that company.

Montreal (Que.) Tramways.—Coffin & Burr, Boston, Mass., are offering jointly with N. W. Harris & Company, New York, N. Y., $2,000,000 of first and refunding mortgage gold bonds of the Montreal Tramways dated July 1, 1911, and due July 1, 1941. The bonds are in the denomination of $500 and $1,000 each registerable as to principal. Interest is payable on Jan. 1 and July 1 in New York, Chicago or Montreal, or in London at the fixed rate of $4.86⅔. The Harris Trust & Savings Bank, Chicago, Ill., is trustee of the issue, with the National Trust Company, Ltd., Montreal, as co-trustee. Previous issues of the bonds are listed on the New York, Montreal and London Stock Exchanges and application will be made to list the present offering. The price at which the bonds are being offered is not given in the circular describing the issue.

New York State Railways, New York, N. Y.—A dividend of 1 per cent has been declared on the $19,952,400 of common stock of the New York State Railways, payable on Jan.

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2 to holders of record of Dec. 22. In October last 1¼ per cent was paid on the common stock of the company. The regular quarterly 1¼ per cent on the preferred stock was also declared payable on Jan. 2.

Northern States Power Company, Chicago, Ill.—The directors of the Northern States Power Company have declared the usual quarterly dividend of 1¾ per cent on the preferred stock of the company, and have declared a dividend of 1¾ per cent on the common stock, which is an increase of one-quarter of 1 per cent. The preferred stock dividend is payable on Jan. 15, and the common stock dividend is payable Jan. 20, to stockholders of record Dec. 30.

DIVIDENDS DECLARED

American Cities Company, New York, N. Y., 1½ per cent, preferred.

Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1¾ per cent, preferred.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred; one-half of 1 per cent, common.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1½ per cent, preferred A.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred.

Eastern Texas Electric Company, Beaumont, Tex., 3 per cent, preferred; 2½ per cent, common.

Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly, 1¾ per cent, first preferred; quarterly, 1¼ per cent, second preferred.

Illinois Traction Company, Peoria, Ill., quarterly, 1½ per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred; one-fourth of 1 per cent, common.

New York State Railways, New York, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Reading (Pa.) Traction Company, 75 cents.

Union Passenger Railway, Philadelphia, Pa., $4.75.

Utah Power & Light Company, Salt Lake City, Utah, quarterly, 1¾ per cent, preferred.

Virginia Railway & Power Company, Richmond, Va., 3 per cent, preferred.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 75 cents, preferred.

Wisconsin Edison Company, Inc., New York, N. Y., $1.75; 75 cents extra.

ELECTRIC RAILWAY MONTHLY EARNINGS

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov.,		'16	$1,328,388	$20,021	$1,308,367	$214	$1,308,123
1 "	"	'15	490,622	15,537	475,085	40,833	434,252
12 "	"	'16	9,071,718	236,868	8,834,850	299,479	8,535,370
12 "	"	'15	4,352,412	167,112	4,185,300	490,000	3,695,300

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m. Nov.,		'16	$2,361,936	$1,321,399	$1,040,537	$814,174	$226,363
1 "	"	'15	2,136,746	1,192,258	944,488	815,532	128,956
5 "	"	'16	11,369,858	6,307,726	5,062,132	4,073,313	988,819
5 "	"	'15	10,203,500	5,722,268	4,481,232	4,080,296	400,936

PHILADELPHIA & WESTERN RAILWAY, UPPER DARBY, PA.

1m., Nov.,		'16	$43,452	$20,840	$22,612	$12,545	$10,067
1 "	"	'15	40,460	19,065	21,395	12,490	8,905
12 "	"	'16	511,227	244,122	267,105	150,555	116,550
12 "	"	'15	456,354	219,905	236,449	147,426	89,023

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Nov.,		'16	$479,367	$199,073	$280,294	$225,605	$54,689
1 "	"	'15	455,165	208,850	246,315	224,196	22,119
12 "	"	'16	5,453,454	2,521,251	2,932,203	2,692,578	2,239,625
12 "	"	'15	5,542,899	2,534,331	3,008,568	2,748,004	260,564

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m., Nov.,		'16	$344,942	*$196,083	$148,859	$72,643	‡$76,465
1 "	"	'15	289,151	*167,266	121,884	57,200	‡65,184
11 "	"	'16	3,614,204	*2,092,146	1,522,058	773,321	‡754,567
11 "	"	'15	2,800,427	*1,706,191	1,094,235	618,169	‡477,856

*Includes taxes. ‡Includes other income.

Traffic and Transportation

BROOKLYN CAR AND SERVICE ORDER

B. R. T. Directed to Purchase 250 Cars in an Order by the Public Service Commission Censuring the Company for Over-Crowding.

The Brooklyn (N. Y.) Rapid Transit Company has been directed to purchase at once 250 additional cars for operation over its lines. The order was issued by the Public Service Commission for the First District, following the adoption of an opinion by Commissioner Travis H. Whitney, in which Commissioner Whitney censured the line for overcrowding its cars and for insufficient equipment. All of the new cars are directed to be in service by Feb. 1, 1918. It is ordered that the new cars shall be of the center entrance stepless type so-called, having a seating capacity of fifty-eight passengers each. Cars of similar type are now in use on the lines of the Brooklyn system.

In his opinion Commissioner Whitney found that it is impossible to regulate street car service in New York City by means of so-called health ordinances. He states that while such ordinances provide additional accommodations for a few passengers, the rest are denied accommodations, altogether, and the ordinance is thus regulating the public and not the street railroads. He finds other objections to such regulations. Commissioner Whitney finds that the present practice of the company of maintaining a balance of only 4.8 per cent reserve of cars for repairs and other exigencies must cease, as he holds that at least 8 per cent reserve is necessary. He states that any street railway in discharging its functions must provide not only sufficient cars for immediate needs, but must make ample provision for the near future. He criticizes the practice of the company in utilizing many cars seating only from twenty-four to thirty-eight passengers each, whereas he states if the company operated larger cars, it would be able to get more passengers past a given point in the rush-hour period, thus increasing accommodations materially. The opinion also disagreed with the contention of the company that it is a reasonable standard of service to operate surface cars during rush-hour period with a standing load of from 60 to 100 per cent.

Among the charges made by Commissioner Whitney are:

1. That overloading and inadequate service are largely due to insufficiency in equipment.

2. That the company is not doing its duty if it is not prepared to keep up with the development or growth of the community.

3. That the company contemplates opening four new surface lines without being prepared to meet the service needs.

4. That ninety of the present cars having a seating capacity of twenty-four to twenty-six passengers each have become obsolete and are unsuited for a community with a population of 1,800,000. The cars should be retired.

5. That the principal lines during rush hours show excessive overloading, in some cases of more than 100 per cent during an interval of an hour.

6. That the company, when it argues it is not getting a proper return, is attempting to reverse the existing law, which is that a fair return is predicated upon adequate service.

7. That the percentage of standees claimed by the company is not proper.

8. That heating and ventilation are inadequate.

9. That the company admits the inadequacy of the service and the superintendent of transportation asked for 100 additional cars, which he did not expect before 1917 or 1918.

10. That the company "no doubt still contemplates the continued maintenance of the percentage of overload" which it has adopted as a standard for operation.

With respect to the increase in traffic in Brooklyn Commissioner Whitney said:

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"The increase in traffic on the Brooklyn surface lines from 1900 to 1915 inclusive, is shown by the following table:

Year	Brooklyn Surface
1900	204,106,397
1901	209,119,668
1902	216,594,408
1903	223,433,771
1904	233,184,407
1905	242,780,611
1906	265,204,811
1907	262,460,253
1908	274,766,791
1909	275,038,827
1910	289,308,085
1911	305,977,350
1912	322,321,981
1913	345,321,401
1914	351,905,234
1915	354,700,113

"The number of closed cars controlled by the Brooklyn Transit System including the Coney Island & Brooklyn Railroad, during the period from 1908 to 1915, inclusive, has been as follows:

Year	No. of Closed Cars
1908	1,823
1909	1,823
1910	1,841
1911	1,841
1912	1,841
1913	1,943
1914	1,943
1915	1,943

"It appears, therefore, that the percentage of increase in traffic has been far greater than the percentage of increase in cars necessary to transport the traffic, and, unless the facilities afforded for the traffic transported during the year 1908 were in excess of the requirements, the additions made to the accommodations have not kept pace with the requirements of increased traffic. It is an historical fact that the accommodations on the surface railroad lines in Brooklyn, during the year 1908, were not in excess of the needs of the time, as the service on the surface as well as on other lines in Brooklyn was, during that period, the subject of repeated complaint and criticism.

"It does not, however, follow that the number of cars should increase in exact proportion to the increase in the number of riding passengers. More frequent operation of cars might accommodate in part the traffic increase. Limiting points of operation where the maximum operation has been reached may prevent an increase in the number of cars, although the situation may be remediable through the substitution of cars of greater capacity.

"According to the testimony in this case, the companies now operate during the rush hour period 95.2 per cent of their total number of cars, leaving a balance of 4.8 per cent only for repairs and reserve. This reserve the commission considers insufficient and is considered by the companies as a very narrow margin. The incidents and exigencies of operation must be taken into account in rendering reasonable and adequate service. The commission is of the opinion that 8 per cent of the total number of cars used is a safe margin to be kept in reserve for repairs and emergencies. Upon the basis of 1,943 cars now operated, the companies should provide sixty-two additional cars of thirty-seven passenger capacity or thirty-nine cars of fifty-eight passenger capacity to allow such 8 per cent reserve. If the total number of cars to be operated be increased, the reserve would correspondingly increase. The commission finds that at least thirty additional cars of fifty-eight passenger capacity should be provided for the purposes of reserve."

Of special interest in this connection is the action of the Board of Health of New York on Dec. 16 in passing seven amendments to the sanitary code to take effect immediately with a view of enabling Health Commissioner Emerson to prosecute the railways for failure to relieve overcrowded conditions on the various lines. The action of Commissioner Emerson's predecessor, Dr. Goldwater in connection with the car-full order made by him before the recent reorganization of the personnel of the commission resulted in raising the question of jurisdiction as between the two sets of authorities and Dr. Emerson's plans as just announced have naturally called forth condemnation from Public Service Commissioner Whitney as noted in the present Brooklyn case. The amendments to the sanitary code will also give the commissioner the power to commence criminal proceedings for infractions of the law requiring cars to be properly heated, ventilated, and lighted.

ST. LOUIS DAMAGE EXPENSES AVERAGE 4.98 PER CENT OF GROSS RECEIPTS FOR SIX-YEAR PERIOD

The special report of the United Railways, St. Louis, Mo., for the first six months of 1916 abstracted in the ELECTRIC RAILWAY JOURNAL for Sept. 23, page 560, contained the following table showing the relation between the damage expenses of the company and the gross receipts since 1910:

Year	Damage Expenses	Percentage of Gross Receipts
1910	$468,325.82	4.05
1911	505,528.46	4.24
1912	607,237.88	4.96
1913	702,703.71	5.53
1914	740,606.43	5.95
1915	600,534.18	5.14

In commenting on these figures the report said:

"The tendency of people to regard personal injuries as an asset and demand large damages, the tendencies of juries and the courts to allow these claims, the activities of a certain class of the legal fraternity in specializing in these cases, the increasing congestion of city streets, and the increasing use of automobiles by inexpert drivers, all tend to increase the number and cost of accidents.

"A safety campaign energetically conducted for several years has checked, to some extent, the increasing size of the damage account. The officers of the company deplore the expenditure of this money, and are exerting every effort to minimize accidents and settle damage claims economically. The cost of damages in St. Louis compares favorably with similar expenditures by street railway companies in other American cities of a comparable size."

ABANDONMENT OF SERVICE DISALLOWED

The Supreme Court of Ohio rendered a decision on Dec. 12 to the effect that the Hocking Valley Railroad must maintain electric service over its line between Hamden and Jackson, although the company insisted that the line is not profitable. This decision upholds the order of the Public Utilities Commission issued on Sept. 1, 1914. Precedents have been established by other courts to the effect that, before a railroad can change the form of its service because of changed conditions in the community, it must have sufficient experience to establish its claim. This decision follows the rule set forth in precedents in declaring that the Hocking Valley Railroad did not have such experience, as it had not been operating a sufficient length of time after conditions changed. The section through which the line passes was at one time a busy coal mining and furnace region, but of late years many of the mines have been abandoned and the iron works closed. This reduced the patronage and left mainly farmers as patrons. Three years ago the company endeavored to abandon the service, but the people living along the line took the matter to the Public Utilities Commission. In the face of proof that the line had been operated at a loss for ten months, the commission ordered electric service restored.

INTERURBAN RAILWAY SAFETY CAMPAIGN

The Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has issued the following notice:

"The Chicago & Milwaukee Railroad has been recently reorganized as the Chicago, North Shore & Milwaukee Railroad, and it is the desire of the new management to cultivate the good will and secure the co-operation of all its patrons and neighbors in the various villages and cities by giving good service.

"Constant supervision is being given to the conditions affecting the safety of operation. Signals, protective devices and gates are being installed, obstructions to vision cleared, and an organized campaign of safety, under the direction of an experienced safety engineer, has been started among all employees, and we earnestly request that the public co-operate with the company in every way possible in this regard.

"The safety engineers will extend this campaign shortly to include instructive talks to all the school children in the various schools along the line, and to impress upon them the care to be exercised in crossing the tracks or in getting on and off the cars."

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REARRANGEMENT FOR I. T. S. FREIGHT SERVICE

Option on all the necessary right-of way for rearrangement of tracking conditions at various points on the Illinois Traction System, Peoria, Ill., has been secured, and work will begin in the spring of 1917 to carry this out in order to facilitate the movement of freight through certain towns. This work contemplates the straightening of curves at Mount Olive and Litchfield, and a belt line at Staunton which will make possible the handling of foreign freight cars in any quantity on the Litchfield-Hillsboro division of the system. At Staunton a branch off the main line will be built at the point where the main line crosses the Wabash Railway tracks to Mine No. 14. From this point the proposed belt line will extend east on private right-of-way for 0.75 mile, and then on Wabash right-of-way for an equal distance to a connection with the Staunton-Hillsboro division.

At present, at Litchfield, the Illinois Traction tracks cross the lines of the Wabash, Illinois Central and Chicago, Burlington & Quincy tracks at grade, making it necessary to flag all three of these crossings. Under the new arrangement the crossing with these railroads will be made at an interlocker some distance south of the present crossing, with new track laid on a private right-of-way from this point in a northeasterly direction and out State Street to the present passenger station. This new right-of-way will cross the Litchfield public reservoir by means of a fill 240 ft. long, with two outlets 48 in. in diameter. This public reservoir has a capacity of 90,000,000 gal., and permission has been secured from the city to make this crossing.

PRESIDENT BRUSH ASKS CO-OPERATION

Matthew C. Brush, president of the Boston (Mass.) Elevated Railway, has issued two statements to the public of Greater Boston asking for co-operation in making the car service as good as possible, especially in connection with the holiday traffic. The travel between residential and shopping districts is greater in Boston this year than ever before and the removal of surface cars from Washington Street has tended to increase still further the patronage of the rapid transit lines, especially in the Washington Street tunnel. The company is operating eight-car trains through this tunnel on the shortest headway consistent with safe service, but notwithstanding this, a certain amount of congestion occurs at the various stations during the evening rush hours. His statement points out that to the extent that shoppers consistently can leave the downtown district slightly ahead of the afternoon rush-hour traffic, the handling of the enormous crowds now requiring transportation will be materially facilitated.

The second statement bespeaks the co-operation of the traveling public in giving names as witnesses to employees when requested or by sending to the company statements of untoward occurrences on the cars that might otherwise not come to the attention of the management. The company is bending every effort toward the elimination from its cars of those persons who are under the influence of liquor or are otherwise disorderly. Extra efforts are being made to keep the stations and cars free from objectionable persons. The statement says in part:

"I earnestly urge the co-operation of the entire community served by our company, in the suppression of any disorderly or discourteous acts on any platform or cars under our jurisdiction and nothing will be more conducive to the elimination of objectionable persons than the cordial co-operation of all our other patrons."

Car Mail Boxes Opposed. The Kansas City (Mo.) Railways has notified the post office at Kansas City that it will not consider any proposition, regardless of compensation offered, for attaching mail boxes to the cars of Kansas City. The announcement mentions unfavorable experience as to service to the public in cases where mail boxes have been used on cars.

Name-Suggesting Contest Closed.—The Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has closed the contest for the selection of two names by which two new trains of the company are to be designated. From thousands of names suggested, the two chosen were the "Second City Limited" and the "Universal Limited." Each of the successful contestants received $5.

New Albany Tariff Suspended.—The Public Service Commission for the Second District of New York, by order of date Nov. 8, suspended from Nov. 25, 1916, until Jan. 25, 1917, unless otherwise ordered, the taking effect of the changes in the fare tariff on the Albany-Troy line of the United Traction Company referred to in the ELECTRIC RAILWAY JOURNAL of Nov. 11, page 1040, seeking the elimination of transfers on the Albany-Troy line.

Car Stop Signs on Poles.—Experiments are being made by the International Railway, Buffalo, N. Y., with a new stop sign on the Kenmore-Tonawanda division of its interurban line. The sign is an 18-in. white band painted on the poles along the line. The bands are 5 ft. above the ground and are easily seen. In some places the company has been displaying "Cars-Stop Here" signs on the wire. If the experiment proves a success the system will be generally adopted on the interurban lines.

Children Carried Free to Safety Conference.—In order that all the children of Scott County, Ky., may be present at a safety first meeting to be held in connection with a fair at Georgetown, the county seat, on Dec. 22, the Kentucky Traction & Terminal Company, the Frankfort & Cincinnati Railroad and the Queen & Crescent Railroad, announced that they would carry them free from any part of the county. The safety first movement is being carried out by the Kentucky Traction & Terminal Company and will be extended over the whole system.

Journal Cartoon Reproduced in Youngstown.—The *Em-An-Ess Electric News*, published in the interest of the employees of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, reproduced in its issue for December the cartoon "Every Employee a Publicity Representative," which appeared in the ELECTRIC RAILWAY JOURNAL for Nov. 4. The Mahoning & Shenango Railway & Light Company, adapting the picture more nearly to its own requirements than the text permitted as it appeared in this paper, labeled the cartoon, "Why Courtesy?" and published some pointers to its own men on this topic underneath the picture.

Drops Handkerchief, Traffic Is Suspended. Courtesy Paramount.—One of the Eugene (Ore.) papers contained the following item in a recent issue: "Eugene street car men are the embodiment of courtesy. Of course everybody knew that, but now and then a concrete example comes to the attention of the public. Just this morning one of these watchful aids in the public service observed a young lady drop her handkerchief. Promptings of courtesy at once asserted themselves, and without a moment's hesitation he stopped his car in the middle of the block, and, hastening after the young lady, called her attention to her loss. When she had recovered the bit of linen, the car resumed its way up Willamette Street."

Men Complimented for Reduction in Claims.—The legal department of the Kansas City (Mo.) Railways sent a special message to the various departments in December, complimenting the men on the marked reduction in claims in November. A particularly gratifying reduction was in the number of cases where people had brought suit or filed claims concerning accidents of which the company had no record. Under the present safety practice and custom of the company, the trainmen are required to report every accident or incident which might by any stretch of the imagination become the basis of a claim. There has accordingly resulted a better fund of information to assist the legal department to meet improper claims.

Railway Employees Urge Jitney Regulation.—More than 500 office employees of the British Columbia Electric Railway, Ltd., Vancouver, B. C., have organized for the purpose of urging the City Council of Vancouver to pass regulations which will put the jitney under the same regulations as the street railway. Their representatives who called on the Mayor pointed out that the movement is not connected with the management of the company's interests, but is solely for their own protection. They stated that if the jitney drivers claim that further regulations will put them

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out of business, the same is also true as regards the employees of the railway, unless adequate jitney regulations are passed. Petitions are being drawn up and will be presented to the City Council.

Changes in Illinois Traction Fares.—After Dec. 29 the cars of the Illinois Traction System operated between St. Louis, Mo., and the Tri-Cities in Illinois will be run pay-as-you-leave instead of pay-as-you-enter. It has also been decided by the management that from Dec. 29 six tickets for the Tri-City-St. Louis trip will be sold for 50 cents. A special ticket, good between the hours of 5 a. m. and 8 a. m. and 5 p. m. and 8 p. m., entitling the holder to fifty-two rides, will be sold for $3. This will effect a saving of $2.20 over the regular rate, as the 10-cent fare recently allowed by the Interstate Commerce Commission applies to most points on the trip. It has also been announced that there will be one car every seven and one-half minutes, instead of one every ten minutes.

One-Man Cars in Leavenworth.—The Kansas City Western Railway, Kansas City, Kan., is rebuilding its Leavenworth city cars for one-man operation, closing the rear door and removing that step; installing sliding double doors on the front vestibule and placing fare receivers in this vestibule. The city objected that one-man operation was not safe for the passengers, but this objection was removed by agreement between the company and the city. The Kansas City Western Railway formerly operated ten cars in Leavenworth. Since the 3500 soldiers, expending $100,000 a month, have been away from Fort Leavenworth, business has not continued to increase as of old. The company will remodel and operate six local cars. The interurban service of the company has also suffered because of the absence of the soldiers, and schedules have been reduced.

Within the Law Interurban Lines Are Railroads.—An accident recently occurred on the interurban line operated by the San Francisco-Oakland Terminal Railways, and suit to recover damages was brought by parties injured in the automobile which collided with the street car. The suit hinged on the question of whether the electric line was a railroad or a branch of a street railway system. If the former, the chauffeur would be required to "Stop, Look and Listen," whereas in the case of a street car line he would be required only to look and listen. Superior Judge Waste ruled that within the meaning of the law an interurban electric railway was a "railroad," and that the same interpretation would apply as in the case of steam lines. The electric railway, therefore, won the case. The rule applies to every crossing of the interurban line, whether or not the crossing is within the city limits. In this particular case it was shown that the driver of the automobile was intoxicated at the time of the accident, and in his decision the Judge recommended that the district attorney enter suit against the man for reckless driving while under the influence of liquor.

Fort Worth Jitneys Excluded from Business District.—The City Commission of Forth Worth, Tex., has passed a jitney ordinance which is to become effective on Jan. 1. The new measure will prohibit jitneys from operating on Main and Houston Streets or any intersecting streets between Weatherford and Front Streets, except on Fifteenth and Second Streets. Jitney cars will not be allowed to stand on Fifteenth or Front Streets and will not be permitted to stop on these streets longer than is necessary to put off or take on passengers. No one will be allowed to drive a jitney except the driver named in the original application for a license or subsequently approved. No license may be transferred without approval by the city, and any violation of the ordinance may be regarded as grounds for revocation of license. Jitney men protested to the City Commission that the ordinance excluded them from the business district of the city and would compel them to stop running. Their objections were overruled. The jitney men then undertook to circulate petitions to order a referendum election on the ordinance, but Mayor Tyra and the City Commission took the position that the ordinance was a police regulation and was not subject to referendum vote of the people. The City Commission assigns safety to pedestrians and traffic in general as the reason for ordering the jitneys off Main and Houston Streets.

Personal Mention

R. B. Marchant, treasurer of J. G. White & Company, Inc., New York, N. Y., has been elected vice-president of the company.

Gilbert E. Porter has been elected to the governing committee of the Chicago (Ill.) Elevated Railways to succeed Henry A. Blair.

W. H. Zinsmeister, formerly assistant auditor of the Empire United Railways, Syracuse, N. Y., has been appointed auditor of the company to succeed S. C. Rogers, whose appointment to the American Pulp & Paper Company is noted elsewhere in this issue.

Homer Hodson, former secretary of the East St. Louis Commercial Club, has been appointed head of the safety-first department of the East St. Louis & Suburban Railway, East St. Louis, Ill., in charge of the safety-first advertising campaigns which the company is planning.

W. E. Rolston, electrical engineer of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has had his jurisdiction extended and now has control of the shops and equipment of the company, with the title of superintendent of power and equipment. Mr. Rolston has thus taken over the duties that formerly devolved on the late Karl L. Wilcox as master mechanic of the company.

Fred J. Warnock, who has been chief claim agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, for the last five years, has resigned, effective on Jan. 1, to practice law for himself. Mr. Warnock was born near New Castle. He moved to Youngstown with his parents when he was twelve years old. He began the study of law under Theodore Johnson, dean of the Y. M. C. A. law school at Youngstown, and in his studies was closely associated with R. J. Nicholson, retiring assistant prosecutor of Mahoning County, with whom he will now enter into partnership.

Joseph F. Collins, whose appointment as division superintendent of the Mahoning Valley division of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, was noted in the ELECTRIC RAILWAY JOURNAL for Dec. 9, has been with the company for more than fourteen years, joining its force on Aug. 4, 1902, when he became freight clerk and assistant to Richard Flannery, dispatcher at the West Federal carhouse. Mr. Collins was located there for four years, acting as extra dispatcher, assisting in the shop. Shortly after the Park & Falls and the Mahoning Valley lines were merged Mr. Collins became night inspector and finally was appointed chief inspector.

S. C. Rogers, assistant treasurer and auditor of the Empire United Railways, Syracuse, N. Y., has resigned to accept a position as comptroller of the North American Pulp & Paper Company at Montreal, Can. Mr. Rogers has been connected with the Empire United Railways since May, 1915. Before that he had been, since 1911, secretary and treasurer of the Youngstown (Ohio) Dry Goods Company, which position he assumed after ten years of service with the Mahoning & Shenango Railway & Light Company, Youngstown, and its constituents. Before entering the field of public service accounting and finances he served nineteen years in New York and Chicago with J. M. Young & Company, importers of china, glass and fancy goods.

Rex D. Billings has been appointed chief claim agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, to succeed Fred J. Warnock, whose resignation is noted elsewhere in this column. Mr. Billings was formerly Mr. Warnock's chief assistant at Youngstown, but for the last three years has been chief claim agent of the Reading Transit & Light Company, Reading, Pa. Mr. Billings was born on Aug. 8, 1888, and was reared in Warren, Ohio. He became connected with the Mahoning & Shenango Railway & Light Company as a claim adjuster eight years ago, and when Mr. Warnock was made head of the claim department Mr. Billings was promoted to the position of assistant chief of claims.

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Frank A. Gannon has been promoted to the office of assistant treasurer of the United Railways, St. Louis, Mo. Mr. Gannon entered street railway service in St. Louis twenty-five years ago with the Lindell Railway, when the motive power was Missouri mules. From office boy he was advanced to messenger. Fifteen years ago he was appointed cashier and since that time it is estimated that about $75,000,000 has passed through his hands. In addition to his official duties with the company, Mr. Gannon is assistant treasurer of the Employees Mutual Benefit Association, which now numbers 4019 members, and is president of the United Railways Dramatic Club, which has a membership of several hundred. He is also a director of the United Railways Savings & Loan Association, which has issued more than $2,500,000 of stock certificates to employees who are building their own homes. Mr. Gannon was born in Sullivan, Mo., in 1873, and went to St. Louis in 1874. He was educated at Christian Brothers College. He is married and has two sons and two daughters. Mr. Gannon is prominent in civic affairs and is treasurer of the improvement association in the Shaw District, in which section is his home.

F. A. GANNON

Lafayette G. Rudd will continue in charge of the Lyme and Saybrook divisions of the Shore Line Electric Railway, Norwich, Conn. It had been proposed to extend Mr. Rudd's jurisdiction also to cover the New London lines of the company. An official statement says that because of the extent of the territory involved in the consolidation of the New London, Lyme and Saybrook divisions of the company, under a single superintendent, as was contemplated by the promotion of Mr. Rudd to the position, it has been decided by the officials of the corporation that such a change would not be expedient at this time. Mr. Rudd will, therefore, resume his former place as superintendent of the Lyme and Saybrook divisions, and for the present W. C. Callaghan, general manager, will have personal oversight of the New London lines.

E. E. Downs was recently elected president of the Alton & Jacksonville Railroad, Alton, Ill., formerly known as the Alton, Jacksonville & Peoria Railroad. Mr. Downs was formerly vice-president and general manager of the Sterling, Dixon & Eastern Railway and the Lee County Lighting Company, Dixon, Ill., from which he resigned to take the position of general manager for the receivers of the Chicago & Milwaukee Electric Railroad. He remained with the Chicago & Milwaukee Electric Railroad during the term of service of the receivers, when he became general manager of the Elgin & Belvidere Electric Company, owned by Bion J. Arnold. After serving the last-mentioned company three years, he resigned to organize a company and introduce the automatic parcel checking locker system. He takes charge of the Alton & Jacksonville Railroad as the property changes ownership, and expects to make many improvements to better the service and the condition of the physical property.

D. C. Green, for the last year and a half manager of the Salt Lake City division of the Utah Power & Light Company, has resigned that position to become general manager of the Fort Smith Light & Traction Company, Fort Smith, Ark. This property, which is operated by H. M. Byllesby & Company, Chicago, Ill., furnishes the electric lighting and street railway service in Fort Smith and operates an electric interurban railway between Fort Smith and Van Buren. Before taking his position with the Utah Power & Light Company Mr. Green had been connected with the Byllesby company for several years at San Diego, Cal.; Albany, Ore.; Marshfield, Ore., and Everett, Wash. Mr. Green is a graduate of Purdue University, Lafayette, Ind., class of 1908.

Raymond H. Smith, whose promotion from the position of general manager of the Jackson Light & Traction Company of Jackson, Miss., to that of vice-president and general manager of the Sheboygan (Wis.) Electric Company, was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 11, was presented, before he left Jackson, by the citizens of that city with a silver loving cup, about 12 in. high, exclusive of base, "in grateful recognition of his public service." Mr. Smith took charge of the local street railway, electric plant and gas plant at Jackson four years ago, and his work brought him in contact with practically the entire population of the city. He rehabilitated the plant, installed one-man cars and reduced operating expenses. For the first three years of his service in Jackson Mr. Smith had to contend with competition in the electric light and power business. The competitor died a natural death, but the question of municipal ownership immediately came up. The people defeated the proposed plan, and Mr. Smith received much credit for his work during the agitation. In addition to his work in the railway and light field in Jackson Mr. Smith improved greatly the operation and service of the gas plant. Many of the citizens of Jackson signed a telegram of protest against Mr. Smith's removal to Sheboygan, but, finally decided that it would not be fair to attempt to deprive Mr. Smith of an excellent opportunity for promotion and did not send the message. Mr. Smith was active in the local Board of Trade at Jackson and at the time of his departure from that city was president of the local Rotary Club. An incident worthy of note is the fact that each member of the Jackson Rotary Club wrote a letter to a member of the Sheboygan Rotary Club in the same business, commending Mr. Smith in the very highest terms. In consequence, at the first meeting of the Sheboygan Club after his arrival Mr. Smith was unanimously elected to full membership without the formality of any investigation.

E. C. Hathaway, whose resignation as assistant general manager of the Virginia Railway & Power Company, Richmond, Va., in charge of the properties of the company at Norfolk, was noted in the ELECTRIC RAILWAY JOURNAL for Dec. 16, has been in charge of the companies there for fourteen years and was connected with them in an advisory capacity for two years prior to that. In 1902 he was appointed vice-president and general manager of the Norfolk, Portsmouth & Newport News Company, a consolidation of the railway and lighting companies in Norfolk, Portsmouth, Newport News and Hampton. After the withdrawal of the Newport News and Hampton companies and the reorganization under the name of the Norfolk & Portsmouth Traction Company, Mr. Hathaway held the same title, and in 1911, when that company was absorbed by the Virginia Railway & Power Company, Richmond, he was retained with the title of assistant general manager. Before coming to Norfolk, Mr. Hathaway was general manager of the Railways & Light Company of America, with headquarters in Baltimore. This company controlled the utility properties in Norfolk, Knoxville, Tenn., Lexington, Ky., and several other places. Mr. Hathaway is resigning at Norfolk because his many other interests require the greater part of his time and attention. His principal outside interest is the Railway Audit & Inspection Company, Philadelphia, of which he is president. This company was organized by Mr. Hathaway about ten years ago and has steadily grown until it has now become necessary for him to devote a good deal of his time to it. He will retain his residence in Norfolk, where he has numerous other interests. His successor at Norfolk will be T. Norman Jones, who is at present chief engineer of maintenance of way of the Virginia Railway & Power Company in Richmond.

E. C. HATHAWAY

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Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Waterbury & Bristol Tramway, Waterbury, Conn.**—A petition will be presented to the incoming General Assembly for the incorporation of the Waterbury & Bristol Tramway to construct a line between Bristol and Waterbury. Among those interested are Frederick N. Manross, Bristol; Richard Elliott, Southington, and John R. Hughes, Waterbury.

***Westfield River Railway, Huntington, Mass.**—The Selectmen of Huntington, Cummington, Chesterfield, and Worthington have petitioned the Legislature to pass a bill incorporating the Westfield River Railway to construct an electric railway along the Westfield River and Major Brook and manufacture for itself and the adjacent towns electric energy for light, heat, and motive power. Capital stock, $182,000. Leonard F. Hardy, Huntington, is interested.

Coatesville (Pa.) Trolley Company.—The Public Service Commission of Pennsylvania has approved the application for a charter for the Coatesville Trolley Company, which proposes to construct a line in Coatesville and in East Hallowfield and Valley Townships. The applicants for the charter are H. I. Schotter, J. V. Pennegar, C. F. Humpton, H. G. Rambo, and W. J. Elliott, all of Coatesville. [Sept. 23, '16.]

***Mineral Heights Street Railway, Greenville, Tex.**—Incorporated with a capital stock of $3,000. Incorporators: J. A. Phillips, J. M. Massey, and W. T. Wright, Greenville.

FRANCHISES

***Globe, Ariz.**—The City Council of Globe has granted the request of C. H. Munson for an option for three months on the local street railway franchise at $1,500.

Bridgeport, Conn.—The Connecticut Company will petition the Legislature in January for permission to extend its tracks on Golden Hill Street, northerly through either Middle or Water Streets or Housatonic Avenue to Congress Street, in an effort to relieve the congestion of traffic on Main Street. The company will also petition for permission to extend its Oak Street line through Madison Avenue to Marion Street.

Bristol, Conn.—The Bristol & Plainville Tramway Company will petition the next General Assembly for an amendment to its charter under which the company will be allowed to extend its lines on lower Main Street, South Street, Wolcott Street, and West Street.

Hartford, Conn.—The Connecticut Company will ask the Legislature for permission to extend its East Street line from the present terminus on Smalley Street as far as the railroad crossing, and also to extend the Pleasant Street line from the terminus at Fairview and Pleasant Streets into Fairview Street and thence southerly to Kelsey Street, down Kelsey Hill to Rocky Hill Avenue.

Caldwell, Idaho.—The Caldwell Traction Company has received a franchise from the City Council of Caldwell to construct a line along Cleveland Boulevard and other streets.

Urbana, Ill.—The Kankakee & Urbana Traction Company has received a franchise from the City Council of Urbana giving permission to lay special work so as to make physical connection with the Wabash Railway, the plan being to handle grain shipments from the traction company to the steam railroad.

Columbus, Kan.—The Oklahoma & Northern Traction Company will ask the City Council for a franchise to construct a line in Columbus. W. K. Palmer & Company, Kansas City, Mo., consulting engineers. [Nov. 4, '16.]

Gardner, Mass.—The Northern Massachusetts Street Railway has asked the Council for a franchise to construct an extension on Parker Street, Gardner.

Cleveland, Ohio—The Cleveland Railway has received a franchise from the City Council to construct an extension on Hough Avenue to East 105th Street.

Columbus, Ohio—The public utilities committee of the City Council recently approved a franchise giving the Columbus Depot Company the right to construct and operate tracks and switches across Town, Front, Rich, Walnut, and Wall Streets, near High Street, and to build a depot over Wall Street. The time for the completion of the depot has been extended to 1919. It was to have been completed by January, 1917.

Dallas, Tex.—The Dallas Northwestern Traction Company and the Dallas Southwestern Traction Company have been granted a six months' extension of time on their franchises in which to begin construction on their proposed lines to Cleburne and Denton. E. P. Turner, Dallas, president. [Oct. 21, '16.]

***Princeton, W. Va.**—A. S. Hecker, Pittsburgh, Pa., and H. E. De Jarnette, Princeton, W. Va., have asked the Council for a franchise to construct a line to be operated by either steam, electricity, or horse power, from Princeton to Athens, about 6 miles.

TRACK AND ROADWAY

***Fort Smith, Ark.**—Albert Emanuel, president of the Albert Emanuel Company, Schwind Building, Dayton, Ohio, is reported interested in a plan to construct an electric railway between Fort Smith and surrounding towns within a radius of 50 miles. Options on electric power plants in Booneville, Mansfield, Huntington, Hartford, and Greenwood have been obtained.

Visalia Electric Railroad, Exeter, Cal.—It is reported that this company may construct an extension from Lindsay to Woodville, 11 miles.

Pacific Electric Railway, Los Angeles, Cal.—This company on Dec. 3 began the use of its new elevated line, constructed at a cost of about $300,000. This new terminal improvement, built to relieve congestion on Main Street, permits the rerouting of a large number of cars to San Pedro Street. The elevated line leads from the rear of the Main Street Station at the second-story level, which is the street level at the front, to San Pedro Street, approximately 2000 ft., and carries practically all outgoing trains and a few incoming. The majority of incoming trains enter the station from Main Street, as before. The new structure is of steel and concrete construction, and carries three tracks completely equipped with automatic signal system. Loading and unloading platforms, supporting reinforced concrete and steel umbrella sheds, parallel the line on either side for a distance of about 1100 ft. Work on the structure was begun in April, upon an order issued in 1915 by the City Board of Public Utilities demanding relief of traffic congestion on Main Street.

Lordship Company, Bridgeport, Conn.—A petition will be presented to the General Assembly when it convenes to have an extension built by the Lordship Company in Bridgeport.

Washington & Maryland Railway, Washington, D. C.—This company reports that during 1917 it will construct a 1-mile extension from its present terminus to Sligo Creek in Tacoma Park, Md.

Jacksonville (Fla.) Traction Company.—Double tracks across Springfield Park from Pearl Street to Cedar Street and on Cedar to Eagle and down Eagle to Hogan Street are being laid by the Jacksonville Traction Company, to eventually be completed with double track on Hogan Street to Bay Street.

Georgia Railway & Power Company, Atlanta, Ga.—A contract has been awarded to R. M. Walker, Atlanta, at $19,400, to repair the Edgewood Avenue bridge, the cost to be divided between the city, the Southern Railway, and the Georgia Railway & Power Company.

Aurora, Mendota & Western Railroad, Aurora, Ill.—It is reported that this company will construct its proposed line from Aurora to Mendota by day labor. H. D. Hallett, 132 Downer Place, Aurora, engineer. [Sept. 16, '16.]

Fox & Illinois Union Railway, Aurora, Ill.—This company proposes the construction of an extension from Morris south to Gardner and thence to Dwight.

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Chicago & West Towns Railway, Chicago, Ill.—This company has discontinued service through the village of Berwyn owing to franchise difficulties with the Village Council.

Woodstock & Sycamore Traction Company, Genoa, Ill.—This company, which operates between Sycamore, Genoa and Marengo, twenty-five miles, will electrify its line during the coming spring. Cars are now being operated by gasoline.

Illinois Traction System, Peoria, Ill.—The town of Catlin has approved the plan of the Illinois Traction System for taking care of its track through the village streets. As Catlin is under a commission form of government, the settlement of the franchise privileges was voted on by the citizens who approved the franchise granting the following type of construction: The track is to be rebuilt in the center of the street, occupying a space 7 ft. wide; the ties are to be surfaced on 6 in. of washed gravel and the track then filled with stone screenings up level with the brick paving each side of the track. This settlement came after some agitation to force the company to pave the streets of the village over which its lines pass, in order to gain franchise rights.

Quincy (Ill.) Railway.—This company has purchased a lot, 140 x 160 ft., at the southwest corner of Ninth and Locust Streets, Quincy, in contemplation of another loop. The construction of the new loop will enable cars to make a shorter circuit and to avoid entering the grounds of the State Soldiers' home at certain periods of the day.

Indiana Railways & Light Company, Kokomo, Ind.—This company is reported to have in contemplation two extensions in Kokomo, one to the northwestern part of the city and the other to the southern part of the city.

Orleans-Kenner Electric Railway, New Orleans, La.—It is reported that this company contemplates the construction of a 6-mile extension from St. Charles Parish. Johnson & Company, Inc., New Orleans, contractor.

***Portland, Me.**—Plans are under contemplation for the construction of an electric railway to connect Portland and York Beach, Me., with Portsmouth, N. H. The York Beach Chamber of Commerce is interested.

Massachusetts Northeastern Street Railway, Haverhill, Mass.—The Public Service Commission of Massachusetts has issued an order authorizing the Massachusetts Northeastern Street Railway to issue $100,000 of first mortgage, twenty-year, 5 per cent. bonds. Of the proceeds, $36,000 are to be used for construction and for railway equipment and $64,000 for carhouse equipment.

Michigan Railway, Kalamazoo, Mich.—This company is negotiating for the sale of its tracks inside the city limits of Flint, extending from the northern limits to Hamilton Avenue, to the Detroit United Railway.

St. Paul Southern Electric Railway, St. Paul, Minn.—This company is constructing an extension from Hastings to White Rock, 23 miles. Two 160-ft. and six 80-ft. steel spans will be erected on piles. On the completion of this extension the company contemplates the construction of a line through White Rock, Dumbrota, Rochester, Chatfield, Preston, and Harmony, Minn., and Burr Oak, Iowa, to Decorah, a distance of 126 miles.

***Kansas City, Mo.**—It is reported that Samuel J. McWilliams, secretary of the Gaston Railway Syndicate, Scarritt Building, Kansas City, Mo., is interested in the construction of a proposed line from Kansas City to Springfield, via Butler and Rockville.

International Railway, Buffalo, N. Y.—Surveys have been made and work will be begun in the spring by the International Railway on the construction of an extension of its Elmwood Avenue line from Hertel Avenue to the city line.

***New York, N. Y.**—A statement has been issued by F. Van Z. Lane, traffic engineer, Bayonne, N. J., urging the construction of an electric railway from Staten Island to New York via Bayonne, Greenville, and Lower Jersey City. It is proposed to construct a tunnel under the Kill von Kull River between Staten Island and New Jersey.

Ohio Electric Railway, Springfield, Ohio.—Bids will soon be asked by the Ohio Electric Railway for constructing a 120-ft. steel deck girder bridge, with concrete abutments, over the Cincinnati, Hamilton & Dayton Railroad at Middletown.

Welland, Ont.—Municipalities along the Canadian shore of Lake Erie between Port Colburne and Bridgeburg and the municipalities between Port Colborne and Welland along the east side of the Welland Canal, will vote on Jan. 1, or at special elections to be held soon after, on propositions guaranteeing bonds for a publicly owned hydroelectric radial railway. The cost of the proposed railway is estimated at $2,208,716. It will be built by the Ontario Hydro-Electric Commission.

Montgomery Transit Company, Philadelphia, Pa.—A report from the Montgomery Transit Company states that the company has under construction an extension from Harleysville to Souderton, 4.3 miles, and from Lederach to East Greenville, 12 miles.

Dallas (Tex.) Electric Company.—Street railways of Dallas are unable to comply with the orders of the City Commission to lay 90-lb. T rails on Tremont and Colorado Streets, the time limit for this work having expired Dec. 1. According to Edward T. Moore, general manager of the lines, the company has found it impossible to procure the rails necessary for laying this work, and the City Commission has voted not to enforce the penalty provided by the charter for failure to comply with its order on the part of the company.

Roanoke Railway & Electric Company, Roanoke, Va.—Work will be begun at once by this company on the construction of 4,000 ft. of new single track on Ninth Street for the Viscose silk mills.

Monongahela Valley Traction Company, Fairmont, W. Va.—During 1917 the Monongahela Valley Traction Company expects to construct 17 miles of new track.

SHOPS AND BUILDINGS

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—As one of the movements in preparation for the establishing of freight service on the Chicago, North Shore & Milwaukee Railroad, work has been begun in the placing of a yard for storage of the freight cars and equipment near the south limits of North Chicago. Tracks are being placed, the overhead system is being rapidly installed, and all arrangements are being made for the establishment of both a switch yard and a storage yard for the care of the freight department.

Toledo Railways & Light Company, Toledo, Ohio.—This company contemplates the construction of a carhouse on the site of the old Casino. The new carhouse will be capable of housing seventy-five cars, and will have a complete repair department.

Sand Springs Railway, Tulsa, Okla.—A contract has been let by this company for the construction of a combination freight and passenger station at Tulsa, to cost about $25,000.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—This company will extend its power lines from Pueblo to Avondale.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is erecting three new substations between Fort Wayne and Decatur, one being located just south of Fort Wayne, one-half way between the two terminals, and the third just outside of the city limits of Decatur, near the power-house.

Kansas City-Western Railway, Kansas City, Kan.—This company has completed half of the replacement with aluminum of its high-tension line that is between Kansas City and Walcott, 18 miles. The company receives its current at Kansas City, Kan., from the Kansas City Railways Company. The current is stepped up at the receiving station, carried to Walcott and there stepped down for transmission in both directions to Leavenworth and Kansas City, Kan.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.—Work has begun on the new freight and power house to be erected at Lisbon Falls for the Lewiston, Augusta & Waterville Street Railway.

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INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases **Business Changes** **Trade Literature**

TRACK GRINDER BUSINESS GROWING RAPIDLY

Reciprocating Grinder Sales Show Increase—Deliveries Now Prompt—Grinding Brick Manufacture—New Plant for Brick Making

"When the manufacturers of railway track grinders first offered their machines for sale to the electric railways of this country, grinding was looked upon as a luxury. It is now regarded as an essential factor of improvement in track construction." This statement was recently made by W. B. Goodall, Railway Track Work Company, Philadelphia. He also said: "Many roads are now grinding all of their new track. This assures smooth joints from the start, and defers the time when cupping will begin. The reciprocating process of grinding offers many advantages when the result desired is a smooth rail surface."

The demand for "reciprocating track grinders" is good. Sales in 1915 exceeded those of 1914 by 50 per cent, and the sales this year will exceed those of last year by 30 per cent. The demand has come partly from sources which at first were not expected to buy grinders. Foreign sales also have increased lately. Several small roads, with less than 20 miles of track, have purchased grinders for reclaiming old track. Some of the longer users of this type of grinder are the Third Avenue Railroad, New York, eight grinders; Philadelphia Rapid Transit Company, twelve grinders; Brooklyn Rapid Transit Company, United Railways of Baltimore, and Connecticut Company, each four grinders. The Brooklyn property makes use of a grinder on the elevated tracks of its system. Some of the roads in the Northern States operate their grinders all winter.

The price of the reciprocating track grinder has not been increased even though costs for manufacture and for demonstration have risen in accord with general cost. Delays of material at one time forced the manufacturer to fall three months behind in deliveries, but this condition now has been relieved, and grinders can be shipped promptly.

How Cutting Bricks are Made

The conditions surrounding the manufacture of the abrasive bricks used with the reciprocating grinders are of interest. These bricks, in sets of four, sell for about $4.50 per set. At one time the manufacturer was 5000 bricks behind his orders. Shipments are now made three weeks after receipt of orders, and steps have been taken which will still further accelerate deliveries.

Track-grinding bricks are made in two grades of hardness. Some engineers prefer bricks so hard that they will last as long as five working days. Others prefer the soft grade of brick which cuts the rail much faster but will last only fifteen to twenty hours. The bricks are made of bauxite, imported from Greece and France. It has been difficult to obtain this material since ocean shipping has been restricted. The prepared bauxite is burned in electric furnaces until it is hard and sharp. Then it is crushed and screened to size. Clay and feldspar are then added, and the bricks are molded. Next they are burned in kilns. Ten days' time is required to mix, pour and dry a lot of bricks, and then a week's time is allowed for baking.

Because of the difficulty experienced by the Railway Track Work Company in obtaining abrasive bricks for sale to users of its grinders, the principals of this company have formed and incorporated a new company known as the Abrasive Products Company. One kiln has been installed and bricks are now being made by this company at Thirtieth and Walnut Streets, Philadelphia. Cutting wheels also are being made, and the business is reported to have shown such prospects that this company is now considering the installation of three additional kilns.

Prospects for track grinder sales during 1917 look bright, according to Mr. Goodall, who also says that the accelerating demand for grinder bricks is proof that the roads are making more intensive use of their grinders.

"WIG-WAGS" WITHOUT BELLS ARE RECOMMENDED

Referring to the article on highway-crossing signals published in the issue of Nov. 18, William P. Hall of the Hall Switch & Signal Company, New York, confirms the statement earlier made that the swinging disk commonly known as the "Wig-Wag" has met with great favor by purchasers of such signals. "It is also a fact," he says, "that this is due to a belief on the part of the railroad companies that an audible signal alone does not fully meet their requirements.

"In the light of our many years of experience in the automatic block signal field, we concluded some time ago that a wig-wag signal so constructed and operated as to indicate danger to the users of highways, both when in motion and in a state of rest, was eminently desirable. We have developed a wig-wag signal which gives warning of danger when in motion, and which, when deprived of its operating current, indicates danger by a fixed position showing red, the latter being insured by gravity.

"Any type of wig-wag signal which indicates danger only when in motion may become a positive danger to highway traffic when interrupted in its normal movement by a lack of power, therefore we believe that the wig-wag, constructed and operated as described, is more desirable than the combined use of the ordinary wig-wag and bell. If the current used for the operation of the bell should fail there is absolutely no signal of danger in one case, whereas, if the current used for the operation of the wig-wag signal should fail, the signal would still indicate danger to highway traffic by assuming a fixed red position. It also appears that the plan of using the wig-wag only eliminates the oftentime very objectionable features of the noisy bell at highway crossings."

COPPER PRICES FORCED DOWN SLIGHTLY BY PEACE PROPOSALS

Although showing considerable and somewhat unexpected strength on the proposal for peace offered by the Teutonic Allies for a few days, the copper market was apparently unable to stand the strain any longer. December copper is more than a cent lower than the high price of a week ago, and on Tuesday following the declaration of the position held by England regarding Germany's proposals December electrolytic was quoted at 34 cents bid, 34.5 cents asked. January copper was quoted at 32.75. Quotations for 1917 were as follows: First quarter, 32.25; second quarter, 31.25; third quarter, 30.25, and fourth quarter, 29.75. As will be noticed, the greatest reaction was in copper for early delivery. Copper for last quarter 1917 delivery was affected least of all.

While the reaction has not been great, there is considerable uneasiness among the buyers. Every day there appears on the market a number of small lots up to 200 and 300 tons of spot copper. How much more of this resale copper is held is not known. It is well known that producers are sold out, but it had generally been understood that practically all sales had been made by consumers and the volume of copper held for speculation was exceedingly small.

Copper wire manufacturers and manufacturers of electrical goods stand in a very unsatisfactory position should there be a large amount of copper available for speculation. Stocks were laid in at top-notch prices, and in many cases these stocks were very substantial. Both wire and electrical manufacturers have orders on their books for deliveries

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way into 1918, and unfilled orders would keep the factories going night and day well through 1917, and great care was taken to prevent any uncertainty of delivery through lack of raw materials.

WHO SHOULD KEEP THE STOCK OF RENEWAL PARTS?

This topic, previously mentioned in the issues of Nov. 25, page 1135, and Dec. 2, page 1183, has brought forth many very interesting views from manufacturers of standardized and other products. In the following discussion of this topic, Charles M. Sneider, development department, The Jeffrey Manufacturing Company, Columbus, Ohio, sets forth another view. He says:

"Stock-keeping is far from being an office boy's job. The question of the stock of renewal parts is one of mutual responsibility wherein the purchaser should consider the cost of first repairs in connection with the cost of the original apparatus. The manufacturer should be able to inform the purchaser as to when the first repairs should be needed under nominal service conditions and how soon such repairs can be supplied upon order or out-of-stock. The extent to which repair parts are required should be the basis of carrying the same in stock, care being taken to keep in touch with the matter of obsolete and new designs so as to slow up sufficiently in anticipation of new designs and not to have a large quantity of "dying" repairs on hand. This latter feature is the common fault with overzealous stock departments.

"The head of an efficient service stock department is not the first step from the office boy's job—not even in a country town. The stock department should be in charge of a capable man, fully acquainted with the product, the trade demands and the matter of new designs."

ROLLING STOCK

People's Railway, Dayton, Ohio, is said to be in the market for ten motor cars.

People's Railway, Dayton, Ohio, has ordered ten trailer cars from the W. R. Kershner Company.

Lake Shore Electric Railway, Cleveland, Ohio, has placed an order for thirteen interurban cars and five city cars with the Jewett Car Company.

Cleveland, South Western & Columbus Railway, Cleveland, Ohio, has placed an order with the Kuhlman Car Company for six interurban cars.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., is building three passenger cars and one freight car for use on its newly acquired line between Fort Wayne and Decatur, Ind.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 9, 1916, as being in the market for fifteen center-entrance interurban cars, has ordered this equipment from the Kuhlman Car Company.

Columbus (Ohio) Railway Power & Light Company is said to be in the market for five city cars and three interurban cars. A recent issue of ELECTRIC RAILWAY JOURNAL noted that this company was planning to rebuild forty-five cars in its own shops, but these plans have been changed. The company now plans to have new car bodies built by the American Car Company, making use of the hardware and equipment from the old cars as far as possible.

Michigan Railway, Jackson, Mich., has specified the following details for the twenty prepayment passenger cars which it has recently ordered from the St. Louis Car Company:

Seating capacity.....40	Height, rail to sills.....31 ft.
Weight (car body only), 19,000 lb.	Sill to trolley base..8 ft. 5¼ in.
Bolster centers, length....19 ft.	Body .....Semi-steel
Length of body.....28 ft.	Interior trim.....Mahogany
Over vestibule.....40 ft. 4 in.	Headlining .....Agasote
Width over sills.....8 ft. 2 in.	Roof, type.....Turtle deck
Over all .....8 ft. 6 in.	Underframe .....Metal

New York (N. Y.) Municipal Railway Corporation reported in the ELECTRIC RAILWAY JOURNAL of Nov. 11, 1916, page 1046, as asking for bids on 100 subway cars, will probably exercise an option on 100 subway cars in addition to the 500 cars already contracted for, which 100 cars will be similar in construction to the present equipment and will probably be purchased during the year 1917. The specifications for this equipment are as follows:

Name of road, New York Municipal Railway	Curtain material..D. C. Pantasote
Type of car....Closed passenger	Destination signs, Hunter illuminated
Seating capacity.....78 to 90	Door operating mechanism, National Pneumatic
Weight (car body only), 45,000 lb.	Gears and pinions, GE Grade "F"
Bolster centers, length....47 ft.	Hand brakes.....Geared
Length of body:	Heaters .....Electric
Over vestibule...66 ft. 2¼ in.	Journal boxes....Malleable iron
Width over sills....9 ft. 9 in.	Motors, type and number, GE-248A 2 per car
Over all .....10 ft.	Motors, outside or inside hung, Inside, 1 per truck
Height, rail to side sills, 3 ft. ½ in.	Paint.....Enamel system
Side sill to top of roof, 9 ft. 1¾ in.	Sash fixtures .....Edwards'
Body .....Metal	Seats, style, Longitudinal and transverse
Interior trim..Steel and Agasote	Seating material.....Rattan
Headlining .....Agasote	Step treads.....No steps
Roof, type.....Compromise	Trucks, type.....Arch bar
Underframe .....Metal	Ventilators...Perry—24 per car
Air brakes.....Westinghouse	Wheels, Carnegie solid steel, National Malleable Castings Co.
Axles, Carnegie quenched and tempered	Special devices, etc., Draw bar centering device, Westinghouse empty and load brake, Smith Ward slack adjusters, Selective acceleration device.
Bumpers ...Hedley anti-climber	
Cables, New York Municipal Railway's specification	
Car trimmings, Bronze and aero metal	
Control, type.....Westinghouse	
Couplers .....Westinghouse	
Curtain fixtures, Curtain Supply Company	

London & Port Stanley Railway, London (Ont.), Canada, which has just placed an order with the Jewett Car Company for two three-compartment closed motor cars, has specified the following details for this equipment:

Type of car, Three compartment, closed, motor	Control, type, GE type M.K. M.U.
Seating capacity..... 68	Couplers .....Tomlinson
Weight (car body only), 49,733 lb.	Curtain fixtures.....Ring type
Bolster centers, length, 45 ft. 4 in.	Curtain material.....Pantasote
Length of body.....64 ft. 6 in.	Fenders or wheelguards, Steel pilots
Over vestibule .....70 ft.	Gears and pinions, GE Grade "M"
Width over sills.....9 ft. 6 in.	Gongs .....Pneumatic
Over all .....9 ft. 10 in.	Hand brakes....Peacock brakes
Sill to trolley base.9 ft. 10¼ in.	Heaters...Consolidated Electric
Body .....Steel	Headlights...U. S. incandescent
Interior trim.....Mahogany	Motors, type and number, 4 GE No. 225 B 750-1500 v.
Headlining .....Agasote	Motors, outside or inside hung, Inside
Roof, type.....Monitor	Sanders .....Air
Underframe .....Steel	Seats, style.....High back
Air brakes, GE straight and automatic	Seating material, Plush and pantasote
Bumpers .....Spring	Trolley base..Pantographs used
Car trimmings .....Bronze	Ventilators .....Automatic

TRADE NOTES

Rochester Light & Power Company, Detroit, Mich., has ordered two 2000-kw. rotary converters for railway service from the General Electric Company.

Lord Manufacturing Company, New York, N. Y., reports an order of 100 Horne double-acting brakes from the Laconia Car Company for use on surface cars being built for the Boston Elevated Railway.

Buffalo & Lake Erie Traction, Buffalo, N. Y., has placed an order with the General Electric Company for fifteen double motor equipments, for the necessary air brakes, and for a 500-kw. rotary converter equipment.

J. B. Hill, W. E. Schwob and H. G. Miller, Iowa City, Iowa, announce the organization of the Schwob-Miller Engineering Company, to engage in a general practice as consulting and designing engineers, with offices in the Phœnix Block, Iowa City.

Bound Brook Oil-Less Bearing Company, Bound Brook, N. J., announces the appointment of William Fisher Jennings as Eastern sales manager of that company. Mr. Jennings has been connected with the company for almost three years and is well known to the trade.

F. Castiglioni, electrical engineer of the Railway Improvement Company, on leave of absence serving in the Italian Army, has been promoted in the 84th territorials heavy artillery. Signor Castiglioni left for the front June 1, 1916, on the Regina D'Italia. Readers of this paper will remember him as the author of technical articles on railway operation.

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H. W. Johns-Manville Company, Cleveland, Ohio, announces that every employee with the company a year or more was gladdened by the receipt of a Christmas greeting signed by President T. F. Manville announcing the board of directors' decision to give a bonus equal to 10 per cent of the year's salary. This action was prompted by the very satisfactory earnings of the company in 1916 and the splendid service rendered by the J-M employees.

SKF Ball Bearing Company, Hartford, Conn., announces that S. B. Taylor, sales manager of the company, has been appointed vice-president to succeed F. B. Kirkbride, who remains on the board of the company. Mr. Taylor will remain in charge of sales. G. A. Ungar, former representative of the company in Cleveland, Detroit and Pittsburgh, has been appointed technical manager and chief engineer, succeeding Uno Forsberg, who returns to Sweden after completing his work of creating the manufacturing organization of the SKF Ball Bearing Company in this country.

National Pneumatic Company, New York, N. Y., reports that it has received an order from the Toledo Railways & Light Company for twenty-five sets of manual door control for equipping cars which are being remodeled. This company's manual door control, with safety interlocking feature, has been specified on the fifteen cars recently ordered by the Buffalo & Lake Erie Traction Company, and its door engines have been specified on the six cars ordered for the Cleveland, South Western & Columbus Railway.

ADVERTISING LITERATURE

Findley Electric Porcelain Company, Findley, Ohio, is distributing a bulletin on "Standard Electrical Porcelain."

Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has issued booklet M on magnetic switch control apparatus.

Holland Trolley Supply Company, Cleveland, Ohio, is distributing pamphlets on its Bishop sleet cutter and Holland sleet wheels.

Ohio Brass Company, Mansfield, Ohio, has issued a bulletin on its all-copper type and on its steel terminal type gas-weld bonds.

Nash Engineering Company, South Norwalk, Conn., has issued bulletin No. 4 descriptive of its turbine vacuum and low-pressure boiler-feed pumps.

Berry & Zimmerman, Philadelphia, Pa., is distributing bulletin No. 4 of "Development," which contains an article "Grasp," of interest to the industries and public utilities.

Westinghouse Church Kerr & Company, New York, N. Y., has issued a pamphlet on some of the products of plants or factories designed and constructed by the company.

W. K. Palmer Company, Consulting Engineers, Kansas City, Mo., announces that the company has opened a branch office at 705 Merchants Loan & Trust Company Building, Chicago, Ill.

Ohmer Fare Register Company, Dayton, Ohio, is distributing a reprint of an article which appeared in the *Denver Tramway Bulletin* for October on the Ohmer system of fare protection.

American Appliances & Machinery Manufacturing Company, Brooklyn, N. Y., announces that after Dec. 15 it will occupy its new factory building at 161 Jamaica Avenue. The building contains 4500 sq. ft. of floor space.

Standard Electric Tool Company, Cincinnati, Ohio, has issued bulletin A-53 on its portable electric drills and grinders. In addition to the regular types of a.c. and d.c. drills, this company has a number of ball-bearing tool post grinders, parallel grinders, aerial grinders and bench grinders.

Railway Storage Battery Car Company, New York, N. Y., has issued bulletin No. 33 describing its car No. 316, which operates on the Chattahoochee Valley Railway between West Point, Ga., and Riverview, Ala. This car is equipped with Edison storage batteries. Actual operating costs per car-mile are also given in a table.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued leaflet 3764-A, describing and illustrating its No. 323-V railway motor. This motor has a rating of 30 kw. at 600 volts and is said to represent the latest development in railway motors of the split-frame type. This company has also issued circular 1577, which treats briefly and concisely the question of standard railway equipment.

Hubbard & Company, Pittsburgh, Pa., is distributing a pamphlet on "Continuity and How." This pamphlet devotes considerable space to pin failures and gives the result of a number of tests on the new Pierce forged steel pin, which is made by this company. The various pin lengths recommended by a number of insulator manufacturers are given and the different manufacturers' insulators and pins are fully illustrated and described.

National Tube Company, Pittsburgh, Pa., exhibited a series of three industrial motion picture films illustrating the manufacture of pipe, from ore to finished product, at a meeting of the American Institute of Electrical Engineers, West Lynn, Mass., on Dec. 20, 1916. These pictures were taken under the direction of the company after eight months' work and at an expenditure of several thousand dollars. These films start at the Mesaba ore ranges in Minnesota and follow the ore, step by step, until it is shipped out as finished pipe.

Chicago (Ill.) Pneumatic Tool Company has issued bulletin No. 263 on its Boyer railway speed recorder. This machine consists of a rotary pump, a cylinder and a piston. Oil is used as a circulating medium, the pump chamber and the cylinder being entirely filled. By examining a chart which pulls around a drum in the upper part of the machine, the exact speed at which the train passed any point on the road, the number and location of stops, the distance, speed and location of any backward movement that may have been made can be determined at a glance.

Grip Nut Company, Chicago, Ill., has issued a bulletin of a recommended process in using grip nuts. A number of tables are given showing the economy of using grip nuts in lieu of double nut process, another showing the economy of using grip unit nuts in lieu of United States standard nuts and grip nuts, a third table showing the economy of using grip holding nuts in lieu of United States standard nuts and grip nuts. Grip nuts are used on draft rigging, box and column bolts, side rods and frames, frogs and crossings, air brake equipment, brake beams and brake beam hanging poles.

J. G. Wilson Corporation, Norfolk, Va., is distributing catalog No. 34½, which describes and illustrates its rolling doors, shutters and partitions in steel and wood. This eighty-page catalog shows a number of street railway carhouses equipped with interlocking slat rolling steel doors. Among these are the Cleveland Street Railway, Cleveland, Ohio, Pittsburgh Railways, Mount Washington, Pa., and the Washington & Alexander Railway, Baltimore, Md. The doors are operated with standard chain hoists and are equipped with improved automatic release, controlled a fusible length by means of which the doors close automatically should the temperature reach 150 deg. Fahr.

General Electric Company, Schenectady, N. Y., has issued bulletin No. 44417, describing and illustrating its GE 258 ventilated commutating pole railway motor. This motor was designed especially for light-weight, one-man cars, and is built in two types, one being suitable for 24-in. wheels and a 4-in. axle diameter, the other being built for 30-in. wheels and a maximum of 4½-in. axle. Both types have an hourly rating of 25 hp. on 600 volts. The motors are designed to use a maximum gear ratio which will give the car speed necessary to maintain the usual city schedule. A number of tables given indicate the capacity of this motor and will assist materially in determining whether this motor is suitable for any desired schedule.

Hall Switch & Signal Company, 30 Church Street, New York, N. Y., is distributing bulletin No. 20, which describes and illustrates its new highway crossing signal and its Universal crossing bell. The signal is of the wigwag type, which gives an oscillating movement on either side of the center. Should the apparatus from whatever cause become deranged, the danger or stop indication is automatically displayed. The bell, which can be mounted on the top of a 4-in. iron post, strikes approximately three times a second, which gives a more effective warning than that given by a gong struck at a more rapid rate. This equipment has been generally installed on railroads in connection with automatic block systems and for highway crossing protection.

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Electric Railway Journal

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Consolidation of STREET RAILWAY JOURNAL AND ELECTRIC RAILWAY REVIEW

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OUR SERIES OF CARTOONS

The ELECTRIC RAILWAY JOURNAL believes that the most important need of the electric railways today is a better understanding by the public of the problems of the electric railway industry. But, to secure this result on any property, there should first be an equally good understanding by the company of the problems of the public. Where this mutual understanding does not exist there must be education both ways. This is the reason for the series of cartoons and editorial talks on the need of publicity departments, which have appeared in this paper during the past twelve weeks. We have not attempted to express in these editorial talks any new discoveries on the subject of public relations and publicity. We have repeated simply the old facts about methods necessary in every industry which is dependent for its success upon a favorable popular opinion, but they have been applied to electric railway conditions and have been expressed in a somewhat different way than we have used before. The series is now completed, but the importance of the subject is such that we expect to devote during the coming year a great deal of attention to the best means of improving public relations. We expect to tell how it has been done on various properties, why that method was followed and what it has accomplished. We believe that only by a better knowledge on the part of the public of the problems of the utility can that increase in fares or reduction in burdens come which is necessary so that the properties will be maintained at their highest point of efficiency and thus be of maximum benefit to the public.

INVESTMENTS IN SOUTH AMERICA

It is by no means a new thing to have a funded debt repudiated on the pretext of invalidity, as a glance back at the 1870-1884 period in state financing in this country, for instance, will clearly show. Indicating as it does, however, an unusually low standard of business ethics, repudiation always comes as a shock even to those who are not financially interested. It is thus that we are affected by the events in Bahia, Brazil, which are reported at length in the financial columns this week. To sum up the story of what is characterized by the English investors as a "disgrace," it may be said that the municipality of Bahia, after allowing unfair competition, in 1914 voluntarily offered to purchase the Bahia Tramway, Light & Power Company and entered into a contract to such end, the consideration being about $7,605,000 of municipal bonds. Since then, it is asserted, the city has deliberately defaulted most of the fixed charges and virtually repudiated part if not all of the bond principal. There seems to be no doubt that the English investors were legally justified in relying upon the good faith of the city, while the whole course of the city, including its neglect of the purchased property, appears to indicate a deliberate disregard of its liability. The lesson for American investors in this case is not that all South American investments should be shunned. A liberal investment of United States capital in our Southern neighbor is probably necessary to a solution of many of our national trade problems. This does not mean, however, that the investor is relieved from the responsibility of investigating all propositions with increasing care as the security-issuing bodies decrease in size and cosmopolitan influence. Naturally the investor cannot do much investigating personally, but he can seek the aid of those banks, utility syndicates or financing, engineering and management organizations that have had experience in Latin-American countries and with their people. If he is guided by the undertakings that are handled through these well-equipped institutions, he will not find the investment risk greater in South America than at home.

LESSONS OF THE BOSTON DRAWBRIDGE ACCIDENT

The drawbridge accident which occurred in Boston early last month will not have been in vain if it impels such attention to safeguarding similar danger spots elsewhere that future accidents will be prevented. As far as Boston is concerned the problem of protection will undoubtedly be solved promptly and effectively. The important thing now is to capitalize the interest in the subject by applying elsewhere the wealth of information and suggestion brought out. The ELECTRIC RAILWAY JOURNAL has done everything possible to render this promptly available. The latest contribution is an article by F. W. Johnson, published in this issue, in which he analyzes some of the recommendations made in connection with the Boston case and makes some suggestions of his own which merit careful consideration. He favors, among other things, the use of safety zones in which the trolley wire is "dead"; of warning signs placed at a considerable distance from drawbridges; of positive stops with distinct markers, preferably placed in the track, and possibly of red flare lights as impressive warnings of impending danger. He especially cautions against the use of protective devices which may give a false clear indication. In his study of the subject, Mr. Johnson has also made an analysis of operating rules relating to drawbridge protection and finds little uniformity in practice. This is not surprising considering the fact that conditions differ so widely. In fact, it is doubtful if absolute

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uniformity in this regard is desirable. Uniform recognition of the principles involved in such protection is, however, quite essential. The most important of these seems to be that human intelligence must in the long run be the main dependence for safety. Hence the prime consideration in any drawbridge safeguarding scheme must be to impress upon the mind of the operator on each trip the fact of the existence of the drawbridge. This can be accomplished preferably by warning devices of one kind or another just before the car reaches the danger point, with possibly the addition of an auxiliary distant warning signal. The "home" warning can well be some form of physical barrier and, as a general principle, positive stops at points plainly indicated should be made.

WHAT'S TO BE DONE WITH THIS EQUIPMENT?

So many able papers on the lack of wisdom of trying to make modern schedules with ancient equipment have been presented before electric railway associations that we were rudely shocked lately to learn how many cars and equipments of a past generation were still in service on a certain group of railways comprising a total of 2800 miles of single track. For convenience the result of the survey that was made may be stated in terms of motors.

Of 17,809 motors, 5637, or 31.6 per cent, may be classified as obsolete—namely, motors of early grease-lubricated types, hard to get at for repairs, subject to frequent burnouts and operated under harder service conditions than those to which the motors were subjected when new.

Another group, 10,787, or 60.6 per cent, may be classified as "old." These motors belong to the earlier forms using oil-lubrication—and while still fairly serviceable are not equal to making the higher speeds necessary to a more economical schedule.

Finally, a mere 1385, or 7.8 per cent, consist of motors which are modern—namely, motors with commutating poles and with self-ventilation.

We do not believe that these roads, or others like them, have clung to this inefficient equipment for sentimental reasons. In all probability, when replacement was considered, too much stress has been placed upon the upkeep cost only of old equipment and too little upon excessive transportation cost.

It is easy to show theoretically that a modern motor can be made to pay for itself in four to five years through reductions in mileage maintenance cost alone. However, the figures will not always bear analysis because some large shop costs, like labor, will not be reduced as radically as theory may often indicate. A railway shop is not a factory where a definite rate of manufacture is maintained; rather it is a place with a good deal of slack in the line. A given number of shopmen may be kept very busy after a thunderstorm or a blizzard, yet have plenty of idle time thereafter.

The really big losses due to out-of-date equipment are not in the shop, but in the operating department. If we investigate some given motor defect report, for example, we are likely to find that the repairs which cost $10 in the shop actually deprived the railway of $100 on the road. Every car-mile lost means extra platform time at the very least, and there are few roads where it does not also mean that passengers will walk instead of ride. The platform labor loss alone is a formidable charge, especially on those roads where a few minutes' delay past the quarter hour calls for a half-hour's pay and so on. Time-tables on these roads naturally are made up to avoid such penalties, yet a delay of two minutes may mean payment for fifteen minutes.

It is evident, then, that just as in the case of car bodies which lack modern door, step and signal apparatus, the transportation side of equipment is far more important than the shop side. If railways will make it their business to find out what their old apparatus really costs in the way of lost revenue mileage, low schedule speeds, extra platform expense and exasperating service delays, they will be far more likely to buy new cars and car equipment on the scientific basis of making fewer cars carry more people in more comfort and with more speed.

BEHIND THE SCENES

Although the idea of commission regulation of public utilities has spread to such an extent that commissions have now been organized in forty-six states, the theory of regulation is much better known to utility operators than its detailed practices. In other words, the interest of utility operators is usually confined to the words of the principal players in the lime light, the commissioners, and little if at all to the complicated activities and heterogeneous assistants behind the scenes. Moreover, to continue the figure, utility representatives as a rule feel little concerned with plays whose setting is not laid in their particular branch of the public utility industry.

Such an attitude as indicated above, however, makes for narrow-mindedness. To understand properly the place which regulation holds in present-day life, the utility operator must take a broad view of the matter as it pertains to every utility group. Furthermore, he must know in a general way what goes on behind the scenes in commission work, for only by so doing will he fully appreciate what the practice of regulation means. We are giving our readers this week such a glimpse of the inside workings of the Public Service Commission for the Second District of New York, and we hope that the opportunity offered will not be lost. There is particularly a lesson to be learned by the utility operators, if there are such, who are still filled with an unrelenting hatred of the whole idea of regulation or who persist in using obstructive or dilatory tactics simply for the pleasure of annoying the regulatory body. Regulation is the order of the day; it is conducted as far as possible upon the same principles of efficiency and business management that obtain in the case of the utilities themselves, and the utility officer who deliberately endeavors to interfere with regulatory practices deserves just as much censure as he himself would bestow upon anyone who tried similarly to hamper the operation of his utility.

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If it will do utility operators good to learn more about how a commission works, however, it will do commissioners no less good to make more of a study of utility operation. There is every ground for the belief that the many subordinates who are essential for the adequate performance of the duties of each commission are too often filled with theoretical fancies regarding utility operation and too little acquainted with existing utility practices and the reasons therefor. The impossible operating suggestions often made by so-called commission experts prove conclusively their need of practical knowledge. It is obvious that if commission employees are properly to perform their duties they must have at least as much general knowledge of operating conditions as those whom they have to regulate. They have one advantage in that in their supervisory capacity they have an opportunity to observe the practice of many properties and can pick up valuable points, but in addition they should utilize every opportunity to keep abreast of the knowledge in every utility service with which their daily round of commission work requires them to be familiar.

In this connection we believe that commission employees would greatly profit if they would take a more active part in association activities, and that the various utility associations should encourage such affiliation in every way. Another source of knowledge of current thought and practice in utility operation is, of course, the technical papers in the various fields. Both of these agencies, the associations and the technical press, are in reality university extensions for the assembling of the best ideas regarding existing practices and the promulgation of new engineering ideas in utility operation, and their educational value should be utilized to the fullest possible extent in public service commission circles.

The whole problem of regulation is to harmonize public and private interests, to develop a system whereby the welfare of the public will be promoted and private enterprises will be stimulated and have every incentive to efficiency and economy. In the solution of this problem mutual understanding and bases of thought should be the goal of both the commissions and the utilities.

GIVE ELECTRICITY ITS DUE!

Physically, the proposed electric zone of the Illinois Central Railroad which is to serve its suburban and freight-transfer traffic within the city limits of Chicago, as outlined in the last issue of this paper, displays a remarkable similarity to the New York Central Railroad's west side improvement in New York City. In each case the railroad tracks block off for 5 or 6 miles the water front of valuable park property, and the effect of the smoke nuisance set up by the steam locomotives extends even beyond the park limits, influencing the value of exceedingly desirable real estate throughout the whole vicinity. In each case, also, the remedy that has been proposed is the covering of the tracks, with the consequent change from steam to electricity, and this appears to be the only means for relief, since a right-of-way through Grant Park in Chicago as well as through Riverside Park in New York is the only practicable method of reaching sections of the respective cities that simply must have transportation facilities.

From the standpoint of the city both of these proposed plans are eminently satisfactory. Aside from a certain amount of give and take from both sides which is necessary to the final adjustment but which is really quite unimportant in the final result, the city gets without expense that which is equivalent to the removal of the tracks. Yet it retains the transportation facilities that are absolutely essential to at least part of its industries and population. On the part of the railway there is a relief from the ceaseless agitation over the nuisance, which in New York, at least, has even reached the point of threatening the retention of local traffic rights although these may be the very life-blood of both railway and community. Ethically, the railroad, having been on the ground before the advent of a dense population made parks essential and real estate valuable, might well consider that the community should stand at least part of the expense of abating the nuisance, but since the railroad, in both Chicago and New York, has undertaken to pay for the change, it would seem that every one ought to be well satisfied if the present plans go through.

In the proposals, however, we could wish to see more emphasis laid upon the matter of changing topographical features and less upon the question of electrification. No one can, in reason, deny that a railroad, by offering to pay the immense sum required to cover some 5 miles of track, takes a very liberal and thoroughly broadminded attitude. It is quite unnecessary to call attention, in addition to the millions thus offered, to several more millions that are to be expended in electrification of some 30 miles of main line in the suburban area. Admittedly, the former is a gift. The latter is by no means so.

Electric operation has, long since, demonstrated its ability to stand upon its own two feet. In some cases, no doubt, the direct economies are insufficient to pay a full return upon the investment involved, but with these come indirect returns that must be enough to turn the balance. Invariably it has been the history of heavy electric traction that installations have been extended, not diminished, nor even left stationary in electrified mileage.

At the Illinois Central's Chicago terminal, plans for a magnificent three-level passenger station were brought out some three months ago. No doubt it is needed; if not now, at least in the near future. Should a station of the same capacity be designed for a single level (as would be absolutely necessary under steam operation) it is safe to say that the increased first cost over that of a three-level design would more than overbalance the investment for any reasonable terminal electrification. Manifestly, if the direct and indirect returns from electrification can make it a self-supporting proposition, it is hardly logical to put forward an expenditure made on that score as an additional premium upon an offer that is already most liberal. Such a procedure is not likely to strengthen the argument for the change.

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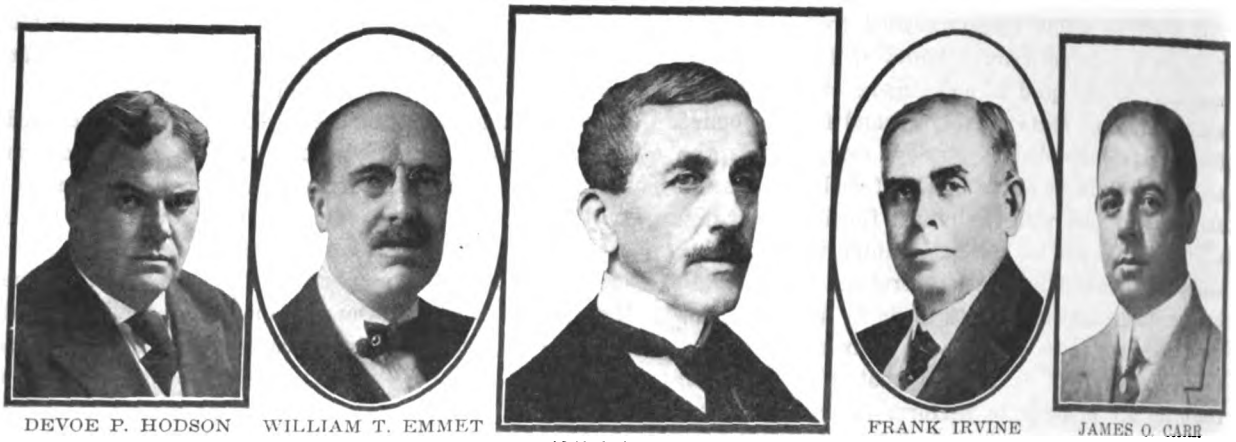

DEVOE P. HODSON WILLIAM T. EMMET SEYMOUR VAN SANTVOORD, Chairman FRANK IRVINE JAMES O. CARR

Members of Public Service Commission for Second District of New York

Regulating $5,313,000,000 of Utilities

This Description of the Machinery of Present-Day Regulation Is Based on the Intricate but Smoothly Running Organization of the Public Service Commission for the Second District of New York

Although the regulation of public utilities by commissions has long since passed its experimental stage, there are many who do not understand the working of the regulatory machinery. Even utility operators, as a rule, are interested in only the phase of the commission's work that pertains to their particular service group, and consequently they do not appreciate the magnitude or cost of the work as a whole or realize the intricate system that is required for the regulation of all the utilities in the state. Simply for the purpose, therefore, of showing the extent to which the machinery of regulation has been developed up to the present day, the Electric Railway Journal in this article is going to take apart the Public Service Commission for the Second District of New York—a commission that has run with marked smoothness while handling very diversified work.

THE Public Service Commissions for the First and Second Districts of New York were organized in July, 1907, and under the authority of the enabling act they took over the functions of the Commission of Gas and Electricity and the Board of Railroad Commissioners. The Legislature gave them jurisdiction over all other corporations serving the public in any manner, with the exception of water-transportation companies. This was the first application of the theory of controlling all principal utilities by means of one state regulatory body, although in putting this theory into actual practice in New York it was deemed expedient on account of local conditions to divide the regulatory force into two separate commissions of equal rank. The State was divided into two sections, one commission having jurisdiction over each. The First District Commission in general has control over the utilities in New York City, while the Second District Commission has control over the public service corporations in the entire State operating outside New York City, with the exception that within that city it has jurisdiction over the telephone and telegraph companies and the steam railroads running from the city through the State.

MAGNITUDE OF THE WORK

The magnitude of the work accomplished by the Second District Commission can best be understood when it is known that it has regulative powers over 928 corporations, municipalities and unincorporated persons engaged, on Dec. 31, 1915, in serving the public in some capacity or incorporated or organized for the purpose of rendering such service. Included in this total are 147 steam railroad corporations, 103 electric railway companies, six express companies, one sleeping car company, fifty-seven baggage and transfer companies, three stage coach corporations, one stock yard company, 325 electric lighting companies, thirty-five coal-gas or water-gas companies, forty-seven coal-gas or water-gas and electric companies, fifty-five natural gas companies, two electric and natural gas companies, one coal-gas and natural-gas company, one electric, coal-gas and natural-gas company, twenty-five acetylene gas companies, fifteen gasoline gas corporations, twelve steam corporations, 109 telephone companies, and five telegraph and cable corporations. These detailed figures include twenty-two duplications on account of corporations which make separate reports in two or more classes of operation or for distinct properties. All the utilities mentioned had outstanding in 1915 an approximate total of $5,313,000,000 of securities.

This field for regulation is greater than that of any similar state commission, both in the number of persons and corporations involved and in the diversity of interests affected. While the First District Commission in New York City has a larger organization, this is due to its superimposed function of subway construction relating little to regulation. The magnitude of the Second District Commission's task, therefore, as well as the fact that it was one of the two pioneers in the regulatory field, attaches particular interest to the study of the organization which has enabled it to dispose of its work smoothly.

The work of the commission is to determine the best method of regulating the activities of all the above-mentioned utilities; to adjust, by hearings or other means, all questions that arise between these utilities and the public, and to issue such orders to the utilities as are necessary. The matters brought to the attention of the commission cover every variety of circumstances possible in connection with the operation of

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public utilities. The number of applications received from persons and corporations for various authorizations and permits, and the number of complaints presented against such persons and corporations since the organization of the commission, are shown in the following table:

	1908	1909	1910	1911	1912	1913	1914	1915
Formal complaints	252	532	345	330	312	315	312	353
Correspondence complaints	1,147	1,088	1,452	1,713	2,227	2,158	1,726	1,352
Total number of complaints	1,399	1,620	1,797	2,043	2,539	2,473	2,038	1,705
Applications from corporations	207	225	262	278	314	369	325	292
Total number of complaints and applications	1,606	1,845	2,059	2,321	2,853	2,842	2,363	1,997
Total for eight years								17,886
Orders of commission to show cause, etc., 1915								21

That the commission is a busy one may be judged from the fact that in the calendar year 1915 it disposed of 2184 applications and complaints. For this work 578 hearings were required, of which number 256 were held in Albany, 150 in Buffalo, eighty-four in New York City and eighty-eight in various other places in the State. Of the 352 days actively devoted to such hearings, the time of the commission was divided as follows: Albany, 152 days; Buffalo, seventy-eight days; New York City, fifty-six days, and general, sixty-six days.

The commission always endeavors to adjust its cases in an informal way, and hundreds of cases have been quickly settled by informal means. In fact, cases are made formal and hearings are held only when substantial plans of adjustment have failed by informal means. Thus, much of the work of the commission is done in connection with matters that do not receive much publicity except at the hands of the persons interested. In 1915, for example, out of the 2184 matters disposed of by the commission, only 404 represented formal complaints, while the total of correspondence complaints informally settled was 1443.

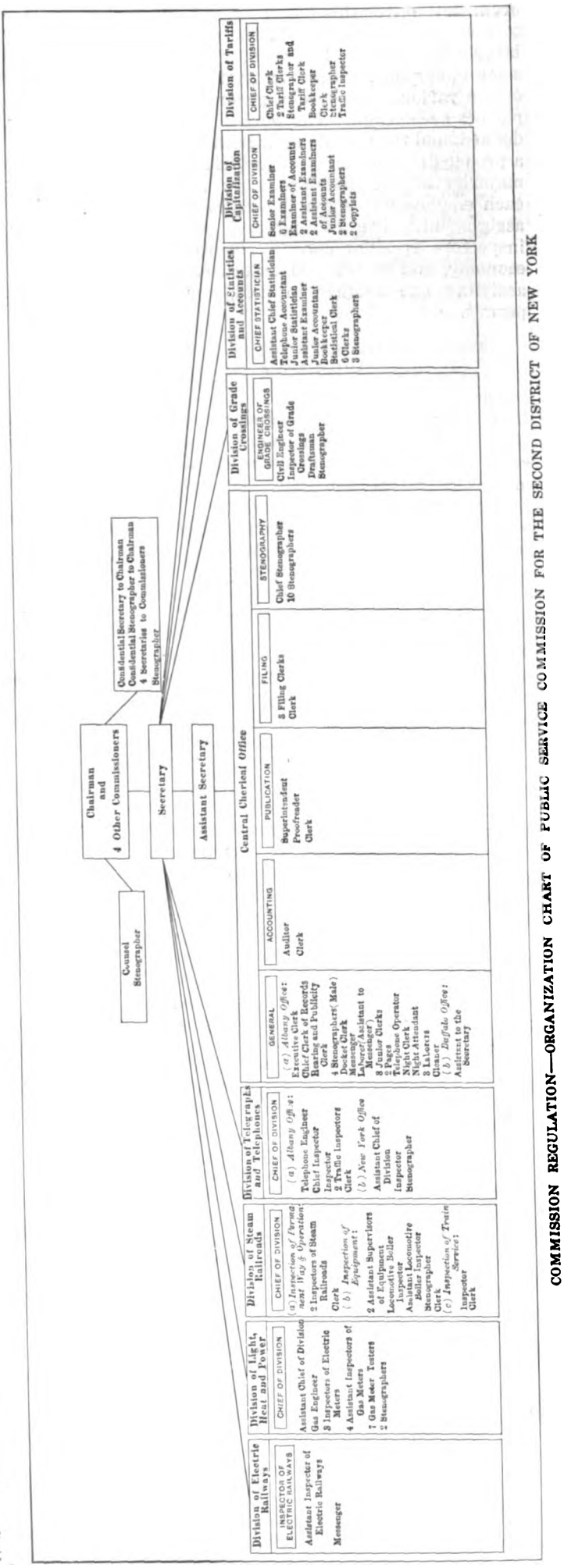
To give effect to the commission's desire that all matters possible be disposed of in the informal and more speedy way, its rules of practice are remarkably short and simple, being contained in a brochure of but a dozen pages. Moreover, the commissioners give as much personal attention as possible to matters of complaint and frequently make personal inspections, and all departments of the commission are required to give their sympathic attention to written or personal applications for relief or information, with a view to inspiring in both patrons and proprietors of utilities confidence in the desire of the commission to attain equitable results through the least cumbersome methods.

GENERAL ORGANIZATION

The machinery that is used to carry on all this work consists of many parts. As a whole, the commission is organized in several operating units, which are as follows: (1) Commissioners—having jurisdiction over the entire organization; (2) legal staff and confidential staff to the commissioners; (3) administrative division; (4) division of electric railways; (5) division of light, heat and power; (6) division of steam railroads; (7) division of grade crossings; (8) division of telegraphs and telephones; (9) division of statistics and accounts; (10) division of capitalization; (11) division of tariffs, and (12) general clerical office.

Each of these will be described in turn, but this first section of the present article will cover only the three leading groups (1, 2 and 3) and the five following groups (4, 5, 6, 7 and 8) devoted to special classes of utilities and to grade crossings.

The accompanying chart gives the organization more in detail. The commission was fortunate in its first



COMMISSION REGULATION—ORGANIZATION CHART OF PUBLIC SERVICE COMMISSION FOR THE SECOND DISTRICT OF NEW YORK

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organization, for this has remained practically intact up to the present time. Even the personnel has remained largely the same. The greater part of the employees come under the civil service system, although the heads of the various divisions in general and a few other employees are exempt. The work of the commission is well defined, and the scheme of organization in general shows a proper distribution of supervision and control. In the majority of the divisions work records are made by each employee to show the time, etc., devoted to each assignment. The routing and assigning of work to inspectors receives careful attention with a view to economy, and the several units co-operate in regard to assisting one another in field work when conditions permit.

COMMISSIONERS WITH LEGAL, CONFIDENTIAL AND ADMINISTRATIVE AIDS

The commission itself is composed of a chairman and four other members appointed by the governor for a term of five years at a salary of $15,000 per annum each. The appointments are so regulated that one commissioner retires each year. The present members are shown in an illustration elsewhere. The commissioners have from time to time been changed with different political administrations at Albany, and no one of the original commissioners now remains. The commission has, however, escaped conspicuously political appointees, which fact has contributed materially to the unbroken maintenance of a concededly effective working force. For example, throughout the recent four years of Democratic administrations at Albany, the head of every division but one in the commission was, if anything in politics, a Republican. Though all the commissioners now serving are lawyers, this is purely incidental. Commissionerships have been ably filled by engineers and laymen.

The legal staff of the commission consists of a counsel ($10,000), with one stenographer ($1,080). The counsel renders opinions for the commission and for individual commissioners, brings and defends actions, prepares briefs in the appellate courts and gives advice on all legal matters connected with the commission.

The confidential staff is nominally composed of a confidential secretary to the chairman ($2,500), a confidential stenographer to the chairman ($1,500), four secretaries to the commissioners ($1,500), and one stenographer. At the present time, however, the positions of confidential secretary and of secretary to one commissioner are vacant. One commissioner's secretary is assigned to the chairman at a salary of $2,250, and the stenographer is an acting secretary to a commissioner at a salary of $1,500. A further word of explanation need be added about only the secretary assigned to the chairman. This employee, in addition to his ordinary stenographic duties, conducts correspondence in connection with informal complaints regarding rates and regulations of common carriers and in connection with applications regarding rate adjustments filed by the carriers. He also prepares forms of various orders involving rates and regulations, etc.

The administrative division consists of a secretary ($6,000) and an assistant secretary ($4,500), the latter position being now vacant. The secretary is the administrative officer of the commission and has direct supervision over all divisions, which report through him to the commissioners.

DIVISION OF ELECTRIC RAILWAYS

The division of electric railways inspects all such systems in the State with the exception of lines operating in New York City. The inspection covers the physical condition of the roadbed, structures, poles, wires, power plants, etc., as well as service, accidents and other phases of electric railway transportation. The inspections are usually conducted after complaints have been filed with the commission. Intensive studies are made of traffic conditions, and reports are rendered to the commission and the railways in regard to such matters. There are three employees in this division, the electric railway inspector ($4,500), the assistant electric railway inspector ($1,800) and a messenger ($900). The inspector, of course, is in full charge of all the work of the division. His assistant makes reports and recommendations only as directed.

The work of this division is well shown by the report for 1915. In this year there were seventy-four operating electric railways in the territory under the jurisdiction of the commission. During the period a detailed examination was made of thirty of these companies, most of them in this group being small. In addition to the foregoing, however, twelve larger railways were partly inspected, the inspection in most cases being made by observation while the inspector was riding over the track when on these lines for other than inspection purposes. While such inspection was not complete in detail, it was sufficient in character to determine the condition of track, roadbed and structures. Where necessary, the reports on inspections contained recommendations for improvement. These were submitted to the companies interested, and in all cases compliance by them was assured. In general, it was found that the track, roadbed and structures on all of the lines except one were being properly maintained. In the case of this one, the commission caused temporary repairs to be immediately made pending permanent reconstruction and replacements. In the interval, it secured a reduction in speed of cars necessary for safe operation. The group of illustrations on the opposite page shows a few of the things that the electric railway inspector examined.

All complaints against electric railways which are classified as correspondence complaints are handled by this division. At the beginning of 1915 there were fifteen such complaints open on the records. During the year sixty-six were received, making a total of eighty-one complaints referred to this division. Of these, sixty-nine were investigated and in most cases satisfied and closed on the records, leaving twelve open at the end of the year. Of these, seven were received after Oct. 1, 1915. In addition to the correspondence complaints, the department assisted in the investigation of twelve formal complaints, one of which included a complete survey of traffic requirements and service furnished by one railway.

The division during the year investigated the collisions occurring on interurban railroads in the district and the number of persons killed and injured. The accompanying group contains a wreck photograph taken by the electric railway inspector. The division also determined the number of collisions between automobiles and electric cars. All of the latter accidents resulting in fatalities were investigated. Notwithstanding efforts to reduce accidents, there was a material increase in the number of automobile accidents occurring at grade crossings of highways and electric railways during the year. With the object of reducing the number of such occurrences, the commission caused a conference to be held between representatives of the automobile clubs and electric railway officials, at which the subject of safety of operation at grade crossings was fully discussed and a committee was appointed to consider the matter. This committee has now made definite recommendations [ELECTRIC RAILWAY JOURNAL of

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Trestle on Electric Railway Line

Steam Shovel and Work Car Operation

New Fill for Electric Railway Track

Electric Railway Bridge Structure

Standard Culvert Under Electric Railway Track

Collision Between Electric Railway Cars

Commission Regulation—Examples of What the Electric Railway Inspector Examines

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Dec. 9, page 1221] for standard signals and improvements in surrounding highway conditions.

The jurisdiction of the commission over local transportation service, as supplied by electric railways, was extended by the Legislature of 1914 to cover the so-called jitneys, all operators of vehicles for a 15-cent fare or less in all cities of the State being required to obtain a certificate of public convenience and necessity from the commission as well as the consent of the municipal authorities. Upon the application of a jitney operator for such a certificate, the commission holds a hearing if there is any question of competition with an existing carrier or of opposition of any sort. This hearing almost invariably takes place in the city concerned. Should disputed points arise, the division of electric railways is called upon for a report. The local authorities are relied upon to see that no jitneys operate without proper authority, as this is a police function with which the commission deems itself not to be vested. Wherever unauthorized operation has been tried, it is said, prompt steps to check it have been taken by the local authorities, either in the courts or before the commission. As the commission can only appeal to the courts, however, the direct appeal by the local authorities has proved the speedier method.

DIVISION OF HEAT, LIGHT AND POWER

The function of the heat, light and power division consists of supervising and inspecting gas, electrical and steam-heating corporations and making tests of the equipment used and supplied by these companies, as well as investigating adjustments and complaints and making examinations and reports in connection with capitalization and rate cases. The division is not yet sufficiently equipped, it is said, to permit regular and thorough inspections of plant and equipment, but extensive work is done along the other lines.

The electrical work of the division covers the inspection of power plants and periodic tests of instruments and equipment used in measuring the output of electricity sold to the public. The law requires that all types of electric meters be tested and approved by this division, and it is the custom to take one or more meters of the type proposed for use and, after a thorough test, to approve or disapprove their use by the corporation. During 1915, 597 station testing standards owned and used by companies were tested, this total including 445 rotating standards, 145 indicating wattmeters, four voltmeters and three ammeters. On the complaints of consumers twenty-five electric meters were tested. A generous laboratory appropriation in the last year has enabled the division to commence the adequate equipment of its laboratory in new quarters.

Moreover, the law requires that all gas meters be tested by the commission before being placed in use. This means a test of every new meter installed by any gas corporation within the State. During 1915 gas meters numbering 121,121 were verified and sealed as correct within the allowable limit of error of 2 per cent, and 2482 were rejected. It is the work of the division also to test the quality of gas of all corporations. The tests are made without the knowledge of the supplying companies, but the results determined are furnished to them. In 1915 the division made 875 tests of gas. Up to the present, besides testing the gas for pressure, the inspectors have tested samples for candlepower, total sulphur and other ingredients. After Jan. 1, 1917, however, the photometric test will in most cases give way to a calorimetric test. As the result of a number of years of study and experiment, the commission has adopted a heating-power standard of 585 B.t.u. per cubic foot for manufactured gas. This move has been made in view of the increasingly prohibitive cost of the enriching oils necessary to maintain gas at a candlepower standard, with the obvious passing of the flat-flame open burner for illumination in favor of the mantle burner, and the growing use of gas for cooking, heating and other domestic and industrial purposes where illuminating power is negligible and heating power essential. The gas laboratory is now being equipped with the extensive apparatus required for testing and calibrating under the new standard.

The general staff in the light, heat and power division consists of the following officials: Chief of division ($5,000), assistant chief of division ($3,000), gas engineer ($3,000), three inspectors of electrical meters ($1,200), four assistant inspectors of gas meters (three at $1,200 and one at $1,080), seven gas-meter testers (two at $1,200 and five at $1,080), and two stenographers (one at $1,200 and one at $1,080). The chief of the division is in charge of the general administration of the work. He also makes special investigations of accidents and for appeals in capitalization and rate cases. Complaints of all kinds, such as those arising in connection with overcharges and quality of service rendered by the gas and electrical corporations, are supervised by him, some investigations being made personally.

In general, however, the assistant chief of the bureau tends to correspondence and complaints relative to electric service, and the gas engineer to such matters relative to gas and steam-heating service. The assistant chief also directs the work of the inspectors of electric meters. These three inspectors are assigned to definite territory in the State, the work of testing the meters being done in the laboratory of the commission. These inspectors also make investigations in regard to accidents. The work of the division in conjunction with the division of capitalization and in rate cases is handled by the assistant chief in the case of electric corporations, and the gas engineer in the case of gas and steam-heating corporations, with such assistance as may be necessary from the inspectors. This work consists in checking inventories and making appraisals of all property in connection therewith.

Besides his work in capitalization and rate cases and in handling complaints, as before mentioned, the gas engineer directs the activities of the four assistant inspectors of gas meters, as well as the testers of gas meters, and apportions their work. The four inspectors make routine inspections of gas properties and tests of gas in various towns. The work requires about two hours in each town, and the inspectors visit from eight to ten places a week. Their laboratory testing of gas samples is performed at irregular intervals, probably averaging one day per week. The seven gas-meter testers test all meters and make special investigations on complaints. When a meter is tested a record is made, and if it is within the legal limits the commission seal is attached to the meter giving authority for its use. Each tester is assigned to definite territory and, under normal conditions, tests from sixty to seventy-five meters a day.

DIVISION OF STEAM RAILROADS

Prior to Oct. 1, 1915, the organization of the commission provided for a division of engineering inspection, including departments of transportation, inspection of equipment, train service, grade crossings and electric railways. On this date, however, the last two departments were placed in separate divisions under their respective names, and a consolidation of the transportation, inspection-of-equipment and train-service departments was effected to form a division of steam rail-

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roads. The work of this division now covers—besides the investigation of accidents and the appraisal of property—the inspection of permanent way and operation, the inspection of locomotive and passenger-car equipment, the inspection of locomotive boilers and the examination of train service.

Before describing such work, a word should be said regarding the overlapping of jurisdictions of the State commission and the Interstate Commerce Commission, especially in connection with the inspection of trunk-line railways, locomotive boilers and equipment. Every effort is made by the New York body to avoid conflict with the federal commission and to reduce to a minimum any burden upon utilities growing out of the double duty of reporting to both commissions. Steam railroads report in New York upon the same forms used for their reports to the Interstate Commerce Commission (and a form is now being prepared to relieve interstate

Summary of Passenger-train Movement for Month of June, 1916

Railroad	Total number of trains run.	Number of trains on time.	Per cent of trains on time.	Number of trains late.	Per cent of trains late.	Average minutes late per train run.	Per cent of lost time made up.	Principal Causes of Delay, in Per Cent.												
								Engine failures.	Equipment failures.	Wrecks.	Condition of track.	Waiting for connections, other divisions	Waiting for connections, other railroads	Meeting and passing.	Signals.	Trains ahead.	Waiting for orders.	Stations.	Storms.	Other causes.
Bath & Hammondsport	219	172	78 6	47	21 4	4 6	1 5	1	....	....	10	....	57	....	....	....	....	32	....	.....
Boston & Albany	1,058	923	87 1	135	12 9	2 8	37 2	2	1	1	4	5	55	1	1	5	....	9	....	6
Boston & Maine	1,211	765	63 2	446	36 8	6 9	16 3	2	1	1	....	34	31	1	1	4	....	25	....	.....
Buffalo & Susquehanna	118	67	56 8	51	43 2	13 7	0 0	13	....	....	41	15	28	1	....	....	....	2	....	.....
Buffalo, Attica & Arcade	83	69	83 0	14	17 0	18.0	0 0	1	....	....	10	....	11	....	....	....	....	78	....	.....
Buffalo, Rochester & Pittsburgh	1,152	922	71 4	330	28 6	5 3	30 0	2	3	4	14	30	8	7	1	2	....	28	....	1
Buffalo Division	352	164	46 6	188	53 4	9 6	15 9	3	3	3	19	21	....	8	....	1	....	42	....	.....
Middle Division	146	109	74 7	37	25 3	5 1	43 6	3	5	....	1	22	34	....	....	3	....	26	....	6
Rochester Division	654	549	84 0	105	16 0	3 1	41 3	....	2	7	14	42	8	9	3	3	....	12	....	.....
Schoharie Valley	156	149	95 6	7	4 4	1 0	0.0	....	....	....	....	....	100	....	....	....	....	....	....	.....
Ulster & Delaware	423	356	84 2	67	15 8	4 4	63 2	6	1	8	....	19	8	16	....	1	....	40	1	.....
Main Line Division	232	200	86 3	32	13 7	5 1	64 4	7	1	10	....	2	13	18	....	1	....	47	1	.....
S C & K Branch	191	156	81 7	35	18 3	3 6	61 2	4	....	4	....	63	....	12	....	....	....	27	....	.....
Unadilla Valley	120	115	95 8	5	4 2	0.7	60.7	....	....	....	....	....	35	....	....	....	....	65	....	.....
Wellsville & Buffalo	120	55	45 9	65	54.1	15.0	16.2	35	....	....	....	....	28	2	....	....	....	31	....	4

COMMISSION REGULATION—EXAMPLE OF MONTHLY TRAIN-SERVICE BULLETIN ISSUED BY STEAM RAILROAD DIVISION

electric railways in the same way). In general, the New York commission tends to confine its activities to matters over which the federal body exercises no control.

1. *Inspection of Permanent Way and Operation:*

The employees handling the inspection of permanent way and operation, as well as accident and appraisal work, consist of the chief of the division ($4,500), who was formerly the head of the transportation department; two steam-railroad inspectors ($3,000), and a clerk ($900). The chief supervises and assigns the work of inspectors, examines the reports and prepares memoranda in regard to these, classifies and tabulates all accidents, makes physical valuations of steam and electric railways, and personally conducts investigations of accidents on steam railroads when necessary. The valuation work is done mostly for the purpose of checking up and making appraisals of property from inventories furnished to the division of capitalization by corporations desiring to issue securities. The two inspectors travel and inspect all steam railroads within the State, and they also assist in the valuation of steam railroads as required. The clerk classifies and tabulates all accident statistics and has charge of the filing system in the division.

The permanent-way inspections are made on all lines at least once a year. On the larger steam-railroad systems they are made from an inspection engine or car traveling at the rate of 20 m.p.h. and stopping at all openings, bridges, stations and other desired points; or by handcar on certain lines, or on foot when necessary. Inspections of track require careful scrutiny to detect rails with minor defects, broken angles, or loose or missing bolts. Conditions affecting the roadbed must be noted, such as ballast, ties, structures, etc., while the signal system and the condition of bridge timbers, steel work and masonry must also be examined. The inspections on the trunk lines are much less rigid than on the smaller or intrastate lines, for the former are under the jurisdiction of the Interstate Commerce Commission and also have a highly developed system of inspection of their own. The results of all inspections are embodied in a report with recommendations for the elimination of defects and the installation of appliances to safeguard the traveling public. All such reports and recommendations are furnished to the railroads concerned.

In the case of accidents, inspectors are sent out to investigate the causes and to report on such accidents as result from any defects in track, roadbed, etc. Accidents arising from defects in equipment and other defective conditions not under the jurisdiction of these inspectors are assigned to other officials in the division for investigation and report. All accidents are classified and their various causes tabulated. The commission has made a careful study of the rail problem, and in its latest report presented a table of rail failures by months from 1909 to 1915, with a technical discussion of the reasons for such failures.

2. *Inspection of Equipment:*

The equipment-inspection section handles the examination of operating equipment, the inspection of methods and facilities for repairs at terminals, the reporting of all accidents caused by defective equipment and the inspection of locomotive boilers. In the routine inspection of equipment the attention paid to locomotives does not cover the work assigned to boiler inspectors. The inspection of a locomotive consists in examining and reporting on such defects as general bad conditions, defective air brakes, defective flanges, leaking metallic packings, unguarded water and lubrication glasses, poor headlights, bad driving-wheel flanges, etc. Special attention is paid to ash pans and spark arresters on locomotives operating in the Adirondack forest reserve. In 1915, out of 5255 locomotives in service or

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available for service on the railroads where a general inspection was made, 4027 were inspected.

Inspection of passenger cars has been incidental to other inspections, attention in this case being given mainly to sanitary conditions, safety appliances, air brakes and the location of emergency tubes. In the commission's opinion, the passenger equipment should be inspected as carefully as the motive power, but because of the lack of available employees only the smaller lines have been covered. In 1915 general inspection of passenger equipment was made on thirty-eight lines operating 269 passenger cars, about 64 per cent of the cars being examined.

The work of locomotive boiler inspection covers the physical inspection of boilers and the investigation of boiler accidents that have caused personal injuries, as well as the calculation of stresses, etc., on boilers and the checking of inspection statistics filed with the commission by the railroads in compliance with the law requiring that all locomotive boilers be inspected by competent men at least once every three months and a certificate filed covering each inspection. During 1915 there were reported to the commission specification cards, etc., of 9940 locomotive boilers. There were approximately 40,000 certificates of inspection filed, each of which was checked and compared with previous records. The inspectors examined 1872 boilers.

The equipment-inspection group contains the following employees: Two assistant supervisors of equipment ($2,600), locomotive-boiler inspector ($3,000), assistant locomotive-boiler inspector ($1,800), stenographer ($1,500) and clerk ($1,200). One assistant supervisor of equipment directs the employees in the section, outlines work plans and handles correspondence. His field work consists of investigations of accidents where equipment is concerned, and such other investigations as arise upon complaints. The other assistant supervisor of equipment helps to investigate accidents caused by equipment defects, and he inspects locomotive and passenger-car equipment. The locomotive-boiler inspector and his assistant carry on all boiler examinations, the former handling all correspondence in regard thereto. The clerk keeps monthly tabulations of engine failures, compiles statements from reports, keeps a check on all inspectors as to the filing of reports, and is in charge of the files and records. The stenographer is in special charge of the files of boiler certificates and indices of all locomotive boilers.

3. *Train-Service Inspection:*

The part of the division devoted to train-service inspection checks train dispatchers' reports concerning the movement of all trains, prepares monthly reports for train-service bulletins showing the causes of delay, handles complaints relative to passenger service and station facilities, and makes special investigations as to causes of freight-train accidents and other subjects assigned by the commission. The dispatchers' reports of train movement are forwarded to the commission, but a commission representative must often go to the various offices and check the reports with the original sheets in order to discover late trains. One of the commission's monthly train-service bulletins is reproduced on page 1335. There are two employees in this section, an inspector ($2,000) and a clerk ($1,080).

DIVISION OF GRADE CROSSINGS

The work of the grade-crossing division consists of examining plans filed with the commission for the elimination of grade crossings, devising plans for such work, supervising construction and apportioning costs. All applications for the elimination of grade crossings receive a hearing from the commission and are either approved or disapproved. In the case of approval, plans and specifications are made, a contract for the work is advertised and generally awarded to the lowest bidder, and the commission is kept informed as to the progress of the work. The total number of grade crossings abolished in the State through the action of the commission up to Dec. 31, 1915, was 371, of which number twenty-three applied to the calendar year of 1915. The total amount paid out by the State Treasurer up to Jan. 1, 1916, for the State's share of the cost of grade-crossing elimination was $2,182,378, with an estimated cost of $389,146 to the State for work authorized, either not yet completed or completed and not yet paid for.

While the commission has power to order the elimination of steam railroad grade crossings, its power over electric railway grade crossings has been confined to making operating rules therefor. In all probability, however, it is said, a recommendation will be made by the commission at the coming legislative session for a grant of additional authority over the grade crossings of highways and electric railways, as the result of conferences between railway officials, automobile club representatives and commission experts. These parties, as noted before in describing the electric railway division, have been at work the past year on standard signals for highways, electric railway cars and automobiles, and also on recommendations to give the commission power to alter the physical surroundings of electric railway grade crossings in the interest of clearer vision, perhaps apportioning the small cost in the same way as the cost of steam railroad grade-crossing eliminations is apportioned among the railroads, the State and the locality concerned.

The employees in the grade-crossing division include an engineer of grade crossings ($4,500), a civil engineer ($3,000), a grade-crossing inspector ($2,000), a draftsman ($1,400) and a stenographer ($1,200). The engineer of grade crossings, who is the chief of the division, examines plans and specifications for the elimination of such crossings or prepares plans to be put before the commission. He checks and makes estimates on all contracts published, attends hearings and advises the commission on all grade-crossing cases, and examines all final bills and makes the distributions thereon. The civil engineer visits the localities where construction work is going on, consults and interviews railroad officials and others, criticises plans, prepares or supervises the work on estimates and assists in the final distribution of various charges. The office of this official is in New York City, and his attention is given mainly to work in that vicinity. The grade-crossing inspector inspects all work under construction, such as masonry, stone and concrete work, bridge erections, drainage, etc., and reports conditions to the chief of the division. The draftsman, besides his regular work, makes inspections in the field when necessary.

TELEGRAPH AND TELEPHONE DIVISION

The telegraph and telephone division is charged with the investigation of complaints regarding utilities under its jurisdiction, the general inspection of the physical property, the investigation of operation and management, and the valuation of companies in connection with rate and capitalization cases. All informal complaints concerning service are referred to the chief of the division for investigation and report. With few exceptions these complaints are settled satisfactorily by correspondence or through personal attention on the part of the chief or some member of his staff. More than 600 complaints and inquiries relative to service,

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rates, discriminations and disputed accounts were received by the division during 1915.

The general inspection of the physical condition of the properties is made by male inspectors. The inspection work has tended toward encouraging the co-operation of telephone corporations and obtaining immediate action in the field without having recourse to formal reports and recommendations. General inspection of plant and equipment has been handicapped on account of the lack of funds and also the greater necessity of using the available men on inventory work in connection with capitalization and rate cases.

Service testing, however, forms an essential part of the inspection routine. The investigation of the operation and the management of telephone companies is performed by female traffic inspectors, who have had previous experience as traveling chief operators of telephone systems. Their work is to go into the different cities and make general observations and records as to the service rendered. These investigations include tests as to speed, accuracy, attention on the part of the operators and the time taken in each operation. The qualifications of these inspectors are such that they are capable of reporting on the inside equipment. The inspection of telegraph service is handled by male inspectors, who examine the inside and the line equipment, special attention being given to time consumed in sending and delivering messages.

The telegraph and telephone division has two offices, one in Albany and one in New York City. The employees in the Albany office consist of the chief of the division ($4,000), the telephone engineer ($2,800), the chief inspector of telephones and telegraphs ($1,500), the inspector of telephones and telegraphs ($1,200), two telephone traffic inspectors ($1,200) and a clerk ($1,200). The chief handles most of the correspondence regarding complaints, etc. He is also charged with the making of special investigations and spends some time traveling in reporting on formal and adjusting informal complaints. The telephone engineer is in charge of the detail work of the Albany branch, and directs the work of the inspectors. He compiles reports concerning their work and makes special investigations of both formal and informal complaints. The appraisal of most properties is done by him or directly under his supervision. The chief inspector makes general inspections of physical property and assists the telephone engineer in the inventory and appraisal of various properties. The work of the inspector in Albany is practically the same as that of his superior, and the work of the two female telephone traffic inspectors is as previously described. The clerk keeps a complete file of all complaints and correspondence, and at times assists in the checking of inventories.

In the New York office the employees are the assistant chief of the division ($3,000), an inspector of telegraphs and telephones ($1,800) and one stenographer ($1,500). The assistant chief is responsible for the directing of the inspection work and the investigation of all complaints in New York City and its contiguous territory. He makes personal investigations of complaints that cannot be closed by letter or by the local inspector, and also makes studies of rates in his territory. While he reports to the chief of the division monthly on all matters pertaining to the New York office, he handles them entirely independently. The inspector in New York City does work similar to that of the two inspectors of telephones and telegraphs in Albany.

GENERAL DIVISIONS TO BE DESCRIBED LATER

Thus far attention has been turned to the three leading groups—the commissioners themselves, their legal and confidential staff, and the administrative division—and also to the five groups charged with the supervision of electric railways, light, heat and power companies, steam railroads, grade crossings, and telegraph and telephone companies. In the organization of the commission, however, there are four more divisions, not devoted to any particular classes of utilities but doing work that in the main concerns them all. These—the divisions of statistics and accounts, capitalization and tariffs, and the central clerical office—will be described in detail in a later issue.

Boston Elevated Policies

President Brush Describes Them to Massachusetts Street Railway Association

PRESIDENT Matthew C. Brush of the Boston Elevated Railway was the guest of honor at the regular monthly meeting of the Massachusetts Street Railway Association at Young's Hotel, Boston, Dec. 20. F. A. Belden, president of the association, occupied the chair and introduced as the first speaker President P. F. Sullivan of the Bay State Street Railway. Mr. Sullivan pointed out that the occasion was the thirty-fourth anniversary of the association, and in extending the right hand of fellowship to Mr. Brush wished him the fullest success in the administration of the Boston company. In characteristic vein Mr. Sullivan contrasted conditions in the electric railway industry to-day with those prevailing under horse traction thirty years ago. "Then," said the speaker, "problems were simple, investment low and profits high. In Massachusetts the ratio of investment to income has risen from 2.5 to 1 in 1883 to 5.5 to 1 in 1913. Depreciation took care of itself in those days." Mr. Sullivan also emphasized the great difficulties in the way of providing for depreciation under the rates allowed on the Massachusetts lines of the Bay State company. Before closing he welcomed C. D. Emmons, recently made general manager of the Boston & Worcester Street Railway, to fellowship in the association.

C. V. Wood, president of the New England Street Railway Club, brought the greetings of its 900 members to Mr. Brush, after which H. H. Crapo, New Bedford, Mass., presented the guest of honor with a "Christopher," or talismanic medal of Middle Ages fame, on behalf of the association.

In response, Mr. Brush paid a high tribute to the loyalty of his friends and subordinates, and said in part: "My office door is wide open and they come and go as they please, making the business of the company their own personal concern. My job is to help them make a success of theirs, to encourage the delivery of that extra 10 per cent of effort which cannot be obtained without the kind of loyalty that you can see in a man's eye. Our problem is to encourage this loyalty in each of the 10,500 employees of the company, carrying enthusiastic devotion to duty all down the line." The speaker cited a recent instance in which a crane car operator off duty took the initiative and shortened the duration of a surface car blockade by getting permission to run out a crane car to remove a heavy girder which was interrupting traffic in the evening rush hours. Referring to co-operation in the administration of the company's affairs, Mr. Brush described the bi-weekly "council meetings" at which department and bureau heads discuss pending matters, eliminating as much correspondence as possible. Letters to the president over one page in length are tabooed. Mr. Brush then outlined the company's financial situation as presented to the special Legislative commission in recent hearings and urged his hearers to read thor-

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oughly all the available printed matter on this and the Bay State case before the Massachusetts Public Service Commission.

TIME TO STOP EATING HUMBLE PIE

"We are all engaged," said Mr. Brush, "in an honorable business, and it is time to stop meekly taking unjustified abuse from the public. It is easier to sit back in a hearing and keep out of trouble than to come forward, get up on our hind legs and refute with all our might attacks which are without foundation. We are in a first-class reputable business, and it is time to get over acting as though we were ashamed of it in any way. In reality, there is no business about which the public and its representatives know so much as that of the electric railway. The Massachusetts Public Service Commission goes into the affairs of the companies under its jurisdiction more thoroughly than any other commission regulating traction systems; its auditor has full authority to examine every expense voucher we possess." Speaking of the company's statement of its case before the commission, sent to all stockholders and employees, Mr. Brush said that careful inquiries indicated that 90 per cent of the employees read the statement, and thus a large body of opinion favorable to the company's case was created.

Recent Pittsburgh Publicity

Posters and Folder for Public Education and Use—Historic Parade with Mule Car in Front

THE Pittsburgh Railways has recently been doing some public relations advertising that shows considerable thought and originality. One kind is a series of car-window posters on the theme of "How long will the nickel stand the strain?" The first poster issued several weeks ago shows various factors which are tearing the nickel apart, such as taxes, claims, paving and street cleaning, increased cost of material, wages and tolls over bridges. In the second picture of the series, issued during December, the same factors are shown again, but this time they are accompanied by pictures of car riders who are making appropriate remarks.

CAN THE NICKEL STAND THE STRAIN?

Another poster, which is put into each car as fast, or as slowly, as it arrives, reads as follows:

"This is the .... car of the 150 motor cars ordered in 1915, long delayed on account of slow delivery of electrical apparatus.

"Constructive criticism is invited for assistance in the design of the next lot of cars."

This is the company's direct way of explaining the shortage of cars. Naturally Pittsburghers know about the difficulty of now getting quickly anything that is manufactured from metal, but they are not likely to connect it immediately with local railway troubles unless the matter is brought sharply to their attention. The text of this poster is the same in all the new cars except that the number of the car in order of delivery is stenciled in. The last paragraph of the poster calling for suggestions in the design of new cars has produced quite a response. Probably a number of suggestions may be found applicable, as they come from all classes of workers in wood, steel, glass, ventilation, heating, etc.

The Pittsburgh Centennial parade, held on Nov. 3, gave the Pittsburgh Railways a timely opportunity for effective publicity. Its exhibit in the parade consisted of an old-time mule car, which bore at the sides the legend, "Fare up hill 10 cents, down hill 5 cents." These fares were for a distance of 2½ miles. The sign also pointed out that this was the kind of transportation that Pittsburgh had, not 100 years ago, but only thirty years ago. At one stage of the parade a third mule with an extra driver or postillion was added for grade-climbing help, as in the "bad old days."

HISTORIC PARADE OF CARS IN PITTSBURGH

Behind the mule car followed an early single-truck electric car. Then came the first semi-steel car, built in 1907 by the Standard Steel Car Company for surface operation in Pittsburgh. This car had a steel underframe, steel sides, wooden posts and a flat roof. The fourth car in the parade was the 1917 Jones model center-entrance front-exit design. It bore the slogan, "The fare is still 5 cents."

ROUTE GUIDE ALSO ISSUED

The company also issues a twelve-page folder guide, which contains a great deal of information about the system of value to the resident as well as the visitor in Pittsburgh. In the center of the folder is a two-page map of the company divided into squares, each 8000 ft. square. Each square is numbered and an index of routes on another page shows the car line which a passenger has to take to get to any square thus shown. Two other pages of the folder tell the interesting points in the city and the route to be used, list the city parks and points from which the entire city can be viewed, and give interesting sightseeing trips in and about Pittsburgh. Another page shows typical daily traffic graphs and a rush-hour chart on a typical line. A statement on another page is entitled, "Some Things the People Can Do to Improve the Service," and among the suggestions given are: "Board and alight from cars promptly," "Do not insist on unnecessary stops," "Provide legislation to keep wagons off the tracks," "Have the exact fare ready before boarding the car," "Do not block the doorway of the car," "Do not forget to ask for your transfer upon paying fare," etc.

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Electric Railway Drawbridge Safeguarding

The Author Takes Exception to Some of the Conclusions of the Committee Appointed by Mayor Curley of Boston, Mass., to Investigate the Drawbridge Accident Which Occurred in That City on Nov. 7, 1916

By FREDERICK W. JOHNSON

PERHAPS no single electric railway accident of the past decade has occasioned so universal a feeling of regret as did the Boston disaster of Nov. 7, 1916, wherein a surface car plunged through the open draw of Fort Point Channel bridge with a loss of some forty-seven lives. To all railway men, and particularly to those who have been identified with the development and furtherance of the safety factor in railway operation, it has seemed peculiarly unfortunate that so distressing an occurrence should have been visited upon a group of officials who, for many years now, have rendered such distinguished and conspicuous support to the movement to bring to present-day transportation methods the widest possible margin of safety, alike for the passenger, the traveler upon the highway and the employee.

The basic facts of this mishap have been so graphically set forth in the columns of the ELECTRIC RAILWAY JOURNAL that little is to be gained from a reiteration of them. The situation appears to have been singularly free of any unusual or extraordinary complication, as, for example, a heavy grade, an uncontrollable car, a dense fog, a blinding snowstorm, treacherous rail, or a stricken motorman. If the fact that the arc light on the bridge was extinguished is to be accepted as one of the chief contributing causes, its principal value as an aid to future guidance is to be found in the knowledge that any imperfectly designed protective device which relies solely upon electricity for illuminative purposes properly must be regarded with apprehension, for under circumstances such as these a dark sign at night may upon occasion offer precisely the same degree of actual protection as did the "dead" arc light, and no more.

STREET RAILWAY OPERATION HAS ITS OWN REQUIREMENTS

It is not enough to say that a "dark" signal is always a "danger" signal, for there is a wide gulf separating steam, subway, elevated and high-speed interurban railroading upon the one hand and metropolitan surface operating upon the other. Because of the absence of rigid signal control, the individual surface unit is in a sense a free agent between terminals. The presence of a signal or warning light in this field is rather an exception than a fixed rule. Instead of spotting lights, one's attention rather is directed to watching the movements of vehicles, studying the wishes of passengers, guardedly approaching intersecting streets and angular crossings, working out of traffic jams, observing the everchanging condition of the rail, avoiding pedestrians, conforming to traffic rules, and innumerable other duties inherently peculiar to this particular phase of railroading. It is just the difference between public right-of-way operating and private right-of-way railroading.

Small wonder, then, that the surface operator on a large system should occasionally fail to detect a "missing" light with the same facility as would one trained in a radically different school where the accurate picking up of signals forms one of the most essential elements of the calling. And again, on the surface it is necessary frequently to transfer men at short notice from one route to another to meet the exigencies of travel, which still further interferes with one's studying the operating conditions of any particular route with the same exactitude as though operating upon but that one alone. The normally greater annual turn-over in labor upon surface lines, as compared with the other branches named, is yet another factor to consider. These points are not cited as furnishing extenuating grounds for carelessness, nor as a justification for indifferent railroading, but rather as a frank statement of facts as they actually exist, and in support of the contention that warning lights, signals or signs for surface operation should be made as conspicuous, dependable and foolproof as possible.

CLASSES OF DRAWBRIDGE SAFEGUARDING

Electric railway drawbridge safeguarding may be roughly summarized under three general classifications: (1.) High-speed interurban, subway or elevated operation. (2.) Extraordinary physical conditions, particularly those involving dangerous grades, curves or blind approaches. (3.) Ordinary city service, with the usual accompaniments of close headway, density of traffic and frequent operation of the draw.

The first of these obviously inclines toward established steam railroad procedure, while the second necessarily requires specialized protection commensurate with the imminence of the particular hazard involved. The last group, however, more readily lends itself to a somewhat plastic standardization of methods, and it is, therefore, with this phase of the problem alone that we are at present concerned. The Boston situation, in common with many others throughout the country, properly comes within the scope of this classification. Not all are susceptible of exactly the same mode of treatment, of course, because of the inevitable peculiarities of local conditions, but in the main the principal essentials of most of them will be found to bear a close resemblance one with another.

POSITIVE STOP SHOULD ALWAYS BE MADE

The first safeguard to which attention instinctively directs itself is the establishing of a fixed or positive stop for all cars approaching a drawbridge, at such distance from the draw proper as in all reasonable probability should obviate any danger of a car not being under safe control when nearing the span, and at the same time sufficiently close as to enable the operator to obtain an accurate and certain view of conditions in the immediate vicinity of the draw intersection. An examination of the official rule books issued by twenty-nine operating companies situated in various parts of the country discloses the fact that of the entire number nine specifically require an absolute stop; five treat of the general subject of drawbridges, but say

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nothing of positive stop requirements, while thirteen make no mention of the subject at all. Of the last named some or even all may relate to properties having no bridges of any character upon their systems. Two other roads, oddly enough, content themselves with stipulating that cars shall be brought to a full stop whenever the draw happens to be open. Most of the roads which make no provision for a stop require that motormen shall approach drawbridges with their cars under complete control, and at speeds varying from 4 to 10 m. p. h. One company compels a double stop, the first 100 ft. from the span, and the second approximately 20 ft. Still another stipulates that the conductor shall remove the pole from the operating wire and place it upon a supplemental wire while the draw is open and the car standing. The standard code of rules for city operation as adopted by the American Electric Railway Transportation & Traffic Association does not touch upon the matter of drawbridge operation, the committee presumably viewing the subject as one which could be handled to better advantage by individual companies as a purely local operating matter.

The distance from the draw at which the positive stop is to be made varies from 50 ft. minimum to 200 ft. maximum. In some cases the exact point is fixed presumably by a sign or similar device, although it is not just clear how extensive is this practice. George W. Bishop of the Massachusetts Public Service Commission, in his recent investigation of the Boston fatality, recommends that the distance shall be not less than 50 ft. nor more than 100 ft. Excluding approaches complicated by pronounced grades, obstructed view, high speed, excessively heavy equipment, or a chronically treacherous rail, this would appear safely to meet every requirement of good railroading. In placing the stop at too great a distance from the draw, the danger may unconsciously be incurred of neutralizing the protection sought, by permitting a fast operator to acquire too great momentum in the distance intervening between the stop and the draw intersection. There is but one kind of stop that should be at all acceptable, and that is a full and complete stop. If trainmen are to be permitted to "slur" their stops, the 3-mile slowdown of to-day may become the 5-mile "safety" stop of to-morrow, with an ever-increasing tendency in the wrong direction.

SUGGESTION FOR A CONSPICUOUS "DEAD LINE"

It is seldom, indeed, that men agree in their estimates of time, speed or distance. It also is true that the average operator watches the track immediately before him with greater circumspection than he does either the poles on the curb line or the overhead construction. Therefore I make the following suggestion for definitely fixing the precise spot at which the positive stop must be made, and as an auxiliary precaution against any likelihood of one's passing a stop sign unobserved. Install as a part of the permanent pavement between the rails three transverse rows of vitrified brick set in concrete foundation, the two outside rows to be of white or yellow brick, the center of red. This would then constitute a permanent "dead line," conspicuously apparent alike to the regular or occasional operator. In some cases a different color combination might be required, especially where red brick is used for paving purposes. If it be argued that the scheme might prove less effective during the snow period than at other seasons of the year, it is to be remembered that the Boston catastrophe, as well as others of a similar nature, occurred at a time when there was no snow upon the ground. During the winter months the "dead line" could be kept reasonably free of snow and ice in exactly the same manner as curves and switches are kept open and operative. Identically the same scheme could be utilized in safeguarding the movement of following units in electric switch operation, as indicating the point beyond which a car may not proceed until its leader is safely out of the switch.

"DEAD" TROLLEY WIRE SECTION A WISE PRECAUTION

In commenting upon the advisability of installing section insulators at a safe distance from operating spans, the report of Mayor Curley's committee has this to say: "It has also considered the wisdom of automatically cutting off the power from electric cars at a reasonable distance from the draw span before the latter is opened, but feels that this might prove dangerous in case of failure of the brakes, as the motorman would then have no opportunity of controlling the car with his reverse." Plainly, this fails to take cognizance of the very practicable method of reversing a car upon generated current. By this means a car traveling at good speed may be stopped, even upon a very appreciable grade, though the power be off the line and the brakes useless. In other words, the higher the speed the more effective the generated current reverse. But aside entirely from this phase of the problem, the query irresistibly arises, "Is it at all probable, or even possible, that the accident of Nov. 7 would have occurred had the motorman of that car been automatically deprived of power at a distance of one full city block from the open draw?" The single fact that he was able to draw current right up to the very instant when he suddenly discovered the safety gates in front of him, of itself alone made possible the deplorable consequences which followed. One of the first instincts of any motorman, even one newly employed, is to stop his car immediately upon losing his power or when his car becomes dark, for if ever there was an unmistakable indication of trouble or danger it is this.

Serious mechanical failures are of such relatively infrequent occurrence nowadays, compared with errors of human judgment, that it would appear as though the committee unwittingly has chosen the greater for the lesser evil; for in this case it is to be observed that although the motorman had the benefit of current right up until the final moment, his reverse availed him naught. It also is significant to note that the report of Mr. Bishop expressly states that "in the present instance there is no evidence that the accident was due in any way to defective brake equipment, etc." Here, then, was a situation wherein everything conduced to a fair test of the committee's preference for uninterrupted power in contradistinction to the section insulator theory, yet the worst possible result ensued. Even as a desperate last-ditch resort, the reverse undeniably is a very elusive and uncertain quantity, especially in the hands of new men.

ELECTRIC LIGHT NOT DEPENDABLE FOR NIGHT WARNING

Drawbridge danger being greater at night than during daylight hours, it follows that the means adopted for warning travelers at night should be correspondingly effective and far-reaching. The plan of utilizing automatic electrically illuminated signals admittedly is a good one, but always with the proviso that some untoward incident may not arise unexpectedly to derange the mechanism or interrupt the current. In the report of the Massachusetts Commission we find this: "A street arc light is located . . . nearly opposite the gates. This light, if kept burning at night, is of great assistance to the motorman in determining the position of the draw. The motorman claims that the light was not burning at the time of the accident. His statement is substantiated by a passenger on the car, as well as

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by a person riding in an automobile, who arrived immediately after. There is further evidence that later in the evening the light went off and came on again." Here we have a striking illustration of the fallibility of electricity for the purpose in hand, that carries with it a ring of conviction that may not be denied. Cause and effect seldom have been more closely coupled. Public utilities many years ago foreswore the practice of depending upon the illumination supplied by a city's arc lights as a means of warning travelers at night of the presence of dangerous excavations or obstructions in the public highway. Electrically illuminated devices have their value in the general scheme of protection, but only as an auxiliary or secondary consideration. A more certain and more effective agent is needed if travelers by night are to be vouchsafed maximum security.

A Red Flare Light Might Be Used

Departing from the stereotyped customs of years standing, it is pertinent to inquire whether we may not profitably take a leaf from the book of the mariner, who burns a Coston light at night when in need of assistance at sea. As a means for safeguarding drawbridges, the idea really is not as chimerical as it may at first seem. Immediately it becomes necessary to operate a draw, the first move to be made by the bridge-tender would be to light the "red flare." This should instantly warn everybody approaching the bridge from either end, for a distance of several blocks, at least, that the draw either is open or is about to be opened. A permanent metal holder could be provided for the "flare," placed several feet above the level of the bridge flooring. Doubtless such lights could be manufactured to burn five, ten or fifteen minutes, according to requirements. The desired degree of brilliancy also could be arrived at with some little experimentation. In any event the "flares" should be of good quality for obvious reasons. Should they be found to interfere with pilots sighting their markers accurately or to startle horses, shields might be devised to overcome these incidentals, though both belong rather to the realm of the possible than to the probable. Whether one "flare" would prove sufficient, or whether two of lesser brilliancy, one upon either side of the draw, would better serve the purpose, could best be determined in the light of actual experience.

Given a car load of passengers approaching an open draw protected by a "red flare," it is a safe prediction that if the motorman failed to make his positive stop at the required spot, he would very quickly be reminded of his delinquency once the public at large became conversant with the details of the scheme. Incidentally, motormen who fail to pass the standard color test should be excluded from drawbridge routes, for upon them the vital significance of a red bull's-eye, or a "red flare" might be wholly lost.

Preliminary Warning Signs Desirable Also

Supplementing both the "red flare" and the positive-stop sign, it would seem in order to install a preliminary warning sign, to be continuously illuminated at night, approximately 500 ft. on either side of each operating drawbridge, to read something like this: "*Drawbridge*—500 *Ft. Ahead—Reduce Speed.*" Such a sign should, of course, be tapped in on the "live" side of the section insulator, and if desired could specify the speed permitted in the block between this point and the positive stop. Immediately the "red flare" appears, a rule of the company should require the motormen of all cars within the block bounded by the 500-ft. sign and the positive-stop indication at once to bring their cars to a full standstill. Should the first car of the line, however, be at a point beyond or outside the 500-ft. sign, the motorman of that car should not be permitted to pass the preliminary until the "flare" is extinguished. If this latter provision be deemed unnecessarily drastic, the whole scheme is susceptible of innumerable variations and modifications. Certain it is, however, there is nothing to be gained by allowing cars to coast into the dark area controlled by the section insulator. The real point at issue, after all, is whether these suggestions may not contain the germ thought so essential to the introduction and development of additional operating safeguards of a practicable nature.

Co-operation With Bridge Tender Is Necessary

A logical counterpart of the protection afforded by the adoption of the "red flare," the section insulator, the preliminary warning and the positive stop, is to be found in the possibilities of an even closer co-operation upon the part of the bridge tender than seems heretofore always to have been the case. For example, the responsible municipal authorities might be prevailed upon to lend their assistance thus: After the "flare" has been lighted and the gates closed, the draw shall not be operated until the leading car which has passed the 500-ft. sign is brought to a standstill. If, however, the first car is close to and approaching the preliminary, then the same procedure will be adhered to. On double-track bridges the same rule would apply to either side. If the company, as its contribution toward the success of the plan, will insist upon a rigid observance of the "red-flare-immediate-stop" order, there need be no resultant delay whatever to water craft. The brief interval between the lighting of the "flare" and the closing of the safety gates would be found sufficient for the plan to operate.

Conductors Could "Run" Drawbridge Crossings Also

The almost universal practice of requiring conductors to "run" grade railroad crossings in the absence of flagmen opens up yet another avenue of speculative thought. If the grade crossing, why not the equally hazardous drawbridge? All that would be required would be for the conductor to advance to the point of intersection, satisfy himself that the draw was in proper position as evidenced by the matching of the rails, then give the "come ahead" signal. It is questionable, however, whether such a precautionary measure is really needed during the daylight hours. It probably is not, but its possibilities as a further step toward maximum security during hours of darkness, fog or storm are readily apparent. Perhaps some roads even now pursue this method. If so, it should be of general interest to learn just how efficacious it may have proved. In some cases the plan might entail complications of one character or another, particularly if it should necessitate the interruption of fare collections on short-haul runs during the rush period. Even this, however, would apply to but a few winter months, during which time a company watchman might be utilized for an hour or so morning and evening. The possibilities for an occasional platform accident may not appeal to the claim department officials with any considerable force, yet of the two hazards the chief precaution very properly would be directed against the greater. With certain types of cars the premature-start mishap need receive no consideration whatever, for it nominally has ceased to exist. But in any event the danger incurred would be no greater than that now readily enough assumed in the protection of electric cars on steam railroad crossings where flagmen are not maintained.

Dangers of False Clear Signal Indications

Of the several specific recommendations adopted by the conference called by Mayor Curley, as reproduced

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in the JOURNAL for Dec. 2, that of painting drawbridge safety gates with alternate stripes of white and black, an innovation recently standardized by some of the steam roads, appears to be excellent. The idea of installing a large automatic gong interlocked with the drawbridge operating mechanism, 100 ft. distant on either side, may not prove very effective. For example, the ringing of the gong is a positive indication of danger, and its silence an equally positive assurance of safety, but a *false* assurance whenever it fails to sound a warning because of a short-circuiting of current or other derangement of the mechanism. Defective bells of this very character have been directly responsible for many serious steam railroad grade crossing collisions, although this defect has of recent years been largely overcome by the manufacturers of specialized equipment, some of which might be found to be better adapted for drawbridge protection than the simple automatic interlocked gong.

The final recommendation of the committee, "That an illuminated sign . . . reading, 'Stop When Draw Is Open,' be installed at a distance of approximately 200 ft. from each highway drawbridge, and the illuminating mechanism interlocked with the drawbridge and gong-operating mechanism," is rather curiously worded. If the draw actually is open, the sign should so indicate in positive language, instead of leaving travelers to conjecture whether it is or is not. Every traveler is willing enough to come to a stop if only he knows in advance that the draw is open; clearly the thing to do is to apprise him of the fact that it *is* open. The interlocked illuminated electric warning sign is subject to identically the same criticism as the automatic gong, *i. e.*, when dark because of faulty operation of the mechanism it treacherously conveys a false assurance of security to the traveler. To each preliminary or cautionary electrically illuminated sign there should be attached at night a yellow-globed oil-burning lamp or lantern, and to positive-stop signs of the same character red-globed lamps or lanterns. These colors conform to standardized signal aspects, and would serve as "an ace in the hole" in case of current failure.

It is no part of this discussion to move a blanket indictment of all electrically-operated safety devices, for entirely apart from the truly phenomenal advances made of late years in the science of railway signaling, there are many extremely ingenious and highly perfected appliances upon the market which almost hourly give abundant proof of their incalculable value as a means of adequately safeguarding life, limb and property. An effort has been made, however, to focus attention upon the futility of adopting protective devices which only partially fulfill their allotted mission. It is earnestly to be hoped that in the not distant future engineering genius will permanently supplant many of the hazards and uncertainties of the human equation with the more stable and dependable safeguards afforded by the fixed laws of applied mechanics.

Illinois Commission Issues Rules for Overhead Electrical Construction

The State Public Utilities Commission of Illinois has issued general order No. 30 establishing rules for overhead electrical construction. R. V. Prather, Springfield, Ill., is secretary of the commission. The order comprises several sections treating respectively of the following: general matters such as definitions and classifications of supply circuits; overhead construction in general; construction at crossings between wires; construction at crossings of wires over railroad tracks; crossings of wires under railroad structures; construction for jointly-used pole lines; and general recommendations for the construction and operation of supply systems and signal systems whose lines are involved in parallel.

There are also appendices containing sag data for wires from No. 10 to No. 0000 gage inclusive, for temperatures from zero to 100 deg. Fahr., for spans from 100 to 175 ft. inclusive, and for weatherproof soft copper, weatherproof hard or medium copper, and for hard or medium copper wire. The tables also include sags for bare hard copper and bare galvanized iron wire for signal circuits. A comprehensive table of contents renders the pamphlet very convenient for reference.

Historical Pennsylvania Pamphlet

To inform its patrons and the public in general, the Pennsylvania Railroad System has issued, in booklet form, an historical and descriptive treatise covering the territory traversed by its lines.

One of the principal objects in the publication of the booklet is to preserve, in permanent form, the most interesting and picturesque incidents connected with the settlement and subsequent development of this region, which has become the richest and most thickly populated in the United States.

Another purpose is to set forth the present character of the various portions of the territory with reference to industry, mining, agriculture and commerce. The region covered includes the principal sections of the Middle States and the Central West, together with some portions of the Southern States. A brief description is given of all the cities and of the more important towns on the Pennsylvania Railroad, east and west of Pittsburgh, with the business advantages and achievements of each.

Many of the historical incidents recorded in the book are little known and were obtained with difficulty from obscure sources to rescue them from oblivion. They relate chiefly to events in the discovery period of American history, to happenings during Colonial days, the revolution, the war of 1812, the wars with Mexico and the Indians, and the civil war, with some or all of which practically every portion of the territory traversed by the Pennsylvania Railroad System was in one way or another associated.

The book is profusely illustrated, and is accompanied by a large folding map of the territory served by the Pennsylvania System.

A Muzzle Loader

Cars of various types in operation on the same system obviously have drawbacks, but are the price that is paid for advancement. How the confusion that sometimes results from such operation as seen by the so-called man in the street is shown in this clipping from a contemporary:

"Street cars * * * are of a varied kind. Some are of the peek-a-boo or open sort. Some load passengers at the rear end only. Others receive and discharge their load at the front end. Naturally some confusion results, and waiting passengers are never sure where to station themselves to board the car hurriedly. One of the front-end cars rolled up alongside a waiting passenger early in the week. The passenger wanted a rear-end car and so placed himself. The car did not properly identify itself to him. Time was being lost. The motorman was resourceful, and sizing up the situation, poked his head out at the door and called out, 'She's a muzzle loader, old top.' The passenger understood, hopped aboard and the car went on its way."

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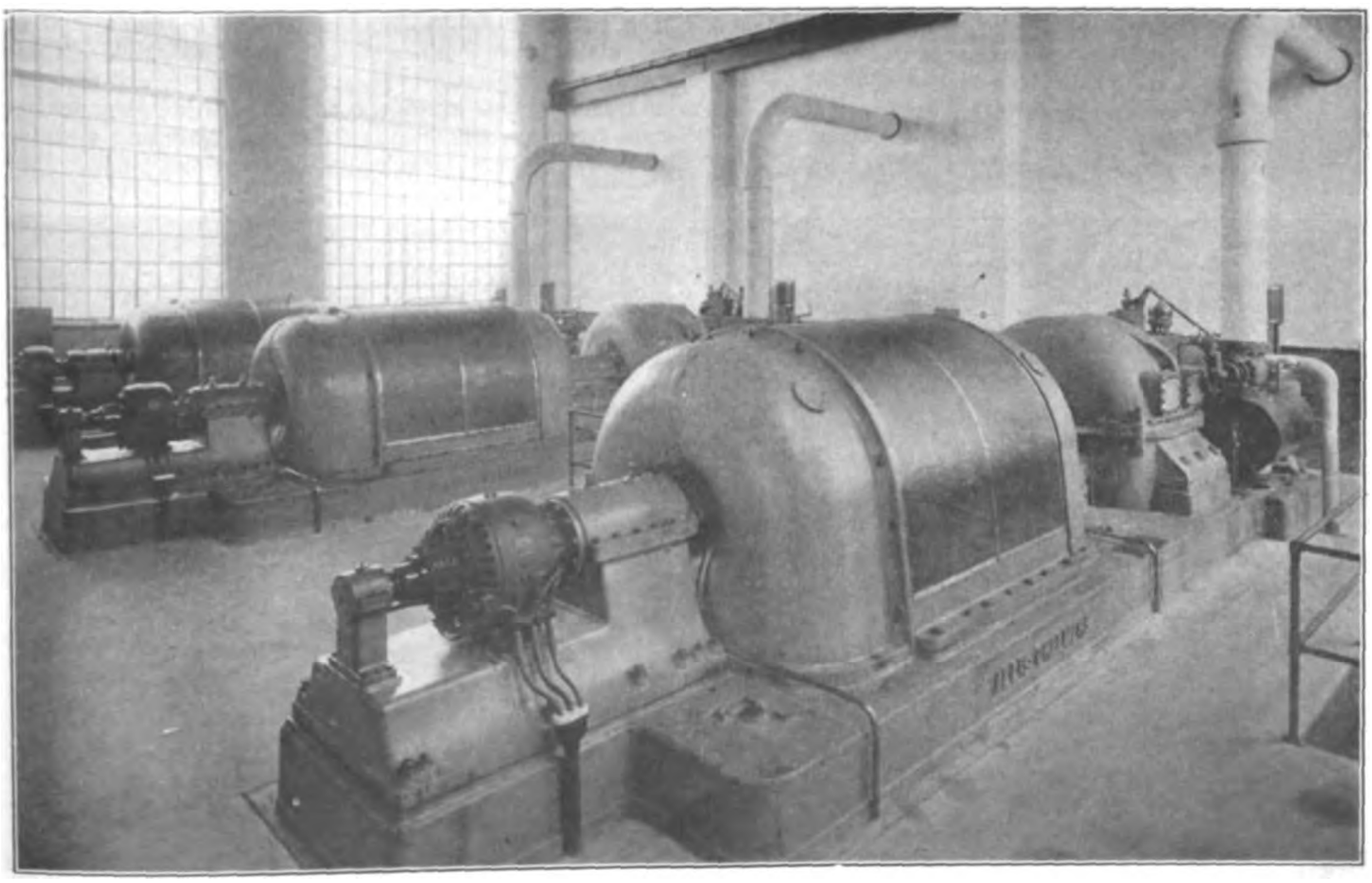
New Power Station of Compact Design

The Fremont Plant of the Ohio State Power Company, Which Supplies Energy for the Lake Shore Electric Railway, Follows the Unit Arrangement of Apparatus and Covers Practically One-Half Square Foot of Ground per Kilowatt of Capacity

THE Lake Shore Electric Railway has recently arranged to obtain its supply of energy from a new steam generating station of 15,000-kw. capacity which has just been completed by the Ohio State Power Company under rather unusual circumstances. The plant is located on the bank of the Sandusky River at Fremont, Ohio, and its output is supplemented by that of an adjoining hydroelectric station which was constructed on the same site several years ago.

More than the usual requirements of good water supply and coal-receiving facilities governed the location of the new steam station at this particular point. Its sister station, the 3000-kw., 25-cycle hydroelectric plant, was built in 1913 by the Sandusky River Power Company, also a wholesale producer, which had arranged to supply the Lake Shore Electric Railway with a certain minimum amount of energy each month under a contract carrying a penalty clause for failure to supply this minimum. But the river, as usual, did not deliver as much power as was anticipated, and at the end of the year the penalties imposed had totalled an amount such that the Sandusky River Power Company actually owed its customer money, and it was promptly put into the hands of a receiver in order to nullify the contract. Then the Ohio State Power Company was incorporated, and this company purchased the securities of the defunct company and reissued the stock in the name of the new company. But in order to save the $600,000 investment in the hydroelectric plant, it was necessary to resort to some means of operating the station at its full productive capacity without the penalties under which it had previously run. The solution, briefly, was the securing of a 17,000,000 kw.-hr. a year minimum contract with the Lake Shore Electric Railway and an 8,000,000-kw.-hr. a year minimum contract with the Ohio Light & Power Company, and, with these contracts as the principal basis of financing, there was undertaken the construction of a modern steam plant large enough to carry the load and supply all energy required over and above what the hydraulic plant would develop. The new plant was planned to be a 60-cycle station, and therefore the work included also the placing of new 60-cycle generators in the water-power station.

Principal interest in the new station centers about the complete layout of the station on the unit plan to give better insurance against complete shut-down, to allow for future extensions, and to simplify the piping. A further carrying out of the unit plan appears in the complete isolation of exciter units, the installation of the potential and current transformers in the fireproof compartments for each pole of the oil switches; and the location of the two concrete stacks on the steel structure directly over the boilers. This has resulted in a generally compact layout of the station and equipment



FREMONT POWER STATION—TURBINES FOR MAIN FLOOR

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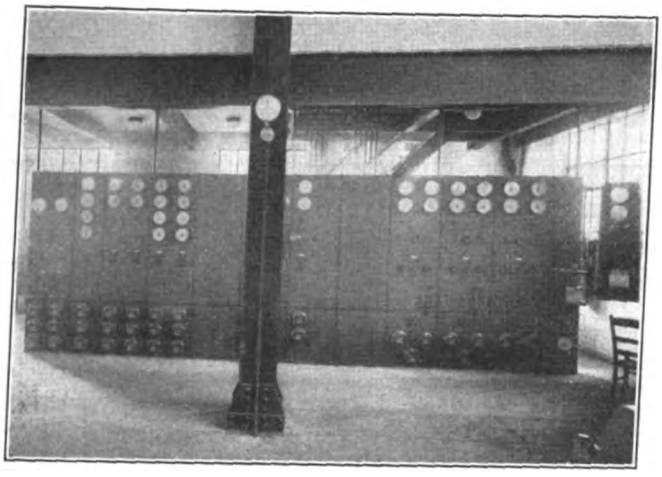
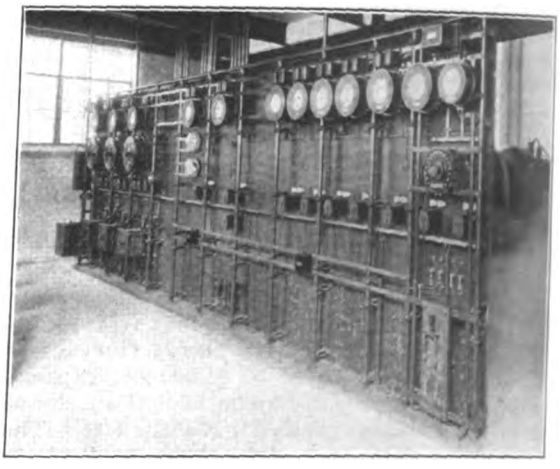




FREMONT POWER STATION—FRONT AND REAR VIEWS OF SWITCHBOARD

and gives a modern plant at the lowest possible cost. The ground area covered is 0.5266 sq. ft. per kilowatt of capacity and the cubical content is 28.666 cu. ft. per kilowatt.

GENERAL LAYOUT

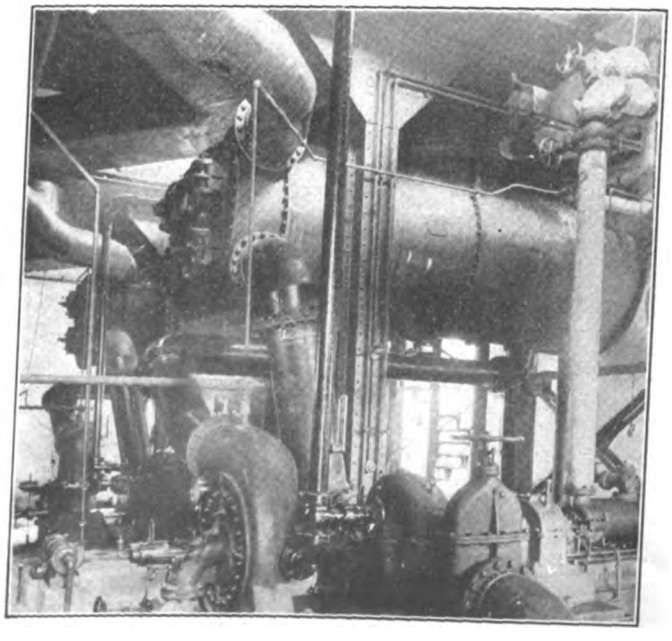
Promoting the idea of complete independence of each generating unit, the entire station is laid out so that a section through every 24 ft. of its length may be made to represent a generating plant complete in itself, with all its auxiliaries and a battery of boilers. The station at present is designed for three 5000-kw. units and two batteries of two 750-hp. Babcock & Wilcox boilers each. This sectionalizing of the layout reduces the matter of future expansion of the station to one involving simply the addition of another 24-ft. section on both the turbine and boiler rooms for the installation of another complete unit. The layout may perhaps be characterized as a one-floor-level station, as the boiler room, turbine room and switchboard room are all on the same elevation with only the high-tension switching and protective apparatus above it. The only electrical equipment below this is the 4000/66,000-volt water-cooled transformers and the station-power and lighting transformers.

The switchboard with all control circuits leading from it and the 4000-volt oil switches are on the main floor at the most convenient location for the observation and immediate accessibility of the engineer in charge. The transformers are installed immediately below this switchboard section of the station and the high-tension oil switches, lightning arresters, etc., immediately above.

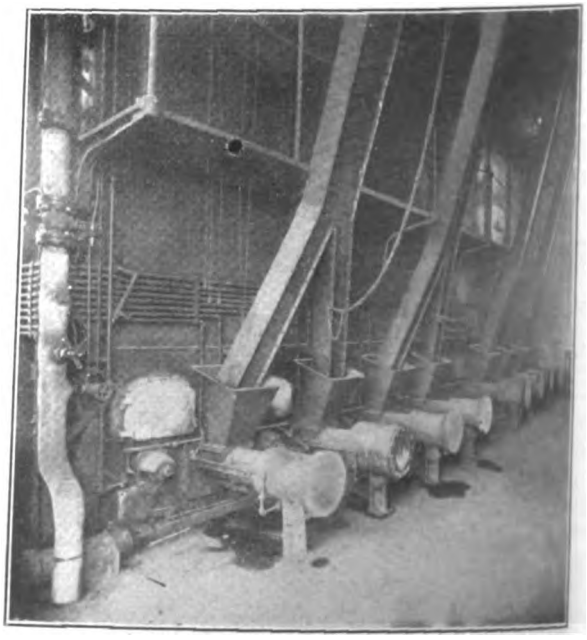
Supports for the various pieces of equipment consist of steel columns, thus giving the maximum of open space available underneath for the installation of auxiliary equipment. The basement under the boilers is utilized for the forced-draft fans and the ash hoppers, water heaters, etc., while that under the turbine room houses the condensers and also all other auxiliary equipment, the turbine-room floor being entirely free from miscellaneous equipment.

BOILER AND TURBINE ROOM EQUIPMENT

The boilers are installed on both sides of a central firing aisle, opposite units forming a battery of two for each turbine, each pair of boilers on the same side of the aisle being connected to the same stack. These stacks, constructed of reinforced concrete, are mounted on steel supports above the boilers. Although a heavier steel structure was required for this plan, and a saving in first cost and operating expense was shown over



FREMONT POWER STATION—BASEMENT BELOW TURBINE FLOOR



FREMONT POWER STATION—BOILER FRONTS AND STOKERS

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the more customary scheme of building the stacks from the ground up and enlarging the boiler room to provide the necessary additional space, or placing the stacks behind the boiler room and installing the long breeching. The plan makes a very compact boiler plant and has necessitated a minimum property purchase for the ultimate plant. The stacks are 104 ft. high above the steel supports and have an internal diameter at the bottom of 10 ft. 4 in. which tapers to 8 ft. 6 in. at the top.

Each of the boilers is of 750-hp. rating and operates at 250-lb. pressure with 125-deg. superheat, having 7629 sq. ft. of heating surface. All are equipped with specially-designed stokers built by the Jones Underfeed Stoker Company with four retorts for each furnace, the latter being 16 ft. wide. With these four retorts per furnace, it is possible to run the boilers considerably above rated capacity.

The coal-handling equipment comprises a monorail system extending out from the boiler-room firing aisle on steel structures over a concrete storage pit. The ashes are dropped into cars which run on an industrial track in the basement and dump into the ash storage bin just outside the plant.

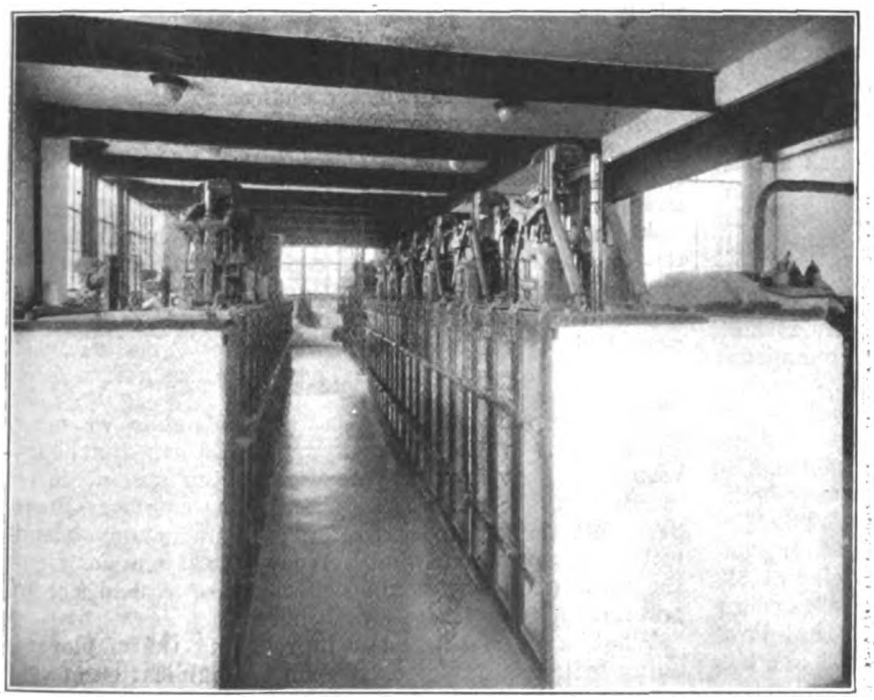
Simplicity is the most impressive feature of the turbine room, as it is free from all auxiliary equipment. The use of combination condensate, air and circulating pumps in one unit makes possible the complete installation of the turbine auxiliaries within the space that is available under each turbo-generator unit. In addition, separate exciter units on the turbine-room floor have been avoided by the independent operation of the direct-connected exciters. A winding stairway beside each unit places all auxiliaries almost within instant reach of the engineer. Further to safeguard operation, an Illinois Engineering Company's automatic stop valve is placed in the steam main just above the throttle, and this is so arranged that if the vacuum on the condenser is lost, for any reason, this valve cuts off the steam supply and automatically shuts down the turbine.

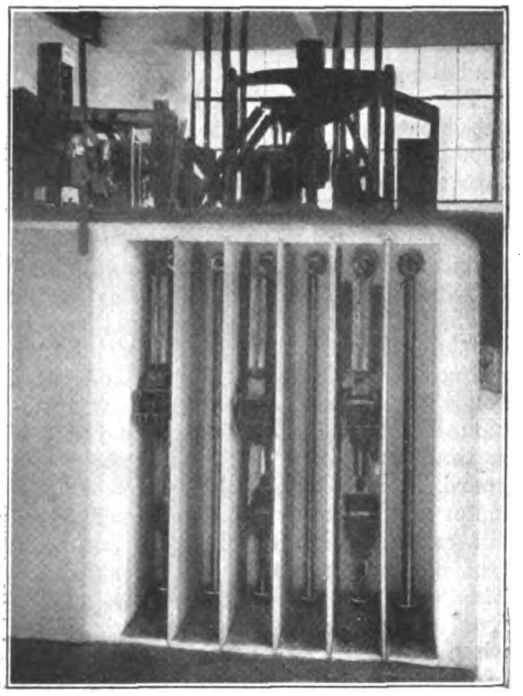
The main machines are 6250-kva., 3600-r.p.m., three-phase, 60-cycle, 4000-volt, grounded-neutral, Allis-Chalmers turbo-generators with individual exciters mounted on the generator shaft. They are set across the turbine room and are served by a 25-ton, three-motor traveling crane.

In the installation of auxiliary equipment a separate boiler-feed pump, Hoppes feed-water heater, etc., have been furnished for each of the two batteries of boilers, and a forced-draft fan for each boiler. A house service pump and condenser and condenser auxiliaries, etc., are installed for each turbine. The combined condensate, air and circulating pump units are turbine driven, as are also the boiler-feed pumps. The house pumps and soft raw water pumps, however, are motor driven.

A water softening and purifying plant is placed in the basement under the boiler room. Raw water is brought in through a Chain Belt Company's traveling intake screen in the river wall.

Both steam and water piping for each station unit are complete in themselves, and operation normally goes on without any intercommunication of systems, although a steam header connecting all boilers is provided for emergency operation. The steam supply lines for the turbine driving the condenser auxiliaries are tapped into the main supply to their respective turbines just above the throttle. There is also a steam connection between the feed water heaters and the turbines, so that in case the pressure in the heaters builds up, due to badly fluctuating load or any cause, a regulating valve opens and this pressure is taken back into the low-pressure stages of the turbine and utilized.





FREMONT POWER STATION—OIL SWITCHES ON TURBINE FLOOR; VIEW OF OIL-SWITCH COMPARTMENT

ELECTRICAL CONNECTIONS

The main bus in the station is divided by disconnecting switches into three sections whereby any unit may be operated independently of the others if desired. In addition to this main bus, there is an auxiliary bus and also an auxiliary feeder, the function of which is to make possible the interconnecting of the system in various ways. If it is necessary to work on the switches or instruments of any particular feeder in the 4000-volt local distribution system, this feeder can be energized from the auxiliary bus through the auxiliary feeder, which latter is equipped with an oil switch and disconnecting switches and complete instrument equipment with capacity large enough to take care of any two outgoing feeders. A small oil switch is pro-

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vided in the neutral of each generator so that the neutral energy may be supplied from any one generator. An ammeter connected in the neutral bus serves to warn the operator that something is wrong if the current flowing is an amount approaching overload.

All buses and heavy power leads are copper tubing mounted on post-type busbar supports, and with busbar spacers placed about every 4 ft. to prevent displacement or distortion of buses due to the magnetic stresses under short-circuit. The sixteen oil switch compartments are constructed of 4 in. concrete with transite board partitions 1 in. thick. These oil switch cells serve the purpose also of providing a fireproof compartment for the potential and current transformers which are mounted in the same compartment with their respective oil-switch poles. This is probably the first time transformers have been so located, and there are several advantages claimed for the scheme. The whole unit, including oil switch, disconnecting switch and current and potential transformers, is thus placed altogether to make a handy and accessible arrangement. Less space is required and the installation cost is reduced. Type C-1 Westinghouse oil switches are used in this connection and they lend themselves well to the compact construction.

The high-tension switches and protective apparatus are located in the room above the switchboard and 4000-volt oil switches and bus structures which are on the turbine-room floor level. The 4000-volt, aluminum-cell, indoor-type lightning arresters are also located in this upper room, as are tanks for the 66,000-volt aluminum-cell arresters, the air gaps being on the roof but operated from inside.

The switchboard controlling these various feeders consists of twelve panels of black natural slate and one swinging bracket. Meters are of the 7-in. Westinghouse dead-beat type, and the watt-hour meters are mounted on the back of the board 5 ft. above the floor, so that a man does not have to stoop to read them. The board is also equipped with a curve-drawing voltmeter and a curve-drawing frequency meter. The Tirrill regulator is designed for individual exciter control, as the exciters are not operated in parallel at all. This was a matter of completely isolating each exciter from the others to avoid the possibility of shut-down when two units are being operated in parallel and one of them fails, thus throwing the whole load on the other. The arrangement necessitated the installation of a complete spare unit and the present peak load on the station can, therefore, be carried by two of the three 5000-kw. units.

Energy for the remote control switching system is supplied by fifty-five of Electric Storage Battery Company's E-9 cells. These are charged by a 2-kw. motor-generator set which is kept floating on the line with the rate of charging so adjusted as to be practically equal to the energy consumption of the indicating lamps on the switchboard.

The station was designed and the general contract for its construction was handled by Woodmansee & Davidson, consulting engineers, Chicago.

Robert G. Staplin, claim agent Shore Line Electric Railway, Norwich, Conn., has contributed to the fostering of pleasant relations with the public by sending out to the many friends of the railway, a handsome little New Year's card. It is on a fine quality of Bristol board, 2¾ in. x 5¼ in. in size, and is printed in two colors in raised letters. It is in excellent taste, containing simply the name and title of the sender and appropriate good wishes. The sentiment is this: "Good luck—good times—good health—good cheer. Good everything—for all the year."

Railway Publicity*

What a Railway Should Do to Foster Good Public Relations and How to Do It

BY WALTER S. THOMPSON

Press Bureau, Grand Trunk Railway System, Montreal

THE day of slamming and abusing the public has passed. It was doubtless good sport, but it did not pay. The railroad and the public should be in one great partnership for mutual interest. Much has undoubtedly been done to give proper information to the public, but much has been left undone. It is impossible to attend any meeting of the Railway Commission, when the public is represented, without realizing how deep-seated are the misconceptions regarding railway management; how strong, in many quarters, the prejudice against the roads.

There is only one way to overcome this prejudice and this misunderstanding. That is by persistent, intelligent, informative publicity, directed to the people as a whole.

To the publicity campaigns waged in the last few years is attributable, I think, the change in public sentiment toward the railways, a change so favorable that it indicates the beginning of co-operation instead of the continuance of antagonism. W. M. Acworth, the foremost expert in Great Britain on railway management and operation, recently collected reports from all over the American continent. Thirteen hundred and ten of these correspondents reported that antagonism toward the railroads i nabating, and only 185 correspondents asserted that the former attitude of hostility remained.

BEGIN WITH THE EMPLOYEES

If we are to talk of educating the public we must surely begin with our own men. Efforts that have been made have for the most part been spasmodic or purely departmental in character. The employees have been left largely to learn facts of importance about railway service from whatever news items and comment the daily press has found space to print. A field rich in possibilities lies ready for us here.

What is the best method of reaching the employee? Many railroads have looked upon the publication of employees' magazines with some misgivings, and have not embarked upon their issuance because they believed that the commercial advertising that has been very generally carried between the covers of such magazines was "policy advertising," given by supply houses and other firms doing business with the roads. That there are objections to a railroad employees' magazine accepting this form of revenue is obvious. The railways, however, are now coming to the view that these publications, when properly conducted, are worth the price they cost and that support received from outside advertisers can be dispensed with.

Experience has shown that instead of leaving the issuance of such magazines to an editorial committee representing various grades in the service, with a "business manager" to make the magazine "pay," this work is best left to the publicity agent of the road, the whole expense being carried by the company. That is the right plan. Men in all departments should be encouraged to write articles for publication on subjects in which they possess special knowledge, and contributions should be solicited and paid for from writers outside the railway service. The main purpose of the magazine should be to raise the standard of knowledge and the standard of loyalty among the men. The material car-

*Abstract of paper read at meeting of Canadian Railway Club, Montreal, Oct. 10, 1916.

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ried should be of the highest class. Such an organ gives the executive an opportunity of speaking to all grades and produces an *esprit de corps* that is invaluable.

There are several other channels for reaching the employees which can be used to advantage. I will mention only one more. That is a bulletin frame carried in each office, station building, round house and mechanic's shop. Attractive matter with "punch" and "point" could be supplied fresh each month, prepared in such a way that it would have a direct appeal, one subject of general interest being treated on each bulletin. These bulletins could be large enough so that those who run may read, and at the same time the cost would be inconsiderable.

Opportunities for the Officers

I have been speaking of the railway employee. I will turn for a moment to the duties of the officers in this crusade. The modern railway official is the best equipped technically and among the best informed of all the men of our day. There is, however, a distinct and well marked tendency on the part of these able men to keep clear of public discussions and of public office. Every railway publicity man knows of the difficulties that arise in obtaining permission from railway officials to make known to the world praiseworthy achievements with which they have been associated. This reticence belongs to a time that is gone. This is an age of publicity. The stupendous labors that have gone into railroad upbuilding would fill hundreds of volumes, but for the most part they have passed unnoticed. The people want to know the men who are running the railways. Such statements that the "railways are owned by the banks," that they are "soulless corporations," have been accepted by a portion of the public and gained wide attention, because the public have known in only the most hazy way who the men are who are silently but doggedly staying by the task of providing transportation facilities of a high order while hampered often by heart-breaking conditions of lack of legitimate revenue and overabundance of "regulation." The public must know and believe in the men who are running the railroads before they believe and trust in the railways themselves.

Every officer has, according to his responsibilities, opportunities of supplying good publicity to his road. A large number make use of these opportunities; many, it would appear, do not realize fully what is lost by adopting an attitude of indifference toward publicity, favorable or unfavorable.

It is well to remember that it is not always the large things that count with the public. Some of the announcements that have been most widely quoted, that have been seized upon by the newspapers for editorial comment and have brought additional reputation to the roads, have not told in staggering figures of immense outlays of money for double-tracking or new facilities. If I may be pardoned for making a direct reference by way of illustration I would mention a bulletin issued by the Grand Trunk in connection with the service rule that the utmost courtesy must be shown to the public at all times and in all circumstances. That bulletin went out to each employee on the system above the signature of the president. It was headed "Politeness Pays." It was a human little document, but it left no doubt in the reader's mind that the policy which it enunciated was regarded as the keystone of the arch of service, and that failure to comply with its teachings would be looked upon with a serious eye. Here was something that concerned the relationship of every traveler toward the railroad, but it was the phrase "Politeness Pays" and the human note in the appeal that led, I believe, to its being featured prominently in practically every paper on the continent and in scores of publications in Europe. Such announcements may be matters of routine, but they can be made publicity features of great value. All the announcements issued to employees should reach your publicity department at some stage, whether you desire the co-operation of the head of that department in drafting them or not. They may contain just that happy phrase or that new idea that the public will fasten on to and associate with your road.

Work Which the Publicity Department Can Do

I will now outline what are believed to be the legitimate activities of a railroad publicity department. This subject was very fully discussed at a conference of the publicity representatives with the railway Executives Advisory Committee at Washington this year. The outline which follows is not a description of any particular organization in any railroad, but is rather a summary of the general scheme of action as presented at that conference.* It may be of assistance to the members of the club in approaching the subject under review.

General Scope of the Publicity Department.—Should handle all matters involving the public relations of a railroad. Should be the medium of promoting good will and reflecting an intelligent understanding of railroad problems on the part of the community and people whom its facilities serve or concern. Should afford the means of conducting campaigns for maintaining a high standard of loyalty among employees. In direct advertising should prepare material used in campaigns in newspapers and periodicals, time-table folders, excursion and resort booklets, exhibitions, etc. The department should be established to serve every branch of the service without reserve, and the director of the work should be regarded as a staff member of the executive organization.

Service to the Press.—Should maintain friendly relationship with those who control the policy and men who edit and write the matter which goes into all classes of publications. Should maintain a service whereby publicity statements sent out reach all the papers simultaneously and go direct to the person on the editorial staff delegated to handle the various kinds of matters, thus keeping managing editor, news editor, telegraph editor, railroad and financial editor in direct touch with railroad. Should be at the service of the press at all times, where information is requested or might be given without demand. When it understands that a railroad aims to act honestly with the public, the press is invariably disposed to afford fair consideration. It should be possible for the press to communicate with the publicity department by wire day and night and receive prompt replies to inquiries.

Executive Statements.—Publicity Department should assist in the preparation of authoritative statements and interviews given out by executive officers or other members of railroad organization. It should be possible for the head of this department to prepare articles presenting the railroad's side of topics so that unwarranted criticism can be forestalled, the head of the department having access to general information concerning his company and enjoying full confidence of officials.

Public Addresses.—Records should be kept in the department of facts and figures concerning the railroad situation, as well as general and historical data relating to the company itself, so that upon requests for an offi-

*See addresses by J. Hampton Baumgartner and others.

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cial to present a subject to a community in the form of a signed article or interview in a newspaper, or an address before a gathering of business men, the preparation of this material should be assisted in by the Publicity Department.

Clipping Service.—The Publicity Department should operate a press intelligence service of clippings for the information of the railroad officials and as a matter of record. These clippings should embrace all railroad matters, subjects relating to government regulation, financial articles, topics of general interest and municipal doings of important character. The department should enable the railroad to keep informed concerning the attitude of the communities toward the company and should present all information available with reference to traffic possibilities.

Community Development.—By working in co-operation with the industrial and colonization departments of a railroad, the Publicity Department can render important assistance in emphasizing the interests in common possessed by patrons of the railway in building up prosperous communities. Through boards of trade, commercial clubs and manufacturers' associations it can reach the business men on such subjects as railroad service and facilities, fair rates, etc.

Photography, Lectures, etc.—The Publicity Department has a new field of endeavor in the demands for information received from university faculties, schools, colleges and students in general. Photography has always played an important part in publicity, and the departments carry thousands of negatives of all classes for illustrating articles and making lantern slides. Moving picture reels have now been added to stock equipment and, if the circumstances are favorable, the railway can supply a complete travelogue before any representative body.

On Dec. 19 the Commonwealth Edison Company of Chicago delivered to its distribution system 5,176,527 kw.-hr. This is the first time in the history of the company that the output in any twenty-four-hour period has passed the 5,000,000 mark. The peak load on the company's stations occasioned by this enormous demand for electrical energy was 369,740 kw., which is also the greatest peak the company has ever experienced. It is an unusual occurrence for the annual peak and the maximum yearly output to fall on the same day, as they did this year. In 1915 the peak for the year reached 337,900 kw. on Nov. 29. The maximum twenty-four-hour output last year was 4,550,137 kw.-hr. on Dec. 29. The peaks are definitely attributable to the railway load.

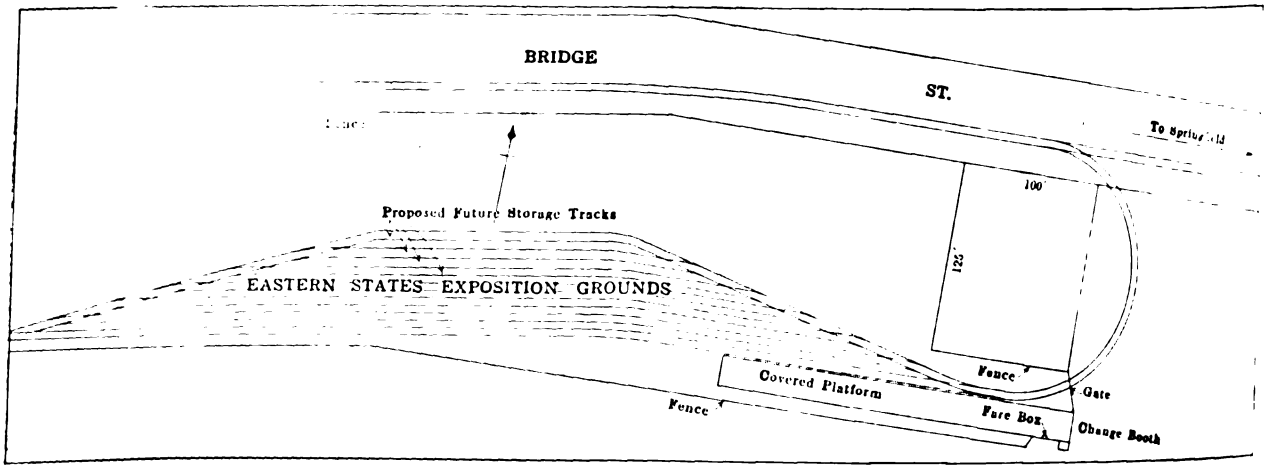
HANDLING FAIR TRAFFIC—LOADING PLATFORM AS SEEN FROM OUTSIDE AT SPRINGFIELD (MASS.) FAIR GROUNDS

Handling Traffic at the National Dairy Show

Methods Employed by the Springfield (Mass.) Street Railway to Provide Adequate Facilities for the 300,000 People Who Visited the Show

THREE hundred thousand people attended the National Dairy Show at West Springfield, Mass., which closed a short time ago after a run of about twelve days, and the street railway facilities provided were very important factors in the success of the exposition. The attendance was drawn from all parts of New England and even outside, about $1,000,000 worth of cattle being one of the features of the display, besides a notable exhibit of machinery. Before the show opened, the Springfield Street Railway built a special prepayment station just outside the grounds, a map of which is reproduced on this page. This contained excellent storage track facilities as well as a loop for the expeditious handling of traffic at all hours. Eighty cars an hour were operated over the loop during periods of maximum travel, the limitation in car movement being imposed by a 2600-ft. single-track section on the North End Bridge over the Connecticut River, between Springfield and West Springfield. The movement of cars across the bridge was controlled by an installation of Chapman automatic block signals, cars usually being run over the single-track section in sets of five.

The accompanying illustrations show the prepayment station from within the exposition grounds and the loading platform from the outbound gate, at a time of light traffic. The cars were routed through the station from west to east, discharging upon a 200-ft. covered platform of crushed stone. Passengers walked through a gate at



HANDLING FAIR TRAFFIC—MAP SHOWING ARRANGEMENT OF PREPAYMENT STATION AND STORAGE TRACKS AT SPRINGFIELD (MASS.) FAIR GROUNDS

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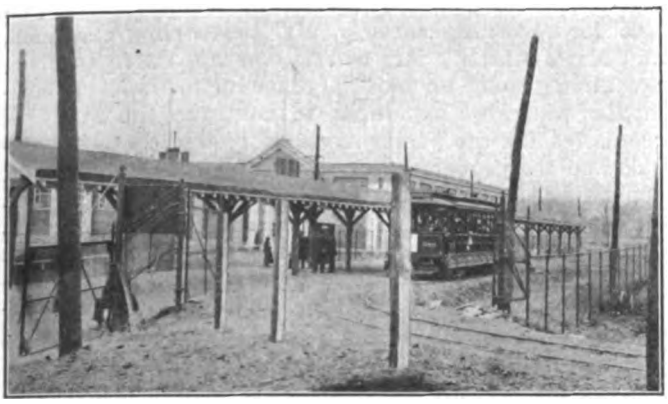

HANDLING FAIR TRAFFIC—CHANGE BOOTH, GATE AND FARE BOX AT SPRINGFIELD (MASS.) FAIR GROUNDS

the end of the platform to the main entrance to the grounds. Cars were loaded at the same point, the inward and outward traffic peaks being virtually non-interfering. Parallel tracks adjacent to the platform provided a storage capacity of thirty-two double-truck cars in addition to the main line track, which holds six cars inside the station and affords further opportunity for temporarily storing cars approaching the latter. The platform width is 33 ft., the prepayment station being permanently installed for service in connection with future events at the grounds. The yard tracks are spaced to enable cars with double folding steps to be stored upon them without folding the steps, and two future storage tracks are planned.

Passengers outward bound from the grounds enter the station at an opening just at the left of the change booth shown in one of the illustrations. The wire fencing which surrounds the grounds forms a truncated-V terminating at an International motor-driven fare box and register. The passage on either side of the fare box is 28 in. wide, and an additional hand-operated register was installed under the roof within reach of the gateman to record passes or employees' tickets. In about 45 minutes in the afternoon homeward rush Oct. 12, 4000 persons passed the fare box. A sign about 6 ft. by 12 ft., illuminated by five 56-watt series incandescent lamps mounted in metal reflectors calls the attention of the public leaving the grounds to the trolley service. A telephone booth for company use is provided just inside the prepayment station. As the usual jitney charge to and from the exposition grounds was 25 cents each way, the service of the railway was greatly appreciated during the show, the round trip with transfer privileges in Springfield being but 10 cents.

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

ASSOCIATION NEWS

MID-YEAR MEETING BOSTON FEBRUARY 16, 1917

List of New Manufacturer Members—Four Important Committee Meetings—Company Section Meetings of Past Few Days—Series of Biographical Sketches of Section Officers Continued

Manufacturer Members in the Association

Supplementing the lists of manufacturer members of the American Association printed in the issues of the ELECTRIC RAILWAY JOURNAL for June 3, July 29 and Aug. 26, Secretary Burritt has supplied the list given below, bringing the roll up to date.

American Cotter Pin Company, Pittsburgh, Pa.; American Electrical Works, Phillipsdale, R. I.; Atlas Preservative Company, New York, N. Y.

Barrett Company, New York, N. Y.; Beckwith-Chandler Company, Newark, N. J.; Blackburn Varnish Company, Cincinnati, Ohio.

Call Switch Company, New York, N. Y.; Cobb Shockless Railway Crossing Company, Los Angeles, Cal.; Columbia Refining Company, New York, N. Y.

F. W. Devoe & C. T. Raynolds Company, New York, N. Y.

Electric Railway Equipment Company, Cincinnati, Ohio; The Eureka Company, North East, Pa.

Fadgl Flexible System Company, San Francisco, Cal.; Flood & Conklin Company, Newark, N. J.; F. M. Freeburg Company, Philadelphia, Pa.; Frictionless Rail Company, Boston, Mass.

W. R. Garton Company, Chicago, Ill.; Gould Coupler Company, New York, N. Y.; Gulick-Henderson Company, Pittsburgh, Pa.

Hildreth Varnish Company, New York, N. Y.; The Hoover Smith Company, Philadelphia, Pa.; Hubbard & Company, Pittsburgh, Pa.

Ingersoll-Rand Company, New York, N. Y.

Johnson Automatic Register & Manufacturing Company, Johnstown, Pa.

Kay & Ess Company, Dayton, Ohio; Keystone Equipment Company, Philadelphia, Pa.

The Lincoln Electric Company, Cleveland, Ohio.

MacGovern & Company, New York, N. Y.; McGuire-Cummings Manufacturing Company, Chicago, Ill.; MacRae's Blue Book Company, Chicago, Ill.; Monroe Calculating Machine Company, Orange, N. J.; T. J. Mullen Sons, New York, N. Y.; Murphy Varnish Company, Newark, N. J.

National India Rubber Company, Bristol, R. I.; National Lead Company, New York, N. Y.

Patton Paint Company, Milwaukee, Wis.; Philadelphia Holding Company, Philadelphia, Pa.; Pressed Steel Car Company, Pittsburgh, Pa.; Pyrene Manufacturing Company, New York, N. Y.

Rand McNally Company, Chicago, Ill.

St. Louis Surfacer & Paint Company, St. Louis, Mo.; Shanklin Equipment Company, Springfield, Mass.; Sterling Varnish Company, Pittsburgh, Pa.

Templeton Kenly & Company, Ltd., Chicago, Ill.; Thayer & Company, New York, N. Y.; Transportation Utilities Company, Chicago, Ill.

U. S. Metal & Manufacturing Company, New York, N. Y.

Van Dorn & Dutton Company, Cleveland, Ohio; Vulcan Brake Shoe & Equipment Company, Baltimore, Md.

Wallace Supplies Manufacturing Company, Chicago, Ill.; Weiss Manufacturing Company, Monroe, Mich.; Worthington Pump & Machine Company, New York, N. Y.; Wyoming Shovel Works, Wyoming, Pa.

Engineering Association Standards

As announced in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 16, page 1253, a meeting of the committee on standards was held in New York on Dec. 14 and 15. In addition to those mentioned earlier, the meeting was attended by L. P. Crecelius, Cleveland, Ohio, and Hugh Hazleton, New York City. The meeting was taken up with three main topics, namely, the revision of material in the *Engineering Manual*, the plan of publishing the *Manual*, particularly with reference to the incorporation of revisions, and the procedure to be followed in adopting association standards.

In considering the revision of the text of the *Manual* the committee took up, item by item, its present con-

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tents. The chairmen of the respective committees concerned stated their views as to the disposition to be made of each section and secured the advice of the other members. The suggestions will be considered by the several technical committees and recommendations will be made to the standards committee at a later meeting. There was also some discussion as to the present form of the *Manual*, after which the following sub-committee was appointed to consider the matter and report at the next meeting: J. H. Hanna, Washington, D. C., chairman; L. P. Crecelius, Cleveland, Ohio, and Martin Schreiber, Newark, N. J.

In the matter of procedure in adopting standards a sub-committee prepared a set of recommendations addressed to the executive committee. These have for their purpose the institution of a plan to insure more consistent use of the standards among member companies.

Power Generation

A meeting of the Engineering Association committee on power generation was held in New York City on Dec. 7. Those in attendance were J. W. Welsh, Pittsburgh, Pa., chairman; A. B. Stitzer, New York City; F. S. Freeman, Boston, Mass.; E. H. Scofield, Minneapolis, Minn.; R. W. Eaton, Norwich, Conn.; C. W. DeForest, Covington, Ohio; W. C. Slade, Providence. R. I. After consideration of the assignments made by the executive committee the work for the year was divided among sub-committees with topics as follows: Specifications for fuel, Messrs. Freeman and Eaton; power station operation, Messrs. Scofield and DeForest; automatic substations, Messrs. Slade and E. F. Gould. Cleveland, Ohio; historical development of turbines, Messrs. Stitzer and G. H. Kelsay, Anderson, Ind.

Joint Committee on Block Signals

A meeting of this committee was held in Newark, N. J., on Dec. 15 with the following members of the committee in attendance: J. M. Waldron, New York City, chairman; J. W. Brown, Newark, N. J.; co-chairman; J. J. Doyle, Baltimore, Md.; R. C. Johnson, Brooklyn, N. Y., and J. B. Stewart, Jr., Youngstown, Ohio. The following visitors were also present by invitation: H. W. Griffin, New York City; R. V. Collins, West Newton, Mass., and H. H. Norris, New York City.

The several subjects to be considered by the committee were assigned to sub-committees as follows: Requisites for automatic block signal systems on high-speed interurban lines, John Leisenring, Peoria, Ill., chairman; G. K. Jeffries, Indianapolis, Ind., and Mr. Waldron. Use of continuous track circuits for the control of automatic signals for high-speed interurban service, Mr. Johnson, chairman; and Messrs. Brown and Griffin. Block signal rules, J. J. Brennan, Fort Wayne, Ind., chairman; and Messrs. Leisenring and Johnson. (This committee was appointed to study the subject with instructions to confer with the chairman of the rules committee of the Transportation & Traffic Association, and these two committees are to appoint a sub-committee of two to confer with the president of the Transportation & Traffic Association relative to the making of an appointment for a meeting with the rules committee of the American Railway Association, at which meeting an attempt will be made to harmonize all rules.) Further study of block signal operation on roads signaled from end to end to cover maintenance cost, efficiency of operation and effect on traffic, Mr. Leisenring, chairman; and Messrs. Jeffries, Brennan, Stewart, Griffin and S. M. Day, Rochester, N. Y. To advise the committee on way matters of approval or rejection of all or any portion of conventional symbols for recording surveys, Mr. Leisenring, chairman, and Mr. Johnson. Mr. Norris was appointed to bring the bibliography on block signals up to date. A committee was also appointed to continue the study of requisites for the performance of trolley contactor signals and the proper aspects of trolley contactor signals, consisting of Mr. Stewart, chairman; and Messrs. Brown, Collins, O. E. Chapman, Boston, Mass., and C. P. Nachod, Louisville, Ky. It was considered advisable also to appoint a committee to develop needs of automatic signals and interlocking apparatus and the following were appointed: Mr Waldron, chairman; and Messrs. Johnson, Leisenring, Griffin and Day. Mr. Doyle agreed to continue the digest of block signal laws and rules.

After the meeting the committee made an inspection of the blocking in use on the fast line between Newark and Trenton, the trip being made in a heavy snowstorm at which time the signals were observed under the most adverse conditions. It was decided that the next meeting of the committee will be held at the William Penn Hotel, Pittsburgh, Pa., on Friday, Feb. 2, 1917.

Schedules and Time-tables

The Transportation & Traffic Association committee on schedules and time-tables met in Boston on Dec. 15 and 16 to block out the year's work. The following were in attendance: Edward Dana, Boston, chairman; Howard F. Fritch, Boston; F. L. Hubbard, Toronto, Ontario; Alexander Jackson, Newark, N. J.; R. T. Sullivan, Youngstown, Ohio. The assignments made were as given below.

Mr. Jackson will study the subject of latest practices and recommendations in dispatching on urban lines. The chairman will prepare for discussion by the committee a statement of the factors essential in the making of all time-tables and in the establishment of a uniform basis for determining and stating schedule speed. Messrs. Fritch and Sullivan will lay out the work on the skip stop. The former will consider it in connection with schedule speed, and the latter will prepare a set of questions which will form the basis for short papers by all members of the committee to be incorporated into a joint paper later. The subject of street railway transportation in congested districts will be taken up later after conference between H. C. Donecker and the chairman.

Rolling Stock Department Discussed in Milwaukee

At the regular meeting of Company Section No. 1, held on Dec. 14, forty members were present. The program comprised a paper on "Current Events in the Rolling Stock Department" by D. C. Hinstorff, and one on "Civic Art and the Progress It Has Made in Milwaukee," by A. C. Clas, a prominent architect of the city. Mr. Clas described among other things the lay-out of the new proposed court house building and civic centers, illustrating his talk with appropriate pictures and diagrams.

Mr. Hinstorff touched on some of the "high spots" in the work of the rolling stock department, dwelling mostly on the construction of the new center-entrance cars. He also described the hot galvanizing plant which has recently been added to the shop equipment.

After the meeting a luncheon was served in the company dining room, accompanied by orchestral and vocal music. A Christmas tree furnished decoration appropriate to the season.

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Electrical Pressure Discussed in Chicago

Reports of an interesting meeting held on Dec. 15 come from the Chicago Elevated Railroad section. P. B. Woodworth, professor of electrical engineering at the Lewis Institute, Chicago, lectured on "Electrical Pressure." The less serious part of the program comprised musical and humorous selections. The latter culminated in an imitation by one of the entertainers of Richard Mansfield in his famous walk to the lunch counter which was quickly copied by all present.

Newport News & Hampton Railway, Gas & Electric Company Section

The following notes regarding the men who are charged with the responsibility of conducting section affairs at Hampton, Va., form part of the series begun last week.

Edgar C. Kelly, who was re-elected president of Company Section No. 10 this fall, has been in railroad work for about twenty years. At present he is head electrician and pit foreman in the car shops of this company, having previously been master mechanic of the West Chester, Kennett & Wilmington Railway & Electric Company, and master mechanic of the Hampton Roads Traction Company. He is forty years of age, and hails from Huntingdon, Pa. After obtaining a public school education he took a course of study at the Coast Artillery School, Fortress Monroe, Va.

EDGAR C. KELLY
President Company Section No. 10, Hampton, Va.

JOHN W. HOWARD
Secretary Company Section No. 10, Hampton, Va.

John W. Howard, secretary of this section, is at present taking the student course offered by this company. He completed the four-year course in civil engineering at Rensselaer Polytechnic Institute, Troy, N. Y., in 1916, immediately thereafter entering the service of his present employer.

Annual Smoker in Newark

Thursday evening, Dec. 21, was ladies' night at the Public Service Company Section. A real "movie" show, with vaudeville, was presented under the personal direction of the general manager of Loew's theaters. After the program there was informal dancing and a buffet luncheon was served.

In addition to the entertainment described, a short business session of the section was held. The feature of interest was the announcement of the result of the membership campaign started in October. President Warner stated that 107 new members were added during the campaign and that the award of $20 in gold announced as the prize for the member enrolling the largest number went to J. R. Cameron, assistant instructor Hoboken School of Instruction, Mr. Cameron having secured forty-six applications. A. J. Bliss, supervisor, was a close second with forty recruits. The names of seventy-one applicants for membership were read. They were men in all departments and from several divisions of the property within reasonable reach of Newark. The largest number were from the transportation department and the carhouse shops. The attendance at the meeting was 200.

Operation on the Milwaukee

Results of Increased Speed and Train Loads Outlined by G. H. Hill Before New England Railroad Club

At the November meeting of the New England Railroad Club, George H. Hill, assistant chief engineer of the General Electric Company, read an illustrated paper on the electrified section of the Chicago, Milwaukee & St. Paul Railroad, in which comment was made on the results of operation on this notable installation. He stated that, in operation, the success of the regenerative method of braking had far exceeded all expectations. The braking effort is so completely under the control of the engineers that they much prefer it to the air, and find that regenerative braking means less danger of drawbar failures and much less care required to avoid dangerous surges in the trains. As to operating results of the electrification, the period of use has not been sufficient to present accurate comparative data but does give an indication of results.

The electric locomotives were designed to haul 2500 tons up a 2 per cent grade at 15 m.p.h. They have been used successfully to haul 3500 tons on the 2 per cent grade, and it has been found necessary to increase the length of the passing sidings in order to utilize the maximum hauling capacity of the locomotives. Before the electrification it was usual to have the freight cars congested at the entrance of the mountain division and it occasioned some surprise to find that the electric locomotives not only could easily keep this congestion from forming but delivered the tonnage to the neighboring divisions of the railway faster than it could be hauled away.

The time occupied on the mountain division has been much reduced. Both the passenger and the freight schedules have now been reduced by about 30 per cent, and the schedule is maintained with greater reliability. Freight trains that formerly required ten or twelve hours to make the run of 115 miles from Three Forks to Deer Lodge now require seven or eight hours. The mountain division is now counted upon to make up time lost by steam passenger trains on adjacent divisions.

Tests between Colorado Junction and Three Forks show that the total power taken to cross this division (including the 2 per cent grade) corresponds to 31.7 watt-hours per ton-mile neglecting the power returned by electric braking. The actual net power required, taking account of the regenerated power, is 23.7 watt-hours per ton-mile. From these figures it may be calculated that to move the train over the same distance on level track of the same curvature would be 20.4 watt-hours per ton-mile. It appears, then, that the energy actually required to move the trains over the mountains is only 16 per cent greater than for a level track, and that the energy required to move the train without any return from braking is 55 per cent more than that actually taken. In other words, electric propulsion by regenerative braking has eliminated 70 per cent of the mountain from the point of view of actual power required.

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Some Recent Advances in

EQUIPMENT AND ITS MAINTENANCE

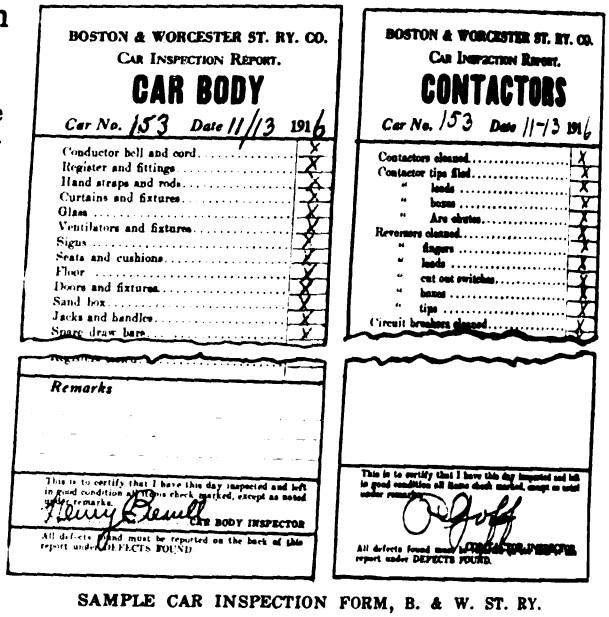
Aluminum Catenary Messenger with Steel Contact Wire on L. E. & N. Ry.—Tests on Electric Headlights for Interurban Service—Convenient Car Inspection System of Boston & Worcester Street Railway—Sleet Cutter for Use in Place of Trolley Wheel—Circuit Breakers for Tying Third-Rails Together

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.)

Convenient Inspection Record System

BY A. BLANCHARD
Master Mechanic Boston & Worcester Street Railway

On the Boston & Worcester Street Railway, cars are inspected on the basis of each 1000-mile run. The company owns about 100 motor cars. The staff devoted to this branch of the service includes one foreman inspector, one car-body inspector, one motor inspector, one truck inspector and helper, one air-brake and trolley inspector, one contactor and miscellaneous electrical inspector, and one oil and journal inspector. The mileage of the cars is kept by the dispatcher, who turns in a daily report to the master mechanic, whose clerk adds this to the mileage already made by each car. Every morning the foreman inspector turns in his inspection slips for the previous day, and every car inspected is checked off on the mileage sheet. Then a slip is given the foreman inspector of all cars with a mileage of 700 miles or more, and should any of these cars be in the carhouse, he tries to inspect them during the day in addition to the ones he already has for regular inspection, so as to avoid shifting for inspection. Before leaving at night, the foreman inspector gives the night foreman a list of cars for inspection the following day, and he also telephones this list to the dispatcher, who can arrange for these cars to come in to Framingham at night, otherwise they might put up in one of five other carhouses. From six to nine cars are inspected daily, depending on the amout of repairs found necessary, as the inspectors also take care of small repairs. On the main line between Boston, Framingham and Worcester, the cars average a daily run of about 250 miles, the schedule speed being the highest of any interurban road in Massachusetts. Cars traverse the company's own lines from Chestnut Hill to Lake Junction, 31 miles, in one hour and fifteen minutes.


BOSTON & WORCESTER ST. RY. CO.
CAR INSPECTION REPORT.
CAR BODY
Car No. 153 Date 11/13 1916

Conductor bell and cord	X
Register and fittings	X
Hand straps and rods	X
Curtains and fixtures	X
Glass	X
Ventilators and fixtures	X
Signs	X
Seats and cushions	X
Floor	X
Doors and fixtures	X
Sand box	X
Jacks and handles	X
Spare draw bars	X

Remarks

This is to certify that I have this day inspected and left in good condition all items check marked, except as noted under remarks.
Henry Blend
CAR BODY INSPECTOR
All defects found must be reported on the back of this report under DEFECTS FOUND.

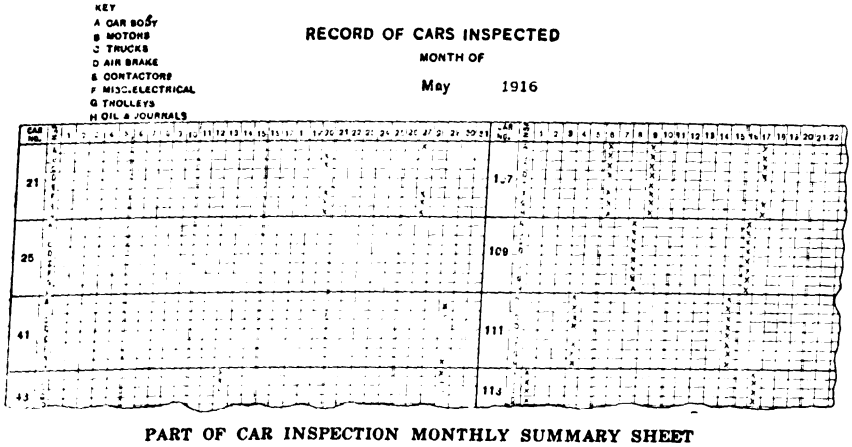
BOSTON & WORCESTER ST. RY. CO.
CAR INSPECTION REPORT.
CONTACTORS
Car No. 153 Date 11-13 1916

Contactors cleaned	X
Contactor tips filed	X
" leads	X
" bases	X
" Arc chutes	X
Reversers cleaned	X
" fingers	X
" leads	X
" cut out switches	X
" bases	X
" tips	X
Circuit breakers cleaned	X

This is to certify that I have this day inspected and left in good condition all items check marked, except as noted under remarks.
O. Judd
All defects found must be reported on the back of this report under DEFECTS FOUND.

SAMPLE CAR INSPECTION FORM, B. & W. ST. RY.

The system of inspection records used on the road is illustrated herewith. Fig. 1 shows two samples of a series of car inspection blanks, the originals being 3⅝ in. x 9¼ in. in dimension. On the front, each blank carries a list of items to be checked by the inspector for that particular car, a space being provided on the back for listing any defects found and noting the action taken on each. One card is devoted to the car body, and covers thirty-one items; one assigned to motors covers fourteen items; one assigned to trucks covers twenty-three items; one for air brakes, twenty-two items; contactors, nineteen items; miscellaneous electrical, twenty-five items; trolleys, eleven items; oil and journals, eight items. These records show at a glance the condition of the car in detail at each inspection, and have been approved by the company's counsel for use in court as evidence.


KEY
A CAR BODY
B MOTORS
C TRUCKS
D AIR BRAKE
E CONTACTORS
F MISCELELECTRICAL
G TROLLEYS
H OIL & JOURNALS

RECORD OF CARS INSPECTED
MONTH OF May 1916

PART OF CAR INSPECTION MONTHLY SUMMARY SHEET

From the card records of the individual cars, a monthly inspection summary sheet, Fig. 2, is made. This is about 27 in. long by 30 in. wide, and shows at a glance the dates when each car was inspected and the kind of inspection performed, the inspections being summarized under eight letters corresponding to the titles of the detail inspection cards above described. The inspections are checked off by the chief clerk of the master mechanic from the detail card records, and any irregularity in the inspection can be detected at a moment's notice. Even-numbered cars are of the open type, odd-numbered cars being closed, and cars with a cipher before the number are used in freight and express service.

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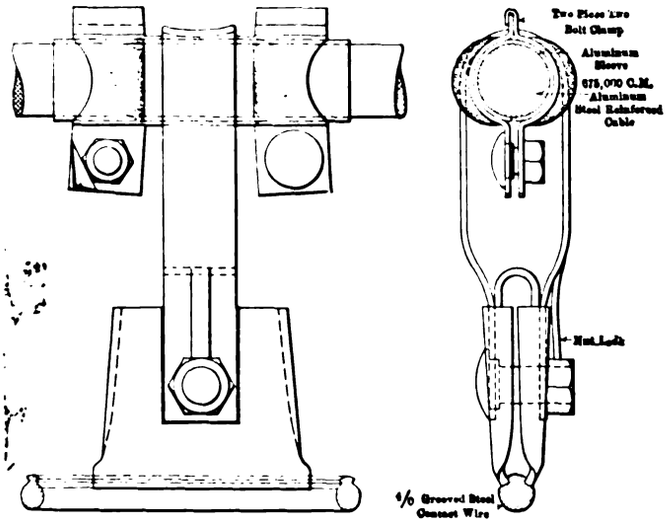
Aluminum Catenary Messenger with Steel Contact Wire Used on L. E. & N. Ry.

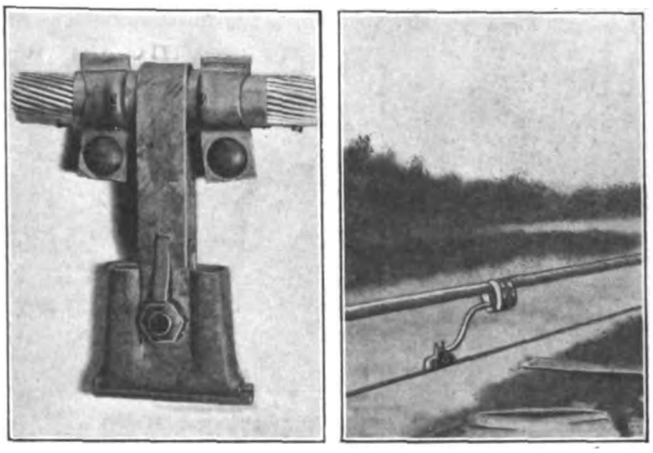
Specially Designed Fittings Provide Simple Overhead Construction—Methods of Splicing Are Described

The Lake Erie & Northern Railway is a single-track, standard-gage road, extending from Galt, Ont., through the cities of Paris, Brantford and Simcoe to Port Dover, on Lake Erie, a distance of about 50 miles. In this distance approximately 36 miles consists of tangent track. The curves are all comparatively easy with the exception of a few short lengths near the sidings and yards where the curvature becomes as great as 7 to 9 deg. There are a number of sidings as well as yard tracks at certain points along the road, particularly at Galt and Brantford. Both passenger and freight service is provided. In the former there are six quadruple-equipment interurban-type cars, operating at a maximum speed of 45 m.p.h. The freight service is cared for by two 60-ton locomotives. The line voltage is 1500 d.c.



DETAILS OF PRESSED STEEL CATENARY HANGER

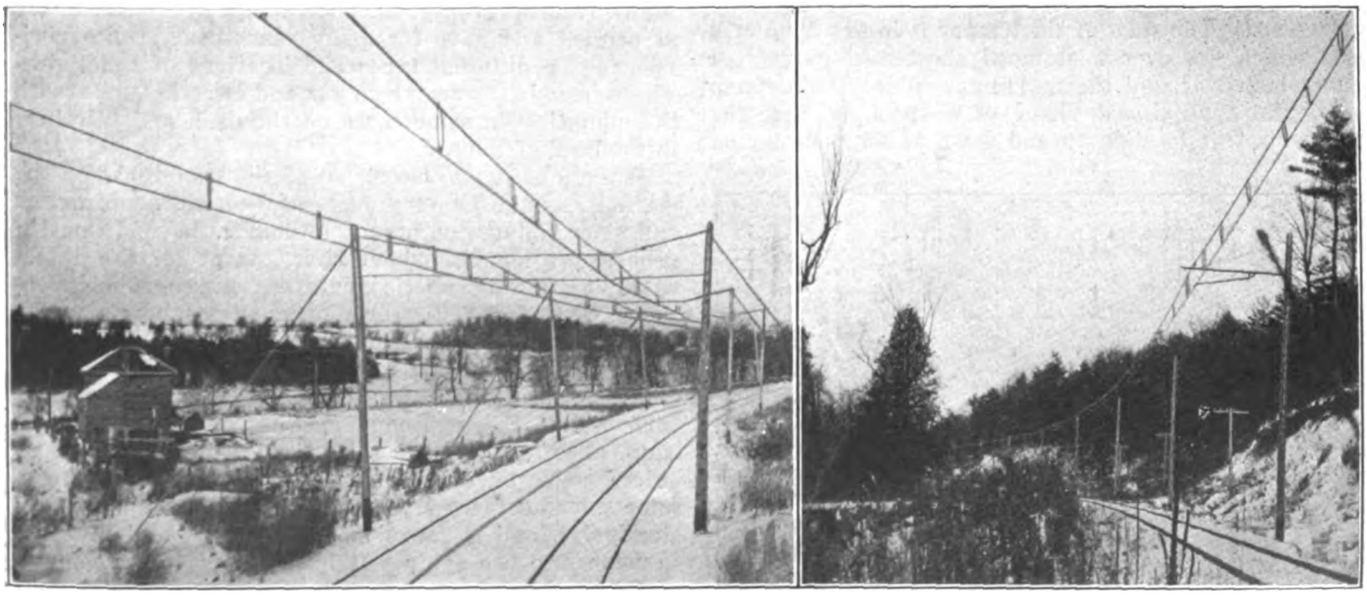
The general features of this road and details of the locomotive were covered in articles appearing in the issues of the ELECTRIC RAILWAY JOURNAL for May 27, 1916, page 986, and Oct. 7, 1916, page 730, respectively. The purpose of the present article is to describe the rather novel overhead construction. The general offices of this property are at Galt. Martin N. Todd is general manager and Matthew Kirkwood is electrical engineer. The overhead lines were designed and erected under the direction of Mr. Kirkwood.



PRESSED STEEL CATENARY HANGER WITH ALUMINUM SLEEVE AND CLAMPS, AND FEEDER TAP, MESSENGER TO CONTACT WIRE

In approaching the problem of electrification the officials of the railway made a careful investigation of the types of overhead construction and kinds of material available. They finally decided upon the use of wooden poles with T-iron bracket arms, carrying a single messenger conducting cable and supporting a single contact wire 22 ft. above the rails.

The traffic conditions contemplated required for conductivity the equivalent of two No. 0000 copper conductors throughout the length of the line. To obtain the simplest possible construction it was decided to use a messenger cable having the combined qualities of maximum strength and necessary conductivity. For this purpose an aluminum cable with a steel reinforcing core was adopted. This cable consists of an extra high strength double galvanized steel core of seven strands, each 0.1118 in. in diameter. Around this core are stranded, in three layers, fifty-four hard-drawn pure aluminum wires, each having a diameter of 0.1118 in. The aggregate cross-section of the aluminum part of the cable is 675,000 circ. mil, and as the conductivity of the



OVERHEAD CONSTRUCTION ON L. E. & N. RY.—SPAN-WIRE SUPPORT AT TURNOUTS AT LEFT; BRACKET SUPPORT AT RIGHT

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JOINING STEEL CORE WITH SPLICING SLEEVE

aluminum is 61 per cent this cable corresponds to two No. 0000 hard-drawn copper conductors of 97 per cent conductivity. The weight per foot of the complete cable with the steel reinforcing core is 0.874 lb. The weight of the two No. 0000 copper conductors would be 1.316 lb.

The messenger cable is spliced by joining the steel core with a McIntyre sleeve, which consists of a steel tube 18 in. long and having a figure 8 cross-section. This tube is given four and one-half turns by means of a pair of twisting tongs. Before making up the McIntyre joint, one-half of an aluminum sleeve is placed over each end of the cable. After the McIntyre joint is complete the halves of the aluminum sleeve are brought together and screwed up tight like a pipe coupling. The ends of the aluminum sleeve are bored to fit the exterior of the cable closely. The ends of the sleeve are successively placed between the dies of a hydraulic press and the aluminum is cold forged around the cable. The metal flows into the interstices between the strands, making a practically perfect joint. The press is operated from a small hand pump, with which it is connected by means of a small flexible pipe. It exerts a pressure of 100 tons.

For the contact wire a No. 0000 grooved, double-galvanized steel wire was selected. The characteristics of this wire are 14 per cent conductivity; weight, 0.562 lb. per foot, and elastic limit, 36,000 lb. per square inch. The material was furnished in continuous lengths of approximately 1 mile, on reels of 48 in. in diameter and 22 in. wide.

The contact wire is suspended from the messenger cable by flexible hangers placed 15 ft. apart. These hangers are made from sheet-steel stampings thoroughly galvanized. The stem of the hanger is in the form of a loop which fits over a stamped sheet-steel galvanized clamp bolted around the messenger cable. This clamp is of the approximate shape of a spool, so that the hanger is free to slide up and down as the collector on the car passes under it, but it is prevented from coming in contact with the aluminum cable. The shield is used around the cable so that the constant rubbing of the hanger may not in time wear away the strands of the messenger.

HYDRAULIC PRESS FOR JOINING ALUMINUM STRANDS IN SLEEVE

The poles are spaced 150 ft. apart on tangents and closer on curves. The messenger cable is installed with a sag of 2 ft. at 60 deg.

In order to carry current from the messenger cable to the contact wire, an aluminum parallel-groove clamp is bolted to the messenger cable in every span. The other side of the parallel groove clamp carries a No. 00 flexible copper jumper, which is attached by set screws to a feeder ear on the contact wire.

The messenger cable is furnished in continuous lengths of approximately 1 mile, and on reels approximately 5 ft. in diameter.

The track consists of standard 85-lb. rails, bonded with No. 0000 copper bonds electrically welded on each joint.

The advantages claimed for the Lake Erie & Northern overhead construction are: (1) Great strength in the messenger cable on account of the steel core, which has an elastic limit of 130,000 lb. per square inch. (2) Durability. On account of the lightness of aluminum the main conductor can be placed around the messenger cable where it is most conveniently located for feeding the contact conductor, but is not impaired by the wearing away of the latter. (3) Saving in insulators and labor of installing an independent feeder cable. (4) Use of a comparatively cheap but durable contact conductor, which is not relied upon for conductivity. (5) Low coefficient of expansion of the contact conductor, together with higher elastic limit, rendering steel better for this purpose than other materials.

Study and Comparative Tests of Electric Headlights

Analysis of Experiments with Headlights in Interurban Service, Showing Various Degrees of Efficiency Under Different Conditions

BY R. N. HEMMING
Superintendent of Motive Power, Union Traction Company of Indiana, Anderson, Ind.

The subject of headlights has been and is now one of great concern to all railway properties for the part it plays in safe operation between sunset and sunrise. Many railway properties, both steam and electric, are at present and have for many years past been experimenting on different types and locations of headlights. These include oil, acetylene gas and electric lamps, with the mounting in some cases on the dash and in others in the hood of the car.

Strange as it may seem, all of the headlights on the market seem to be very successful on some properties and utter failures on others, although the conditions in general are identically the same, except for the differences due to atmospheric conditions or geographic locations, where mist, fog or a hazy atmosphere may be common in one case and totally absent in another.

There are many types of headlights on the market and three which are in most common use: the inclosed carbon arc, the luminous arc and the incandescent lamp, all of which have some good features, but more objectionable ones. The inclosed carbon arc possesses some splendid features, especially from an illuminating standpoint, and it ranks among the best and is liable to come into use again. It has the common weakness of inner globe breakage and requires frequent trimming, resulting in a high maintenance cost. Its mechan-

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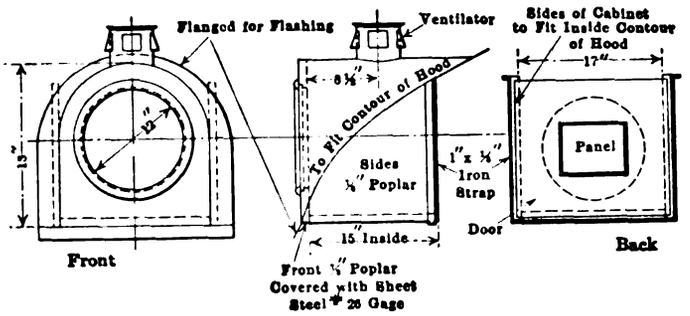
ism is apparently not any more subject to failure than the luminous arc mechanism. The relative cost of repair parts for it may be a little in excess of those for the latter on account of its obsolescence.

The luminous arc headlight also has its defects, and its illuminating value varies, like all others. The luminous arc demands daily attention, particularly as to the cleaning of lenses and reflectors, which become coated with a heavy deposit from the electrodes. If not removed, this naturally affects the illuminating efficiency. The shifting of the arc around the electrodes very materially affects the illumination intensity. This is also characteristic of the inclosed carbon arc, but not to as great a degree, due to the difference in the diameter of the carbons compared to the electrodes. Each type, however, is subject to the forming of craters, thus causing the arc to flicker and often to be extinguished entirely.

While the use of the bull's-eye or semaphore lens has been a great improvement, it has not offset all of the evils. It would seem that here is a timely suggestion for the manufacturer to improve the electrodes.

The incandescent headlight has been looked upon with a great deal of favor, as it seemed for a time to overcome all of the objections found in the arc types. The incandescent headlight for interurban service, however,

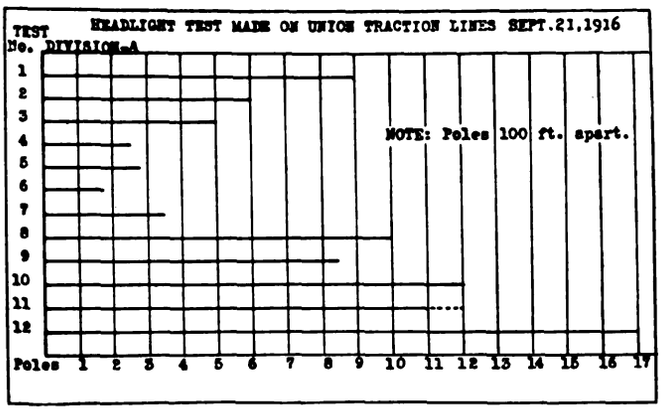


DETAILS OF U. T. CO. HEADLIGHT MOUNTING

is only efficient and reliable as long as the line voltage is up to the proper amount to give the lamp its required voltage. The fluctuation of potential is more noticeable on this type of lamp than either type of arcs. Many attempts have been made to design some reliable and practical voltage regulator to overcome this objection, but apparently only one or two have proved to be successful. In one of these, low-voltage lamps all wired in series are used.

This plan involves the use of other than the type of lamp now standard. As, I believe, it is customary to use 36-watt tungsten lamps of a voltage to make them available for use in residences and stores, there is a temptation to theft on the part of persons minded to steal. The low-voltage lamp used with voltage regulators has little commercial value, hence is not so liable to be stolen, one reason why this scheme demands careful attention. At the same time it is desirable to standardize interurban car lighting as far as possible as more and more in the future this business will depend upon long-haul traffic involving the operation of the cars over foreign lines.

The next experimental step with the incandescent lamp was to operate it independently of the trolley circuit by means of a storage battery, using either an independent battery or taking current from batteries operating the controller circuits. This has been done with more or less success. The keeping of these batteries charged up to full capacity without employing any special apparatus was important, and a plan was devised to utilize the air compressor load, sometimes adding the lighting circuit. If batteries are not required

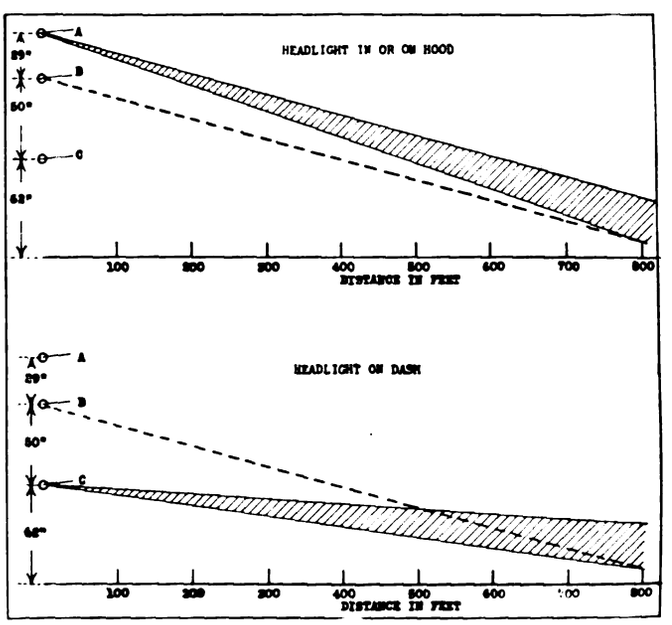


DATA FROM HEADLIGHT TEST, U. T. CO. OF IND.

for the control circuits and an independent battery is installed for the lighting alone, the illuminating results and efficiency are highly satisfactory, but the cost of installation is almost prohibitive.

Two of our cars were equipped, one with six batteries charging and discharging in series, with a two-way switch in the circuit to transpose the compressor circuit, and the other car with two sets of batteries charging in series and discharging in parallel with an automatic relay to transform the connections from series to parallel and vice versa, and also a two-way switch in circuit to transpose compressor circuit. The former was not entirely satisfactory on account of the discharge capacity not being sufficient to operate continuously a 6-volt, 18-amp., 108-watt concentrated film lamp. The latter proved very satisfactory except that shopmen at the various division points and also on foreign lines had to be ever mindful to see that the batteries were fully charged and distilled water added when needed. It frequently occurred that the car would lay up at some division point or foreign shop all day and if the batteries did not receive attention, the headlight would be very dim or possibly not light at all. Therefore, it is doubtful if the storage battery is going to prove to be all that is desired.

Much interest has been displayed in the development and claims made for the headlights which cast a golden beam of light. Several different trade names have been assigned to this type by their respective manufacturers, but they do not differ much in appearance, especially as to the color of the reflector. The claims



LIGHT BEAMS FROM HOOD AND DASH-MOUNTED HEADLIGHTS

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which were made for this type, compared to the white beam, were accepted by many as theoretical. However, time and practical tests have proved their claims. The golden beam by tests in mist, haze and fog has penetrated to a greater distance than the white beam and is worthy of careful consideration. The white beam seems to cause a mirror effect in rainstorms and mist and will scarcely penetrate a fog at all. The blinding effect of the white beam to the public and cattle is dangerous. The golden beam has been found to eliminate these objections. Any person can look squarely into the golden beam and then look away without being blinded or having the sight impaired. The mantenance cost of this type of headlight with concentrated filament Mazda lamp would be almost nil. The maintenance cost of the batteries could not be predetermined. Service and make of battery would have to be considered to determine this.

STANDARD HEADLIGHT MOUNTING, U. T. CO. OF IND.

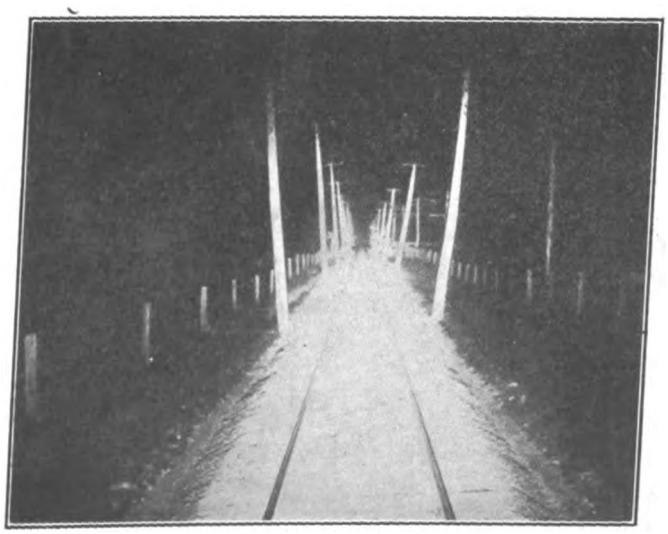
Some tests were made on Sept. 21, 1916, to determine the comparative illuminating value of these several headlights. The results of these tests are shown on the accompanying illustration in graphic form. The man used as the object to be detected in judging the distance illuminated by the various headlights was dressed in dark cloth and his coat collar turned up so there was no means of seeing his white collar or the back of his neck. Thus he presented a completely dark object. The distance was judged by the motorman in the car, an important consideration as an observer standing outside the car would be able to see farther than one inside.

Division A

Test 1. Luminous arc headlight equipped with a semaphore lens; mounted in the hood of the car; a man could be seen on the track with the car standing, at 900 ft.

Test 2. Same headlight mounted on the dash; car standing; a man could be seen at 600 ft.

Test 3. Same type of headlight but with a clean plain glass substituted for the semaphore lens; mounted in hood; car standing; a man could be seen at 500 ft.



TRACK ILLUMINATED BY ARC HEADLIGHT

Test 4. Same headlight as No. 3, only hung on the dash; car standing; a man could be seen at 250 ft.

Test 5. Same type of headlight as in No. 4 after being burned twelve hours without either repairing, trimming or cleaning; mounted in hood; car standing; a man could be seen at 275 ft. This headlight was not cleaned for the test as we desired to observe the relative condition or the effect on the illuminating value, which might be impaired by the deposit from the electrodes, but it will be noticed that even though the headlight was in this condition the motorman could see 25 ft. farther with the headlight mounted in the hood than he could in Test 4 with a perfectly clean headlight mounted in the dash.

Test 6. Same headlight as used in Test 5, only mounted on the dash; car standing; a man could be seen at 175 ft. This gives a direct comparison of the same headlight under the same conditions, but in one instance mounted in the hood and in the other, mounted on the dash.

Test 7. Carbon arc headlight on the dash; car standing; a man could be seen at 350 ft. This headlight was too large to go into the hood of the car and therefore comparisons were not made from that position.

Test 8. Headlight of the golden beam characteristics, operated with storage batteries; mounted in the hood; car standing; a man could be seen at 1000 ft. Unfortunately the focusing screw was somewhat defective and the best results could not be obtained. See Test 12.

Test 9. Same conditions as above, only headlight hung on the dash; car standing; a man could be seen at 850 ft.

Test 10. One of the luminous arc headlights with semaphore lens was placed in the hood and a run was made from Hunt's Siding to Block's Siding, a distance of 6.48 miles. The car had attained maximum speed and at times the light would shine down the track so the motorman could see for a great distance. At one time a passenger signaled the car and the motorman was watching to make a test. It was found that it was 1200 ft. from the point at which the motorman first saw the passenger to the one where the passenger was standing. It was only at times, however, that this was possible, on account of the arc shifting from one side of the track to the other due to its traveling around the electrodes. Twelve hundred feet under running conditions is a decided exception rather than the rule, and in this instance it occurred at the moment when the arc happened to be in its most effective position.

Test 11. A headlight of the golden beam characteristic, the same as used in Test 8 and operated on storage battery, was placed in the hood on the return trip and a run was made from Block's Siding to the carhouse, a distance of 9.25 miles. The car had attained its maximum speed and it was found that the motorman could see on the average from 1100 ft. to 1200 ft. and the track was constantly and brightly illuminated as far as this light would penetrate. This light was very satisfactory and much better than any of the arc lights that were tested.

Test 12. The same outfit as in Tests 8 and 11, except that the focusing screw was repaired. With the car running, a man could be seen at 1600 ft.

All of the Union Traction interurban cars have the headlights mounted in the hood. The exterior appearance will be observed in the accompanying photograph, which shows that this mounting really adds to the appearance rather than otherwise. The headlight resistance is placed in the motorman's cab. This is also an important factor in reducing the maintenance cost, as it puts the headlight up out of the way of minor accidents

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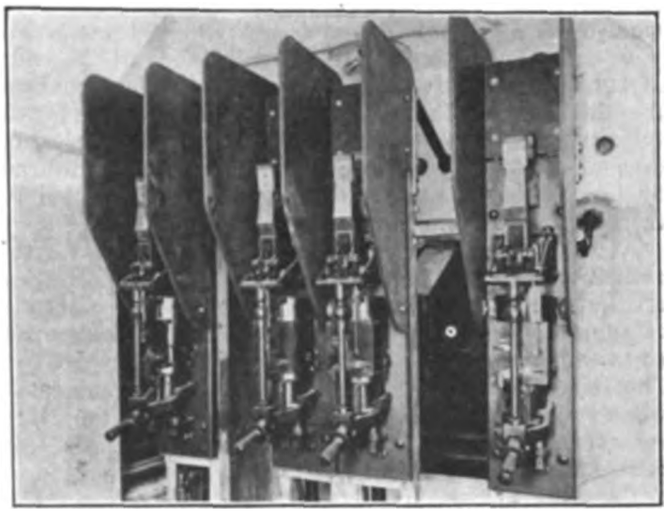
and out of the elements. Details of the headlight hood box are shown in the accompanying drawing. We propose to install adjusting screws, one on each side of the headlight hood box and one on the bottom, so as to focus the headlight and keep it in a rigid position while the car is running, otherwise it keeps shifting about in the hood.

From many previous headlight tests (about two per year) it has also been demonstrated that the illuminating efficiency has been greatly increased by mounting the headlight in the hood. This was first based on theory and then proved in practice. Attention is directed to the accompanying print showing comparative visions which the motorman has in front of his car with the headlight mounted on the dash or in the hood. It will be noted that when the headlight is on the dash, the motorman must look through the rays of light to see the track or any object in front of his car, whereas when mounted in the hood his vision is beneath the ray and he has full vision of the track up to the point where his vision and ray of light and track meet. When a headlight is mounted on the dash, and especially with a white beam of light, it has been proved beyond a doubt that the motorman's vision is greatly impaired in observing any object along the track or right-of-way, and especially so in a mist or rain.

In conclusion, for illuminating efficiency, the golden beam with the headlight mounted in the hood and operated from a reliable storage battery, is the ultimate solution of the highest degree obtainable, but the unfortunate part is the initial cost of such installation.

The Selah Manufacturing Company, Newark, N. J., has developed a line of threadless pipe clamps for use in the support of busbar insulators, switchboard panels, etc. The clamps are made in two parts hinged together and compressed on the pipe by means of one set screw each. The design provides a powerful leverage with slight tension on the bolts. There is also sufficient elasticity to furnish continuity of pressure. One interesting application of the clamps is in attaching pipes to walls in connection with expansion bolts.

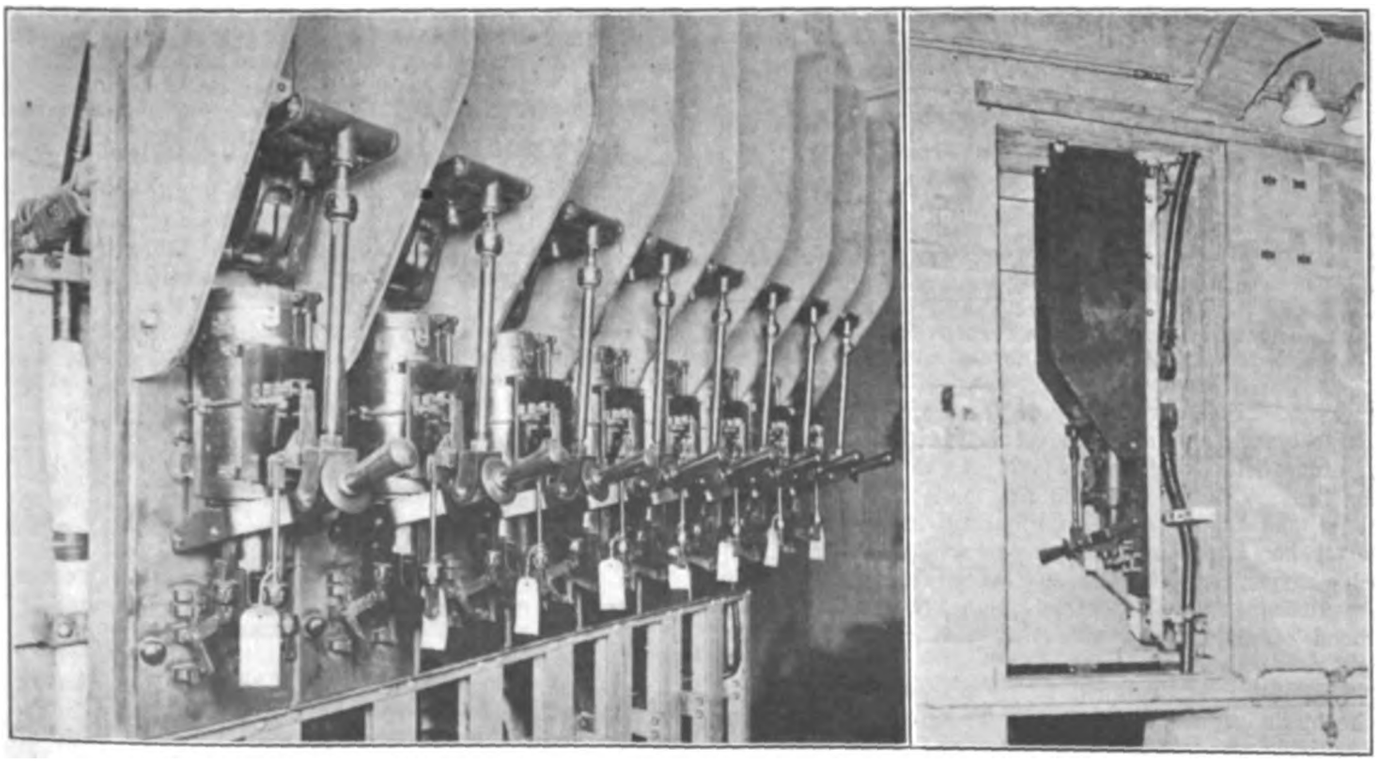


REMOTE-CONTROL CIRCUIT BREAKERS IN NEW SUBWAY SYSTEM, NEW YORK MUNICIPAL RAILWAY

Interesting Applications of Circuit Breakers for the New York Municipal Railway

In connection with its third-rail conductors the New York Municipal Railway Corporation has installed more than 100 3000-amp. continuous-load circuit breakers. These are of I-T-E remote-control type without overload feature, but arranged to give indicating lights at the substation—red when the breaker closes, green when it opens.

They are placed in cabinets under the stairways of passenger stations or else in the upper part of niches in the retaining walls along the right-of-way. Those in the latter location take a minimum amount of copper, as they are located only a few feet from the third rail. These circuit breakers are so mounted on narrow slate panels that the entire breaker can readily be removed if necessary. Ebony transite shields are installed on each side of the breakers to confine and direct the arc. The compartments are closed by sliding doors



REMOTE-CONTROL CIRCUIT BREAKERS IN SPECIAL CHAMBER IN SUBWAY, NEW YORK MUNICIPAL RAILWAY—CIRCUIT BREAKER IN COMPARTMENT IN SUBWAY CURTAIN WALL

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made up of a galvanized iron frame with ¼-in. transite.

In the subway the breakers are installed at the ends of substation feeders where the latter are attached to the third-rail so that the feeders can be disconnected for testing; or to prevent burning of the cables in case of failure of the cables which would be injured by being kept alive from the substation connected to the other end of the third-rail section.

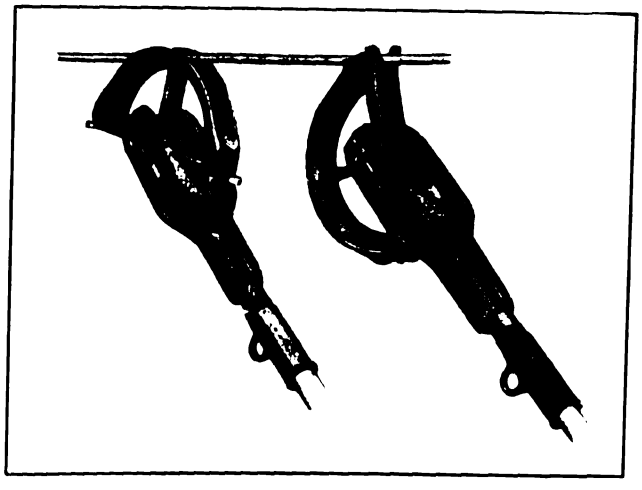
At other places, these breakers are used to tie together the third-rails of all four tracks in order to keep up the voltage at intermediate points; also as a means of supplying power to the third-rail if the feeders on any conductor rails are out of service for any reason. The importance of these ties can be better appreciated when it is stated that currents up to 10,000 amp. are transferred to one rail from the adjacent rails for momentary periods in the starting of trains.

These tie circuit breakers permit a much lower setting of circuit breakers in the substations, as the total load on any one rail is supplied from all the feeders available, thereby protecting all circuits against severe shorts.

Semi-Rotary Sleet Cutter

Difficulty has been experienced with some sleet cutters when it became necessary to back up cars for short distances, as the cutters frequently gripped the wire, forcing the "overhead" upward under great strain, or jumped off the trolley wire altogether. A new type of semi-rotary sleet cutter, which is being sold by the Bayonet Trolley Harp Company, is designed to overcome this fault.

The cutter consists of a malleable iron half-wheel, grooved like a trolley wheel and provided with removable blades made preferably of phosphor bronze or steel. These blades or shoes are securely attached by means of stove bolts to the plane side of the half wheel, and the contact surfaces, which are made of V-form, slide along the trolley wire and cut off the sleet. Each cutter has two blades, which are said to be practically self-sharpening. As the surface of the cutter below the cutting groove is perfectly plane, there is little likelihood of the ice accumulating and clogging up the cutter.



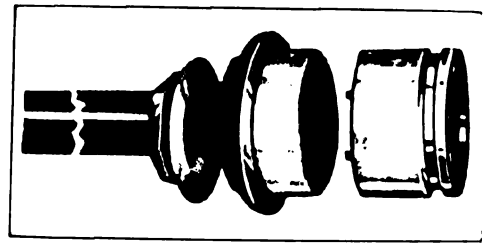
SEMI-ROTARY SLEET CUTTER IN POSITIONS ASSUMED IN BACKWARD AND FORWARD MOTION

The cutter is designed to be placed on the trolley wheel axle in place of the trolley wheel, so that the latter is entirely removed from the danger of being burned up by the flashing.

In operation the cutter revolves until the segment rests against the trolley harp, bringing the cutting edge into action. In case it is necessary to back up, the half-wheel revolves forward until the opposite side of the segment rests on the top of the trolley harp, allowing the wire to slide easily through the smooth groove of the round portion of the wheel. With the two cutting blades, if one burns out before a car has completed its trip, the other edge can be turned up by simply turning the wheel over in the harp, thus bringing the second cutter into action.

Combination Shade and Socket

A lighting unit for use in carhouses, shops, etc., consisting of a combination of a one-piece porcelain enameled steel reflector and a porcelain socket assembled by means of a special holder, is being marketed by the Central Electric Company, Chicago, Ill. The holder consists of a substantial malleable-iron reflector seat with a neck at the top as shown in the accompanying illustration.



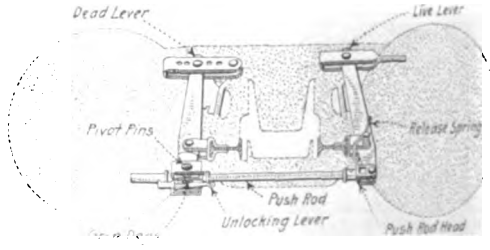
COMBINATION SHADE AND SOCKET

The reflector is held solidly between a lead washer and a locknut above and a special cork washer on top of the reflector seat below. A split porcelain socket is employed, the upper half of which is fastened to the reflector seat. Two long contact screws support the lower half of the socket and make connections electrically between its two parts.

These fittings are made to accommodate all of the standard types of reflectors for lamps up to 1000 watts. With lamps of 300-watt capacity and larger a mogul-base socket is supplied.

Automatic Brake Slack Adjuster

Recent developments in brake slack adjusters have been made by the Gould Coupler Company, New York. One of the latest is an adjuster which takes the place of the turnbuckle or bottom rod connection found on most trucks, or the tie rod connection on cylinder levers. Its application to the brake beam truck is shown in the accompanying illustration. It may be used with all types of trucks and brakes automatically to adjust the piston travel.



AUTOMATIC BRAKE SLACK ADJUSTER ADAPTED TO BRAKE BEAM TRUCKS

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NEWS OF ELECTRIC RAILWAYS

Financial and Corporate | Traffic and Transportation | Personal Mention | Construction News

NEW TRANSIT OFFER IN PHILADELPHIA

P. R. T. Agrees to Equip and Operate the City-Built High-Speed Lines in Conjunction with Its Own Lines as One System

The Philadelphia (Pa.) Rapid Transit Company on Dec. 20 submitted to the city a proposal that a contract for the operation of the city's high-speed lines shall be undertaken by it under the following general terms, which, if acceptable to the city, can be incorporated in a contract drawn in definite terms so as to protect adequately the interests of both parties:

"The Taylor plan covers an elevated from Front and Arch Streets to Bridge Street, Frankford; an elevated from Thirtieth and Market to Darby; a subway in Broad Street with branches and with a delivery loop, and a subway elevated line from City Hall to Roxborough via the Parkway, Twenty-ninth Street and Henry Street. It provides that the Philadelphia Rapid Transit Company shall equip these lines, extensions thereof and other lines built by the city and operate them in conjunction with its own lines as one system, granting free transfers at intersecting points, so that the citizens would get the fullest possible benefit from this great expenditure by the city.

"Heretofore the condition of the rapid transit company was such that it was proposed that the receipts of the two lines should be kept separate, and the company protected by a so-called preferential payment to the extent that its earnings were diverted to city lines. The great improvement that has taken place in the financial condition of the company makes this plan no longer necessary, as this company is to-day making on its own system a greater amount than it is willing to accept as an assured fixed share of the profit from the joint operation of the two systems. Its surplus applicable to dividends for the current calendar year with the month of December estimated will be very close to $2,400,000, or 8 per cent upon the full-paid capital of the company.

"The company, therefore, proposes that the two systems should be operated as one—financially as well as physically. all payments, charges and credits between the city and the company to be eliminated, and the gross receipts from such operation to be applied to the payment of:

"1. The actual cost of operation of the combined system.

"2. The fixed charges of the company.

"3. A cumulative dividend of 5 per cent upon the actually paid-in capital stock of the company.

"4. Ten per cent of the remaining net surplus from operation to be paid to the company and the remaining 90 per cent to be the annual current net revenue to the city from the operation of the city-built lines and paid into the city treasury as such, within the meaning of the recent amendment to the Constitution.

"In so far as may be necessary, the 1907 contract to be amended so as to cover this distribution of net surplus earnings and the company to waive all claims for back dividends due to it thereunder.

"The company has earned a substantial surplus, which at the close of its last fiscal year was in excess of $2,700,000 the cash balance at the same date being approximately $3,000,000, out of which it has since distributed a dividend of 2 per cent, or $600,000.

"It has added substantially to that surplus during the last five months of operation. Until it assumes actual operation of the city's lines under the proposed contract it will limit its dividend distributions to 5 per cent per annum from July 1, 1916, and will carry over into the new arrangement as working capital all surplus which it may have acquired at that time.

"The contract shall reserve to the city the right at any time to purchase the company's property or outstanding capital at a price equal to the par of such stock with dividends accumulated and unpaid during the term of this contract, and may use the sinking fund accumulations for that purpose. The city may also at any time during the term of the contract take back the municipal properties under a fair recapture clause.

FREE TRANSFERS

"Exchange tickets shall be abolished at the earliest practicable moment and free transfers given on surface and high-speed lines outside the delivery district as recommended in the report of the Director of City Transit for 1915. The company will forthwith remodel its Nineteenth Street station on the Market Street Elevated and will make it a stop for high-speed trains and establish a transfer at that point with the Nineteenth and Twentieth Street lines with a further transfer thereon in order to give to passengers between West Philadelphia and either North Philadelphia or South Philadelphia an opportunity to make the journey on the high-speed line and for a single fare, thus relieving a discrimination that would otherwise exist in favor of Frankford, and giving adequate high-speed service to the district tributary to the Nineteenth Street station.

"All payments into the city treasury under the 1907 contract and for tax dividends of subsidiary companies to stop at the time exchange tickets are abolished. The present sinking fund under the 1907 contract to remain in the hands of the commissioners and payments into the same to be resumed five years after the date of the extension of said contract as provided therein.

"The system shall be operated with a 5-cent fare, but provision shall be made for such readjustments of fare at any time during the term of the contract as may be necessary to protect and secure the return to the company as specified herein and necessary and advisable in the interest of the city for any unforeseen reason or contingency.

"The company will undertake to equip and operate the city lines when and as built after the city has obtained a certificate of public convenience. The form of security to be issued by the company to cover the company's contribution for construction and equipment of city's lines to be the best compatible with the interests of both parties.

CAPITAL REQUIREMENTS FOR COMPANY'S SYSTEM

"The company will undertake to obtain $19,500,000 of new capital as and when required for the future requirements of its own system. If obtained by the payment of the unpaid portion of Union Traction stock the company will be permitted to amend its lease with that company so as to pay a rental equivalent to $5 a share upon its full-paid capital. If obtained by an issue of Union Traction preferred stock or Philadelphia Rapid Transit preferred stock or on any other form of security there shall be allowed a return of 6 per cent cumulative thereon as one of the fixed charges of the company.

"It has been suggested that the city might from time to time offer to build feeder or surface lines which would be reasonably remunerative and rent them to the company on a 5 per cent basis. If this were done fifty-year bonds issued by the city to cover the cost would not count against the city's borrowing capacity and the rental paid the city would meet the interest and sinking fund requirements of such bonds. Thus the city would ultimately become the owner of such lines free of debt. This suggestion, which meets with our approval, should, we believe, receive your consideration.

"The contract shall be executed and take effect as soon as it secures the approval of City Councils, the Public Service Commission and the stockholders of the Philadelphia Rapid Transit Company. The fifty-year period of operation and the extention of the 1907 contract shall run from

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the beginning of operation of the first of the city-built lines.

"The 1907 contract shall be so amended as to conform with the terms of the new contract.

5 PER CENT AND CONTINGENT INTEREST

"The plan as proposed has to recommend it definiteness, fairness and a promise of immediate advantage to the citizens in the elimination of exchange tickets. The city secures the best possible operator for its system with a free interchange of passengers between privately owned lines and municipal high-speed lines—a result never before attained in any city. All complicated accounting is avoided, and while the stockholders of the company take a 5 per cent fixed return upon their actual cash capital, in addition thereto they retain a sufficient contingent interest in the success of the joint enterprise to insure a careful and competent management on their part."

MAYOR MAKES STATEMENT

The Mayor issued a statement as follows:

"The Mayor will have no statement to make regarding the attitude of the administration on the proposed transit lease in advance of his message to Councils on this subject. The matter is of such vast importance to the people of Philadelphia that the administration will investigate every phase of it before making any recommendations. The proposal submitted by the company has been referred to the transit department. The transit director has been instructed to make a report to the Mayor, who, in the meanwhile, will give careful consideration to every point involved in order that the people and their representatives in Councils may be fully informed as to the responsibility involved in the undertaking both by the city and the company."

The finance committee and the street railways committee of Councils, a joint body, now have before them the ordinance introduced several weeks ago by Mayor Smith which the company declined to agree to in its original form. The company's proposition, which is a counter to that offered by the city, will be referred by Councils to that committee.

INCREASE IN WAGES IN ATLANTA

The Georgia Railway & Power Company, Atlanta, Ga., on Dec. 22 announced a substantial increase in the wages of its men, effective on and after Jan. 1. According to officers of the company, the new wage scale means the distribution among the men of $50,000 additional each year hereafter. In a statement which he made following the announcement, P. S. Arkwright, president of the company, said:

"This is not a bonus, but a permanent and continuing payment from the company to the men in recognition of their efficient and loyal services and in alleviation of their increased living expenses. It was decided upon several months ago, and very nearly was prevented by the losses we were made to suffer recently. We determined, however, that the men were entitled to the increased pay and it should not be withheld from them. It is made notwithstanding the company's own heavily increased expenses. The increase is in line with the company's policy of increasing wages. Before 1902 the rate of pay in Atlanta was from 12 cents to 15 cents an hour. With the merger in that year, a flat rate of 15 cents was made effective. In 1906 this was increased to a minimum of 16 cents and a maximum of 20 cents. In 1910 it was still further increased to a maximum of 23 cents an hour. In 1912 the wage scale was made from 17 cents to 25 cents an hour. We shall continue to increase wages from time to time as conditions justify."

The announcement of the increase was made by H. M. Atkinson, chairman of the company's board of directors; Mr. Arkwright, and W. H. Glenn, vice-president and operating manager, at the regular December meeting of the men. Mr. Atkinson had come from Philadelphia especially to be present and add his personal greetings.

The new wage scale will be as follows: For first year of service, 20 cents an hour; second year, 22 cents; third year, 24 cents; fourth year, 25 cents; fifth year, 26 cents; sixth year and thereafter, 27 cents an hour. Conductors and motormen on the Marietta and Stone Mountain lines will receive 29 cents an hour. The wage scale which the new one supersedes is as follows: For first three months of service, 17 cents an hour; second three months, 18 cents; second six months, 19 cents; second year, 21 cents; third year, 23 cents; fourth year, 24 cents; fifth year and thereafter, 25 cents an hour. Stone Mountain and Marietta lines, 27 cents.

ADVERTISING FOR EMPLOYEES

Rochester Company Uses Posters — Labor Situation Not Acute in Many Localities

The question of labor supply in the electric railway industry seems to depend largely upon the location of the companies reporting. Those in the center of the great machine-shop sections naturally have suffered most, while those in the agricultural districts and where the textile and other industries are located and furnish the principal sources of employment have suffered least.

Any considerable shortage in labor is quick to manifest itself beyond the management directly concerned. After the management, the first persons who learn about it are quite naturally the other employees to whom such shortage manifests itself promptly in a number of ways. Following them, the general public learns of the shortage, which, if it becomes acute, is indicated directly in unmistakable ways. The fact that this is so true has led several companies frankly to admit that they were greatly hampered in putting service changes into effect because they were unable to secure the necessary help.

That the conditions which now confront some companies are not altogether of recent origin is shown in the case of the New York State Railways, Rochester Lines. Beginning in May, 1916, the company in Rochester experienced difficulty in securing men for positions as motormen and conductors. This was due to the fact that two large companies in the city began the manufacture of munitions and offered a large wage to men even though they had had no experience in machine work. The normal operating force on the Rochester city lines is approximately 1000 motormen and conductors. Between May 1 and Nov. 1, 435 men left the service, the majority of these resigning to accept other positions. Although the company advertised both in city and country papers for men and sent employment agents to various places, including points as far distant as Kentucky, the number of men in service fell to 915. During the latter part of October, realizing that inclement weather would increase the rush-hour demands for service, the company placed a large sign on the dash of each car in service announcing that men were wanted for motormen and conductors. The results were quite gratifying, as during the first week following sixty-six applications were received. On Dec. 1 the number of men in service had been increased to a total of 965, besides which there was a considerable number of men on the cars as students. In the early part of December fewer men were applying for positions, and as a consequence the advertising signs were again placed on the dash of cars. The number of applicants increased promptly.

As was stated before, the extent to which the electric railways have been inconvenienced has depended on their location considered industrially. Thus, the Boston (Mass.) Elevated Railway and the Bay State Street Railway, in the heart largely of the cotton goods and textile country, report an adequate supply of men for platform service at present, contrary to the shortage noted in some other sections of the country. In the case of the former, only a few new men have been employed recently. The return of various employees from military service on the Mexican border, increased use of trail cars, and generally attractive employment conditions on the property are factors in the company's adequate supply of men at the present time. Inquiry at the offices of the Stone & Webster Management Association developed no particular shortage of men on the Northwestern or Southwestern properties. Especially in the latter case, recent wage increases have tended to swell the ranks. On the Blue Hill Street Railway and the Brockton & Plymouth Street Railways, in Massachusetts, some difficulty is being experienced in securing men, but no special campaigns have been undertaken.

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TAX ACTION SUPPORTED BY FULL ST. LOUIS BOARD

The board of directors of the United Railways, St. Louis, Mo., through its president, Richard McCulloch, has issued a statement in which it indorses the acts of Henry S. Priest, general counsel for the company, in the litigation in which the company resisted the payment of the mill tax. The statement by the board follows:

"The directors of the United Railways regret that the impression has been created that the litigation in the matter of the mill tax suits did not receive their full support. Such an impression is unfounded. At a meeting of the board of directors of the United Railways held June 20, 1916, at which were present Messrs. Adkins, Brown, Carleton, Francis, Jones, McCulloch, Priest and Shapleigh, the following resolution was unanimously passed:

"'Resolved, That the president be authorized and instructed to notify Judge H. S. Priest, general counsel of this company, to continue to defend the mill tax cases brought by the city of St. Louis against this company and any of its constituent companies.'

"The Eastern interests, represented by J. D. Mortimer, questioned the advisability of the last petition to the United States Supreme Court for a rehearing, and advised payment, without further litigation, of the judgments affirmed by the Missouri Supreme Court.

"At a meeting of the board of directors of the United Railways held on Dec. 19, 1916, at which were present Messrs. Brown, Carleton, Francis, Jones, McCulloch, Priest and Shapleigh, the following resolution was unanimously passed:

"'Resolved, That every step taken in the courts in relation to the mill tax suit by the general counsel was authorized and was with the full approval of the board.'"

CHANGES IN BOSTON ELEVATED ORGANIZATION

The following appointments will go into effect on Jan. 1 on the Boston (Mass.) Elevated Railway:

J. Walter Allen, acting electrical engineer, appointed electrical engineer of the company.

Cyrus Corliss, assistant to the chief engineer of mechanical and electrical engineering, appointed construction engineer of the department of power.

Joseph A. Howard, chief clerk, department of power, appointed assistant to the superintendent of power.

Messrs. Allen, Corliss and Howard will report directly to Fred S. Freeman, superintendent of power. On Dec. 12, 1916, J. J. Donahue was appointed chief operating engineer.

The work of inspection and maintenance of elevated and subway structures, now performed under the jurisdiction of the vice-president, will be placed in direct charge of the department of maintenance of way on Jan. 1. A. T. Sprague, Jr., superintendent of steel erection and maintenance, will thereafter report direct to H. M. Steward, chief engineer of maintenance of way. The latter will assume the responsibility for the inspection and safe and suitable maintenance of elevated and subway structures and surface line bridges. Steel workers, painters, tools and materials from stock will be furnished by the chief engineer of maintenance of way to the vice-president upon his requisition when necessary for construction work under his charge.

THOMPSON COMMITTEE TO REPORT IN FEBRUARY

Senator Thompson, chairman of the Legislative investigating committee which inquired last winter into the work of the Public Service Commissions of New York, was interviewed on Dec. 27 with respect to the recommendations to be made by the committee to the incoming Legislature as based on the testimony taken by the committee. He promptly denied the report that the committee would ask for an extension of time in which to continue the taking of testimony. He said that the report will touch upon every matter taken up by the committee during the investigation and it will be presented to the Legislature along with the testimony. It may not be ready before February because of the time it has taken to make a digest of the testimony, so that the volumes would be serviceable for easy reference.

NORTHERN OHIO IMPROVEMENTS OUTLINED

The new Akron terminal station, more car-line extensions in Akron and Canton, more new cars in these cities and elsewhere, a large increase in power plants, and the new substation in East Akron, are some of the improvements in the program of the Northern Ohio Traction & Light Company for 1917.

As has been already announced, the Akron terminal station will be carried to completion as rapidly as possible. The Carmichael Construction Company is now tearing away the old brick buildings of the former Webster, Camp & Lane Company, which for many years have occupied the site. Continued low temperature may mean some delay, but the steel is ready for shipment. The main building will be 179 ft. x 84 ft. and four stories high. The train shed will be approximately 147 ft. x 179 ft., with the abundant trackage facilities arranged in the most modern manner. A restaurant and other accommodations will adjoin the large central waiting room. On the upper floors of the building will be the general offices of the company. Upon the completion of the station, interurban cars will make this the point of arrival and departure.

For the Akron City lines, thirty-one new cars of the largest and most modern type have been purchased. Ten trailers of the type used in Cleveland have also been purchased. For Canton twenty-five new pay-enter cars have been purchased. These are in addition to the cars which are now coming through for Canton and which, upon their arrival, will release five new pay-enters in use in that city, which will later be turned over to Akron. This equipment, which will place all Canton lines on the pay-enter plan, will be ready in the very near future.

The subject of car line extensions is receiving attention. This applies to both Akron and Canton. In the latter city the lines to be built were tentatively agreed upon when officials of the company met the City Council and other city executives in Canton on Dec. 13.

Sale of Bay State Parks Authorized.—The Public Service Commission of Massachusetts has authorized the Bay State Street Railway to sell Lakeside Park, Freetown; Dighton Park, Dighton; Westwood Park, Westwood; Glen Forest Park, Methuen; Mountain Rock Park, Tyngsboro, and Long Beach Resort, Gloucester, the board having found them unprofitable in the recently decided 6-cent fare case.

Cleveland Trail-Car Matter Settled.—On Dec. 26 the Council of Cleveland, Ohio, approved the plan of having fifty trail cars built in the new shops of the Cleveland Railway. J. J. Stanley, president, agreed to build as a test three all-steel cars, such as Street Railway Commissioner Sanders recommended. The rest of the fifty will be a combination of steel and wood, the type in use at the present time. This plan was approved by the Council and the matter is now settled.

Employees Receive Insurance Policies.—Some 200 employees of the Manhattan & Queens Traction Corporation, New York, N. Y., received life insurance policies worth $500 apiece at Christmas. The insurance is issued by the Travelers Insurance Company, Hartford, Conn. The employer will pay the entire premium, the only condition being that those who benefit shall join the mutual benefit association. Practically all the employees have joined the association already and consequently the coverage will be practically complete. Each policy is on the one-year renewable term plan.

Quebec Employees Awarded Increase in Wages.—The report of the board of three arbitrators, appointed in connection with the settlement of the one-day strike of a number of employees of the Quebec (Que.) Railway in September last, was made public on Dec. 12. The arbitrators were unanimous in granting the men an increase in pay of 2½ cents an hour. Under the old scale the men were paid as follows: first year, 18½ cents; second year, 19½ cents; third year, 21 cents; seventh year, 22½ cents. The new scale follows: first year, 21 cents; second year, 22 cents; third year, 24 cents; seventh year, 26 cents. The new scale is to remain in force for a period of three years.

Iowa Road to Be Scrapped.—It has been decided to tear up the 36 miles of the Chicago, Anamosa & Northern Rail-

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road, often called the "Can" road, and ship the whole thing to England, to be relaid over there. With the rails will be included six freight cars, two combination passenger cars, three locomotives and six steel bridges. The road runs from Anamosa, Iowa, in a northerly direction to Quasqueton. No trains have been operated over it since November, 1915. The property was sold under foreclosure in July, 1916. Plans were under consideration at one time for electrifying the road and making it part of the Waterloo, Cedar Falls & Northern Railway.

Status of St. Louis Franchise of I. T. S. Unchanged.—City Counselor Daues of St. Louis, Mo., on Dec. 20 announced he would not seek an injunction to restrain the Illinois Traction System from violating the franchise agreement to charge not more than 5 cents fare to an adult between points in St. Louis and the Tri-cities in Illionois, but would await the decision of the Board of Aldermen on a bill to repeal the company's franchise, introduced by Alderman Barney L. Schwartz. The Interstate Commerce Commission recently decided that the Illinois Traction System was entitled on its showing to charge a graduated fare, varying from 6 to 10 cents, according to the number and kind of tickets purchased, stating that a city could not indirectly control or regulate interstate commerce by a franchise condition.

Colorado Court Upholds Commission Control.—Exclusive and original jurisdiction in all cases involving rate making and service of public utilities rests solely with the Public Utilities Commission of Colorado under a decision of the State Supreme Court, which on Dec. 5 denied a rehearing in the case brought by the Denver & South Platte Railroad against the town of Englewood. The Supreme Court ruled the lower court had no jurisdiction where the question of a contract between a city and a public utility corporation was involved. The railway contracted to supply transfers to a Denver line. Later it repudiated this contract. When Englewood went into court to force the company to give transfers the utility commission intervened, claiming the courts had no jurisdiction.

U. S. Deputy Marshals on Springfield Cars.—In connection with the injunction proceedings to prevent the employees of the Springfield (Mo.) Traction Company from going on strike Judge Van Valkenburgh of the District Court of the United States for the Western District of Missouri at Kansas City, some time after granting his original writ, issued an order to the marshal's office to place United States deputy marshals on as many cars in Springfield as was necessary to insure constant operation in accordance with the terms of the injunction issued by him. These marshals were withdrawn a short time ago. On Dec. 20 the railway was operating cars on all lines and only one car less than the regular number, there being twenty-two cars in service then as compared with twenty-three run regularly. The circumstances attendant upon the strike were reviewed in the ELECTRIC RAILWAY JOURNAL for Nov. 4, page 988.

Move to Dismiss Indictment Against Public Service Commissioner.—A motion that the bribery indictment against ex-Public Service Commissioner Robert Colgate Wood be dismissed was made by District Attorney Swann of New York City on Dec. 26 before Judge Nott in General Sessions. After hearing the motion from the District Attorney, as well as an argument by John B. Stanchfield, counsel for Mr. Wood, the court took the matter under advisement. The indictment alleging the solicitation of a $5,000 bribe was found on Jan. 25 last, on which day the ex-Public Service Commissioner pleaded not guilty and was released in $7,500 bail. The alleged disclosures regarding Mr. Wood first became public in testimony taken by the Thompson committee. The district attorney is said to have concluded that in the absence of corroborative testimony it would be useless to put Mr. Wood on trial. Judge Nott on Dec. 27 denied District Attorney Swann's request that the bribery indictment against Mr. Wood should be dismissed. District Attorney Swann replied with a statement in which he called the case against the former commissioner insufficient, and declared that he would be unable to get a verdict because of lack of evidence. Judge Nott in his opinion said: "It may be laid down as a general principle that where an indictment for felony is returned against a public officer holding an important position public policy requires that the case be publicly tried unless it is perfectly apparent that under no possible circumstance can the prosecution succeed, especially where it is evident that the trial of the case cannot be a long one, unduly burdening the parties thereto or unduly obstructing public business."

PROGRAMS OF ASSOCIATION MEETINGS

Railway Business Association

F. A. Delano, member of the Federal Reserve Board, former president of the Chicago, Indianapolis & Louisville Railway, and Alfred P. Thom, general counsel of the Southern Railway, and also general counsel of the railway executives advisory committee, are announced as the speakers for the eighth annual dinner of the Railway Business Association, which will be held at the Waldorf-Astoria Hotel, New York, on Tuesday evening, Jan. 16, 1917, at 7 p. m. The business meeting of the association will convene at 11 a. m. at the Waldorf-Astoria.

American Institute of Electrical Engineers

The American Institute of Electrical Engineers will hold its next meeting in Pittsburgh on Jan. 12, 1917, with headquarters at the Port Pitt Hotel. Following the policy adopted a short time ago, the institute, instead of confining its session to one annual meeting during the year, has decided to hold several meetings at stated intervals in various parts of the country.

The Pittsburgh meeting will be devoted to a discussion of "Braking Electric Vehicles by Regeneration," using the energy generated on down grades to apply brakes to the vehicles. The paper on this subject will be presented by R. E. Hellmund of the Westinghouse Electric & Mfg. Company. The meeting will be presided over by Harold W. Buck New York City, president of the institute.

The morning will be devoted to a meeting of the board of directors of the institute, and the afternoon to an excursion to the various industrial plants in the Pittsburgh district. The session of the institute will be held in the English Room of the Fort Pitt Hotel in the evening. It will be preceded by an informal dinner.

National Civic Federation

The seventeenth annual meeting of the National Civic Federation will be held at the Hotel Astor in New York City, on Jan. 22 and 23, 1917.

In addition to the résumé of the year's work by President V. Everit Macy at the opening session, departmental reports will be made by L. A. Coolidge for the welfare department, August Belmont for the workmen's compensation department, Warren S. Stone for the social insurance department, John Hays Hammond for the industrial economics department, Miss Maude Wetmore for the woman's department, Alton B. Parker for the department on reform in legal procedure, Jeremiah W. Jenks for the department on regulation of industrial corporations, Louis B. Schram for the industrial accident prevention department, and A. J. Porter for the minimum wage commission.

The other sessions of the meeting will be devoted to the consideration of some of the larger economic and military problems confronting the American people during and at the close of the European war, such as:

"The Lesson from the Mobilization on the Mexican Border."

"The Indifference, if not Positive Opposition, of the Wage Earners and Farmers to all Preparedness Programs."

"Will There Be a Flood of Immigration or a Flood of Emigration?"

"Must this Country, to Secure Military Efficiency, Copy the Paternalistic Social Program of Germany?"

"Can the Great Forces of Production, of Labor, and of Finance be Cemented Into One Big Force to Grapple with the Oncoming Problems?"

The annual banquet of the federation will be held on the evening of Jan. 23. The luncheon of the woman's department will be held on Jan. 22.

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Financial and Corporate

MUNICIPALITY DISREGARDS CONTRACT

Bondholders of Brazilian Utility Make Strong Protest Against Disgraceful Action

At a recent meeting in London of the debenture holders of the Bahia Tramway, Light & Power Company, Bahia, Brazil, a strong protest was made against what was designated as a "disgrace to any civilized community," i. e., the deliberate disregard of obligations by the municipality of Bahia, one of the most important cities of Brazil.

At the instigation of the municipality and under a contract approved by it, according to the report submitted by the trustees to the debenture holders, the property of the Bahia Tramway, Light & Power Company was transferred to the city on March 19, 1914, for a provisional 6 per cent sinking-fund bond of $7,605,000, the city not being able to pay cash. From this point obstructive tactics were pursued by the city. The interest and sinking-fund payments due in July, 1914, and January, 1915, were not made, and the municipal council in addition tried to lower the amount of the provisional bond from $7,605,000 to $6,746,000.

On March 29, 1915, however, as a result of sequestrating some of the municipal funds, the company secured from a new municipal leader an authorization for the delivery of definitive bonds in exchange for the full sum ($7,605,000) of the provisional bond, and also a promise for a payment of $200,000 in cash and $210,000 in one-year promissory notes to cover the interest and sinking-fund charges up to January, 1915. These payments were made as promised. In the latter part of 1915 another new municipal head tried to secure a cancellation of the bonds in exchange for a renewed concession, but this was refused because there was no guarantee that a new concession would be any more respected by the municipality than the old one had been. Moreover, it was found on investigation that the property since the transfer to the city had fallen into such a state of neglect that $700,000 would be required to insure its proper working.

The municipality then offered $1,500,000 in cash for the bonds and in final settlement of everything, but this was refused. In July, 1916, the municipality issued a formal protest against carrying out the contract, stating that according to Brazilian law "contracts that cause enormous injury to one of the parties can be cancelled." This protest was not regarded seriously, but was thought to be an excuse to trap the company into long and expensive litigation. Later the $210,000 of promissory notes were returned dishonored by Brazilian banks, while not a penny of the $750,000 of fixed charges due since January, 1915, has been paid.

At present, therefore, matters have come to a deadlock, and the London debenture holders believe that the situation should be explained in Great Britain and the United States. In the view of the trustees the action of the municipality is particularly deserving of censure because it first fostered and protected illegal competition against the company and then of its own volition made an offer to purchase. Until the city ceases to disregard its admitted liability it is thought that no fresh loan should be negotiated by it anywhere. It is felt that the Brazilian government should look into the matter and prevent the city from repudiating its contract.

VALUATION OF CHICAGO-AURORA LINE

During the arbitration proceedings now in progress between the Aurora, Elgin & Chicago Railroad and its employees, Bion J. Arnold was called on to appraise the railway property of the company. Mr. Arnold made a rough study of the physical property, exclusive of the lighting properties, and, using the book values for copper and rail, arrived at a total valuation of $11,382,982. General, legal and organization expenses were placed at 2 per cent and the bond discount at 10 per cent. On the basis of the total valuation, it was shown that the company was not receiving the reasonable return allowed by the courts.

ANNUAL REPORT

San Francisco-Oakland Terminal Railways

The comparative income statement of the San Francisco-Oakland Terminal Railways, Oakland, Cal., for the years ended June 30, 1915 and 1916, follows:

	1916 Amount	1916 Per Cent	1915 Amount	1915 Per Cent
Railway operating revenue	$4,417,847	100.0	$4,353,891	100.0
Railway operating expenses	3,063,084	69.3	2,932,652	67.4
Net revenue—railway operations	$1,354,763	30.7	$1,421,239	32.6
Auxiliary operations—net	.....	....	.....	....
Net operating revenue	$1,354,763	30.7	$1,421,239	32.6
Taxes assignable to railway operation:				
Real or personal property	$5,786	0.1	$7,235	0.2
Earnings	258,976	5.9	241,929	5.6
Miscellaneous	230	0.0	2,716	0.0
Total	$264,992	6.0	$251,882	5.8
Operating income	$1,089,771	24.7	$1,169,357	26.8
Non-operating income	60,413	1.3	62,664	1.4
Gross income	$1,150,184	26.0	$1,232,021	28.2
Deductions:				
Rentals	$1,298	0.0	$291	0.0
Interest on funded debt	849,674	19.2	852,308	19.6
Interest on unfunded debt	166,634	3.8	170,750	3.9
Miscellaneous	1,854	0.0	2,233	0.0
Total	$1,019,461	23.0	$1,025,583	23.5
Net income	$130,722	3.0	$206,438	4.7

The railway operating revenues for the last fiscal year showed an increase of $63,956 or 1.5 per cent over those of the preceding year. The gain was not sufficient to bring the revenues back to the 1914 figure, but it was an appreciable advance in view of the still existing jitney competition. During the first half of 1915 the jitneys diverted from the company at least $150,000 in revenue, and it is not unlikely that this figure was doubled during the last fiscal year.

The operating expenses rose to a greater extent than the revenues in 1916, the total increase being $130,432 or 4.4 per cent. As a result the net revenue from railway operations fell off $66,476 or 4.6 per cent. Taxes continued to rise, on account of the increased tax on earnings, and non-operating income fell off, but these were partly counterbalanced by a decrease in interest charges and miscellaneous deductions. The net income for the year at $130,722 represented a decrease of $75,716 from that of the preceding year. The surplus on June 30, 1916, was $99,695 as compared to $276,751 the year before.

UNJUSTIFIABLE MANAGEMENT PRACTICES

Massachusetts Commission Disapproves Overlapping Control in Construction and Managing Contracts Save Under Exceptional Circumstances

In an order recently made public, the Massachusetts Gas & Electric Light Commission sets forth its disapproval of certain classes of public utility construction and management contracts in which overlapping control is a feature of the administration. The order, which is addressed to all companies under the commission's direction, states that the board has for some time viewed with concern the control of the directorates of certain of the companies under its supervision by officials and employees of engineering, construction and management organizations and corporations with which the companies involved have from time to time contracted for extensions and improvements of and managerial services for their respective properties. In the opinion of the commission such practices are wrong in principle.

The order states that whatever justification may exist for these practices in public service companies whose credit is feeble or future hazardous and uncertain, "that justification ceases when their financial position is firmly established. The management of such companies should be in the hands of directors and officers responsible solely to their stockholders and the public whom they have undertaken to serve. For reasons that are obvious companies should not have any dealings in supplies or materials or make any contracts for construction or management with another

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corporation, partnership or association when said company has upon its board of directors or as its president, manager, purchasing or selling officers, or as its agent in the particular transaction, a person who is at the same time a director, purchasing or selling officer, or agent of, or who has any substantial interest in, such other corporation, partnership or association, unless and except such purchases shall be made from, or such dealing shall be with, the bidder whose bid is the most favorable to such company, to be ascertained by honestly conducted competitive bidding. Notice is hereby given of the conclusions reached by the board to the end that no company under its supervision shall hereafter enter into contracts and relationships of the character above described save under exceptional circumstances and with the approval of the board, and that upon the expiration of existing contracts they shall not be renewed."

ALLOWABLE CAPITALIZATION FOR PURCHASER OF FORECLOSED RAILWAY

The Massachusetts Public Service Commission, in a recent finding approving the issue of $120,000 of capital stock by the Norton, Taunton & Attleboro Street Railway, following a receiver's sale of the antecedent Norton & Taunton Street Railway, discussed the basis for determining the allowable capitalization in the case of the successor company. In the opinion of the commission, the words of the statute "fair cost of replacing" are equivalent to "cost of reproduction less accrued depreciation." It is the intent of the statute that a company organized to take over street railway property purchased at a receiver's sale shall start with a clean slate, not handicapped by the past, and shall be in at least as favorable a position as though the enterprise were entirely a new one. In order that this may be the case, the capitalization of such a company must be based upon the depreciated value of the property acquired. Street railway property purchased at a receiver's sale, being not as good as new, enjoys less time in which to accumulate funds for its ultimate replacement. For this reason allowance was made for depreciation in the case not only of the materials but also of the labor entering into construction, for both of these elements of cost must be repeated in connection with replacements.

In preparing their estimate of reproduction cost the engineers of the commission used the average unit prices prevailing during the last five years so that the valuation might not be affected by temporary or abnormal conditions. As the railway is small and its traffic very light, in estimating depreciation longer lives were assumed in the case of certain of the property units than would ordinarily be assumed. No allowance was made for depreciation in the case of a large portion of the overhead charges, on the ground that most of these charges would not arise in connection with replacements.

NEW STOCK ISSUE AUTHORIZED

Tidewater Southern Railway to Spend $600,000 on Improvements to Its System in California

The California Railroad Commission has authorized the Tidewater Southern Railway, Stockton, to issue $600,000 of its common stock of the par value of $1 a share, to net the company not less than 80 per cent of par. The proceeds of the stock are to pay for improvements of the system, including $109,700 for a proposed extension from Hatch to Irwin City, 8 miles; $68,250 for an electric line from Modesto to Turlock, 16 miles; $12,000 for additional overhead from Ortega to Stockton, 3 miles, $88,000 for notes issued; $15,000 for the Tuolomne steel bridge; $15,000 for lining up the present track; $40,000 for property in Modesto, $10,000 for property in Turlock and other expenditures. The Turlock and Modesto property purchases are for terminals. The original application to the commission was for permission to issue 850,000 shares, but that part of the application concerning the right to issue 250,000 of these to Byron A. Bearce, president of the company, in return for properties sold by him, and for the surrender by him of a certificate for $2,000,000 held for voting purposes only, is held in abeyance.

The Tidewater Southern Railway operates a standard gage railway from Stockton to Turlock, and to Hatch in the San Joaquin Valley, 50 miles. In addition 8 miles have been surveyed from Hatch to Irwin City. The plan of the company is to extend its construction into Merced County to reach a rich section which offers abundant traffic. In this connection it is necessary to acquire terminals and yards at Modesto and Turlock, to construct interlockers at crossings, and to build warehouse terminal facilities, as well as to electrify the line from Modesto to Turlock.

The company has 945,703 shares of stock of a par value of $1 a share, of which 30,000 shares are preferred. The company has on hand $50,000, and materials and supplies worth $15,000. Its obligations consist of $466,500 of 5 per cent bonds due in 1942, $88,000 of notes payable and $40,000 of accounts payable—a total of $594,500. The commission has previously set a "present value" on the company's properties as of June 30, 1914, of $713,493. President Bearce testified before the commission that capital additions had been made to the property which would bring the total value to $1,128,910. Mr. Bearce estimates that the railway will earn $150,000 in the next fiscal year, with a net profit of $30,000 after the payment of fixed charges. He estimates that the gross receipts from the fiscal year 1917-1918 will be $300,000, with a net profit of $100,000. The company has made traffic connections with the Southern Pacific Company, the Atchison, Topeka & Santa Fé Railway and the Western Pacific Railway.

LEGAL STREET RAILWAY BONDS

The Massachusetts Public Service Commission in a report forwarded to the bank commissioner has listed all the Massachusetts street railways which it appears from the returns made by them have annually earned and properly paid, without impairment of assets or capital stock, an amount in dividends equal to at least 5 per cent upon their outstanding capital stock in each of the five preceding years. The bonds of the companies so certified are legal investments for savings banks. The names of the companies that qualify under the ruling follow:

Boston & Revere Electric Street Railway; East Middlesex Street Railway; East Taunton Street Railway; Fitchburg & Leominster Street Railway; Holyoke Street Railway; Springfield Street Railway; Union Street Railway; West End Street Railway and Worcester Consolidated Street Railway.

The commission also certified that the bonds of the Boston Elevated Railway and of the Milford & Uxbridge Railway are legal investments of savings banks by virtue of chapter 273 of the acts of 1915.

No company that was on the list last year has been dropped this year, while the East Taunton Street Railway has been added.

In its report the commission makes it clear that it has not determined whether or not the street railways listed have made adequate provisions for maintenance and depreciation.

Chicago City & Connecting Railways, Chicago, Ill.—A semi-annual dividend of $2.25 has been declared on the 250,000 shares of stock of the Chicago City & Connecting Railways, payable on Jan. 1 to holders of record of Dec. 23. In July, 1916, $1 per share was paid.

Chicago (Ill.) City Railway.—An extra dividend of 1¼ per cent has been declared on the $18,000,000 of stock of the Chicago City Railway, along with the regular quarterly dividend of 2 per cent, both payable on Dec. 29 to holders of record of Dec. 26. In March, June and September last 2 per cent was paid.

Cities Service Company, New York, N. Y.—The Cities Service Company has declared an additional dividend of one-half of 1 per cent on the common and preferred stock along with the regular monthly one-half of 1 per cent, both payable on Feb. 1. The company has arranged that holders of fractional stock dividend warrants may allow them to remain with the company until such time as these fractions total a full share. Under this plan, holders of the fractional warrants will receive on their fractions the regular cash and stock dividends and on the delivery of full shares of stock they will also receive their cumulative cash dividends, any fractional dividend warrants being retained for further cumulation.

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Detroit (Mich.) United Railway.—The shareholders of Detroit United Railway at the annual meeting to be held on Feb. 6 will be asked to approve an increase in the capital stock of the company from $12,500,000, all outstanding, to $25,000,000, the additional $12,500,000 to be issued from time to time and in such amounts as required. A statement made by the directors says that it will be necessary to incur obligations and expend considerable amounts of money in the acquisition and construction of additional lines of electric railway, etc., as well as in betterments and improvements, the cost of which would be properly chargeable to capital account. The proposal to increase the authorized stock indicates that the company plans to finance its future capital requirements by the sale of capital stock.

Kansas City, Outer Belt & Electric Railway, Kansas City, Mo.—The Federal Court at Kansas City, Mo., has postponed indefinitely the sale of the property of the Kansas City, Outer Belt & Electric Railway pending measures for joint re-organization with the Kansas City, Mexico & Orient Railway.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Harper & Turner, Philadelphia, Pa., are offering at 102½ and the dividend, yielding about 6.83 per cent, $3,467,000 of 7 per cent cumulative preferred stock of the Mahoning & Shenango Railway & Light Company. The stock is callable as a whole but not in part at 110 per cent and dividends. The authorized issue is $10,000,000. The amount outstanding is $3,500,000. The stock was originally sold for cash at par to the Republic Railway & Light Company, which controls the Mahoning & Shenango Railway & Light Company. Of the total issue, $3,000,000 was deposited as collateral to secure an issue of the Republic Company three-year 5 per cent notes. All these notes were called for payment, the cash for this purpose being realized from the sale of this preferred stock. Holders of the notes had the right to convert their notes at par for preferred stock and upward of $500,000 of notes were so converted. The additional $500,000 of preferred stock was issued for improvements and other capital expenditures.

Manitowoc & Northern Traction Company, Manitowoc, Wis.—The property of the Manitowoc & Northern Traction Company has been sold to the Wisconsin Securities Company by Thomas Higgins, owner and president of the company. This company operates an electric railway between Manitowoc and Two Rivers, a distance of approximately 10 miles. New officers have been elected for the Manitowoc & Northern Traction Company as follows: Clement C. Smith, president; C. R. Phenicia, secretary; Howard Greene, treasurer; J. G. Miller, manager.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—The property of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company will be sold at auction under foreclosure on or before May 27, 1917, in accordance with an order issued by Federal Judge Booth.

National Properties Company, Philadelphia, Pa.—A semi-annual dividend of 3 per cent has been declared by the National Properties Company on the $2,491,400 of common stock, payable on Dec. 30 to holders of record of Dec. 20. In July last 2 per cent was paid.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—Formal permission has been granted to the New Jersey & Pennsylvania Traction Company by the Board of Public Utility Commissioners to transfer upon its books 5000 shares of its capital stock to the Bucks County Interurban Railway of Pennsylvania. The Bucks County syndicate now holds all the traction company's capital stock. The traction corporation has also been allowed to open upon its books a "Property Abandoned" account because of the sale of its securities to the amount of $439,445 to the syndicate. The latter, however, must surrender for cancellation 5000 of the outstanding shares, leaving 5000 outstanding. In October the company sought to transfer the 10,000 shares to the Pennsylvania Power & Light Company, but the utility board refused to authorize the action. The transfer of securities had left a deficit on the books and this will be taken care of under the new plan. The independent operation of the New Jersey & Pennsylvania Traction Company will not be altered or its financial status affected.

Ohio Valley Electric Railway, Huntington, W. Va.—Newburger, Henderson & Loeb and Bioren & Company, Philadelphia, Pa., and Scott & Company, Wilmington, Del., have placed privately an issue of $1,675,000 of first mortgage 5 per cent thirty-year gold bonds of the Ohio Valley Electric Railway, guaranteed principal and interest by endorsement by the American Railways.

Oklahoma (Okla.) Railway.—It is the intention to take the North Canadian Valley Railway, Oklahoma City, over into the Oklahoma Railway organization on Jan. 1, as the last-named road owns the property.

Public Service Corporation of New Jersey, Newark, N. J.—A gross increase in total business of $438,240, representing an increase of 13.1 per cent over November, 1915, is shown by the financial statement of the Public Service Corporation of New Jersey for November last. The balance available—after payment of operating expenses, fixed charges, sinking fund requirements, etc.—for amortization, dividends and surplus was $580,493, and the increase in surplus available for dividends over the corresponding month of 1915 was $56,150. For the eleven months ended Nov. 30, 1916, the gross increase in total business amounted to $4,534,683 or 13.4 per cent. The balance available for amortization, dividends and surplus totaled $5,148,875, and the increase in surplus available for dividends was $1,074,889.

Republic Railway & Light Company, New York, N. Y.—The Republic Railway & Light Company has declared the regular quarterly dividend of 1½ per cent on the preferred stock and an initial common dividend of 1 per cent, both payable on Jan. 15 to holders of record of Dec. 30.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways has filed with the California Railroad Commission a petition for a continuance of authority to issue $180,000 of equipment notes, to secure funds to pay in part for thirty-two new cars. The original authority for this was granted by the commission last May, but the time of issuing the notes was limited to Dec. 31, 1916. The railways says that it did not avail itself of this authority until Nov. 22, when it issued half of the amount authorized. It has not made any further issue because the builder of the cars ordered has not been able to make delivery of the twenty modern pay-as-you-enter cars until now and the early part of 1917. In order to save interest on these equipment notes, the company has been holding them back as the builders of the twelve additional cars for the Twelfth Street line will not make delivery until the second quarter of next year. For this reason the company wants the authority for note issues extended until June 30, 1917.

Sunbury & Susquehanna Railway, Sunbury, Pa.—The bondholders of the several units which make up the consolidated Sunbury & Susquehanna Railway have appealed to the Supreme Court of Pennsylvania against an order to sell at foreclosure the property of the company in its entirety. A hearing is set for Jan. 3, 1917. Judge Cummings in the County Court at Sunbury ordered the property sold some time ago, as noted in the ELECTRIC RAILWAY JOURNAL of Aug. 19.

DIVIDENDS DECLARED

Birmingham Railway, Light & Power Company, Birmingham, Ala., 3 per cent preferred.

Boston & Worcester Electric Companies, Boston, Mass., $1, preferred.

Chicago City & Connecting Railways, Chicago, Ill., $2.25, preferred.

Chicago (Ill.) City Railway, quarterly, 2 per cent; extra, 1¼ per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

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Columbus (Ga.) Electric Company, 3 per cent, preferred.

Halifax (N. S.) Electric Tramway, quarterly, 2 per cent.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, quarterly, 2 per cent.

International Traction Company, Buffalo, N. Y., quarterly, 1 per cent, 4 per cent cumulative preferred; quarterly, 1¾ per cent, 7 per cent cumulative first preferred; kuarterly, 1½ per cent, common.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, preferred; 2 per cent, common.

London (Ont.) Street Railway, 3 per cent.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, 2½ per cent, preferred.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred.

National Properties Company, Philadelphia, Pa., 3 per cent, preferred; 3 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., quarterly, 87½ cents, common.

Philadelphia & Western Railway, Upper Darby, Pa., quarterly, 1¼ per cent, preferred.

Porto Rico Railways, Ponce, P. R., quarterly, 1¾ per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 2 per cent.

Republic Railway & Light Company, Youngstown, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred; quarterly, 1¼ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, 3 per cent, common.

United Gas & Electric Corporation, New York, N. Y., quarterly, 1¾ per cent, first preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 1 per cent.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, 1¼ per cent, preferred; 1 per cent, on account of accumulated dividends; 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY, SANFORD, ME.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Nov.,	'16	$22,841	*$21,740	$1,101	.....	.....
1 "	"	'15	23,678	*20,902	2,776	.....	.....

DALLAS (TEX.) ELECTRIC COMPANY

1m.,	Oct.,	'16	$211,642	*$116,383	$95,259	$40,683	$54,576
1 "	"	'15	185,200	*104,825	80,375	33,923	46,453
12 "	"	'16	1,939,462	*1,195,561	743,901	440,201	‡323,042
12 "	"	'15	1,865,517	*1,112,210	753,307	401,412	351,895

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m.,	Nov.,	'16	$458,668	$284,356	$174,312	$56,656	$117,655
1 "	"	'15	341,974	200,063	141,911	54,241	87,669
11 "	"	'16	4,689,676	2,865,806	1,823,870	558,626	1,265,244
11 "	"	'15	3,510,933	2,155,044	1,355,889	575,269	780,620

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m.,	Oct.,	'16	$205,490	*$102,633	$102,857	$29,442	$73,415
1 "	"	'15	181,515	*95,642	85,873	27,714	58,159
12 "	"	'16	1,886,666	*1,146,542	740,124	345,315	394,809
12 "	"	'15	1,730,709	*1,038,187	692,522	330,119	362,402

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m.,	Oct.,	'16	$715,833	*$440,857	$274,976	$184,794	$90,182
1 "	"	'15	641,412	*391,703	249,709	182,911	66,798
12 "	"	'16	7,930,385	*5,062,817	2,867,568	2,208,368	659,200
12 "	"	'15	7,620,427	*4,754,319	2,866,108	2,170,492	695,616

SAVANNAH (GA.) ELECTRIC COMPANY

1m.,	Oct.,	'16	$72,246	*$49,068	$23,178	$23,830	†$652
1 "	"	'15	67,962	*44,492	23,470	23,274	196
12 "	"	'16	806,554	*545,425	261,129	281,515	†20,384
12 "	"	'15	800,410	*519,859	280,551	278,552	1,999

TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.

1m.,	Nov.,	'16	$848,497	$521,767	$326,730	$137,676	$189,054
1 "	"	'15	795,274	484,236	311,038	139,783	171,255
11 "	"	'16	9,290,401	5,727,440	3,562,961	1,572,554	1,990,407
11 "	"	'15	8,617,714	5,504,360	3,113,354	1,556,202	1,557,152

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

FREIGHT SERVICE DEVELOPED IN KANSAS CITY

From Twelve to Twenty Cars a Day Handled on 12-Mile Suburban Line Between 9 A. M. and 4 P. M.

The Kansas City (Mo.) Railways is working out more smoothly now its plans for improving suburban freight and express service in and near Kansas City, Mo. Increased leeway for the operation of freight service was granted by the Public Service Commission, after the railroads had threatened that no more freight cars would be turned over to the Kansas City Railways for delivery, unless congestion was overcome. At the time the complaint arose, there were said to be eighty-four cars of freight standing on the city railway tracks and switches, on the Dodson line. The Public Service Commission granted permission to the street railway to operate the freight line between 9 A. M. and 4 P. M. every day on part of the line, and all day on the rest of the line. Previously, freight cars could be moved only at night.

The Kansas City Railways has no freight cars of its own, but switches and hauls railroad freight cars with an electric locomotive, on a 12-mile line between Dodson and the Westport station, the latter in the south residence district of Kansas City. This is the route of the old Westport & Belt Railway, which for years was a "dummy" line operated by steam. Of late years it has been part of the electric railway system, and passenger cars have been operated over it. The building of new lines has transferred much of the passenger business away from the Dodson-Westport line. An incident of the development is that a controversy with citizens of Waldo, a station on the Dodson line, was recently solved by agreement to run more cars on one of these newer lines, the Country Club, which with the recent commission order allowing switching in the daytime, provided a double advantage for the freight service on the Dodson-Westport line. This 12 miles runs through a district which has not been built up with residence property until the past few years. One district has been almost entirely built of materials handled by the street railway, the real estate concern taking often as many as sixteen cars of building materials a day. Lumber yards, a coal yard, and other similar concerns receive freight cars billed via the Kansas City Railways.

The most significant phase of the increasing freight business, however, is the service to grocers and merchants with stores along the line. Two of the largest retail grocers of Kansas City get their supplies largely from Chicago, and receive them in car shipments direct to these branches. Many other merchants and individuals are getting the benefit of the freight service by arranging to receive their smaller shipments in combined full carloads.

The company now handles from twelve to twenty cars a day from the Missouri Pacific and the Frisco Railroads. Frequently the cars total forty-two a day. The company has extensive switch tracks and is building 800 ft. of additional switch at an intermediate station, and 900 ft. more of receiving track at the Dodson terminal, where the freight office is located, and where the junction is made with the railroads.

RAILWAY COMMISSION ACT ON CROSSING PROTECTION

The National Association of Railway Commissioners, which met in Washington on Nov. 14-17, took action which is expected to result in providing greater safety for the public at grade crossings of railroads and public highways. Upon the recommendation of the committee on grade crossings and trespassing on railroads, whose report was abstracted in the ELECTRIC RAILWAY JOURNAL of Nov. 25, the convention adopted certain recommendations for the additional protection of grade crossings and recommended to the several state commissions the submission to their re-

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spective legislatures of a bill for such enactments as may be necessary to put the recommendations into effect.

The recommendations, which were reported in the issue of Aug. 12 in connection with their approval by the American Railway Association after negotiations with the grade crossing committee, provided for the establishment of a cautionary sign to be placed in the highway at a distance not less than 300 ft. on each side of the railroad tracks; that the railroad companies continue to maintain on their rights-of-way such cautionary signs as are now in use; that all lights displayed at night toward highways at grade crossings shall be red; that during the day all crossing flagmen use a uniform white disk 16 in. in diameter, with the word "Stop" painted in black letters on its center instead of the varied colored flags which are now in use; that all crossing gates shall be painted white with diagonal stripes of black; that the railroad companies be required wherever practicable to maintain their property at grade crossings free of obstructions to vision and that the highway approaches to such crossings be so graded that the free passage of vehicles shall not be impeded.

Should these recommendations be carried out by the several states, the cautionary and danger signals, both day and night, at grade crossings will be uniform in every state of the Union, so that the automobile driver from New York State would recognize such signals if driving in California, or any other state, just as readily as he would at home. In the opinion of the committee and the railroad and automobile men who co-operated in this work, this very uniformity would prevent a great many accidents which are now due to mistaking signals. Some of the railroads have already acted upon some of these recommendations without waiting for direction from the State Legislature or commission. The striped painting of crossing gates has been adopted by several roads and the use of the white "Stop" disk in place of flags has been already put into effect.

ED HOWE SPEAKS

The Sage of Kansas Has Something Homely to Say About Reformers

Ed Howe of Kansas has recently said some things about reformers and reforms, in part as follows:

"When country-town idlers gather in the shoemaker's shop and discuss the question of the day, they always give the people the best of it.

"Every convention does the same thing; so does every orator and writer.

"The trouble is, the people cannot be given the best of it; nature will permit only a square deal. If, by means of plenty of laws and plenty of agitation, we advance wages until employers can't pay them, and are forced to close up, we have not helped ourselves; in fact, we have been injured. If we pass laws demanding that merchants sell us supplies at less than cost, nature steps in and punishes our greed and unfairness.

"We can't enjoy rights, and refuse them to others; much less can we demand more than is fairly coming to us and refuse others their just rights.

"Much that we call reform is plain unfairness; it is the pig instead of the patriot speaking.

"We can't rob the corporations in the way we are attempting. They must have as fair a deal for their business as we have for ours, or they can't exist.

"This is the decision of the Supreme Court of Nature, and all human courts, passions, prejudices and mobs must bow to it.

"I wish we could pass innumerable laws benefiting us in innumerable ways; it is so easy to pass laws and adopt resolutions, but all effective laws must be based on common sense and fairness.

"We might easily pass a law ordering the bankers to loan us all the money we want without interest, with the privilege of renewing our notes at will. Such a law, if it could be enforced, would end all our financial ills; but the actual result would be to close the banks and destroy a useful financial system on which worthy and intelligent men have worked for centuries.

"And we are not only willing to rob when we meet in convention, but we lie like thieves. Suppose that a thousand of us are gathered together in an indignation meeting to discuss the railroad question. No representative of the railroad is present; all of us are patrons of the railroad. In discussing our grievances, not one of us tells the truth about our wrongs; not one of us does the railroad justice.

"This is human nature; I am not finding fault with it, but I am saying we can't help ourselves in this way."

JITNEY FRANCHISE APPLICATIONS

The proposed franchise of Stephen Carver, president and general manager of the Portland & Oregon City Electric Railway, which has been approved by the City Council of Portland, Ore., calls for a $10,000 bond and requires a transfer system over the lines. It also provides for the operation of buses seating nine or more, is for a three-year period, and the company is to pay $1 quarterly for each seat. Service would be over three routes from the center of the city which are not now served by car lines, buses to operate every fifteen or twenty minutes during the busy hours of the day. The company is to be known as the Portland Trackless Car Company. The franchise was ordered published in conformity with the provisions of the charter. An application for a franchise for a line to Linnton made by W. M. Foster has been referred to the city attorney so that an ordinance can be drafted.

Jitney drivers declare that the franchise provisions calling for $10,000 bond and a transfer system will prevent jitneys from operating on the franchise basis. Two of the lines accepted by the Portland Trackless Car Company were refused by the Union Motor Bus Company, an organization made up of more than 200 owners of jitney buses. A new zone system has been framed by the City Council to replace that of Commissioner Daly. It provides for taxicab service to various parts of the city on a basis of distance and grades traveled. Report by the Jitney Drivers' Union will be made at an early date as to whether or not the Council's franchise terms will be met. If the members do not accept the Council's terms it will be necessary for them to meet taxicab regulations or discontinue business.

B. R. T. Put In Wrong Light.—Col. Timothy S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, has written a long letter to Chairman Straus of the Public Service Commission for the First District of New York complaining that his company has been put in an unfair position in the eyes of the public in the matter of heat for Brooklyn cars by the orders of the commission, referred to at length in the ELECTRIC RAILWAY JOURNAL of Dec. 23, page 1317.

Service Order in Baltimore.—The Public Service Commission of Maryland has handed down orders providing for the inauguration of new car service for the northwest suburban section, and for the suspension until Jan. 1 inclusive of the rules limiting the number of passengers who may be carried on street cars, and prescribing headways, this latter action being due to the commission's belief that enforcement of the rules would be difficult during the holiday season and probably very inconvenient to the public. The order for the new service for the northwest section states that it shall be in effect not later than May 1, 1917.

The Kansas City (Mo.) Railways has placed seven men on the pension list. It is called an honor roll, rather than a pension list. A committee including officers and employees in various departments designate the men to be pensioned and prescribe the amount to be paid. The minimum is $20 a month. There is no maximum. The basis of estimating the pension and the amount generally awarded is 1½ per cent of the average annual wages for the ten years multiplied by the number of years in service. Twenty years' service is the minimum for pensions. An employee may retire voluntarily at the age of sixty-five after twenty years' service.

New Traffic Rules in Denver.—The new traffic laws in Denver, Col., go into effect on Jan. 1, 1917. The near side stop for Denver tramway cars goes into effect at midnight on Dec. 31, 1916. For some time crews of men have been at work putting iron frames on the poles nearest the corners where the cars will stop. They will put in each frame a card specially printed for that corner. The sign will face the sidewalk, and as it extends only half way around a pole, the company is painting a white band around the other half of the pole so that people on the other side of the street will know that cars stop at the corner. A white sign and a white band around a pole indicate a near side

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stop. A yellow sign and a yellow band indicate a far side stop. Cars will not stop at corners where there is no sign and band.

Annual Southwest Missouri Dinner.—The annual dinner of the employees of the Southwest Missouri Electric Railroad was held recently at Carthage, Mo. A. H. Rogers, president of the company, and others spoke. The guest of honor was J. E. Gibson, general manager of the Kansas City Railways. Mr. Gibson said in concluding his remarks: "It is up to us to keep the pendulum of popularity swinging toward the side of big business. Tell the people our troubles, show them the light, don't 'roll 'em bones' with loaded dice. Play it square. Give the public courteous and generous treatment, handle our jobs in a business-like manner. Don't be 'manana' men—which means to-morrow—do it to-day. Open the window for the fresh air crank, close it again for the dear old maid, gladden the hearts of all around, and it will return to us a hundredfold."

Louisville Line Handles Tobacco.—The Louisville & Interurban Railway has begun transportation to Louisville of some 3000 hogsheads of tobacco from Shelbyville, Ky., and points beyond on the route of the motor truck line making through rates with the railway company. R. H. Wyatt, general freight agent of the company, recently made a canvass of the growers on the route of the truck line and contracted to haul the tobacco. The service of this company is liked by the growers. They are able by using the electric line, to superintend the loading of their crop and then to set out themselves for Louisville. By the time they reach the tobacco "breaks" where their hogsheads are broken open and the tobacco sold, their tobacco is being delivered. They can see it sold and collect their money and return home on the same day. This is service such as no other agency offers. Fourteen to sixteen hogsheads make a carload and Mr. Wyatt is putting four additional freight cars on the line to handle this business.

Interurban Buses Under Railroad Commission's Jurisdiction.—The Railroad Commission of California has been directed by a peremptory writ recently issued by the Supreme Court of that State to assume jurisdiction over interurban motor bus passenger and motor truck freight corporations operating over certain routes on a regular schedule. The decision of the court was rendered in the combined cases of the Western Association of Short Line Railroads against the Wichita Transportation Company, operating freight motor trucks between San Diego and El Centro, and the United Railroads, San Francisco, against the Peninsular Motor Bus Company, operating passenger motor buses between San Francisco and San Mateo. In both cases the railways had met with the commission's refusal in their efforts to have the bus companies put under its jurisdiction. The companies then petitioned the Supreme Court for writs of mandate. The court's decision does not place jitneys operating within the corporate limits of a city under the commission's jurisdiction.

Seats for Conductors in Washington.—The Washington Railway & Electric Company, Washington, D. C., has issued an order effective on Jan. 1, 1917, giving to conductors on all lines operated by the company the privilege of sitting down while on duty under certain conditions, and while passing through zones specified. Motormen have had the privilege for some time. It is planned to provide special seats in the prepayment and center-entrance cars, but until such time as they have been installed conductors will be permitted to sit in the rear part of the car in the seat nearest to the well. On cars with longitudinal seats, conductors will be permitted to sit on the end of the left-hand side next to the rear door, on cars with cross seats, on the end of the left-hand seat next to the rear door, and on open cars, on the right-hand outside end of the last seat facing the direction in which the car is traveling. The rules provide, however, that conductors must stand when giving bell signals; that while sitting they must not read newspapers or books or engage in conversation with passengers, and that they must not occupy seats to the exclusion of passengers. The order is to be made part of the rule book, and specifically states that an abuse of the privilege means a rescinding of the order which was voluntary on the part of the company.

Personal Mention

James F. Shaw, president of the American Electric Railway Association from 1908 to 1910, has become associated with the New York banking firm of Knauth, Nachod & Kuhne.

J. K. Choate, vice-president of the J. G. White Management Corporation, New York, N. Y., has returned from a six weeks' trip to Nicaragua, where he spent considerable time inspecting the property of the Ferrocarril del Pacifico de Nicaragua, which is being operated by the J. G. White Management Corporation.

Walter Belding, electrical superintendent of the Rutland Railway, Light & Power Company, Rutland, Vt., has resigned to accept the position of manager of the municipal electric light plant in Burlington, Vt., succeeding L. R. McBroom. Mr. Belding has been associated with the Rutland company for four years. He was graduated from the University of Vermont in 1911.

N. I. Garrison, who has been connected with the Fort Smith Light & Traction Company, Fort Smith, Ark., for the last fifteen years and is at present treasurer and assistant manager of the company, has been promoted to manager of one of the other plants of H. M. Byllesby & Company, Chicago, Ill., which owns the Fort Smith properties. Mr. Garrison went to Fort Smith as bookkeeper, and was successively promoted to the position of cashier and then to treasurer and assistant to the manager.

Sir Albert H. Stanley, president of the Board of Trade in the reconstructed Cabinet of Premier Lloyd George, was on Dec. 23 elected to the House of Commons for Ashton-under-Lyne without opposition. Sir Albert succeeds in the House of Commons Sir William M. Aitken, who has been raised to the peerage by King George. He resigned recently as managing director of the London Underground Electric Railways, London United Tramways, Ltd., Metropolitan District Railway and the London General Omnibus Company on his appointment to the Board of Trade.

J. M. Penick has been appointed engineer of maintenance of way of the Virginia Railway & Power Company in Richmond, Va., to succeed T. Norman Jones, Jr., who has been appointed assistant general manager of the company in charge of the properties in Norfolk. Mr. Penick is a native Virginian and has been in the service of the company for the last six years. Since 1911 he has been directly associated with Mr. Jones as assistant chief engineer of railways. He is also a member of the general safety committee recently organized for the purpose of reducing the number of avoidable accidents to the public and to the employees of the company.

Cyrus Corliss has been appointed construction engineer of the department of power, on the Boston (Mass.) Elevated Railway. Mr. Corliss is well known in New England electric railway circles. In 1900, after taking a special electrical course at the Massachusetts Institute of Technology, he entered the employ of the Boston company's electrical department, and after a varied experience in cable, motor and power-station work, became assistant to the electrical engineer. In 1905 Mr. Corliss was transferred to the Milk Street offices of the company as assistant to Paul Winsor, chief engineer of motive power and rolling stock, where he was actively associated with equipment development on the system, investigations, tests and advisory work in connection with purchases of engineering material. He is a member of the New England Street Railway Club and an associate member of the American Institute of Electrical Engineers.

J. Walter Allen has been appointed electrical engineer of the Boston (Mass.) Elevated Railway, to take effect on Jan. 1. Mr. Allen is a native of Newtonville, Mass., and was graduated from the electrical engineering course at the Massachusetts Institute of Technology, class of 1899. His entire professional career has been associated with the Bos-

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ton company, and he has been actively engaged in every phase of its electrical work. He entered the employ of the road under the electrical administration of Roger W. Conant, and spent four years in the cable-testing branch of the service, in two of which Mr. Allen was in charge of this department. In 1906 he was appointed assistant to John W. Corning, then in charge of the electrical department, and since Nov. 1, 1915, has been acting electrical engineer with headquarters at the Albany Street shops of the company in Boston. Mr. Allen has borne a responsible share of the work in connection with the electrical equipment of the subways and other rapid transit lines of the company, as well as that associated with surface line operation, and has been closely identified with the installation of the alternating-current transmission system of the road, the provision of substations and direct-current distribution plant. He is a member of the American Electric Railway Association, New England Street Railway Club and an associate member of the American Institute of Electrical Engineers.

T. Norman Jones, Jr., who has been appointed assistant general manager of the Virginia Railway & Power Company, Richmond, Va., in charge of the properties in Norfolk, to succeed E. C. Hathaway, was born in Richmond in 1882. He was educated in the graded schools of Wilson, N. C., the Episcopal High School at Alexandria, Va., and the University of Virginia. He began his professional career with the engineering corps in charge of the construction of the Potomac yards, with which he served for two years. He then became associated with the McKay Engineering Company and the United Electric Light & Power Company, Baltimore, Md. In 1906 Mr. Jones entered the service of the Virginia Railway & Power Company as mechanical and electrical engineer. The following year he took charge of operation of the Richmond & Chesapeake Bay Railway. He returned to the Virginia Railway & Power Company in 1911 as successor to Calvin Whitely, chief engineer of railways, and has continued in that position since. Mr. Jones is president of the Virginia Railway & Power Company's Young Men's Christian Association.

T. NORMAN JONES, JR.

OBITUARY

James Y. Carithers, president of the Athens Railway & Electric Company, Athens, Ga., died on Sunday, Dec. 17, at the age of sixty-two, from heart disease.

Clarke C. Fitts, counsel for the New England Power Company, died at Watertown, Mass., on Dec. 20. He was forty-six years of age and for many years had made his headquarters at Brattleboro, Vt., where he was actively identified with the development of the Connecticut River Transmission Company and allied systems. Mr. Fitts was the first attorney-general of Vermont. He addressed the New England Street Railway Club recently upon "The Future of White Coal," and at that time forecasted the electrification of important steam railroads in northern New England through the use of hydroelectric energy.

William W. Smalley, president of the First National Bank of Bound Brook, N. J., president of the Bound Brook Oil-less Bearing Company, president of the L. D. Cook Company and State Senator for Somerset County, died at his home in Bound Brook on Dec. 27. Mr. Smalley was born on Dec. 17, 1850, near Bound Brook, N. J., and was graduated from the New York University Grammar School. In 1880 he moved to Bound Brook and engaged in the lumber business. His activities in Somerset County brought him prominently before the public, and in 1906, against his wishes, he was elected to the Assembly by the Republican party and had the distinction of being re-elected for four consecutive terms. In 1911 he was elected to the Senate by a large majority and re-elected again in 1914.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

FRANCHISES

Lockport, Ill.—The Chicago & Joliet Electric Railway has received a franchise to construct an extension of the Hickory Street line into Lockport Township, the new extension to reach a point 400 ft. south of the tracks of the Elgin, Joliet & Eastern Railway.

St. Paul, Minn.—The City Council of St. Paul is considering an ordinance requiring the St. Paul Railroad to equip its railroad from Chestnut Street to the west city limits for electrical operation.

Ashville, N. Y.—The Panama Traction Company has received a franchise from the Council to construct a line between Ashville and Panama. [Nov. 25, '16.]

Hillsboro, Ohio—The Hillsboro, Cynthiana, Bainbridge & Chillicothe Traction Company has received a franchise from the Board of County Commissioners to construct a line over roads in Highland County. R. R. Faulkner is interested. [April 29, '16.]

TRACK AND ROADWAY

Fresno (Cal.) Traction Company.—Permission has been secured by the Fresno Traction Company from the Railroad Commission of California to issue and sell $49,597 bonds to be used to extend its lines in Fresno.

Murphysboro & Southern Illinois Railway, Murphysboro, Ill.—Work has been begun on the line of the Murphysboro & Southern Illinois Railway from Murphysboro to Carbondale, 8 miles. The company reports that the line will be extended during 1917, but plans have not yet been prepared. A 52-ft. steel bridge and several pile trestles from 50 ft. to 600 ft. long will be built. Rolling stock and other equipment will be purchased by R. D. Smith, chief engineer, Third National Bank Building, St. Louis, Mo. [Nov. 18, '16.]

Tipton-Frankfort Traction Company, Tipton, Ind.—It is reported that plans are being made by Eastern capitalists to revive the project to construct an interurban line between Tipton and Frankfort and a cross-town system within the city limits of Frankfort. [Oct. 9, '15.]

Paducah (Ky.) Traction Company.—This company reports that it will tear up 3500 ft. of 60-lb. single track and lay double track, using 80-lb. T-rail on a concrete base.

Shelbyville & Frankfort Realty Company, Shelbyville, Ky.—The estimated cost of construction of the proposed electric railway to connect Shelbyville and Frankfort, about 22 miles, is $440,000, according to the figures of C. E. Coon, McConnellsville, Pa., who recently went over the route. Mr. Coon, in a communication to Eugene Cowles, secretary of the Shelbyville Business Men's Association, recommends that a corporation capitalized at $300,000 be formed; that $200,000 of 7 per cent preferred stock be issued, and that a first mortgage bond issue of $240,000 be floated. This is an increase over the original estimate of Roland Cox, the engineer who made the first survey, but it is pointed out that material costs have been increasing steadily. [Dec. 9, '16.]

Ironwood & Bessemer Railway & Light Company, Ironwood, Mich.—A report from the Ironwood & Bessemer Railway & Light Company states that it has under construction an extension from Gile to Montreal, Wis., 1½ miles.

Vicksburg, Miss.—Indianapolis capitalists are contemplating the construction of an electric railway from Vicksburg to Jackson, about 40 miles. H. C. McCabe, secretary Vicksburg Young Men's Business Club, may be able to give information.

Lincoln (Neb.) Traction Company.—A report from the Lincoln Traction Company states that during 1917 the company will construct an extension between Lincoln and Omaha, 49 miles.

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Orange County Traction Company, Newburgh, N. Y.—During 1917 the Orange County Traction Company will construct a ½-mile extension in Newburgh connecting with the Chadwick Bleachery, to be used as a freight line.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York will receive bids until Jan. 10 for the construction of the Livonia Avenue extension of the Eastern Parkway subway in Brooklyn. The contract is being advertised for construction of the line by two different methods. Under one form of contract bidders will be called upon to build the line furnishing all the steel, as well as doing all the necessary construction work. The commission is also asking for bids upon the steel needed—about 15,700 tons—and also for contract for the erection of the steel. The Livonia Avenue extension is a two-track elevated line from President Street and Ninety-eighth Street to Livonia Avenue and Ashford Street, about 2 miles. The commission early last summer received bids for the construction of the line, but these bids, which covered construction of the line and also a separate contract for the furnishing of steel, were rejected, the commission having the hope that by advertising at a later date lower prices for structural steel might be obtained. The final blast holing through the headings of the south tube of the Old Slip-Clark Street tunnel beneath the East River was fired on Dec. 19. The north headings were connected on Nov. 28. The Old Slip-Clark Street tunnel, which is being constructed by the Public Service Commission for the First District, is for operation by the Interborough as a part of the Park Place, Beekman and William Streets branch of the Seventh Avenue subway, and will connect the Seventh Avenue line with the first subway in Brooklyn.

Pictou County Electric Company, Ltd., Stellarton, N. S.—A report from the Pictou County Electric Company states that it expects to construct a 1-mile extension in Trenton during 1917.

Columbus, Delaware & Marion Railway Company, Cincinnati, Ohio.—Citizens along the Columbus, Delaware & Marion Railway north of Columbus have asked the County Commissioners to have the track removed to the center of the public road between the north corporation line of the city and Worthington. The company some time ago refused to make this change without a renewal of its franchise. The commissioners have asked the prosecuting attorney to prepare a tentative franchise, but refuse to say whether or not they will grant the company's demand.

Cleveland (Ohio) Railway.—At a recent conference between county and city officials J. J. Stanley, president of the Cleveland Railway, stated that the company will pay two-thirds of the expense of relocating the railway tracks in order that the approaches to the new bridge across the Cuyahoga River may be built. The city will pay the other third.

Tulsa (Okla.) Traction Company.—Work will be begun immediately between West Tulsa and Red Fork on the construction of this company's line from Tulsa to Sapulpa, 15 miles.

Baysville, Ont. — Plans for the construction of an electric railway from Baysville to Gravenhurst are being considered by the Hydro-Electric Power Commission of Ontario, Toronto, and the municipalities concerned. M. Bucke, engineer.

Bridgeburg, Ont. — Plans are being considered by the Provincial Government for the construction of a radial line between Welland and Bridgeburg and a by-law will be submitted to the municipalities concerned.

Toronto (Ont.) Civic Railway. — The City Council of Toronto has decided to apply to the Legislature for power to construct a double-track line on Yonge Street from the present southern terminus of the Metropolitan Railway to the northern city limits and for power to construct a civic car line, if necessary, on Yonge Street, without the consent of the ratepayers. The Council has decided to extend the Bloor Street line to Runnymede Road.

South Fork-Portage Railway, Johnstown, Pa.—A report from the South Fork-Portage Railway states that one-half of its proposed line between South Fork, Ehrenfeldt, Summerhill, Wilmore and Portage is completed and it is expected that operation of this portion of the line will be begun about May 1. The remaining section of the road is under construction. O. P. Thomas, Johnstown, secretary. [Nov. 4, '16.]

Montgomery Transit Company, Philadelphia, Pa.—It is reported that the Montgomery Transit Company is in the market for 4½ miles of 60-lb. to 70-lb. rails, also 4½ miles of No. 0000 trolley wire and 4½ miles of No. 0000 feed wire.

Houston, Richmond & Western Traction Company, Houston, Tex.—It is reported that the Houston, Richmond & Western Traction Company has let a grading contract for 60 miles of interurban railway from Houston to Garwood to J. S. Moore & Sons, Lufkin. A contract has also been let to the Pittsburgh Bridge Company, Pittsburgh, Pa., for bridges over the Brazos and Colorado rivers. [Dec. 9, '16.]

Seattle & Ranier Valley Railway, Seattle, Wash.—This company reports that during 1917 it will construct 3 miles of new track.

Tacoma Railway & Power Company, Tacoma, Wash.—Preliminary work has been begun by the Tacoma Railway & Power Company toward the extension of its Tideflats line on Eleventh Street from the terminus of the line at the city limits to the bluff at the extreme easterly limits of the tideflats, about 2 miles. No construction will be begun until the county has completed the road, which will be started immediately. The new line will provide access to new shipbuilding yards and lumber mills on the tideflats.

Monongahela Valley Traction Company, Fairmont, W. Va.—A new line has been completed from the Baltimore & Ohio Railroad in Fairmont to Helens Run and the Monongahela Valley Traction Company will soon install street car service over the line.

SHOPS AND BUILDINGS

Indiana Railways & Light Company, Kokomo, Ind.—It is reported that the Indiana Railways & Light Company contemplates the construction of a new terminal station in Kokomo.

Plymouth & Sandwich Street Railway, Plymouth, Mass.—This company plans to construct a carhouse of eight or ten-car capacity at Sagamore in the spring of 1917.

POWER HOUSES AND SUBSTATIONS

Burlington Railway & Light Company, Burlington, Iowa.—This company has applied to the Railroad Commission of Iowa for permission to erect electric transmission lines in Louisa and Des Moines Counties.

Durham (N. C.) Traction Company.—Work has been begun on the extension of the power plant of the Durham Traction Company on Vivian Street which will involve an expenditure of about $30,000. The work will include an addition to the power house 100 ft. x 35 ft. and the erection of a smokestack 175 ft. high. A new 500-hp. boiler will be installed and orders have been placed for a 2000-kw. steam turbine.

Memphis & Rugby Railroad, Memphis, Tenn.—This company, which is constructing a line between Memphis and Rugby, has awarded a contract for the construction of a power house to L. B. Moody, Memphis, at $3,500. The work will also include the erection of 2 miles of transmission line to connect Memphis and Rugby. The total cost of the plant is estimated at $10,000.

Wisconsin Public Service Company, Green Bay, Wis.—The Wisconsin Public Service Company is completing an extension of its transmission lines from Green Bay to Manitowoc, a distance of 38 miles, and has secured a contract for furnishing electric power to the city of Two Rivers, 7 miles north of Manitowoc. A franchise for selling power in that city has also been obtained. The company will reconstruct the pole line of the Manitowoc & Northern Traction Company so as to carry the transmission line, trolley and feeder wires between Manitowoc and Two Rivers. Hydroelectric power will be furnished by the Wisconsin Public Service Company for the operation of the Manitowoc & Northern Traction Company. A new standby steam station equipped with one 5000-kw. Allis-Chalmers turbine, Babcock & Wilcox boilers, etc., similar to the plant which the Wisconsin Railway Light & Power Company is now completing at Winona, Minn., will be constructed in the city of Manitowoc.

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INDUSTRIAL NEWS

Review of Trade and Market Conditions

Rolling Stock Purchases **Business Changes** **Trade Literature**

STANDARDIZATION IN CAR DESIGN

Development Has Been Rapid Under Present Plan, but Time Has Arrived for Standardization Along Certain Lines—Definite Recommendations Are Made in the Way of Types, Sizes and Material of Construction

By W. H. HEULINGS, JR.

Vice-President and General Manager of Sales, The J. G. Brill Company, Philadelphia.

Every opportunity for the discussion of standardization in car design should be welcomed by those who have the interests of the electric railway industry genuinely at heart, but strangely enough it is a subject which those of us who are familiar with the history of car design are inclined to treat with skepticism. It is quite natural to be skeptical of achieving much in the way of standardization, seeing that after a quarter of a century of development types of electric cars are as divergent to-day as ever, and hardly are there to be found two cities in the United States where the cars are alike. Such a state of affairs would appear illogical and wasteful, but the fact is that any industry which is being rapidly developed is liable to wide differences in equipment and probably will be accompanied by heavy expenditures for equipments which are outgrown within a short time because of improvements and economies arising in later developments. The competition between manufacturers also is a factor in creating divergence in plans and details of equipment. All this is necessary to rapid development; and if buyers of railway equipment had been slower to spend money on equipment which had higher earning or saving power and were loath to side-track or scrap their old equipment, the railway industry would not be at the high stage of efficiency that it is to-day. The man who would not buy an automobile because he expected changes, and kept waiting from season to season, still drives a horse. Railway men "are from Missouri," but to the man you can sell them this year's model.

In the days of horse-car building John Stephenson developed certain types of cars and practically refused to depart from his designs even in small details. That was in the latter years of the horse car, and was, doubtless, a wise policy to work to except for the fact that the days of that industry were numbered and a new form of traction came into the field, which made it very difficulty for a company organized to build only certain types of equipment—it naturally lacked the elements for supplying a changing and progressive field. The electric car, unlike the horse car, has come to stay; and while it is possible to standardize designs as it was at the end of the horse-car period, and it may be that shortly such will be the case with a few types of one-man cars, the subject of standardization as it presents itself to the manufacturer to-day is in the structural plan and only in detail as far as necessary to the general plan. There has, of course, been a convergence of car-building practice along similar lines, an adaption of features of construction finally resulting in general adoption and incorporation into principles of the art. Much more could be achieved by co-ordination and to better advantage and saving of time. Standardization, at least on certain fundamental features of modern design, would be distinctly desirable alike to manufacturer and to buyer. There is not the slightest doubt but that such standardization would effect a very appreciable saving in the cost of equipment to the railways and a saving in maintenance charges; also, the time spent in deciding upon more or less minor features of equipment would be saved, as would a great deal of the time now lost in making repairs and replacements. To the manufacturer standardization would be highly beneficial along all lines, such as designing, ordering material, carrying stocks of material, providing manufacturing equipment and facilities, inspection, overhead charges, shipping costs —in fact, the cost of everything would be lessened, and the cost of cars being reduced would mean a larger output.

Without going into the matter thoroughly, but simply with the desire to offer my suggestions as to the lines upon which standardization could proceed at present in a concrete form, I should say that the subject could be divided under three heads, viz., types, sizes and construction, as follows:

Types:

Single-truck car.
Center-entrance, double-truck city car.
End-entrance, double-truck city car.
Interurban car.

Sizes:

Single-truck car, 20-ft. 8-in. body and 6-ft. 3-in. platforms.

Center-entrance, double-truck city car, 47 ft. over bumpers.

End-entrance, double-truck city car, 30-ft. 8-in. body and 6-ft. 3-in. platforms.

Interurban car, 36-ft. body and 4-ft. 8½-in. platforms.

Width of single- and double-truck city cars, 8 ft. 2 in. over side posts, and interurban cars, 8 ft. 6 in. over side posts.

Centers of side posts of single- and double-truck city cars, 2 ft. 5 in.; interurban cars, 2 ft. 8 in.

Construction (for cars of all types):

Steel framing and sheathing; wooden roofs.

Side construction to consist of angle side sills, with the longer leg horizontally placed for lateral stiffness; bar belt rail; steel plates which serve as sheathing; T-posts (not continuous); angle top plate.

Pressed "U" shape steel carlines with wood filler for attaching roof boards of plain arch roof.

Transverse framing members to consist of pressed "Z" form end sill; pressed channel crossings; cast-steel bolsters. (No trussing required in interurban underframes up to any reasonable length.)

Platforms (both dropped and flush) to be supported on angle outside knees and channel center knees; bumper to be of channel construction and to project 6 in. beyond the sheathing.

Round-end vestibules, with all sashes to drop.

Side windows to have top sash stationary and framed in a continuous piece applied to outside of posts; lower sashes to raise full height and constructed of brass stiles, with wood fillers and wood top and bottom rails.

City Single- and Double-Truck Cars:

To be constructed without bulkheads; steel header formed of plate with flanged edge.

End platform doors to be of the two-part double-folding type, mutually operating with a folding step.

Single flooring laid longitudinally, with floor mat strips in aisle. Platform flooring laid transversely.

Interurban Cars:

To have end bulkheads with single slide doors. Vestibules equipped with single swing doors hinged to body corner post. Triple steps with step traps.

Double side floor and single center floor, all laid longitudinally, and the center floor to have mat strips.

It would be desirable to standardize the dimensions of material both in length as well as in cross-section. Many other items are suitable for standardization, but those mentioned, it appears to me, are desirable to establish in regular practice.

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W. S. HAMMOND DISCUSSES HEATING EQUIPMENT

Roads Installing Improved Equipment—More Steel Cars Being Run in Trains—Thermostatic Control Business Active

During the early part of 1916, according to W. S. Hammond, Jr., vice-president in charge of sales, Consolidated Car Heating Company, the business offered to makers of car-heating equipment was below normal. Later in the year activity increased, and now the market for heaters, thermostats, door engines, car-signal systems and similar equipment is fairly brisk for the winter season. A large part of this company's business is based on sales of materials for new cars, and as during 1916 cars were ordered in comparatively small lots the heater and other equipment orders have run smaller than in the past. The total for the year, however, is said to be satisfactory when it is remembered that the high prices of materials have held back orders for cars that ordinarily would have been built. Mr. Hammond expects the market to show a substantial improvement in 1917, so far as sales of cars and car equipment are concerned. High prices have deferred purchases for so long that natural conditions in the industry will soon necessitate more cars in many cities.

Speaking of the costs to the manufacturer of various materials, Mr. Hammond said that molded insulation, as used in some of his company's products, is now 500 per cent above normal. It may also be surprising to learn that in some types of 1200-volt car heaters more than $8 worth of wire alone is used. Because of the rapidly fluctuating market and because some manufacturers have only made horizontal increases in their prices, it is not difficult to find some specialties that are now being sold at less than actual shop cost. Such parts as switches, sockets, plugs, push-buttons, connectors and others formed from molded insulation might be included in a class on which there is now practically no profit.

Referring particularly to the tendencies of the roads toward making car service improvements, Mr. Hammond pointed out that the demand for heaters shows the general adoption of car heaters of larger capacity than previously used. The use of thermostatic control for car heaters has greatly increased, more wiring is being placed in conduit, and more installations of electrically-controlled air-operated door engines are being made. Sales of single-stroke bells and of buzzers show a proportionate increase, which indicates a greater use of surface cars in train service. Inquiries for this equipment confirm the prospective increase in the number of roads which plan to operate street cars in trains.

Thermostatic control is now said to be looked upon as a money-saving part of car-heating equipment. Most big roads, according to Mr. Hammond, have installed or are considering the installation of thermostats to control the input of current to their electric heaters. This control will save, he says, at least 33 1/3 per cent of the current that otherwise would be used by the heaters if controlled only by hand switches. On some roads this saving has reached 60 per cent. The cost of thermostatic control installations at $40 to $50 per car will usually be saved in one year.

In the installation of door engines the tendency now is to use electric push-buttons, rather than mechanical valve control. The magnetically operated pin valve gives better results than the slide valve. It requires no lubrication and also shuts off the air at a point close to the door engine, thus eliminating piping and fittings and reducing air leakage.

CAR SHORTAGE STATISTICS IN THE UNITED STATES

Reports made to the American Railway Association by the railroads of the United States show that on Dec. 1, 1916, there was a net freight car shortage of 105,527 cars. The association has published a statement of car shortages and surpluses since Jan. 2, 1907, which shows that for the whole period of nearly eight years preceding the middle of August this year, there had been a continuous net surplusage of cars not in use on American railroads except for about one month in 1909, three months in 1912, one month in 1913 and the month of March in this year.

HAND-BRAKE BUSINESS SHOWS ACTIVITY

The Sales for 1916 Triple Those of Last Year—Large Orders for Replacement—Deliveries Prompt on Standard Design

The sales of improved hand brakes in 1916 will triple those of 1915, according to Frank D. Miller, president of the National Brake Company. Also, the inquiries received during November and December, 1916, he states, will no doubt produce orders for more hand brakes than ever before were sold in the same two months of a year. In judging the sales prospects for improved hand brakes it should be remembered that to the number of cars ordered during a year must be added the large number of cars which are reconstructed in company shops. In fact, the largest Peacock brake order taken last year was for improved brakes to replace 650 old brake equipments. This order was sold on estimates, which showed that the railway could well afford on the score of economy to scrap its old brakes and put on new Peacock brakes, due to the lower cost of maintenance and repairs. Mr. Miller also points out that in those years when the number of cars ordered is small there seems to be an extra amount of money available for car maintenance and renewal purposes, and in consequence the hand-brake business shows corresponding activity.

The orders for Peacock brakes placed during 1916 were largely received during the latter part of the year, and there is no evidence that the buying will slacken shortly. Mr. Miller says that his company is carrying over into the new year more unfilled orders than ever before. The question of deliveries has been an important one with this company, as it has been with all other manufacturers. A large reserve supply of malleable castings and other brake parts, however, has enabled orders so far to be filled promptly; that is to say, orders for standard brakes. On special types or designs not standardized prompt deliveries have not, of course, been possible. Stock parts are now on hand for manufacturing more than 500 improved Peacock brakes. This brake is largely made of forged and malleable parts, and its cost, naturally, has risen along with the cost of other iron products.

THE GIRDER RAIL MARKET

Dullness Prevails Because of High Prices and Slow Deliveries—Too Many "Live" Sections—Special Work Conditions Better

A review of the girder rail situation and talks with manufacturers of girder rails by a representative of this journal show that few of the electric railway companies are now buying girder rails. The reason is that it would be almost useless for them to order rails, because at this time deliveries cannot be made. The manufacturers say that there is no prospect at present for lower prices. Most of the big railway companies purchased their rail supply, so far as it could be determined, eight or nine months ago.

Prices for girder rails have remained stable for fifteen years until very recently. The old prices were $39, Chicago, and $38.40, New York, for girder rails in 60-ft. lengths. There has been during the year an increase of $11 a ton, but even at these prices there is little prospect of much rail being available for 1917.

The purchases of girder rail in 1916 were relatively small as compared with earlier years but, owing to the rising market, were a slight bit larger than the purchases of 1915. One of the unfortunate situations in the girder rail business from a manufacturing standpoint is the large number of sections demanded. One maker alone has been called upon to make rolls for more than 125 different rail sections, of which more than 100 are used in the United States. These figures cover only the so-called "live" sections, those which have been in demand within the last two years. It seems hardly possible to the manufacturer that track and municipal requirements should call for this multiplicity of rail sections. The cost, of course, is charged into the selling price of the rail; and when it is known that the cost for a set of rolls for any one section is at least $5,000, and that some of the sections amount to a relatively small tonnage, the loss due to non-standardization will be appreciated.

The American Electric Railway Association in 1913

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adopted a standard section for 7-in. 122-lb. rail and also for 9-in. girder rail. The manufacturers state that the proportionate demand shows an increase in the use of these standard sections. This points toward a better manufacturing situation as more roads call for the association rail sections.

With regard to the manufacture of special track work, there is not the same congestion in the plants as is found in the girder rail plants. Deliveries, of course, are slow, due to the delayed deliveries in raw materials, and the price is about 33 per cent above normal. Manufacturers do not feel that this is a high price in comparison with the increases in charges for other forms of rolled steel. Practically all special track-work manufacturers are having difficulty in obtaining satisfactory deliveries on rail stock.

The manganese market has been relieved somewhat; and while the price in earlier months touched $400 a ton, it has become more stable around $160 a ton.

ELECTRICAL EXPORTS IN 1916

Based on the figures reported to the government for the first ten months of the current year, exports of electrical goods of American manufacture will reach in value in 1916 a new high record. It is estimated that the 1916 electrical exports will be well in excess of $37,000,000. If the volume of exports for the three months last reported—August, September and October—has been maintained during November and December, then the above estimate will be too small by more than $1,000,000.

October was another heavy export month, being larger than any previous month. The volume of electrical export business in that month was $4,045,645, in comparison with $2,179,453 in the preceding October. The exports of batteries, generators, insulated wire and cable, carbon filament lamps, motors and miscellaneous merchandise during October last were greater in value than ever before. Attention is called particularly to miscellaneous merchandise, of which almost $2,000,000 was exported in October. In the ten months January-October the exports in this class have almost doubled in value.

Exports of electrical goods amounted to $31,073,268 during the first ten months of 1916, in comparison with $19,419,403 and $16,697,829 during the corresponding periods of 1915 and 1914 respectively. The largest items in the list are: Batteries, $1,504,788; generators, $1,379,153; insulated wire and cable, $3,587,342; metal filament incandescent lamps, $1,165,509; motors, $3,993,233; telephones, $1,322,939, and miscellaneous merchandise, $15,266,360.

During the past three years a steady growth has been noticeable in the exports of batteries, insulated wire and cable, metal filament incandescent lamps, meters, motors, telegraph instruments and miscellaneous equipment.

COPPER PRICES LOWER

From its high point of 36 cents a little over two weeks ago, prompt delivery electrolytic copper had dropped early this week to 31.50 cents, with no buyers. January copper was quoted at 30.75 cents. Copper for the first quarter of 1917 was quoted at 30.25 cents, second quarter at 29.25 cents, third quarter at 28.25 cents and last quarter at 27.25 cents.

In spite of the fact that large producers declared that they were sold out well into 1917, and that unsold production for the rest of 1917 was small, the market was unable to withstand the uncertainties that would be contingent upon peace. There was every evidence also that buyers had overstocked. It was really this latter class, and not the speculators, who forced the market down. The stocks held by speculators were really not very large, and therefore could have but little effect on the market, especially if the manufacturers wished to protect the prices of their own stock. Many manufacturers, however, did not care to do this, as they had protected adequately, by orders for future delivery, their copper stocks and were therefore willing to take a profit on present excess stocks. Frequent offerings of resale copper in lots of under 500 tons cut the quotations to near the 30-cent mark.

One thing is significant, and that is the drop in quotations for delivery during the second half of 1917. When spot copper first began to fall in price long-delivery copper held very firm. It was then pointed out that manufacturing demand for long deliveries was sufficient to hold up the price. Now there is apparently some apprehension on the part of the producers that such might not be the case.

Copper wire base fell off to 37.50 cents for prompt delivery and 35.50 cents for February delivery.

ROLLING STOCK

Montreal Tramways, Montreal (Que.), Canada, are in the market for fifty cars.

Saskatoon Municipal Railway, Saskatchewan, Canada, is considering the purchase of three new single-track cars.

Peoples' Railway, Dayton, Ohio, noted in the ELECTRIC RAILWAY JOURNAL of Dec. 23 as being in the market for ten motor cars, has placed this order with the St. Louis Car Company.

Ringling & Oil Fields Railway, Ardmore, Okla., has purchased an electric motor car which will be put in passenger service between the Ardmore and Healdton oil fields.

Springfield (Ill.) Consolidated Railway has placed an order with the St. Louis Car Company for seven 28-ft., single-end, pay-within cars, equipped with two 50-hp. Westinghouse motors. These cars will be ready for delivery about April 1, 1917.

National Importing & Warehousing Company, Via Erbe 2-9, Genoa, Italy, is asking for bids on equipment for an important Italian suburban railway extension. Two motor cars with four motors each, ten flat cars and six passenger trailers are required. The building of about thirty-eight miles of track is also involved. Details can be obtained by addressing the ELECTRIC RAILWAY JOURNAL, Industrial News Department.

Manitowoc & Northern Traction Company, Manitowoc, Wis., which has been purchased recently by the Wisconsin Securities Company, ordered two steel cars which were ready to be shipped from the St. Louis Car Company to the Evanston Railway Company, to be shipped to the Manitowoc Company. These will replace the two interurban cars now in regular service. The new Evanston cars are exactly the same as the seven cars recently put in service in LaCrosse except for such improvements as three years' use of the latter suggested.

United Railways & Electric Company, Baltimore, Md., noted in the ELECTRIC RAILWAY JOURNAL of Dec. 9 as purchasing one hundred double-truck, semi-convertible, four-motor pay-within cars, announces that contracts have been awarded for the following equipment:

Car bodies and trucks	J. G. Brill Company
Motors	General Electric Company
Air brakes	Westinghouse Traction Brake Company
Seats	J. G. Brill Company
Signs	Hunter Illuminating Car Sign Company
Registers	International Register Company
Fare boxes	Johnson Fare Box Company
Gears and pinions	Tool Steel Gear & Pinion Company
Electric heaters	Consolidated Car Heating Company
Wheelguards	Wendell & MacDuffie Company
Car wheels	National Car Wheel Company
Ackley brakes	National Brake Company
Inspection	R. W. Hunt & Company

TRADE NOTES

Ohio Brass Company, Mansfield, Ohio, has received an order from the Boston Elevated Railway for 5000 trolley ears.

National Pneumatic Company, New York, N. Y., has received an order from the Detroit United Railways to equip the fifty trailer cars recently purchased by that company.

National Pneumatic Company, New York, N. Y., announces that it has taken over and absorbed the factory of the Burdett-Rowntree Manufacturing Company, Chicago, Ill., and hereafter will be in a position to give its customers even better service than before.

Jacques Vieyra, 24 Rue de Lubeck, Paris, France, announces that he will be pleased to receive catalogs and literature on electrical appliances and supplies (motors and generators excepted), labor supplies for industrial chemistry and metallurgical work.

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Railway Improvement Company, New York, N. Y., has received an order for twenty-one Rico coasting recorders from the Havana Central Railroad, Havana, Cuba. These recorders are for use on both type K and multiple unit control cars which are operated on the Maria Nao division of this road.

Johnson Fare Box Company, Chicago, Ill., through its Eastern agents, the U. S. Metal & Manufacturing Company, has received an order for ten fare boxes from the Schenectady Railway and also one for the same amount from the Connecticut Company, New Haven, Conn.

Bound Brook Oil-Less Bearing Company, Bound Brook, N. J., advises that during the New York Automobile Show, to be held Jan. 8 to Jan. 13 inclusive, it will have headquarters at the Woodstock Hotel, New York, and during the Chicago Automobile Show, to be held Jan. 30 to Feb. 3 inclusive, it will have headquarters at the La Salle Hotel, Chicago. The company at both conventions will be represented by George O. Smalley, first vice-president and general manager; Harry J. Lindsley, western sales manager; William F. Jennings, eastern sales manager, and J. Bertram Howell, sales department.

Lord Manufacturing Company, New York, N. Y., has received an order from the G. S. Ackley Company for twelve differential brakes to be used in Australia, and also an order for twenty screenless air cleaners from the Westinghouse Air Brake Company to be used on cars of the International Railway, Buffalo, N. Y. The company wishes to announce that the entire business, together with all of the railway devices now manufactured by it, will be taken over and handled after Jan. 1, 1917, by the Cooley Manufacturing Company, 98 Park Place, New York City. Under the new arrangement manufacturing facilities will be increased and the scope of the selling organization enlarged.

C. A. Wood-Preserver Company, St. Louis, Mo., has completed arrangements with the Kettle River Company of Minneapolis whereby the first-named company becomes general sales agent for the Kettle River company for the sale of C. A. Wood-Preserver and three other grades of preservative oils which it has been manufacturing. Through this consolidation of efforts it is anticipated that in the early part of next year arrangements may be made to supply direct to the purchaser electric railway ties treated with "C. A. Wood-Preserver." This will make it easily possible for the railways to use ties that have been "open-tank treated" with a high-grade oil. The plan is to supply the railways with these treated ties in small quantities and the roads will thus find it unnecessary to carry a large investment in ties and oil.

Beckman & Linden Engineering Corporation, 604 Balboa Building, San Francisco, Cal., was recently incorporated for the purpose of carrying on consulting and development work in civil, electrical, metallurgical and chemical engineering, the partners being J. W. Beckman and H. E. Linden. Their activities will embrace investigations of the natural resources adjacent to existing or prospective power developments, with a view to developing new industrial uses of power; investigation of hydroelectric developments, designing and construction of power developments and industries for power consumption, and the managing of such organizations. They will maintain a laboratory and are prepared to undertake any research work in chemistry, electro-chemistry and electro-metallurgy. They are also prepared to finance such prospective developments as appear promising.

Wagner Electric Manufacturing Company, St. Louis, Mo., announces as incident to its extensive expansion various changes in sales office personnel and locations and in departmental heads. These include the following: The Chicago office will remove to 918 South Michigan Avenue, where it will combine with the service station. The Boston office will remove to 88 Brookline Avenue, where it will combine with the service station. The San Francisco office will remove to 159 New Montgomery Street, where it will combine with the service station. P. B. Postelthwaite, formerly manager of the Cincinnati office, is now in charge of the service department with headquarters at the home office. J. W. Bryant, formerly in charge of the Buffalo and Syracuse offices, is now Cincinnati manager. C. P. MacGonigal of the Philadelphia office will be in charge of the Syracuse and Buffalo offices. The St. Louis service station is now under the direction of C. M. McCord, who was with the home office.

ADVERTISING LITERATURE

Chicago Pneumatic Tube Company, Chicago, Ill., has issued bulletin 34-W on its Giant fuel-oil engines.

E. I. Du Pont de Nemours & Company, Wilmington, Del., announce that the publication of the Du Pont magazine will be discontinued after the current issue until the paper supply again becomes normal.

Sprague Electric Works of the General Electric Company, New York, N. Y., has issued a neat booklet on safety panels. On this type of panel the door covering the fuse compartment is locked and the compartment is accessible only to authorized persons having keys. A four-circuit safety panel with a steel cabinet is also illustrated.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued special publication No. 1577 on its No. 506, 25-hp. 600-volt railway motor. This motor is especially adapted for single-truck, one-man light-weight cars, and is similar to the type built several years ago for the low-floor center-entrance cars of the Pittsburgh Railways.

R. H. Beaumont Company, Philadelphia, Pa., is distributing catalog No. 32 on its skip hoist for ashes handling. This booklet describes and illustrates a number of installations, among which are those of the Reading Transit & Light Company, Reading, Pa., the Eastern Pennsylvania Railways, Pottsville, Pa., and Peoples Railway Company, Dayton, Ohio. One section is devoted to reasons for "Divorcing Your Ash-Handling System," and another points out the advantages of the skip hoist. A typical plant showing coal handling separated from ashes handling is given. Electric worm-geared type drums which operate the skip hoist are described and illustrated.

Arc Welding Machine Company, New York City, N. Y., has issued a well-illustrated forty-page booklet on Arc Welding. Sections of this booklet are devoted to heat production, arc regulation and welding practice. The first section is devoted to showing where and how the arc heat is produced, with practical examples of the total heat requirements for the several systems. The methods of welding, with illustrations of single and double-bevel welds and of welds without bevel are described. Graphs are used to show the percentage of welded surface for different number of strings and also for the effect of reinforcement. Under the next section the constant potential system and the constant-current system are explained in detail and illustrations, practical examples and graphs are given. The third section is devoted to the closed-circuit system which has a constant current generator. In the last section the relative floor areas for equal capacity of different systems of welding, comparisons of wiring systems and comparisons of arc-welding systems and costs are given.

NEW PUBLICATION

Handbook of Machine Shop Electricity. C. E. Clewell, McGraw-Hill Book Company. 461 pages, illustrated. Price $3.

In the preparation of this handbook the viewpoint of the practical shop man has been kept in mind by the author. The subjects treated are chiefly those that apply to particular uses of electric power in shop operations. The arrangement of the material makes reference to any subject easy. There are ten main sections, arranged as follows: Abbreviations; terminology and units; circuits; costs; communication and distant control; generators and transformers; electrochemical, soldering and welding applications; heating and magnetic apparatus; lamps and shop lighting; measuring instruments; motors. Each of these sections has one or more divisions in which the several topics are arranged in alphabetical order. There are many illustrations which show the construction and operation of apparatus, as well as numerous simple diagrams which demonstrate clearly the principles which the practical man should know.

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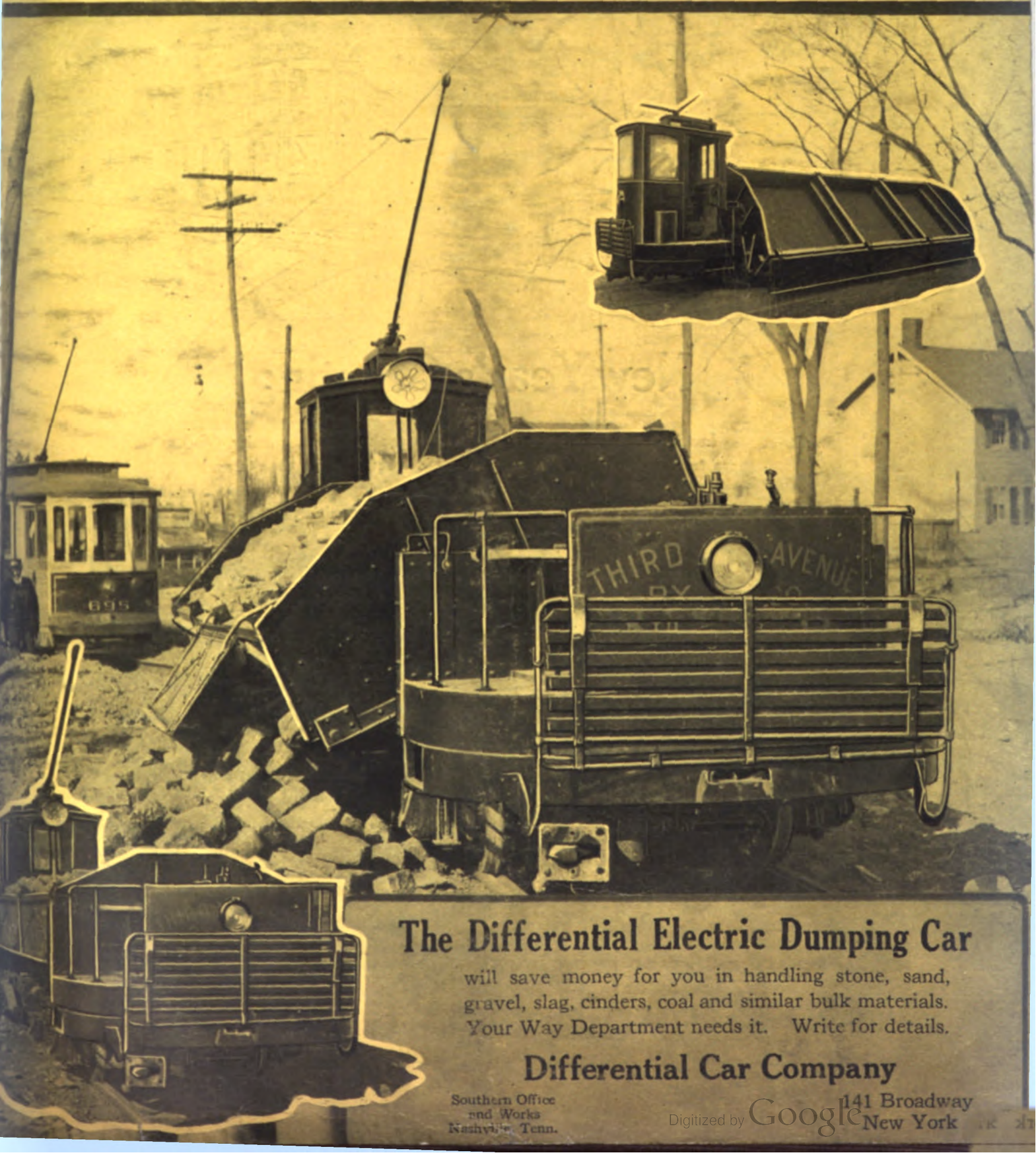
Organization of a Public Service Commission

ELECTRIC RAILWAY JOURNAL

JAN 2 1917

New York, December 30, 1916 McGraw Publishing Co. Inc. Vol. 48, No. 27 10c a copy



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will save money for you in handling stone, sand, gravel, slag, cinders, coal and similar bulk materials. Your Way Department needs it. Write for details.

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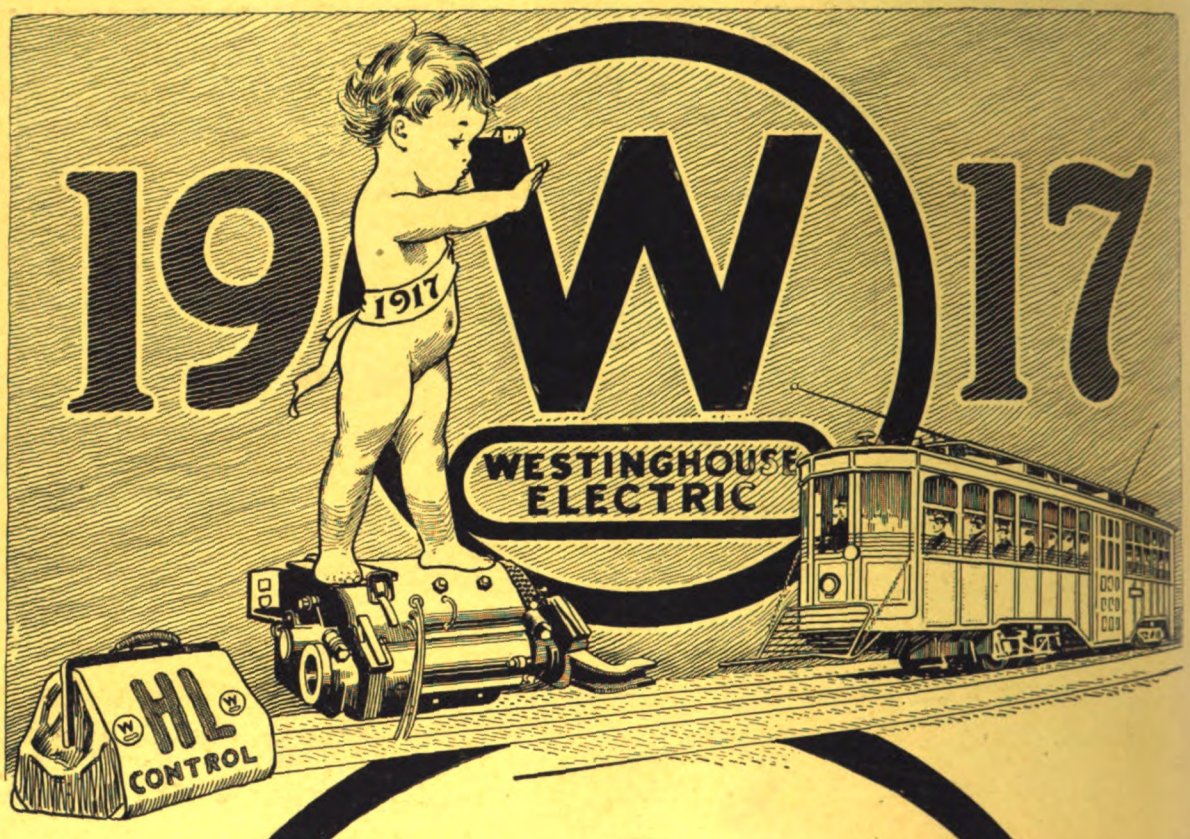

New Year's Greeting

In wishing a Prosperous New Year to the railway fraternity, we take the opportunity also to extend our sincere thanks and appreciation for the hearty support and co-operation which have made it possible for us to maintain our foremost position in this great industry.

We are today better equipped than ever before to provide railway equipments that successfully meet every condition of operation.

Our aim has been, and always will be, to provide apparatus that will insure "Better Service and Lower Maintenance cost."

The success of modern Westinghouse Railway Motors and HL Unit Switch Control in realizing this aspiration during the past years spurs us on to further achievements during the coming year.

Westinghouse Electric & Mfg. Company
East Pittsburgh, Pa.

Sales Offices in All Large American Cities

Westinghouse

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Study and Comparative Tests of Electric Headlights—*By R. N. Hemming.*
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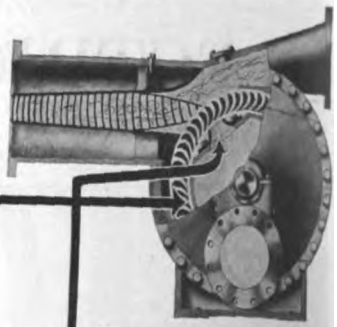
The Pump Runner is very rugged.



The opening admitting water to the runner is large.

The Westinghouse Leblanc Air Pump

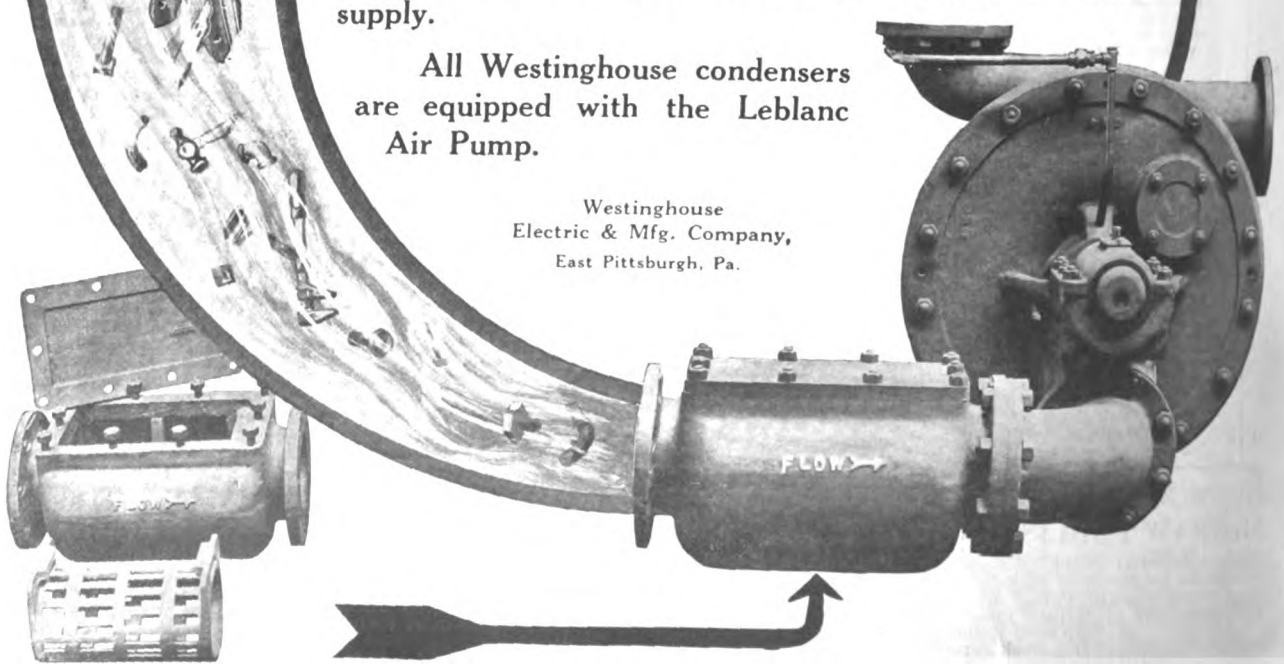
The construction of The Westinghouse Leblanc Air Pump is so simple and rugged that it is not damaged by the small debris that may pass through it with the raw condensing water. Therefore the water strainer used is intended simply to catch and hold—

THE BIG THINGS

—that may, by accident find their way into the water supply.

All Westinghouse condensers are equipped with the Leblanc Air Pump.

Westinghouse
Electric & Mfg. Company,
East Pittsburgh, Pa.



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Westinghouse
Outdoor Transformers

Outdoor Transformer Substation in course of erection.

THE bustling, progressive little town of Westminster, S.C., purchases power from the Southern Power Company.

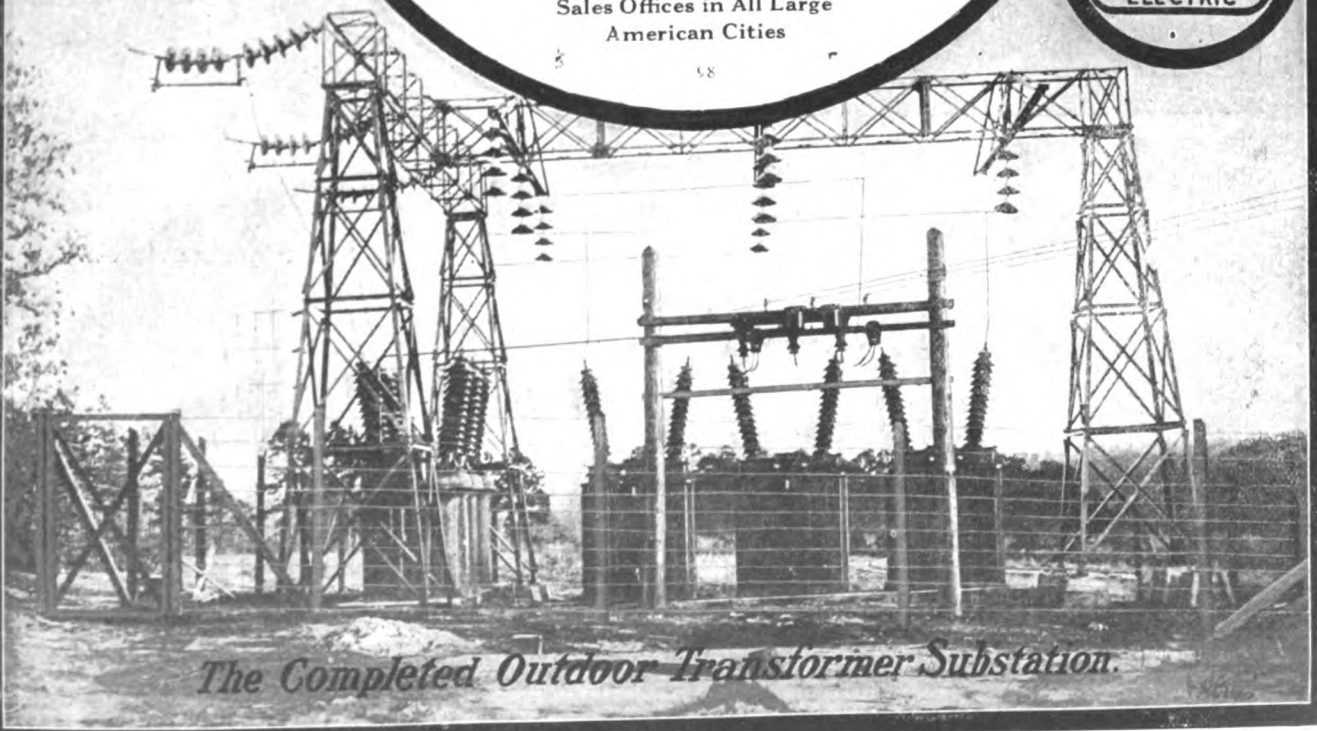
Current is taken from a 100,000 volt transmission line and by means of three Westinghouse Outdoor, Oil-Insulated, Self-Cooling Transformers, stepped down to 2300 volts for local distribution.

Experience has proven these Westinghouse Outdoor Transformer Substations to be the most economical to construct and maintain.

Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

Sales Offices in All Large American Cities

W
WESTINGHOUSE ELECTRIC



The Completed Outdoor Transformer Substation.

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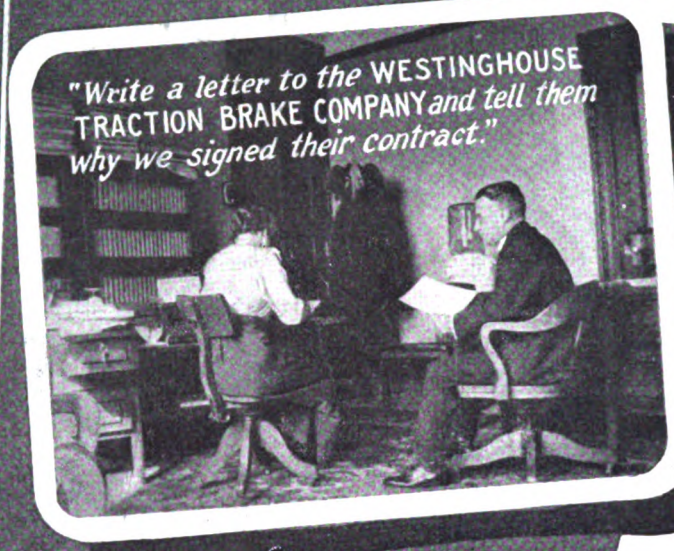


The Finished Letter

Somewhere in United States,
Sometime in 1916.

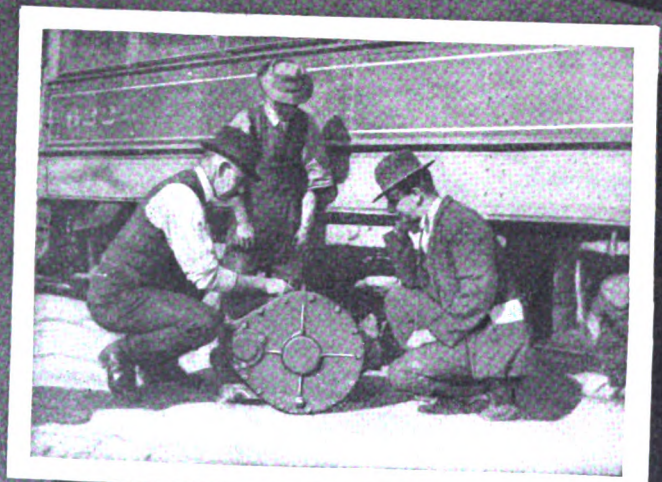
Westinghouse Traction Brake Co.,
Wildmerding, Penna.

Gentlemen:-

I return herewith in duplicate your air brake contract duly signed. My reason for executing this contract is that your equipment on our road has outlasted all others. I lay this remarkable record to the use of good materials, superior workmanship, also the valuable service rendered by your Inspector-Specialist who calls on us regularly and sees that we keep out of trouble.

Very truly yours,

General Manager.



This is one of a number of Westinghouse Air Compressors installed in June 1907, having made approximately 980000 miles, costing little for repairs, and is still running strong and efficiently. Best materials, superior workmanship and Inspector-Specialist Service did it.

Westinghouse Traction Brake Company

General Offices: Wilmerding, Pa.

PITTSBURGH:
Westinghouse Building
CHICAGO:
Railway Exchange Building

TRADE MARK

NEW YORK:
City Investing Building
ST. LOUIS:
Boatmen's Bank Building

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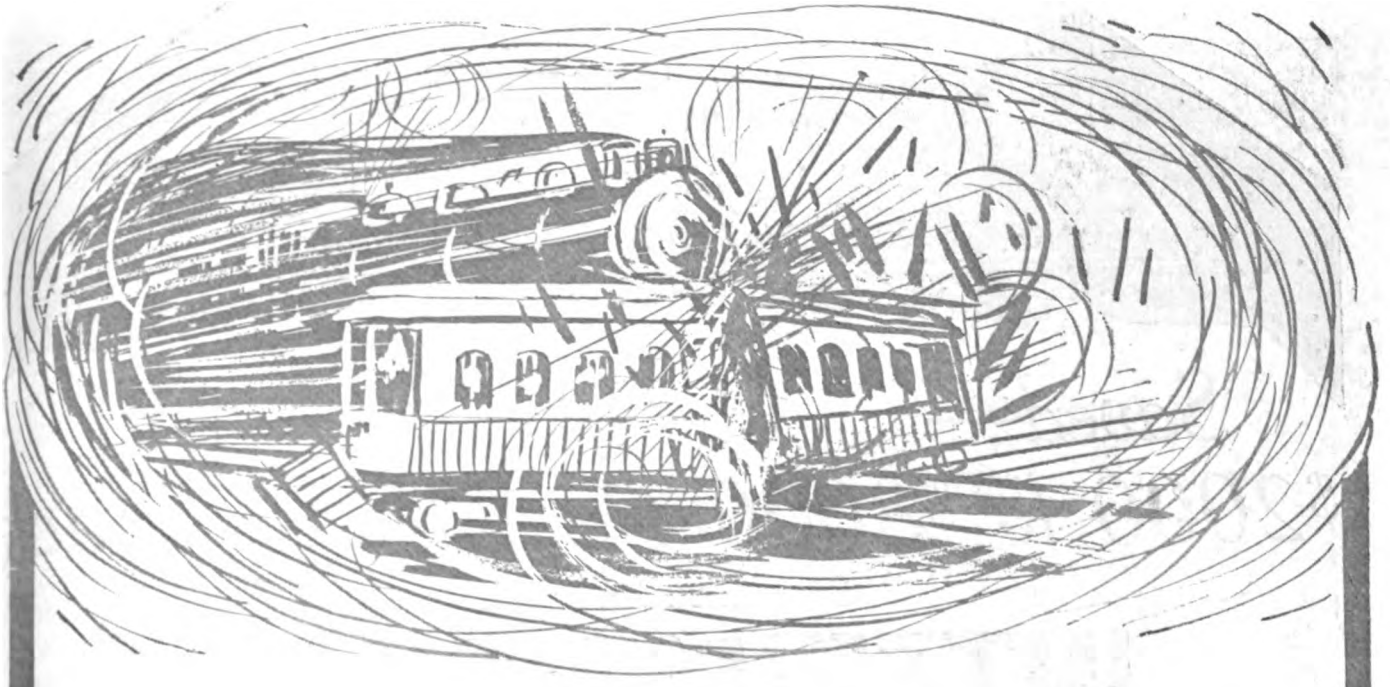

His Responsibility is Heavy

He has unprotected grade-crossings—bad ones. Of course the crews have orders to "Stop, Look and Listen." But the General Manager visualizes a possibility!

"Come ahead," signals the conductor. The car loaded with passengers starts across. The track is bumpy and the wire high. The trolley wheel leaves the wire.

Just then a train comes thundering around the curve and—

But he can avoid this.

National Trolley Guard prevents just such situations. It is an inverted trough of open wire mesh which catches a wild trolley and furnishes power to carry the car with its precious freight to safety.

The protection it affords is out of all proportion to its cost.

FOR SALE ONLY BY

The Ohio Brass Company

Mansfield, Ohio

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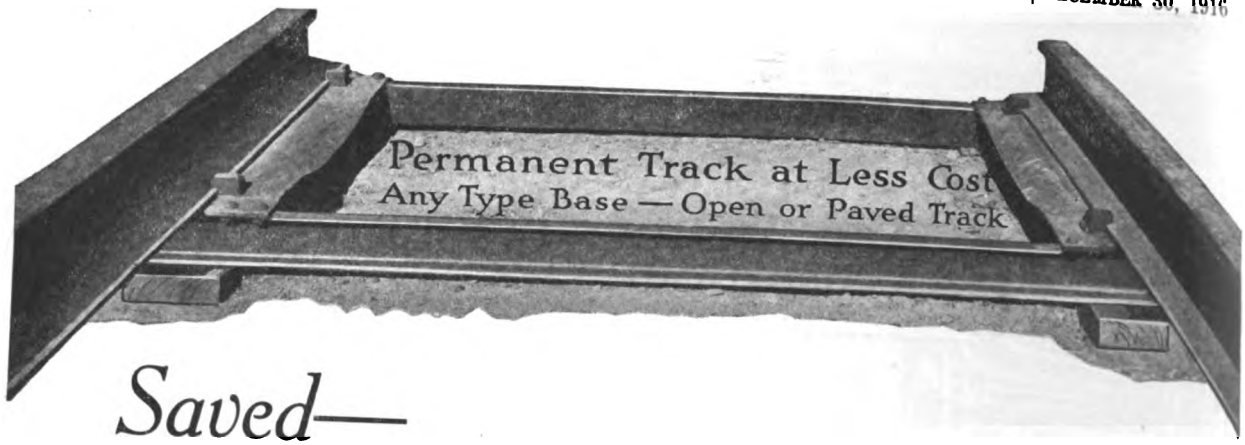


Saved—

$2000 to $8000 Per Mile of Track

by constructing with

INTERNATIONAL
STEEL TWIN TIES

Here Are the Figures: Comparison of Costs of Standard Wooden Tie and Steel Tie Track Construction from base of Rail to Subgrade. Prices, Nov. 15, 1916.

Estimate Based on Type C. Track Shown In A. E. R. E. A. Proceeding of 1914—Page 487

(6 in. x 8 in. x 8 ft. Ties in 9 ft. Trench)

5280 sq. yd. granite block paving at $2.25 per sq. yd.	$11,880.00
880 tie rods 2 in. x 5/16 in. x 5 ft. at 50c	440.00
5280 tie plates at 30c	1,584.00
10,560 screw spikes and clips at 11c	1,161.60
Track labor (laying and surfacing, oak treated, $1.00)	2,640.00
2640 6 in. x 8 in. Y. P. ties at 80c	2,112.00
1494 cu. yds. of concrete at $4.25	6,349.50
1754 cu. yds. of excavation at $1.15	2,017.10
	$28,184.20*

*If tie plates, screw spikes and clips are omitted and cut spikes are used, deduct $2,601.00 from wooden tie construction estimate.

**In case tie rods are required, add $440.00 to steel tie construction estimate.

Estimate Based on Standard Steel Tie Construction

(International Steel Twin Ties in a 7 ft. Trench)

4110 sq. yds. Granite Block paving at $2.25 per yard	$9,247.50
880 Steel Twin Ties at $5.50 f.o.b. Cleveland	4,840.00
7040 clips and wedges at 6c	422.40
Track labor (laying and surfacing)	1,320.00
789 cu. yds. of concrete 1:3:6 at $4.25	3,353.25
801 cu. yds. of excavation at $1.15	921.15
	$20,104.30**

Total cost wooden ties	$28,184.20
Total cost steel ties	20,104.30
Total saving	$8,079.90

Labor saving shown in Steel Tie Estimate is made possible by the reduction of the number of ties, the simplicity of the fastening, the elimination of track gauging, and the reduction in the number of blocks and wedges required to line and surface the track.

Let us submit comparative estimates for your job.

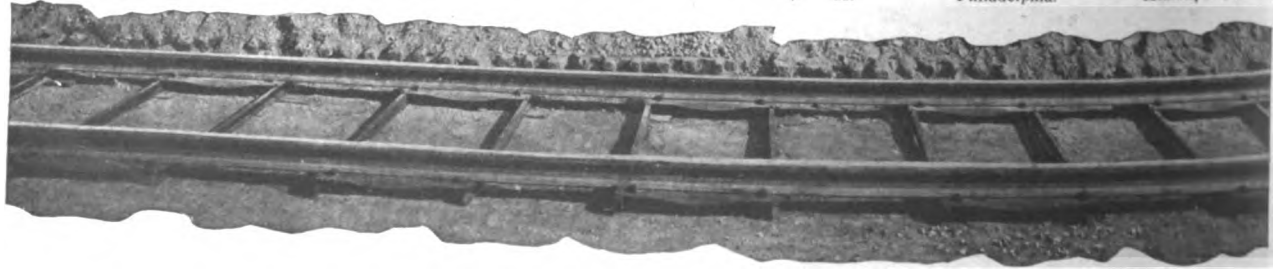
The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES:

Western Eng'g Sales Co., Los Angeles, Cal. San Francisco, Cal. Seattle, Wash. R. J. Cooper Co., Salt Lake City, Utah. J. E. Lewis & Co., Dallas, Texas. Maurice Joy, Philadelphia. William H. Ziegler, Minneapolis, Minn.



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PADUCAH CHESTNUT POLES

"Life - Strength - Service"

IMMEDIATE DELIVERY

Six big yards, Paducah, Ky., Metropolis, Ill., Dividing Ridge, Ky., Bonnieville, Ky., Munfordville, Ky., and Mansfield, Tenn., are prepared to make immediate shipment from stock. All the chestnut poles you want—when you want them. Also long-leaf yellow pine or cypress cross arms, locust pins, oak pins, piling, bridge timbers, posts and lumber.

Chestnut! Strong, straight, durable—the wood Nature intended for poles. It's good for no other purpose—for poles, it knows no equal.

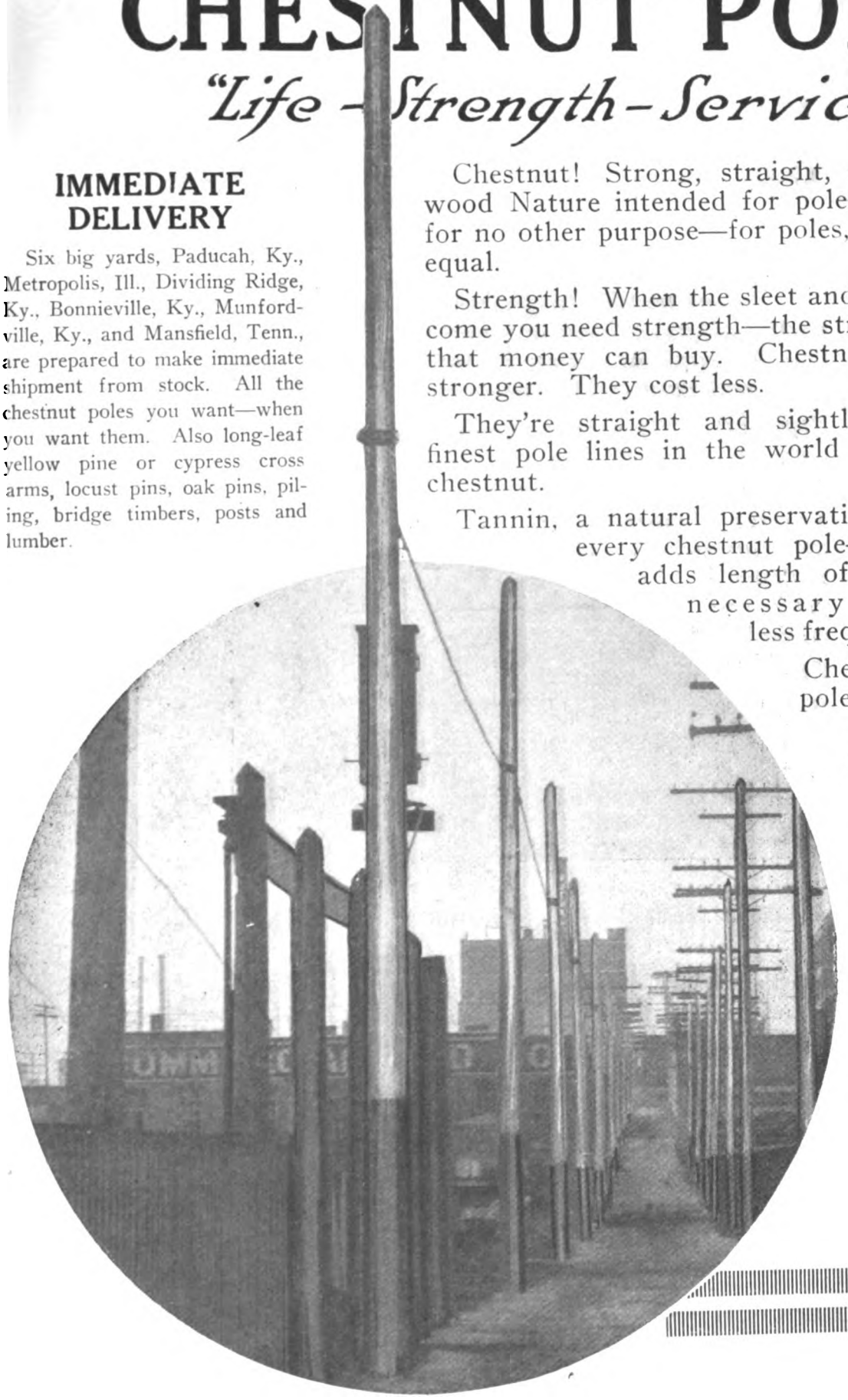
Strength! When the sleet and windstorms come you need strength—the strongest poles that money can buy. Chestnut poles are stronger. They cost less.

They're straight and sightly, too. The finest pole lines in the world are built of chestnut.

Tannin, a natural preservative, saturates every chestnut pole—resists rot, adds length of life, makes necessary replacement less frequent.

Chestnut is the pole you need!

Don't you believe it? Ask us for the proof.



PADUCAH POLE & TIMBER CO.

John L. Fay,
Sales Mgr.
407 City Nat'l Bank Bldg.
Paducah, Ky.

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Phono-Electric

The Ideal Wire for Live Suburban Lines

A live suburban line is the ideal place for Phono-Electric trolley wire.

As traffic on such a line is constantly increasing, it is highly desirable that the original current-carrying capacity of the trolley wire be sufficient for years to come.

If a copper wire is installed, the loss, because of wear, will be very rapid, and breaks of the weakened wire will be frequent, too.

Not so with Phono-Electric—it is so tough that ordinary suburban service will cause hardly any wear or loss of conductivity.

And, of course, there'll be no breaks!

BRIDGEPORT BRASS COMPANY

Bridgeport **Connecticut**

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GOLDEN GLOW AT ST. LOUIS

The Company, the Men and the People all Marvel at its Wonderful Efficiency.

The United Railways Company of St. Louis are firm believers in "Golden Glow" Headlights. They have been using them on some of their cars for a year or so and are now installing more of them on both their city and suburban cars.

Their cars now operate through the streets of St. Louis headed by beautiful beams of soft, non-blinding "Golden Glow" light.

They run cars out into the suburban districts equipped with these same lights; their soft but powerful, penetrating beams piercing any ordinary atmospheric condition, whether foggy, dusty or smoky, better than any other known light.

The Company, the Men and the People have adopted this light because of its efficiency and economy.

All St. Louis is wide awake to its advantages.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Building

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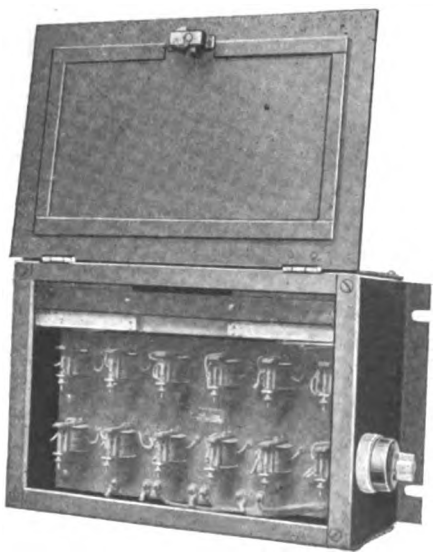
Do You Ever Inspect Your Car Lighting By Night?

How many general managers have tried to read at night on their own interurban cars? How many superintendents know from personal night investigation the effect of fluctuating voltage on their car illumination and headlights? How do you expect to increase night passenger traffic, particularly in competition with well-lighted steam coaches, unless you provide comfortable conditions?

The Watson Car Lighting Regulator



This device makes possible interurban illumination superior to any steam railway coach, free from the effects of voltage drops, controls both interior lights and headlights (either arc or incandescent), provides the simplest car wiring ever proposed, reduces current consumption, offers either direct or indirect steady car illumination and can be installed on almost any car.

It is a fool-proof reliable device consisting of electromagnetic relays which operate as line voltage varies, and in two years' constant use not a single adjustment has ever been necessary. It maintains car lights at maximum intensity within a range of five per cent over a voltage drop of 280 volts. For example, on a maximum trolley voltage of 600 the regulator maintains normal car illumination as low as 320 volts.

Electric railway managers can provide sufficient power for car operation without great loss, but cannot give satisfactory illumination. This prevents increases of passenger business because good lighting is essential. Many schemes have been tried to improve interior lighting and headlights, but so far only the Watson Regulator has proven entirely satisfactory.

Holden & White

General Sales Distributors for The Car Lighting Improvement Company

1508 Fisher Building, Chicago, Illinois

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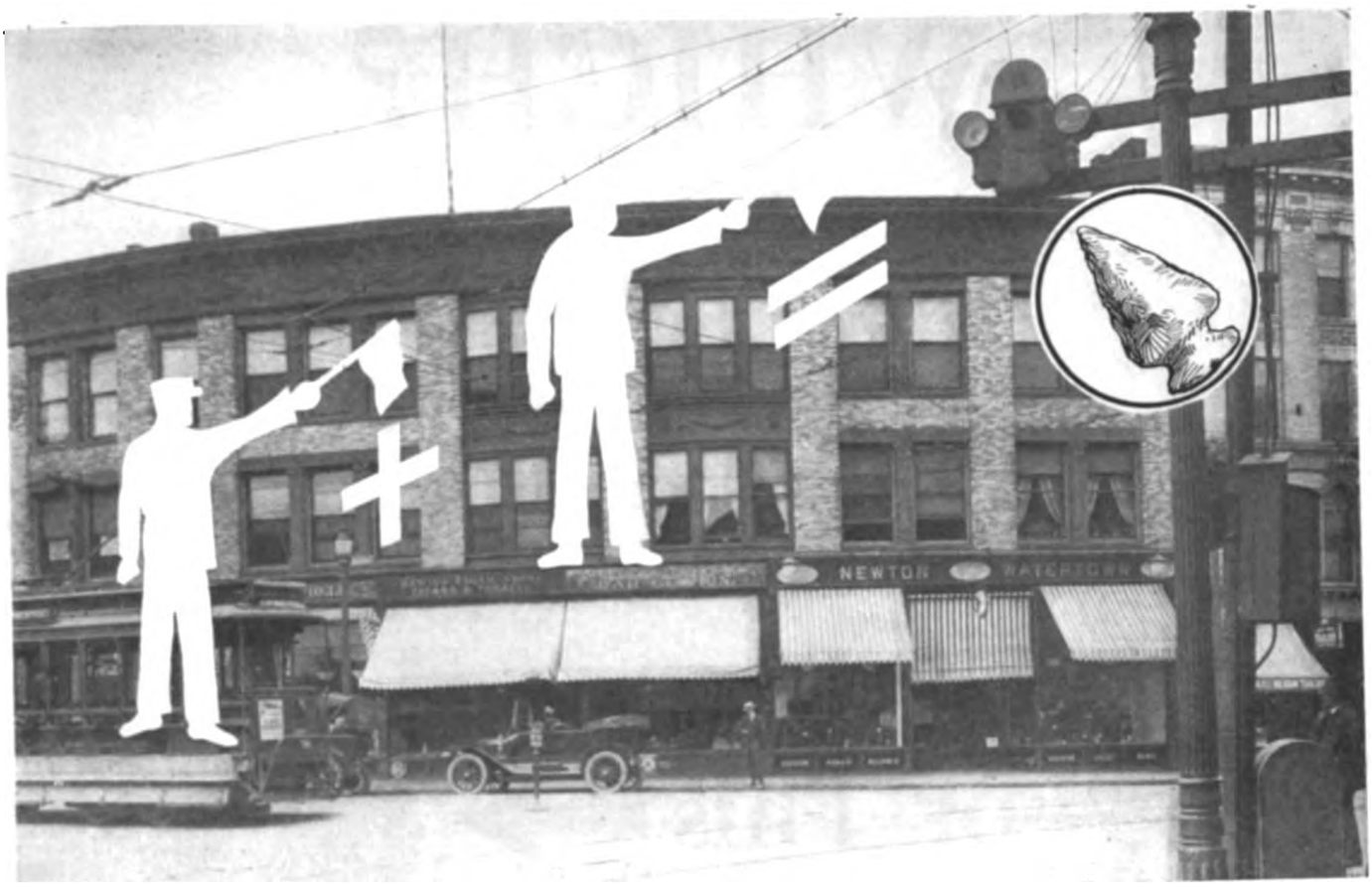

—and the labor saving alone was five dollars a day

During a track reconstruction period of several weeks, the Boston Elevated Railway operated a quarter-mile of single track, from Nonantum Square to Morse Street, Newton, Mass.

Though normally a double-track line, and at one of the busiest suburban points on the whole system, this temporary single track easily carried all the traffic, on the usual 4-minute headway.

A set of United States Electric Signals made operation safe, speedy and economical—and saved the wages of two flagmen.

There's a lesson here for *you*, even if every mile of your line is double-tracked—use a "traveling" set of United States signals during track repairs, rebonding, reconstruction, etc.

United States Electric Signal Company

West Newton, Massachusetts

Representatives:

Western: Frank F. Bodler, Monadnock Bldg., San Francisco

Chicago: Warren Moore Osborn, McCormick Bldg.

Foreign: Forest City Electric Service Supply Company, Salford, Eng.

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WHICH?

Will you do This NOW at Moderate Cost?

—or This Later at Enormous Expense?

Without interrupting your traffic operations in the least you can put and keep your old track in prime condition by using the

Reciprocating Track Grinder

Or you can tinker and repair, replace individual rails and rebuild bad joints until the time when you **must** construct entirely new track.

Figure it out and ask yourself whether it pays to let corrugations and bad joints develop to the replacing point as compared with the economical use of the Reciprocating Track Grinder.

And in your calculations don't forget that keeping track constantly smooth and in good condition greatly decreases the wear and tear on rolling stock and vastly increases the appreciation of your service by the public.

Railway Track-work Company

30th and Walnut Streets
Philadelphia, U. S. A.

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Not Worth the Effort

"Gee," said the disgusted bond cracksmen, "those

Erico Welded Bonds

are sure put on to stay."

Good bonding protects your motors and enables you to keep up your schedules.

Erico Welded Bonds meet your expectations of service under the most complicated conditions

The Electric Railway Improvement Co.

Cleveland, Ohio

Digitized by Google

Especially where vehicles crowd your rails hardest —that's where you need

The Wire-Cut Lug Brick

—because all the strength of the burned clay is retained in Wire-Cut-Lugs.

No frail laminations—no weakness. Each individual brick is **strong.**

Study this brick. Note the sharp square edges which allow the grout to be laid flush with the top of the pavement. Note the rough sides and the bulged ends, which assure a perfect bond.

And bear in mind that this perfect brick pavement is achieved with minimum labor.

That's why the Wire-Cut-Lug brick is so extensively used by the large electric railways of the United States.

Can the Dunn Paving Engineers be of assistance to you in solving your paving problems? If so, they're ready.

Manufacturers Licensed by

Dunn Wire-Cut Lug Brick Co., Conneaut, Ohio

LICENSEES:

Corry Brick & Tile Company, Corry, Pa.
United Brick Company, Greensburg, Pa.
One plant at Conneaut, Ohio.
Sterling Brick Company, Olean, N. Y.
Reynoldsville Brick & Tile Co., Reynoldsville, Pa.
Danville Brick Company, Danville, Ill.
Clinton Paving Brick Company, Clinton, Ind.
Alton Brick Company, Alton, Ill.
Medal Paving Brick Co., Cleveland, Ohio.
One plant at Cleveland, Ohio.
One plant at Carrollton, Ohio.
One plant at Malvern, Ohio.
One plant at Wooster, Ohio.
Metropolitan Paving Brick Co., Canton, Ohio.
Four plants at Canton, Ohio.
One plant at Willow, Ohio.
Bessemer Limestone Co., Youngstown, Ohio.
Three Plants at Bessemer, Pa.
Peebles Paving Brick Co., Portsmouth, Ohio.
Two plants at Portsmouth, Ohio.
One plant at Firebrick, Ky.

Murphysboro Paving Brick Co., Murphysboro, Ill.
Southern Clay Mfg. Co., Chattanooga, Tenn.
One plant at Robbins, Tenn.
One plant at Coaldale, Ala.
One plant at Birmingham, Ala.
McAvoy Vitrified Brick Co., Philadelphia, Pa.
One plant at Perkiomen Junction, Pa.
Windsor Brick Company, Akron, Ohio.
Hocking Valley Brick Company, Columbus, Ohio.
One plant at Logan, Ohio.
Veedersburg Paver Co., Veedersburg, Ind.
Springfield Paving Brick Co., Springfield, Ill.
Terre Haute Vitrified Brick Co., Terre Haute, Ind.
Albion Vitrified Brick Co., Albion, Ill.
Alliance Clay Products Co., Alliance, Ohio.
Westport Paving Brick Co., Baltimore, Md.
One plant at Westport, Md.
The Mack Mfg. Co., New Cumberland, W. Va.
Four plants at New Cumberland, W. Va.
The Hydraulic-Press Brick Co., St. Louis, Mo.
The Barr Clay Co., Streator, Ill.

Burton-Townsend Co., Zanesville, O. Two plants.
The Trimble Paving Brick Co., Dayton, Ohio.
One plant at Trimble, Ohio.
One plant at Glouster, Ohio.
The Thornton Fire Brick Co., Clarksburg, W. Va.
One plant at Thornton, W. Va.
Indiana Paving Brick & Block Co., Brazil, Ind.
Standard Brick Co., Crawfordsville, Ind.
Shawmut Paving Brick Works, Shawmut, Pa.
The Pennsylvania Clay Co., Pittsburgh, Pa.
One plant at Conway, Pa.
One plant at Crows Run, Pa.
One plant at Bradys Run, Pa.
Clydesdale Brick & Stone Co., Pittsburgh, Pa.
Plant at Elwood City, Pa.
John Kline Brick Co., Wickliffe, Ohio.
Streator Clay Mfg. Co., Streator, Ill.
Martinsville Brick Co., Martinsville, Ind.
Cleveland Brick & Clay Co., Cleveland, Ohio.
Jamestown Shale Paving Brick Co., Jamestown, N. Y.
Purington Paving Brick Co., Galesburg, Ill. Four plants.

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A 20% SAVING

in brakeshoes doesn't amount to much in dollars and cents, so far as brakeshoes go.

BUT THE ENERGY

that was NOT wasted in brakeshoes in effecting this 20% saving represents a considerable part of the coal pile.

BRAKING

means wasted energy, but both are necessary to retard the motion of a moving car, or bring it to a standstill.

BUT THE ENERGY

wasted in braking varies as the square of the initial braking speed.

THEREFORE

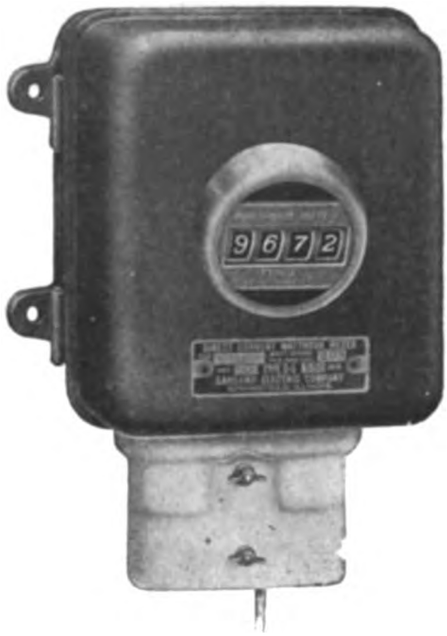
there are efficient and inefficient methods of braking.

TEACH YOUR MEN

that braking at minimum speed and in minimum time means maximum operating efficiency and careful motormen.

TEACH THEM

in the simplest and most inexpensive manner—by means of SANGAMO ECONOMY METERS, and the ECONOMY CAMPAIGN.



New Economy Meter with Cyclometer Dial

ECONOMY
SANGAMO
BUILT LIKE A WATCH
METERS

Sangamo Electric Company
Springfield, Illinois

Specialists in Meters for every Electrical Need.

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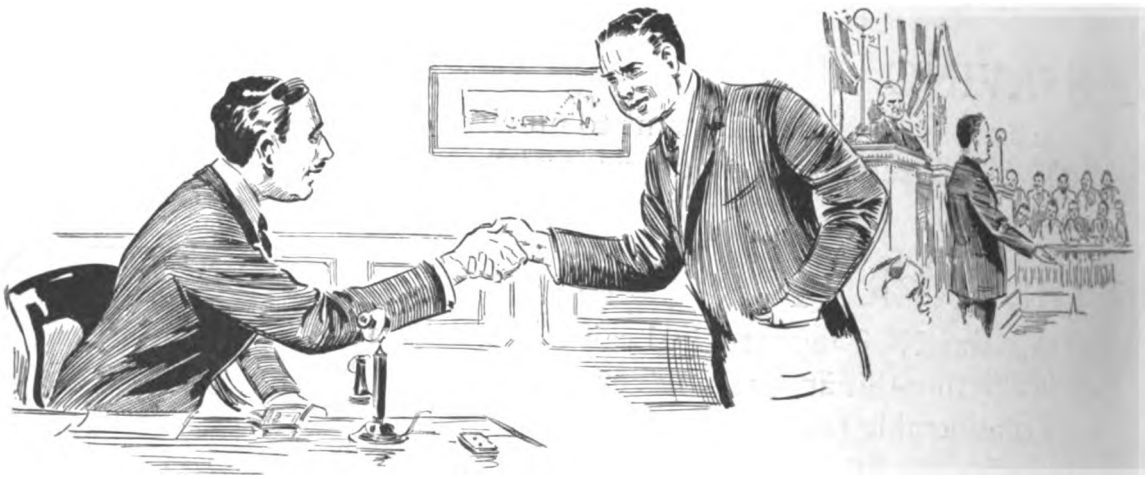

"It worked out just as I said it would,"

said the Claim Agent. "Young Skinner, of Skinner and Gouger, got hold of the man that Smith's car bumped last week on the Marble Avenue Line. You remember; the chap who got up smiling, brushed himself off and walked away saying that 'twas his fault anyway?"

"Yep," rejoined the Superintendent of Transportation. "I remember, also, that the Claim Department didn't have his name and address so that they could get a release."

"Of course that would have been a weak point in our defense," replied the Claim Agent, "if it hadn't been for the wonderful work done by the H-B Life Guard.

"It saved a man's life, sure as anything. So I didn't let *that* worry me any. Skinner wanted to have the case into court right away, so we got at it yesterday.

"And, take it from me, it was a walkover for us! After the witnesses had been examined, and I had our Master Mechanic called to the stand to tell how the H-B works, and how it's saving life and limb all over the world—there was nothing to it. The jury were out just ten minutes, and brought in a verdict in our favor. I felt sure they would, because it was so plain that our railway had done all it could to get the best apparatus for protecting the public.

"I'm no grouchy old hard-heart—I believe in paying damages when the injury is due to the carelessness of our men. But I believe the H-B Life Guard is going to save us a lot of unjust claims. Keep your eye on the H-B and the Providence fender as first-class safety insurance propositions."

The Consolidated Car Fender Co.

Providence, R. I.

General Sales Agents

Wendell & MacDuffie Co.

61 Broadway, N. Y.

Fourth of a series of talks on Fewer Accidents and Better Public Relations

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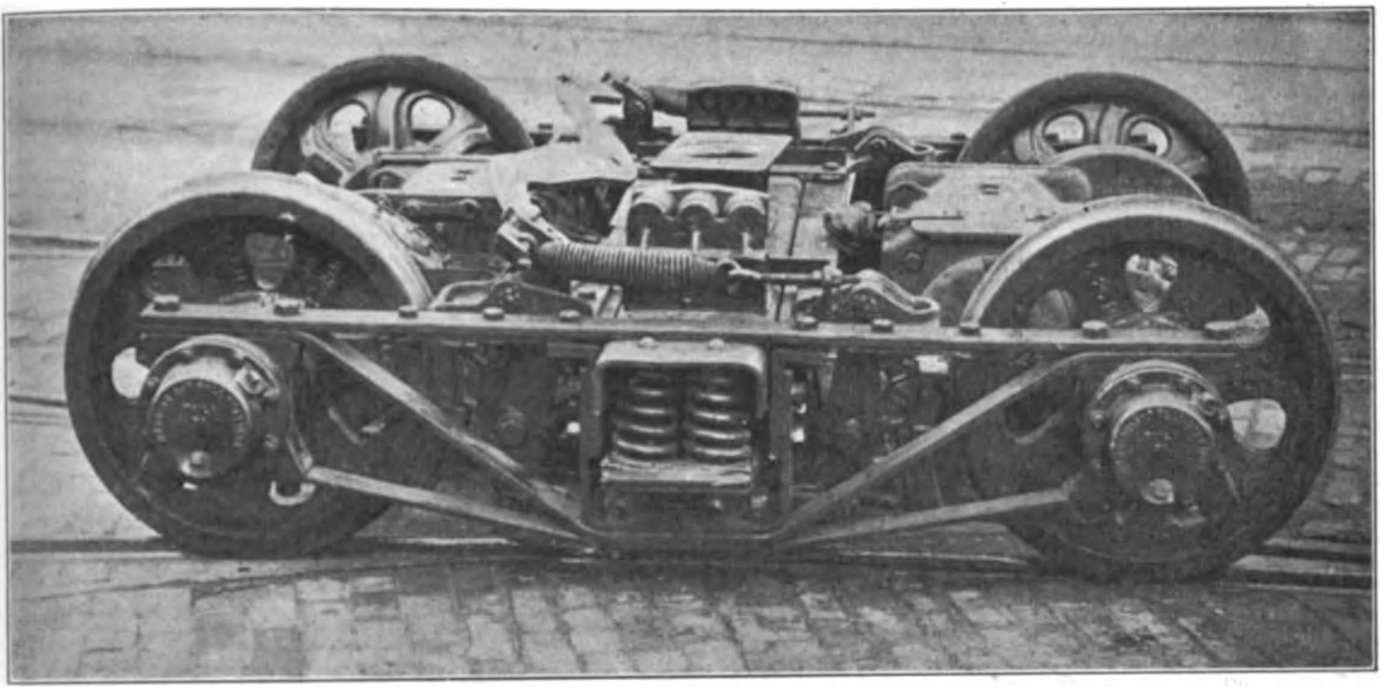

This Truck Is Modern Throughout

It Has

Hess-Bright Ball Bearings

It's one of 100 Baldwin Type C trucks with 26-in. wheels, now being placed in service by the New York State Railways—Rochester Lines.

The same railway that appreciated the novel advantages of a passenger truck that insures easy riding without the use of springs over the journal boxes, equalizing beams and swing links, also appreciated

THE VALUE OF HESS-BRIGHT BALL BEARINGS

for saving energy, reducing carhouse labor, lowering lubrication expense, avoiding hot boxes and getting maximum revenue mileage.

Remember Hess-Bright Ball Bearing Journals are readily applied to all prevailing type of trucks.

TRADE MARK
HB DWF
HESS-BRIGHT
THE INIMITABLE BEARING

THE HESS-BRIGHT MANUFACTURING COMPANY
FRONT ST. & ERIE AVE. PHILADELPHIA, PA.

HESS-BRIGHT'S CONRAD PATENTS ARE THOROUGHLY ADJUDICATED

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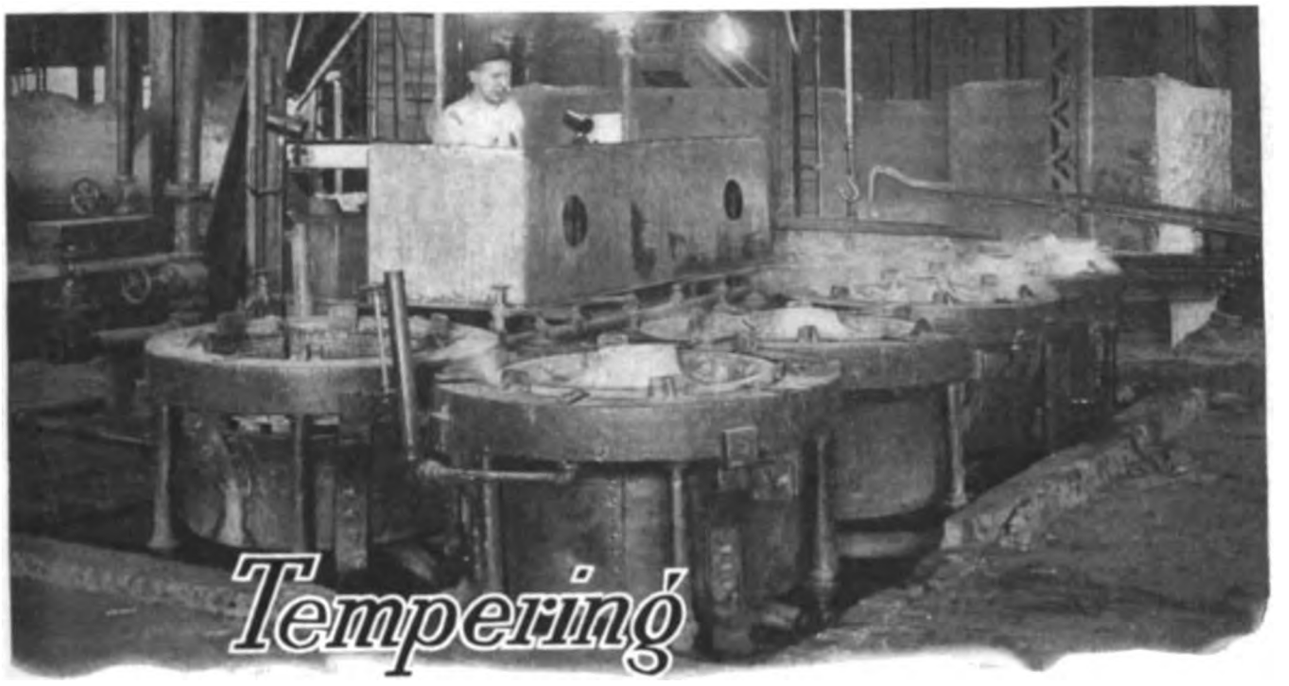

Davis Steel Wheels

The "one-wear" principle of the Davis Wheel depends upon the hardness and toughness of the tread, and these properties are the result of two processes.

First, the wheels are cast in a revolving mold, the first metal entering the mold being treated with ferro-manganese during its passage from the ladle to the mold, where it forms a hard, tough tread and flange.

Second, after cooling they are again brought up to heat in a heating furnace and placed in tempering pots in which innumerable fine sprays of water are directed against the tread. This tempering is carefully regulated by pyrometers, and as a result the rims are given an additional toughness and hardness.

These two processes make Davis Steel Wheels most economical for electric railway service. They insure full life service without grinding wheel removals, or truck changes and the accompanying high expense in labor and special machinery.

Figure what it costs you for wheel removals. It will give you a good idea of the saving you can effect by using Davis Steel Wheels.

DAVIS
Steel Wheels

The steel wheel with the one-wear tread.

No turning—no trouble with motor clearances.

A hard tough manganese tread and flange.

A soft ductile steel plate and hub.

Reduction in slid-flats.

20% saving in weight.

Minimum maintenance cost.

Strength — safety — economy.

The steel wheel backed by years of successful service.

You are not expected to adjust your conditions to meet our product. Davis Steel Wheels are made to meet A.E.R.A. specifications and your service requirements. Write.

American Steel Foundries

1100 McCORMICK BUILDING CHICAGO

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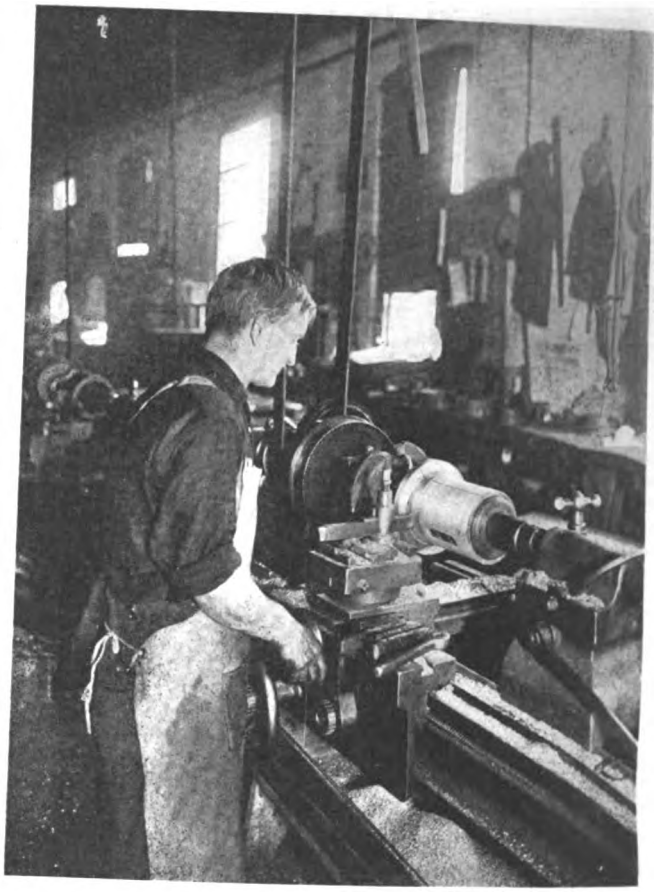
After Columbia Bearings Have Been Babbitted

They go to the machine shop by hundreds and thousands, for Columbia Bearings are mighty popular.

This illustration shows the man and the machine responsible for the outside turning only.

The remaining cuts and the calipering are done by another expert on another machine.



Turning the Outside of a Columbia Babbitted Bearing

Bearings are but one item in the following general list of our principal manufactures:

Here are some Columbia-made specialties conveniently listed:

TOOLS

Armature and axle straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and field coils
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, rigging, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or mall. iron)
Grid resistors
Third-rail contact shoes and accessories
Trolley poles (steel) and wheels

Columbia Machine Works & Malleable Iron Co.

Atlantic Ave. and Chestnut St., Brooklyn, N. Y.

W. R. Kerschner Co., Inc., N. Y. Holden & White, Chicago F. F. Bodler, San Francisco

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New York Sky Line

1763 Rico Coasting Recorders Check the Carrying of 2,500,000 New Yorkers a Day

The Rico Coasting Recorder was born in New York in 1908. It was devised by practical railway operators for practical railway purposes on a railway whose standards must be the highest attainable.

Rico Coasting Recorders have paid for themselves so many times over on this pioneer installation that we dare not even estimate the saving. It is enough to say that for more than eight years the Rico Coasting Recorder has proved abundantly that it does embody

The True Principle for Measuring Operating Efficiency

Time is the Essence of Railroading

RAILWAY IMPROVEMENT CO. RICO 61 BROADWAY, NEW YORK

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Cost per Mile Reduced by G-E Carbon Brushes

In figuring cost per mile on carbon brushes consideration must be given both to life of the brush and to wear on commutators.

With G-E carbon brushes the wear on brush and commutator has been so nicely balanced as to make these brushes most economical on a net cost per mile basis.

G-E brushes are giving continued satisfaction on many big roads in this country and abroad.

They save wear on commutators

General Electric Company

Schenectady, N. Y.

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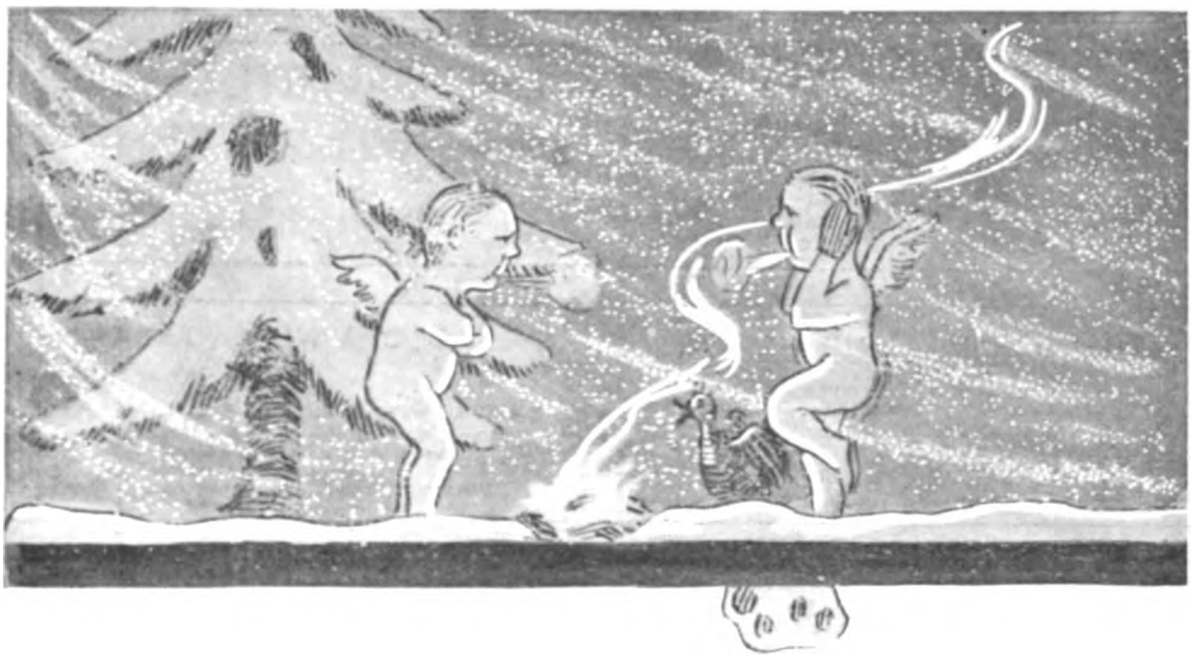


The First Night of Winter

And a sad time it was for Irish fairies when the first night of Winter arrived.

Absent were the flowers, the fruits and the berries. Present were the cold rains, the leafless trees, the starless skies.

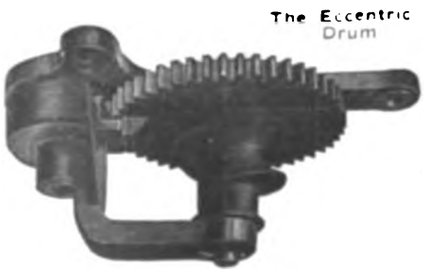
For the wicked pooka (Puck) was abroad in the land.

In these times it's the **claim agents** that are down in the mouth when Winter begins.

Absent are the days of long sunshine and dry rails. Present are the frost-covered vestibule sash, the slippery rails, the many hours of darkness—all pookas.

No need to be gloomy, gentlemen. Accident pookas are easy meat for PEACOCK BRAKES.

Just see PEACOCKS make good in any kind of weather.



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enables two men to install bonds at the rate of 30 per hour. Any road equipped with a Lincoln bonding machine can rapidly install bonds that will insure a return circuit of maximum conductivity.

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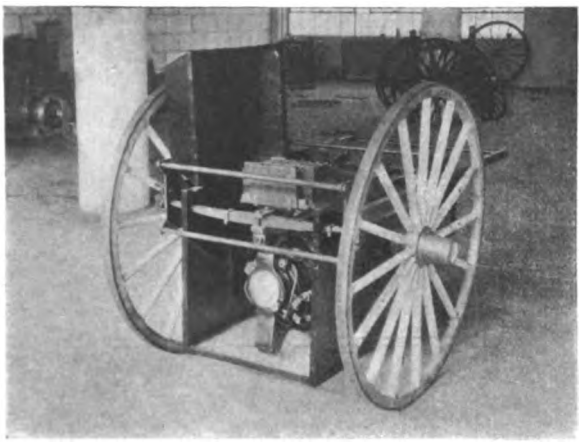

Something New!
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The fact that we have saved from 20 to 50 cents per bond for others proves that we can do the same for you.

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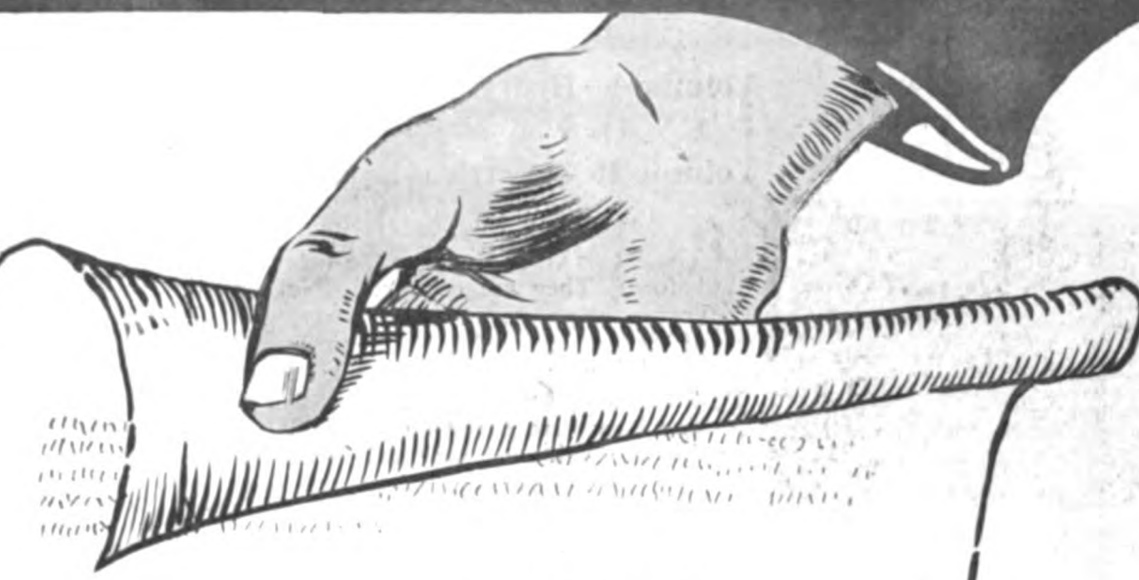

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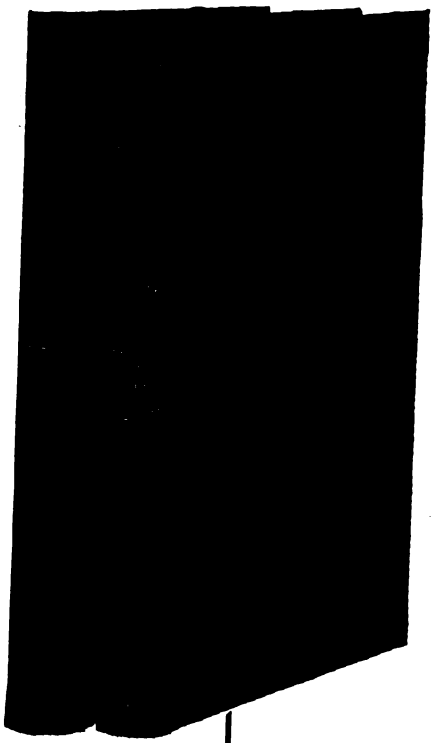

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The outfit is portable—available for work at any point in the shops or yards, or out of the track.

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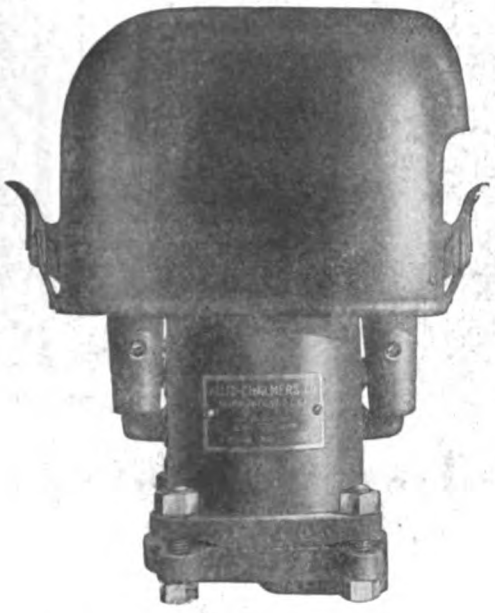

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From the Master Mechanic of
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Protection where high voltage wires interlace requires extra defensive measures

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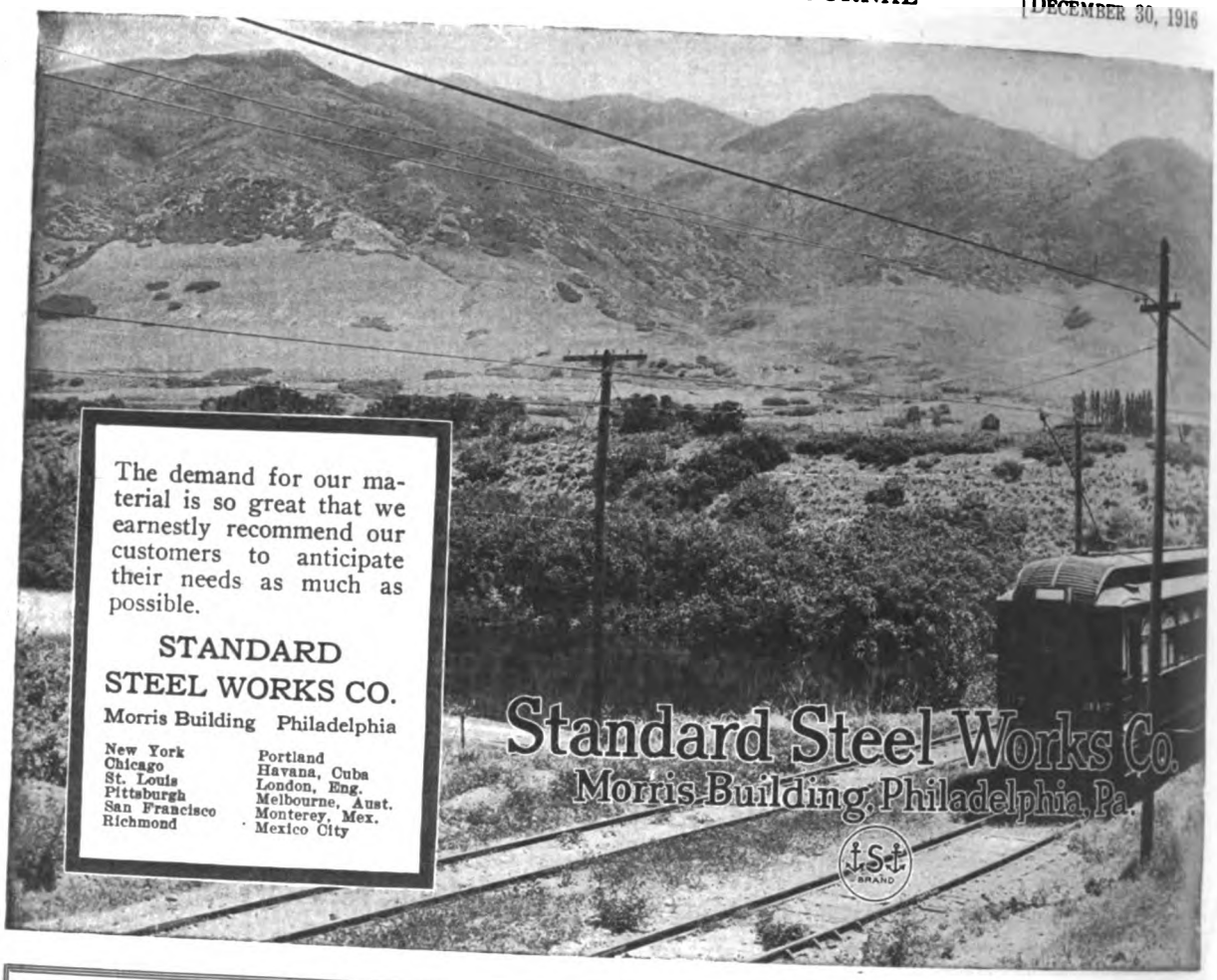

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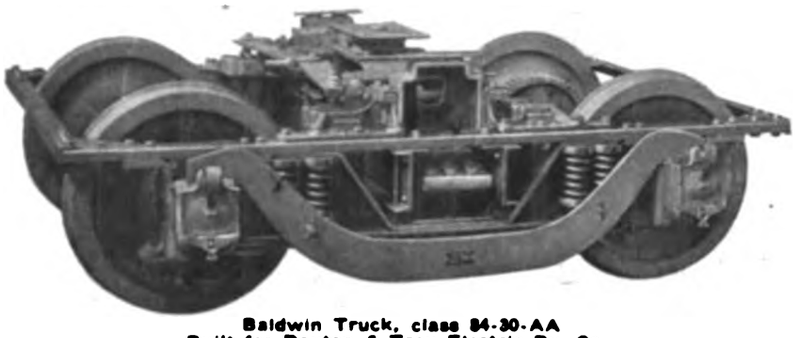

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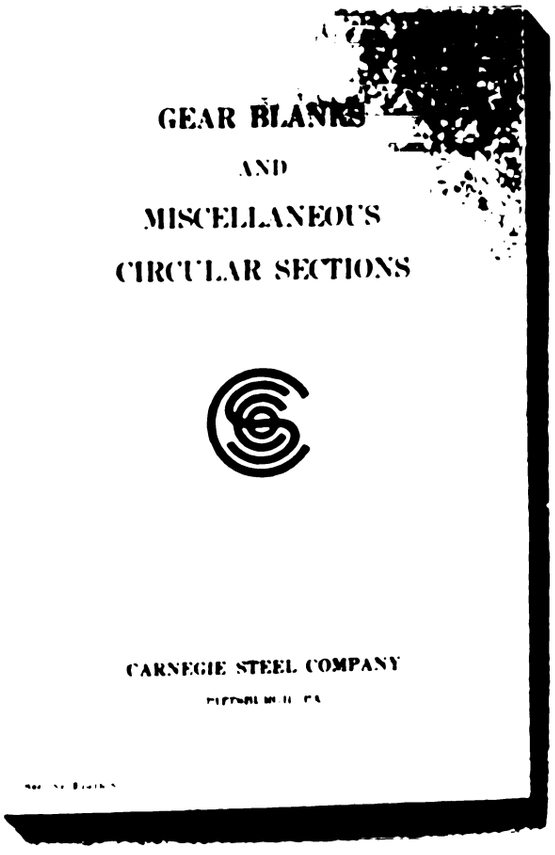

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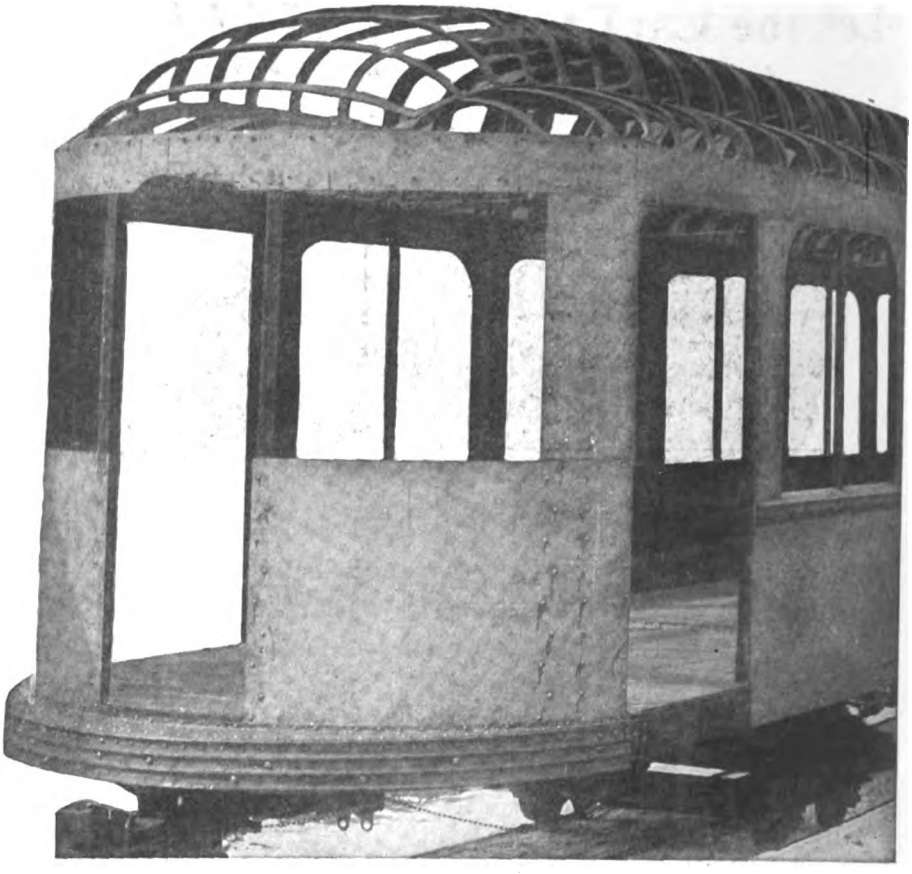

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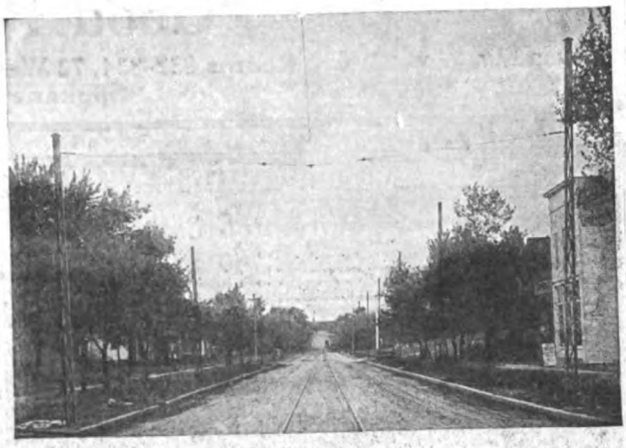

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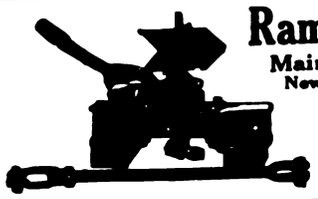

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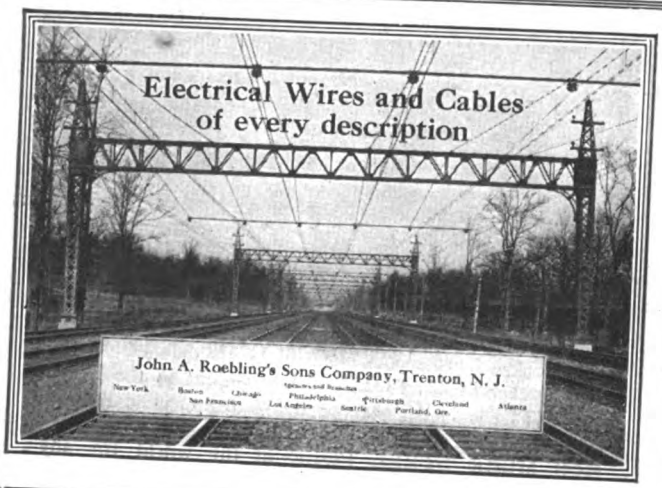

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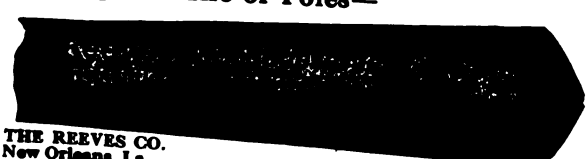

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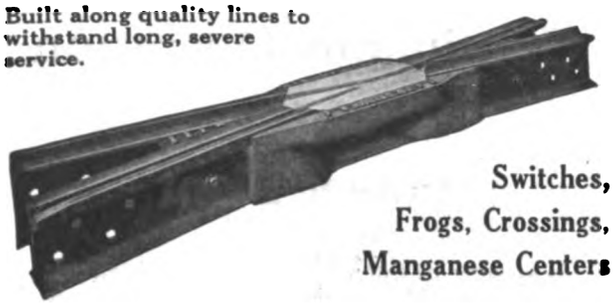

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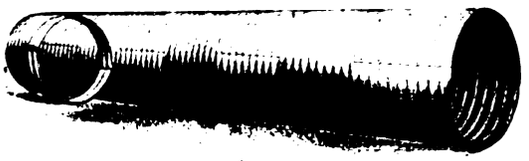

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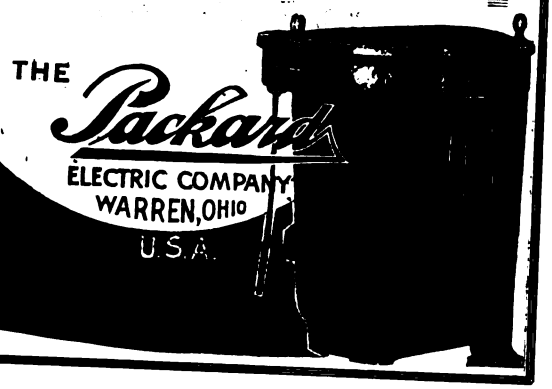

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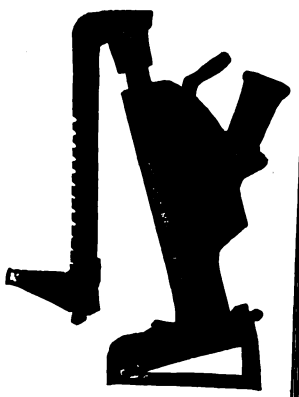

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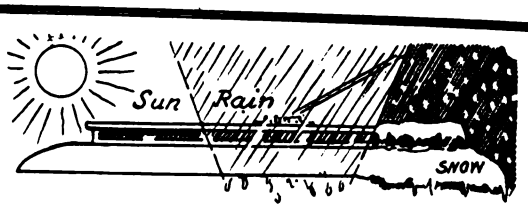

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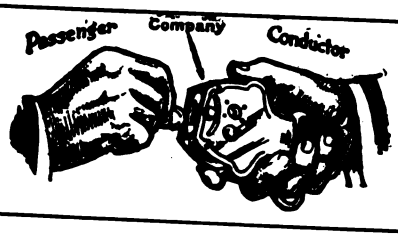

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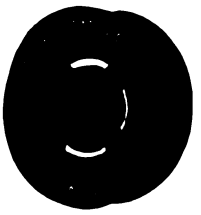

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⅛ p. (1⅛x3⅜ ins.)	$5.00	1 in. (1x2⅛ ins.)	$3.00
¼ p. (2⅛x3⅜ ins.)	10.00	4 inches (4x2⅛ ins.)	11.60
½ p. (5x3⅜ or 2⅛x7 ins.)	20.00	8 inches (8x2⅛ ins.)	22.40
½ p. (10¼x3⅜ or 5x7 ins.)	40.00	15 inches	40.50

For space to be used within one year, to be divided to suit requirements of advertiser, provided some space is used at least once a month following first insertion:

1 page	$80 a page	18 pages	$56 a page
3 pages	72 a page	26 pages	52 a page
6 pages	64 a page	32 pages	50 a page
9 pages	62 a page	40 pages	48 a page
12 pages	58 a page	52 pages	45 a page

In replying to advertisements, do NOT enclose original testimonials, or anything that you may want returned. State your qualifications in as concise and neat a manner as you can and enclose COPIES of testimonials. In machinery ads, use a local name or address if possible so that readers can wire direct and get quick replies.

FOR SALE

Armature Coils

8 Sets GE-1200 Railway Motor Armature coils. Catalog No. 18069. Immediate shipment. If interested address Hagerstown & Frederick Ry. Co., Terminal Bldg., Frederick, Md.

Galvanized Wire For Sale

Have on hand considerable tonnage of galvanized smooth wire, 4, 6, 7, 8. Also 4 and 8 annealed. Has been wet, but in good condition for use. 100 tons bundling wire; 75 tons flat iron hoops. Odd size nails, etc. Write for list, samples and prices. Nichols Wire Company, Kansas City, Mo.

Stock Taking Time

Now is the time to turn the surplus stock of metals you have on hand into cash. We buy all grades of scrap metals, small lots as well as large lots. Write us today and tell us what you have and we will be pleased to quote you prices. National Metal & Rubber Company, 30-31 India Wharf, Boston, Mass.

Transformers for Sale

Six 350 K.V.A. 60 cycle, Type H single phase General Electric Co. transformers, 2400-2300-2200 volt primary; 200-400 volt secondary. New. These can be Y connected for use with 300 or 600 volt rotaries. Box 1308, Elec. Ry. Jour.

For Sale Cheap

STEEL RAILS

300	tons	68 lb.
650	tons	58 lb.
800	tons	52 lb.
600	tons	40 lb.
400	tons	35 lb.
500	tons	30 lb.
300	tons	20 lb.

Also large quantities of other sections

These are practically as good as new and at a fraction of the cost.

Before Buying

LOCOS, CARS, EQUIPMENT, MACHINERY, TANKS, ETC.

see what Zelnicker offers.

ZELNICKER IN ST. LOUIS

423 First Nat'l Bk., Chicago
910 Hennen Bldg., New Orleans
Main Office, 425 Locust St., St. Louis

MISCELLANEOUS WANTS

Turbo-Generator Wanted

A turbo-generator of about 2000 kw., 3 phase, 25 cycles, 2300 volts. Give description of machine and say where it can be inspected. Box 1299, Elec. Ry. Journal.

Motors Wanted

Four G.E. 57 Type H two-turn motors, with or without armature and field coils. Holden & White, 1508 Fisher Bldg., Chicago.

POSITIONS VACANT

STREET railway operating fifteen miles of track in Eastern States, desires a capable working track and line foreman. State age, experience, salary expected, with reference. Box 1307, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

POSITIONS WANTED

ENGINEER, in responsible charge of public utility valuation and regulation work of the most important character, wishes to find positions for a number of high class assistants experienced in the valuation, accounting and management of railroads, gas, electric light, water and steam heating plants. The salaries of the assistants referred to for a number of years have been from $2,500 to $4,200 a year, but the work upon which they are engaged is nearing completion. Box 1291, Elec. Ry. Jour.

GENERAL foreman or M.M. position wanted. Have had 18 years' experience in city and interurban railway shops. 11 years in official capacity. Can keep equipment up and expenses down. A hustler for work, at present employed but desire to make a change. References from past and present employers. Box 1306, Elec. Ry. Jour.

PURCHASING AGENT and general storekeeper with company operating city and interurban cars desires position. 40 years of age, good habits and highest references. Experience covers steam and electric, both construction and maintenance, as well as freight, general freight agent and accounting. Familiar with Public Service and Interstate classifications. Box 1292, Elec. Ry. Jour.

YOUNG man, six years in executive offices large Eastern street railway and lighting company. Now law clerk legal department. College graduate; member of bar. Can handle legal and claim work. Good assistant to busy executive. Box 1223, Elec. Ry. Jour., 935 Real Estate Trust Bldg., Philadelphia, Pa.

POSITIONS WANTED

GENERAL foreman wants position. Married, 35, reliable, experienced. Now assistant general shop foreman for city and interurban road. References. Box 1294, Elec. Ry. Jour., 1570 Old Colony Bldg., Chicago, Ill.

Obsolescence

Have you some equipment, machinery or supplies that ought to be moved? And if a buyer could be found, wouldn't it be easy to convert this into cash?

Our Searchlight Service will be the finder for you. It will help you to locate some one who would be glad to pay you service value now for what you might otherwise sell at scrap value.

Better look over your stock and send us a trial advertisement. The cost will be slight; the results may surprise you.

ELECTRIC RAILWAY JOURNAL

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READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.
The Alphabetical Index (see eighth page following) gives the page number of each advertisement.
As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.
If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will promptly furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Acetylene Service.
Prest-O-Lite Co., Inc.

Advertising, Street Car.
Collier, Inc., Barron G.

Air Cleaners.
Cooley Mfg. Co.

Air Rectifiers.
Cooley Mfg. Co.
National Safety Device Co.

Alloys and Bearing Metals. (See Bearings and Bearing Metals.)

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The

Bankers and Brokers.
National City Co.

Batteries, Dry.
Johns-Manville Co., H. W.

Batteries, Storage.
Electric Storage Battery Co.

Bearings and Bearing Metals.
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Long Co., E. G.
More-Jones B. & M. Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center.
Baldwin Locomotive Works.
Holden & White

Bearings, Roller and Ball.
Gurney Ball Bearing Co.
Hess-Bright Mfg. Co.
Railway Roller Bearing Co.

Bearings, Roller Side.
Holden & White.

Bells and Gongs.
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Zelnicker Sup. Co., W. A.

Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

Blowers.
General Electric Co.
Westinghouse Elec. & M. Co.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Dearborn Chemical Co.
Johns-Manville Co., H. W.

Boiler Coverings.
Johns-Manville Co., H. W.

Bond Clips.
Electric Railway Improve. Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
Electric Railway Improve. Co.
Ohio Brass Co.
Prest-O-Lite Co., Inc.

Bonding Tools.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improve. Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Bonds Welded.
Lincoln Bonding Co.

Book Publishers.
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

Braces, Rail.
Kilby Frog & Switch Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Electric Service Supplies Co.
Int'l Creosoting & Constr. Co.
Lindsley Bros. Co.
Ohio Brass Co.

Brake Adjusters.
Holden & White.
Smith-Ward Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdy. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Cooley Mfg. Co.
General Electric Co.
Holden & White
Long Co., E. G.
National Brake Co.
National Safety Device Co.
St. Louis Car Co.
Westinghouse Trac. B. Co.

Brooms, Track, Steel or Rattan.
Zelnicker Supply Co., W. A.

Brush Holders.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Brushes, Carbon.
Dixon Crucible Co., Jos.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Westinghouse Elec. & Mfg. Co.

Brush Holders.
Anderson Mfg. Co., A. & J. M.

Bumpers, Car Seat.
Electric Service Supplies Co.

Bunting.
Boyle & Co., Inc., John.

Bushings, Case Hardened and Manganese.
Bemis Car Truck Co.

Bushings, Fibre.
Diamond State Fibre Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—(See those headings.)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc., see those headings.)

Cars, Dump.
Differential Car Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

Car Stops, Automatic.
Consolidated Car-Heating Co.

Castings, Brass.
Frankel Connector Co.
More-Jones B. & M. Co.

Castings, Composition or Copper.
Anderson Mfg. Co., A. & J. M.

Castings, Gray Iron and Steel.
Amer. Brake Shoe & Fdry. Co.
American Steel Foundries.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Long Co., E. G.
St. Louis Car Co.

Catchers and Retrievers, Trolley.
Cooley Mfg. Co.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Holden & White.
Long Co., E. G.
Ohio Brass Co.
Wood Co., Chas. N.

Ceiling, Car. (See Headlining.)

Charging Sets, Storage Battery.
General Electric Co.

Cheese Cloth.
Boyle & Co., Inc., John.

Chemists.
Little, Inc., Arthur D.

Circuit Breakers.
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps.
Frankel Connector Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track. (See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

Cleats, Car Wiring.
General Electric Co.

Clusters and Sockets.
General Electric Co.

Coal and Ash Handling. (See Conveying and Hoisting Machinery.)

Coasting Clocks.
Railway Improvement Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature & Field.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.

Commutators or Parts.
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
General Electric Co.
Long Co., E. G.
Westinghouse Elec. & M. Co.

Compressors, Air.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co.

Condensers.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

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Model 370—A. C. and D. C. Ammeter

One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D. C. Wattmeter, Model 329 Polyphase Wattmeter and Model 341 A. C. and D. C. Voltmeter.

The characteristics of the group are extreme accuracy (guaranteed within a fraction of 1% full scale value), adaptability for use on circuits of any commercial frequency and any wave form, great overload capacity, low moment of inertia, effective damping and shielding, and the legibility and remarkable uniformity of the hand calibrated scales.

THE Art of Electrical Measurement, its perfection and its growth, have been associated inseparably with this name—

Weston

From the year 1888 to now, each successive instrument that has borne the name has marked the highest achievement in the Art.

At no time has Weston superiority been more obvious than in the present models.

Weston Indicating Instruments include a great variety of groups for portable or switchboard service on A. C. or D. C. Circuits, Instruments designed expressly for testing and laboratory use, for motor car and boat electrical systems, and many others for special purposes. Write for Bulletins or Catalogs describing those which interest you.

Weston Electrical Instrument Company

21 Weston Ave., Newark, N. J.

New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, Boston, Buffalo, Richmond, San Francisco, Petrograd, Florence, Denver, Detroit, St. Louis, Toronto, Winnipeg, Johannesburg, S. Africa, Montreal, Vancouver, Berlin, London, Paris

U. S. Metal & Mfg. Co.

165 BROADWAY, NEW YORK CITY
Chicago Washington, D. C.

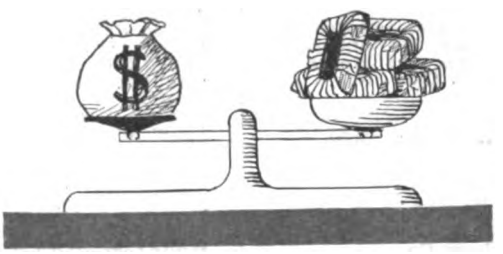
RAILWAY SUPPLIES

SELLING AGENTS FOR

Tool Steel Gears and Pinions
Johnson Fare Box
Perry Side Bearings
Hartman Centering Center Plates
Wasson Trolley Bases
Garland Ventilator
Electric Arc Welders
High Class Railway Varnishes and Enamels

Special Agents for { Tool Steel Gear & Pinion Co. / Johnson Fare Box Co. / C. & C. Electric & Mfg. Co. / Holden & White

General Agents for Anglo-American Varnish Co.
Eastern Agents for Union Fibre Co.



They're as Good as Cash

—those old field coils in your shops. Copper is worth too much to send to the melting pot. Send those old coils to us—let us remove the old insulation, clean and anneal the wire and reinsulate it with

Salamander Pure Asbestos

We will then rewind the wire into new coils of precisely the same characteristics as the old ones.

This is much cheaper for you than buying new coils, for the only charge we make is a very small one for the actual insulation used.

Send us some of those old coils so we can show you what we can do.

Independent Lamp & Wire Co., Inc.

Offices: 1737 Broadway, New York
FACTORIES: York, Pa., and Weehawken, N. J.

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READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

Conduits, Underground.
Johns-Manville Co., H. W.

Connectors, Solderless.
Frankel Connector Co.

Controller Fingers.
Cooley Mfg. Co.

Controller Handles.
Cooley Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

Controlling Systems.
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery.
Green Engrg. Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The.
Long Co., E. G.
Roebling's Sons Co., John A.
Samson Cordage Works.

Cord Connectors and Couplers.
Electric Service Supplies Co.
Samson Cordage Works.
Wood Co., Chas. N.

Cotton Duck.
Boyle & Co., Inc., John.

Couplers, Car.
Brill Co., The J. G.
Cincinnati Car Co.
Long Co., E. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Cranes. (See also Hoists.)
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Creosoting. (See Wood Preservatives.)

Crose Arms. (See Brackets.)

Crossing Foundations.
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

Culverts.
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures.
Brill Co., The J. G.
Electric Service Supplies Co.
Hartshorn Company, Stewart.
Pantasote Co., The.
St. Louis Car Co.

Cutting Apparatus, Oxy-Acetylene.
Prest-O-Lite Co., Inc.

Derailing Devices. (See also Track Work.)
Cleveland Frog & Crossing Co.

Despatching Systems.
Simmen Automatic Ry. Sig. Co.

Destination Signs.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service.
Wisch Service, P. Edward.

Door Operating Devices.
Consolidated Car-Heating Co.

Doors and Door Fixtures.
Brill Co., The J. G.
General Electric Co.
Hale & Kilburn Co.

Doors & Shutters, Fireproof.
Kinnear Mfg. Co.

Doors, Asbestos.
Johns-Manville Co., H. W.

Doors, Steel Rolling.
Kinnear Mfg. Co.

Draft Rigging. (See Couplers.)

Drills, Track.
American Steel & Wire Co.
Electric Service Supplies Co.
Long Co., E. G.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand.
Electric Service Supplies Co.
Zelnicker Sup. Co., W. A.

Engineers, Consulting, Contracting and Operating.
Archbold-Brady Co.
Arnold Co., The.
Byllesby & Co., Inc., H. M.
Drum & Co., A. L.
Ford, Bacon & Davis.
Hunt & Co., Robert W.
Jackson, D. C. & Wm. B.
Little, Inc., Arthur D.
Richey, Albert S.
Roosevelt & Thompson.
Sanderson & Porter.
Scofield Engineering Co.
Stephenson Sons Co.
Stone & Webster Eng. Corp.
White Companies, J. G.
Woodmansee & Davidson, Inc.

Engines, Gas and Oil.
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

Engines, Steam.
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & M. Co.

Fare Boxes.
Brill Co., The J. G.
Internat'l Register Co., The.
Johnson Fare Box Co.

Fences and Fence Posts.
American Steel & Wire Co.

Fencing Wire.
American Steel & Wire Co.
Page Woven Wire Fence Co.

Fenders and Wheel Guards.
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Cooley Mfg. Co.
Eclipse Railway Supply Co.
Electric Service Supplies Co.
Star Brass Works.

Fibre.
Diamond State Fibre Co.
Westinghouse Elec. & M. Co.

Fibre Insulation.
U. S. Metal & Mfg. Co.

Fibre Tubing.
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

Field Coils. (See Coils.)

Filters, Water.
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus.
Johns-Manville Co., H. W.

Fireproofing Material.
Johns-Manville Co., H. W.

Flooring Composition.
American Mason Safety Tread Co.
Johns-Manville Co., H. W.

Forgings.
Standard Steel Works Co.

Frogs, Track. (See Track Work.)

Furnaces. (See Stokers.)

Fusee and Fuse Boxes.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & M. Co.

Fuses, Refillable.
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets.
Diamond State Fibre Co.
Johns-Manville Co., H. W.
Power Specialty Co.

Gas Producers.
Westinghouse Elec. & Mfg. Co.

Gates, Car.
Brill Co., The J. G.
Cincinnati Car Co.
Jewett Car Co.

Gages, Oil and Water.
Ohio Brass Co.

Gear Blanks.
Carnegie Steel Co.
Diamond State Fibre Co.
Standard Steel Works Co.

Gear Cases.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
U. S. Metal & Mfg. Co.
Westinghouse Elec. & M. Co.

Gears and Pinions.
Columbia M. W. & M. I. Co.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Long Co., E. G.
Nuttall Co., R. D.
U. S. Metal & Mfg. Co.

Generating Sets, Gas-Electric.
General Electric Co.

Generators, Alternating Current.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Generators, Direct Current.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bells and Gongs.)

Graphite.
Dixon Crucible Co., Joseph.
Morgan Crucible Co.

Greases. (See Lubricants.)

Grinders, Portable, Electric.
General Electric Co.
Railway Track-work Co.

Guards, Trolley.
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley.
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works.

Headlights.
Electric Service Supplies Co.
General Electric Co.
Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Headlining.
Pantasote Co., The.

Heaters, Car (Electric).
Consolidated Car-Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air.
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Water.
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car, Stove.
Electric Service Supplies Co.
Smith Heater Co., Peter.

Hoists & Lifts.
Duff Mfg. Co.
Ford Chain Block & Mfg. Co.
Niles-Bement-Pond Co.

Hose Bridges.
Ohio Brass Co.

Hose, Pneumatic and Fire.
Johns-Manville Co., H. W.

Hydraulic Machinery.
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Hydrogrounds.
Cooley Mfg. Co.

Inspection.
Electrical Testing Lab's., Inc.
Hunt & Co., Robt. W.

Instruments, Measuring, Testing and Recording.
General Electric Co.
Johns-Manville Co., H. W.
Sangamo Electric Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Co.

Insulating Cloth, Paper and Tape.
Cooley Mfg. Co.
Diamond State Fibre Co.
General Electric Co.
Johns-Manville Co., H. W.
Packard Electric Co.
Standard Woven Fabric Co.
Westinghouse Elec. & Mfg. Co.

Insulations. (See also Paints.)
Anderson M. Co., A. & J. M.
Diamond State Fibre Co.
Electric Service Supplies Co.
General Electric Co.
Holden & White.
Johns-Manville Co., H. W.
Mechanical Rubber Co.
Sterling Varnish Co.
Westinghouse Elec. & Mfg. Co.

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An "Imperial" Electric Motor Driven Compressor Car and "Imperial" Tampers at work on the electric railway lines of Cleveland, Ohio

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Will the Labor Shortage Handicap You?

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Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.
New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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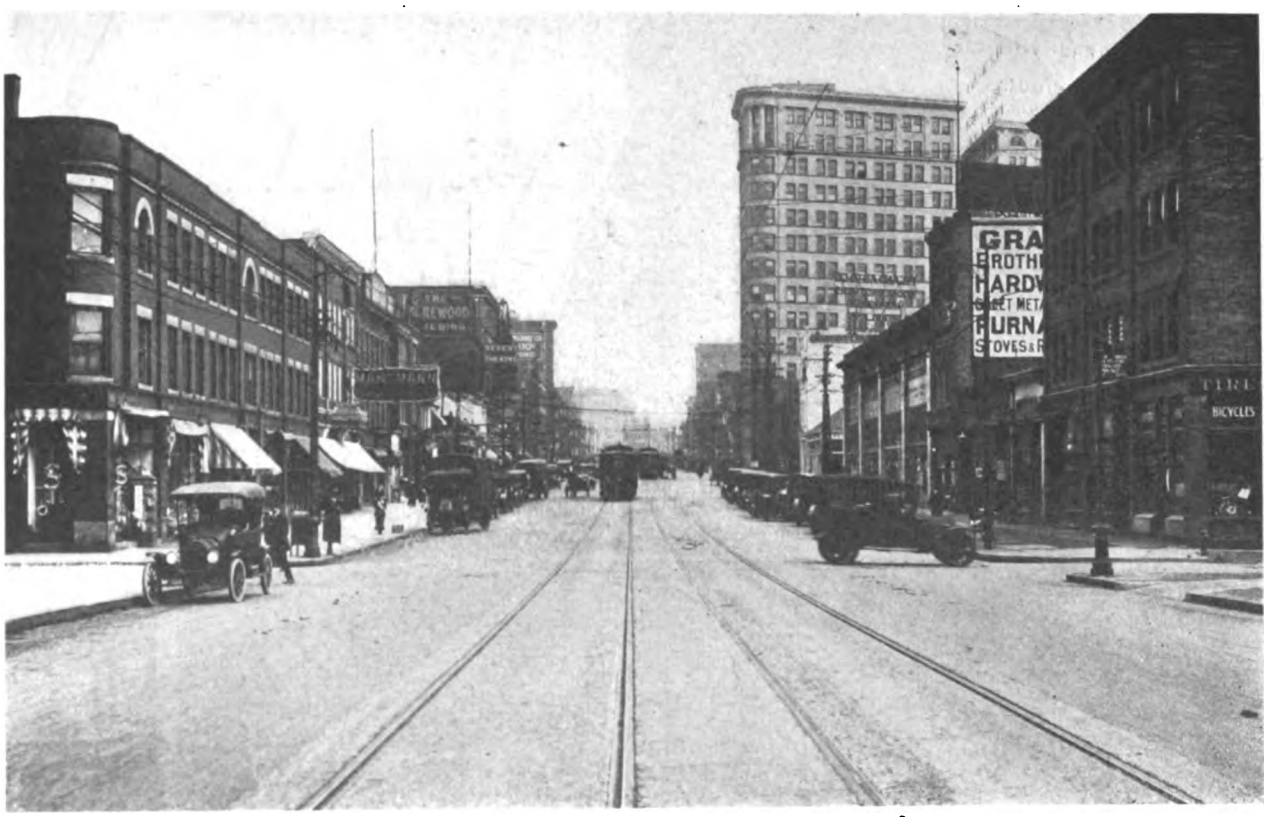

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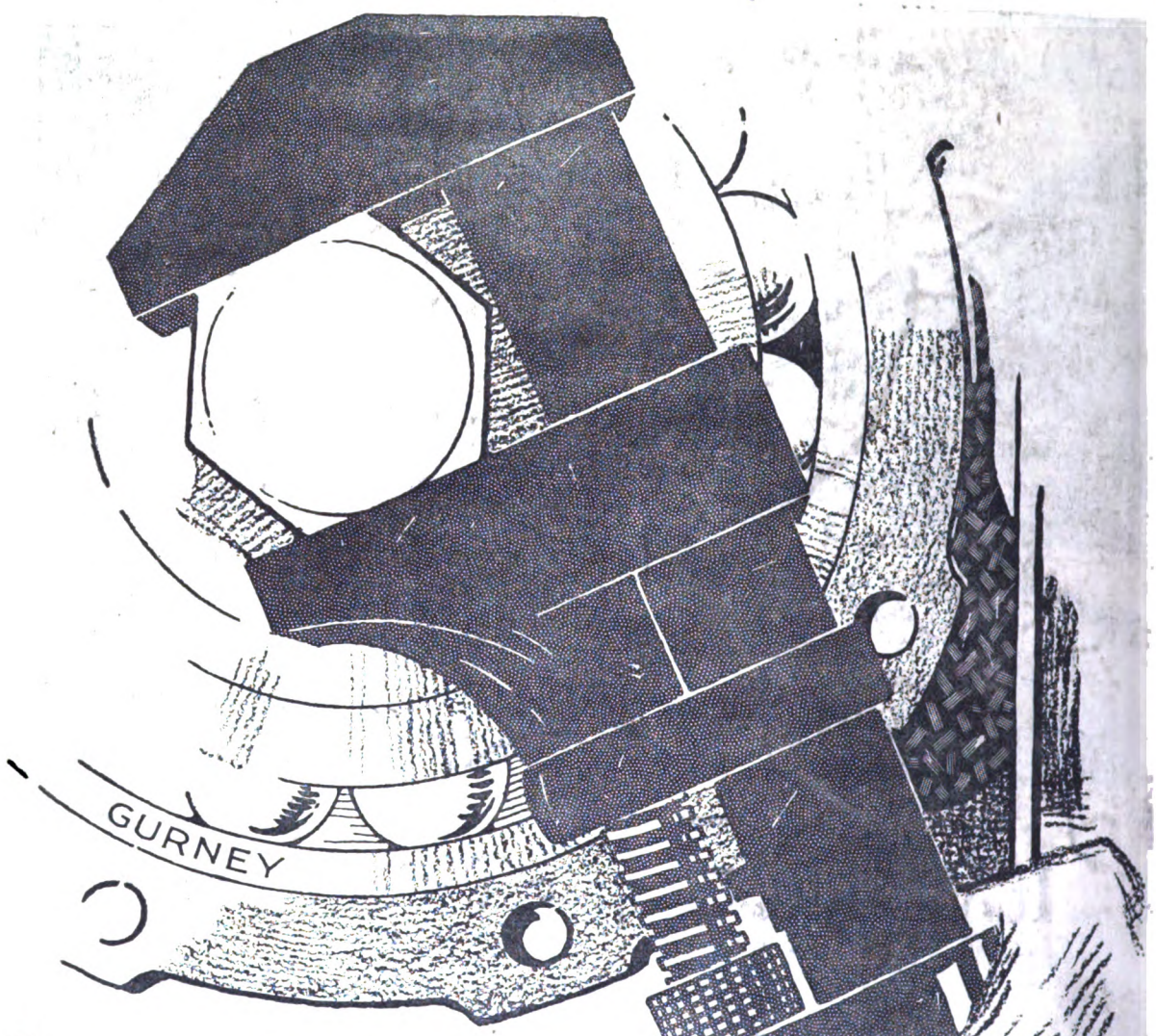

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